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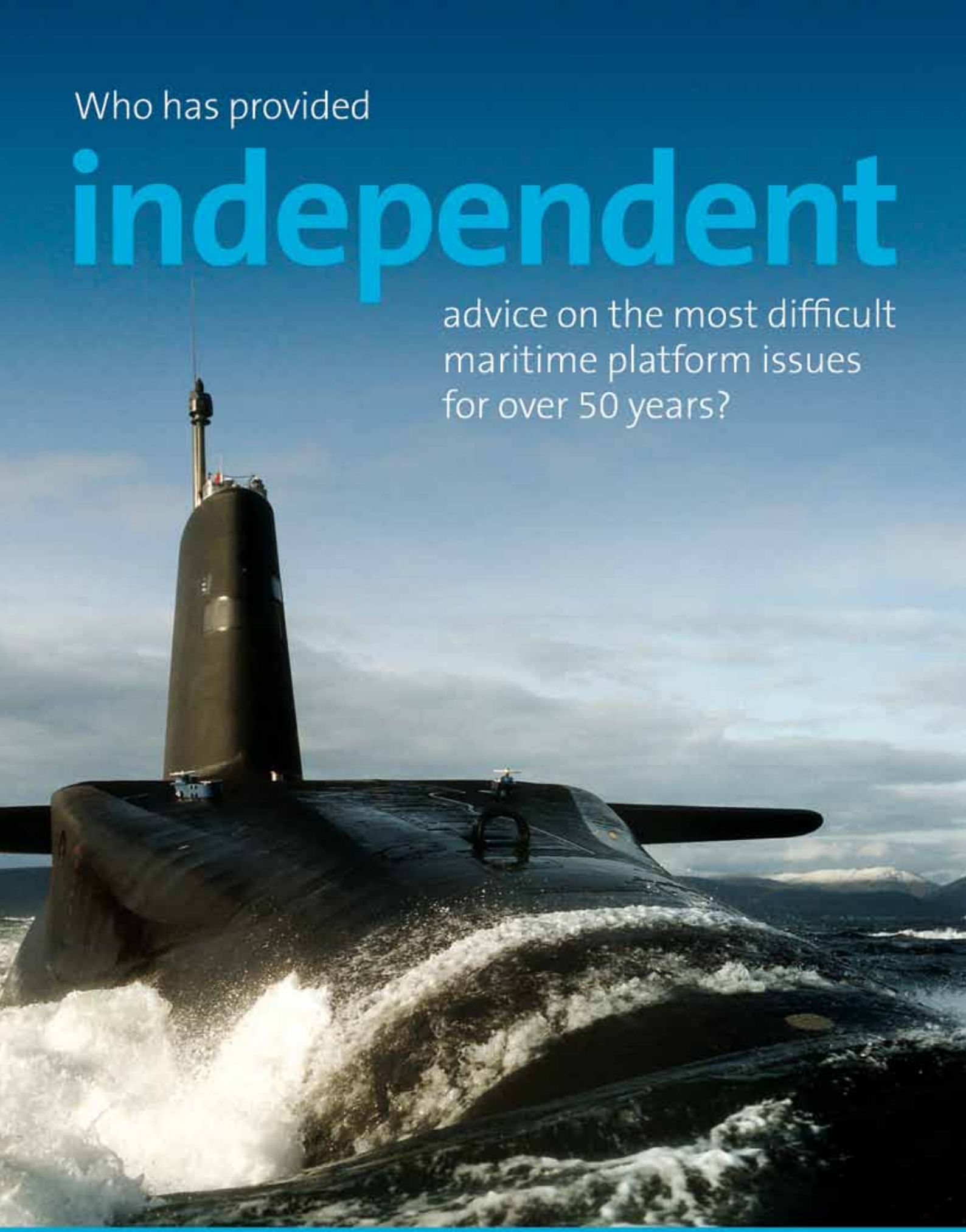

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Able Seaman Boatswain's Mate Darren Young from HMAS Anzac climbs down HMAS Sirius's climbing ladder following a boarding exercise during the Fleet Concentration Period

Front page:
HMAS Sirius takes station in turbulent seas, as HMAS Anzac prepares to conduct a Replenishment at Sea during the Fleet Concentration Period.

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Freedom of Speech & the Naval Review

VADM SIR JEREMY BLACKHAM, RN

Transcript of the speech presented by Vice-Admiral Jeremy Blackham RN to an ANI audience on 1 February 2010

I want to talk about some of the issues surrounding the publication of an independent naval professional journal and examine the freedoms which it should or should not enjoy in engaging in professional debate on matters of policy; a debate on a matter which is most definitely a matter of public interest.

I plan to talk for about 25 minutes and my aim is to stimulate an interesting and useful discussion with you; for this reason I shall stick to a few simple, perhaps over simple, themes. I shall look at two aspects of the question – the official or legal framework and the internal naval pressures. I am assuming a reasonably broad knowledge of what *The Naval Review* is, and what it does, so if I am wrong in that you had better tell me know! I confess to speaking with some trepidation in front of James Goldrick – a very substantial naval historian and in particular a historian of *The Naval Review* too but I comfort myself that I am talking more about lasting principles than history.

In August 2007, following the shocking *HMS Cornwall* incident and the subsequent even greater shambles over whether or not the captured sailors should be allowed to sell their stories to the Press, the MoD, under great political pressure amounting almost to panic, reviewed its media policy. As part of this review, it issued instructions which appeared to make it impossible for any serviceman to utter any statement at all without formal official approval; which was only likely to be forthcoming if it strictly followed the official line. I was on holiday in France at the time and immediately worried that *The Naval Review*'s established privilege of publishing articles by serving officers without their having to seek official clearance was under threat. I was therefore anxious to get in touch as quickly as possible with MoD and spent time urgently seeking an internet café.

Freedom of the press to report was a major factor in the Faulklands War. Media often reported damage to ships - here HMS Glamorgan was hit by a land-based Exocet. (Tom Lewis Collection)

Why did I think this mattered so much? Well, since its establishment as an independent educational charity in 1928, with the important attendant tax benefits and the requirement for political independence that charitable status confers, *The Naval Review* has been granted what is today called "exempt status", a privilege denied to any other service publication in the UK. You should note that this status really precludes the acceptance of money from the MoD. However it allows serving officers who are members to submit articles directly to the Editor, under the protection of a pseudonym should they so wish, without obtaining prior official approval, leaving the responsibility of deciding whether or not the article contravened security, obscenity, sedition, libel or any other legislation to the Editor. Since the copyright of all articles published in *The Naval Review* remains with the author, the Journal really has the status of a correspondence society – but it is not unconditional. The condition, and it is a very important condition, was that the circulation of the Journal should be confined to a carefully controlled set of members consisting of a group eligible by virtue of being officers of the Royal or Commonwealth Navies and those of proven interest in naval and maritime affairs individually approved by the Editor. The eligible categories have subsequently been somewhat expanded but the fundamental conditions still apply. All members would undertake that no non-member would see their copies – an important but, as we shall see, an apparently unenforceable rule. This freedom of debate which allows the development of professional knowledge and understanding is, as I hope to persuade you, fundamental to the role of *The Naval Review.*

Now let me divert for a moment to the words of Lord Haldane which informed our founders and which

appear in the front of every edition of the journal.

"It is only by the possession of a trained and developed mind that the fullest capacity can, as a rule, be obtained. There are, of course, exceptional individuals with rare natural gifts which make up for deficiencies. But such gifts are indeed rare. We are coming more and more to recognise that the best specialist can be produced only after a long training in general learning. The grasp of principle which makes detail easy can only come when innate capacity has been evoked and moulded by high training."

And before I move on let me also note that in modern times Geoffrey Till, in his second edition of *Seapower* last year, has remarked on "*the disinclination of naval commanders to reflect on the science of their trade, unlike military officers, but rather to deal in a free-ranging way with both strategic and combat circumstances as they arise.*" I read these two quotations as a plea, indeed as a demand, for unfettered, informed, professional debate and education, and for the encouragement of officers to join the Journal and develop their analytical skills, professional thinking and power of expression. With that firmly in mind, let me return to the summer of 2007. I immediately got in touch with a senior Navy Board member who was also a long time *Naval Review* member. Interestingly he had apparently been unaware of the particular conditions surrounding the Journal's status, and was under the impression that authors were already clearing articles with their command chain……..and indeed, some (but a small number) of our authors voluntarily, and for their own reasons, do so. He had therefore received advice from his legal advisor that *The Naval Review* should be subject to the somewhat draconian new rules being introduced for public statements by serving officers. To his credit, at my request he agreed to review it, found a civil servant of substantial integrity and courage who was revising the relevant section of QRRN and *The Naval Review's* exempt status was preserved. But it was a very close shave. Following that there was a fair amount of debate in the Journal about the incident itself and about the way in which the RN should train and prepare for such tasks – a vindication, I suggest of the final outcome.

Of course this is not the first time that the status, or even the existence of *The Naval Review* has been threatened. Indeed the first occasion was very shortly after the foundation of the Journal on the outbreak of the First World War, when the Admiralty Board (which had already gone through some traumatic publishing by senior admirals) tried to close it down; at the time it was not protected by its independent charitable status. It was indeed suppressed for the duration of the war, although thankfully the then-editor, Admiral Henderson, collected all the submitted material, and published the full run of wartime issues after the war was over.

Interestingly the same line was not taken during the Second World War when publication continued throughout the war, supplemented by a daily War Diary which is now a valuable part of the *Naval Review* archive. Perhaps this was in part because of the charitable status by then enjoyed by *The Naval Review* which requires the charity to be demonstrably politically independent, and which makes it difficult, if not impossible, to close it down without serious, expensive and public legal action and with no guarantee of success, although the rights of serving officers in respect of the Journal could obviously be changed, more or less at whim, by the Navy Board or the MoD. Perhaps even it is not too fanciful to imagine, and I shall return to this, that in a war against a totalitarian state such as Nazi Germany, it seemed right not excessively and unnecessarily to limit our own liberties. One can at least hope that this might have been a factor. Of course another possibility is that the Admiralty Board did not take *The Naval Review* seriously enough to think that it mattered!

One of the most serious more recent threats occurred soon after


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the 1982 Falklands War when an article by the Captain of one of the ships which was sunk was published, and this incident is particularly instructive. This article had a number of contentious and critical and – I would contend – valuable things to say; but they were undeniably critical of government, and of the MoD and naval authorities, and arguably were on the edge of infringing security. It is, in my view, a general principle of life that, for most holders of senior office and especially of government office, the things that they most need to hear are the things that they least wish to hear, and consequently rarely hear – this is very much a feature of contemporary British politics. In this case great umbrage was taken, not only by the MoD, but also by Members of Parliament, mainly on the then government side, who of course under the rules of the *NR* should not have seen the offending article at all, but who had done so. Summarising, there were some demands in Parliament that *The Naval Review* should be closed down, and a substantial furore, from which *The Naval Review* was probably lucky to emerge unscathed, thanks to some commonsense at high levels in the Navy, some brave and high quality work by my predecessor (then right at the start of his distinguished period of office), and perhaps a realisation from officials that attempting to close *The Naval Review* or markedly to change its status might cause more damage than anything the article could have done, and anyway might well not have been possible.

There are some interesting conclusions to be drawn from this incident. The first, which is a constant headache for the Editor of the *Naval Review*, is the sheer difficulty of restricting access to the Journal solely to the entitled members and indeed of vetting fully those non-entitled members who may be admitted by the Editor. Although members are reminded on joining, and from time to time in the Journal itself, of their obligations in this regard, I am confident that there are fairly frequent breaches of this rule; moreover there are a number of institutional members where access is fairly open – staff college libraries are a good example of this, although this seems a reasonable enough place to put the journal if it is to meet its charitable educational purposes and indeed to recruit new members. Staff Colleges would seem to be privileged places. It is something that keeps me awake occasionally but it is not of course the main issue which I have been using these examples to illustrate and for the rest of my remarks I want to turn to that.

The major issue is, of course, the place and value of open freedom of speech and debate by professionals in the conduct of official government business such as defence policy, and the role of *The Naval Review* in this matter. Put another way, it is a question of striking a proper balance between having an informed public and internal debate, and preserving the disciplinary code on which military activity necessarily rests. Of course freedom of speech is not, and cannot ever be, limitless. Let me briefly mention some of the more obvious limits. Whenever I say freedom of speech in the present context, I am specifically exempting from this freedom anything which contravenes national security, the law relating to sedition, libel or indecency and, for the most part although not quite entirely, anything which offends normal good taste. Please note that this latter is not necessarily the same as offending individual sensitivities or *amour proper.*

That out of the way, let us consider to what extent *The Naval Review* represents a freedom of speech issue. Frankly, on the face of it, it doesn't really and it has survived thus far the attempts to, as it were, reel it in, although I should record that some notable senior officers of recent years (and probably of all years – Admiral Cunningham was one such) have expressed some dismay, or even downright disapproval, that such a publication should exist, on the grounds that any overt criticism of, disagreement with, or debate about the official views of the Navy Board, is *ipso facto,* a breach of discipline. Is this so? I wonder. I have always been of the view that any debate on public policy is better informed if it is joined by those with direct knowledge and experience, and defence is almost unique in that professionals are limited in what they may say publicly, something not true of other employees of the state like, for instance, doctors or teachers. And it is the case in today's smaller navy

that almost all operational activity is carried out by the more junior section of officers, and that there has been a resultant shift in the weight and location of operational knowledge and experience. This is exacerbated by the speed of technological advance and the vastly greater IT understanding and facility that younger people tend to have. I would therefore argue that the debate needs to be informed by these officers and that they therefore need to be encouraged to develop analytic writing and debating skills. But they need to feel that their careers are not threatened by writing in *The Naval Review*, and my impression is that by and large they do feel that; one piece of evidence is the significant decline in recent years of the use of pseudonyms. But it needs only one or two less flexible senior officers to change this.

Of course the legal restriction on public debate was not always so – at the turn of the 19th and 20th centuries, serving officers were actually Members of Parliament, although I admit that this does give me pause! What gives me rather less pause is the fact that over the century since then, there has been an increasing tendency, as part of the general trend in UK towards silencing critical voices, to strangle the public voice of the professional service officer. No-one could envisage, I think, anything today like the highly public and acrimonious debates which were a feature of naval business in the early years of the 20th Century, and in which serving officers certainly took part, not always to the Navy's credit.

Now it is noticeable that in the last two or three years there has been a substantial body of opinion expressed in *The Naval Review* amongst the more junior, and therefore sea going, officers that the size, shape and training of the Navy is not always right for today's circumstances. Of course these officers are very focussed on what they are actually doing operationally at the moment, and are not always fully aware of the variety of political or even strategic considerations which infect (and I mean infect!) the thoughts and words of those serving in the MoD. But this may not be a bad thing; I fear that the creeping politicisation of professional advice is one of the most deleterious and pernicious features of the modern world, and one of the most dangerous for the public services. For what it is worth I am now rather ashamed of some of the things in which I acquiesced because they were standard MoD practice, when I was last serving. But if it is the case that these almost internal naval conversations cannot readily be had within the MoD, where are the "inconvenient" debates to be thrashed out? And how are they to be conducted safely, as it were, and out of the public gaze at least until they have been fully argued within the professional naval community, which of course includes rather more people than simply naval officers, if it is to cover all the necessary bases in the sort of depth that is necessary? And perhaps, what rules should apply?

This of course is *Naval Review* territory; it is absolutely what it is for, and indeed what its founders intended it to be for. And it is a territory that it is still doggedly occupying. If you were to look at editions over, say, the last five years, you would find plenty of debate over issues of key topical importance. I could, as instances and *inter alia*, mention the frequent discussion of maritime security, the role of the RN within it, its nature and the tools needed to deliver it; the force structure of the navy where it is clear that many officers serving at sea are puzzled by the direction in which their navy appears to be heading; the pros and cons, and the modalities, of the replacement of the Trident generation of the nuclear deterrent; and the way in which any hearts and minds campaign in Iraq or Afghanistan should be conducted and what that means for the skills and kit we need. What is critically important about these debates is that the views expressed in *The Naval Review* are frequently at odds with apparent official policy, but are also frequently authoritative, well argued and evidence based. Moreover, if the journal did not exist, it is quite likely that they would never be openly expressed, and so never form part of the debate, uncomfortable though their contribution may sometimes be.

Naturally both as Editor of the Journal and as a serious student of naval strategy and policy, I think this is "a good thing", perhaps even a vitally necessary one. But I would have to admit that the direct contribution of *The Naval Review* to policy formation is not clear – indeed research by Westminster University into this connection, if it exists, is one of our Centenary Commemoration projects. But of course not all senior officers are members of the journal or read it and so we cannot confidently claim a direct influence on policy formation. What then is the value of these debates? Well I would argue that it is at least twofold:

Firstly, it allows and encourages independent analysis, clarity of thought and debate on important professional issues, and it exercises and improves the ability of its members to develop their thinking and express views, clear benefits for those who reach senior rank and for the Service itself. If you doubt that, read again Andrew Gordon's book *The Rules of the Game.*

Secondly, it does inevitably influence, even if only gradually and by osmosis, the thinking of all the members, many of whom do in fact rise to high rank in the fullness of time. Although it may be hard to quantify the impact of this, intuition tells me that it will undoubtedly have an effect. I have

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a feeling that James Goldrick may have something to say about this!

I want to suggest that, in the current climate of the UK government machine, where thinking "on message" is so heavily demanded and so habitual, and "off message" thinking is so punished that many people serving in Whitehall genuinely do not recognise the extent to which their thought and discussion is being restricted, these two factors are of immense value. Indeed, I suggest further that it is a sign of something significantly wrong in a democratic society if such a facility is not widely recognised as useful, important and worth defending. *A fortiori,* this seems to be the case when the publication is reasonably well protected from general public vision as is the case with *The Naval Review*. I would like to go even further than that and say that were attempts to stop such activity to be made, they would not only be profoundly illiberal, and arguably the kind of thing against which many of us have spent our professional lives defending, but would also be, I believe, directly contrary to the interests of our society and nation, and of our navy, in that they would seek to restrict the informed professional discussion and development of key matters, for which the taxpayer at large is paying – a thoroughly undemocratic aim.

You will not surprised therefore to learn that I believe that the Journal, which I have had the honour to edit for nearly eight years now, is both a vital part of naval professional education and development but that it is also, in its own very small way, a crucial and, in some respects, unique symbol of our adherence to liberal, non totalitarian forms of government. It will soon have been such a symbol for 100 years (of which I shall have been a proud member for 50), and I believe that it is indeed fulfilling the function I have described. Long may it remain so.

Vice Admiral Sir Jeremy Blackham KCB MA CRAeS AFRUSI is the Editor of The Naval Review and Vice President Royal United Services Institute, United Kingdom. In a 41 year career Sir Jeremy had four sea commands: HM ships Beachampton, Ashanti, Nottingham and Ark Royal (commanding the RN TG off Bosnia). Ashore his staff appointments included Commandant, RN Staff College; Director Naval Plans, DG Personnel Strategy, ACNS, Deputy CINCFleet and DCDS (Capability). On leaving the RN he worked for three years for EADS before becoming an independent consultant and lecturer in defence affairs. He has edited the Naval Review since 2003.

Lighters amphibious resupply cargo (LARC)s make their way to the beach with the Multi Role Vessel (MRV) HMNZS Canterbury (L421) in the background at Cowley Beach during Exercise Sea Lion.
Landing Craft Heavy (LCH) HMAS Balikpapan (L 126), HMAS Labuan (L128) HMAS Betano (L 133), and HMAS Tarakan (L129) were also involved in the training.

A Follow-Up on Nuclear Powered Submarines

BY GIRGIS

Despite determined attempts to minimise public comment on the decision to acquire 12 new future submarines in what will be Australia's largest-ever defence procurement, the debate will not just go away.[1] In particular the Government decision to rule out nuclear propulsion for submarines without explanation leaves the future submarine program exposed to party-political attacks and as a result could lead to the delay or abandonment of the submarine project. Such an outcome would be a major setback for the whole Royal Australian Navy (RAN), not just for the submariners.

The last issue of *Headmark* included my article 'Australia's Need for Nuclear Powered Submarines'.[2] This article has been criticised for leaning too far towards advocacy instead of analysis, I have taken this as a compliment for that was clearly my intention. Indeed, the public debate on future submarines has received so little attention there is currently no analytical consensus surrounding the decision-making processes that led to the Government decision and definitely no analysis of the options. Although very little factual information has been made available to facilitate informed analysis and debate, claims continue to be published in what appears to be an effort to convince the public without burdening them with the necessary facts.[3] This follow up attempts to add to the debate by examining a number of the more substantial claims made against nuclear powered submarines.

Nuclear powered submarine technology transfer

It has been claimed that the United States (US) and the United Kingdom (UK) will not give Australia the nuclear power technology for our submarines.[4] This appears to be based upon some discussions held in the early 1980s in relation to the *Collins* class. To be honest, it is not surprising that the US and UK did not want to give us nuclear power technology back then, as during the early 1980s Australia was not the most reliable defence partner. In addition, the *Collins* procurement strategy envisaged the submarine being developed by integrating a wide range of combat, propulsion and auxiliary systems supplied by international (at times rival) companies. The risks of integration failure were already high and the danger of technological espionage was always a major concern.

Crew members assigned to the nuclear powered attack submarine USS Dallas make final preparations to get underway for a scheduled deployment. (US Navy photo by Nicole Hawley)

But such experience only suggests we should avoid similar approaches to acquisition in future, it does not conclusively demonstrate that we cannot acquire nuclear power technology from our allies.

Times have changed and now Australia's defence arrangements with both the US and the UK have perhaps never been as strong. When we had difficulties with the *Collins* class and wanted to turn things around in the early 2000s, the US was not only able to assist but the cooperative effort was a strong example of the new depth of our relationship.[5] Since the 9/11 terror

1. Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030*, Defence Publishing, Canberra, 2009, pp. 70-71; and Australian Labour Party: Future submarine project study - Media Statement 6 August 2009 <www.alp.org.au/media/0809 / msdefdipp060.php> (16 December 2009).
2. Girgis, 'Australia's Need for Nuclear Powered Submarines', *Headmark*, March 2010; and Australian Labour Party: Future submarine project study - Media Statement 6 August 2009 <www.alp.org.au/media/0809 /msdefdipp060.php> (16 December 2009).
3. See Submarine Institute of Australia (SIA), *Background to the SIA and Frequently Asked Questions on Australia's Future Submarine*, <www.submarineinstitute.com/?doc=15> (08 March 2010); and Derek Woolner, 'Nuclear subs no answer', *Australian Financial Review*, 25 February 2010, p. 70.
4. Woolner, 'Nuclear subs no answer', *Australian Financial Review*, 25 February 2010, p. 70.
5. Maryanne Kelton, *New*

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USS Connecticut, the US Navy's newest fast attack nuclear submarine departs her homeport of Submarine Base New London USA on her first scheduled deployment. (US Navy photo by Journalist Seaman Apprentice Woody Paschall)

attacks Australia has increasingly integrated its defence people, systems and information with our major allies. I do not intend to list these changes here but I do wish to highlight the extent of the changes. The RAN is now a member of a global maritime partnership alongside our US and UK friends, and so if our Prime Minister asked the US President and the British Prime Minister to support the sale of nuclear powered submarines to Australia, there would be a good chance of success. But the question of exactly what support we wanted would have to be clearly stated.

Australia could either buy (or lease) nuclear powered attack submarines from the US or the UK and operate them as part of the global maritime partnership. We would not seek to manufacture nuclear power plants for submarines in Australia nor should we aim to refuel the core or undertake depot level (by a ship repairer or their supplier) maintenance of the nuclear reactor in-country. The RAN sustainment philosophy should limit support activities on nuclear powered submarines to normal operation, emergency operation and damage control. The design engineering and configuration support functions for the nuclear powered submarines would remain with their country of origin, with Australians working alongside their overseas colleagues as necessary to manage the few Australian-only amendments. The point is that the intellectual property associated with building and depot level maintenance of the nuclear power plant would remain with the country of origin. Isn't this similar to what we already do or will do for other hi-tech military equipment anyway? Just consider the joint strike fighter, most aircraft, most missiles, main battle tanks, gas turbines and many specialised military equipment.

It has also been claimed that if we had access to French nuclear power technology we would have to modify the rest of the submarine to accommodate US systems, communications and weapons. This again assumes that we would need to follow the failed *Collins* style procurement strategy, one which we do not want to repeat. In fact, my suggestion is that if we obtain a nuclear powered submarine from France we would have to basically live with their configuration (combat system, weapons and all) and the last thing we should attempt is to fit US systems into a French submarine. For reasons of coalition interoperability, this may not be the preferred option, but if we cannot obtain US or UK nuclear powered submarines we may not have a better option.

Maintaining a nuclear powered submarine in Australia

Future Australian boats will continue to need regular overhauls to maintain performance and crew safety.[6] How can I argue with such a truism? Indeed this could have been written in late 1909 when the decision was made to procure our first submarines (*AE1* and *AE2*) and to maintain them in Australia. In future, whether we purchase conventional or nuclear powered submarines the majority of structures, systems and equipment will have to be maintained at the depot level in Australia: this is a given. Some systems, however, need to be maintained by their overseas manufacturer. As many manufacturers are located overseas Australian agents

Depths in Australian-US Relations: The Collins Class Submarine Project, Flinders University, Adelaide, 2004.

6 . Woolner, 'Nuclear subs no answer', *Australian Financial Review*, 25 February 2010, p. 70.

or subsidiaries often perform depot level work in-country while depot level maintenance of a system may also involve repair by using a replacement item obtained from overseas to form a pool of spare items. This is how maintenance has been managed, with varying amounts of success, for all submarines operated by the RAN over the last 100 years.

Maintenance of a nuclear powered submarine would not differ to any great extent. Over 95 per cent of the maintenance undertaken is standard to all submarines while less than 5 per cent is on the nuclear reactor and the related components of the power plant. Yes, there will continue to be a requirement for a submarine safety program, like RAN SUBSAFE, which includes approved operating and maintenance procedures, materiel traceability requirements, specialist submarine training and submarine certified maintainers and repairers. For nuclear powered submarines there will be additional requirements within the SUBSAFE program for qualified nuclear submarine operators and maintainers as well as for all other personnel who will have contact with the submarine systems. This would also mean that contracted maintainers and repairers will need to be both submarine and nuclear certified. In practice the maintenance requirements for nuclear powered submarines at the organisational and intermediate levels would be minimal. Depot level maintenance, refuelling and disposal of the nuclear reactor would be undertaken offshore, in the country of origin.[7]

7. Note that the Royal Navy's *Astute* class nuclear submarines have a state-of-the-art Pressurised Water Reactor that is fuelled for life, and hence the depot level maintenance requirements are reduced even further. If the RAN operated *Astutes* they would probably only have to return to the UK once over 20 years. Minor depot level work could be undertaken in Australia by a specialist team from the manufacturer flown out for the purpose. Royal Navy, 'Future Submarines: A Complex Engineering Challenge', <www.royalnavy.mod.uk/operations-and-support/submarine-service/future-submarines/a-complex-engineering-challenge> (8 March 2010).

8. SIA, *Background to the SIA and Frequently Asked Questions on Australia's Future Submarine.*

SUBMARINE INFRASTRUCTURE

The Submarine Institute of Australia (SIA) claims that 'Australia does not yet have the scientific and industrial infrastructure to build and support nuclear submarines' and that 'the cost of establishing a nuclear industry for submarine systems in advance of its adoption for national energy and environmental purposes cannot be justified'.[8] Such claims would probably be true if Australia actually needed to design and build a nuclear powered submarine in isolation of the rest of the world. Unfortunately the public debate so far has lacked the detailed assumptions that underpin such claims, and hence it is difficult to understand how the related policy was formulated. Exactly what nuclear infrastructure are we talking about and what are the associated costs? Who has done the study?

As I have explained previously, in my opinion we should procure nuclear powered submarines from either the US, UK or France under an arrangement that confirms their navy as the parent-navy for the class and which includes an agreement for the parent navy to undertake depot level maintenance of the nuclear reactor. We do not have the requirement or capacity to design and build an indigenous nuclear powered submarine in Australia. In future, even if we desired to become a global power we would probably not want to independently develop such submarines, rather we would work closely with our allies to develop new weapons systems as part of a global partnership. Given the support of a parent navy, the level of nuclear infrastructure that would be required to support a nuclear powered submarine in Australia would neither be too great or costly that it can be ruled out *ipso facto*.

The introduction of nuclear-propelled submarines into Australia will be complex but it is just as achievable as the reintroduction of

Comparison	Virginia (US)	Astute (UK)	Barracuda (Fr)	Future Submarine (Aust)
type	SSN	SSN	SSN	large conventional
surface displacement	6500t	6500t	4765t	>4000t
length	114.9m	97m	99.5m	unknown
beam	10.4m	11.2m	8.8m	unknown
operating depth	488m	>300m	>350m	unknown
submerged speed	34 knots	29 knots	>25 knots	~ 20 knots (sprint)
crew	134	84	60	unknown
entered service	2004	2009	2017	~2025
estimated cost/ boat	A$2.6b (2009)	A$2.4b (2009)	A$2.2b (2009)	A$2.1b (2009)

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leading-edge conventional submarines. As with all Defence projects, we will have to consider the fundamental inputs to capability, which include organisation, personnel, collective training, major systems, supplies, facilities, support, command and management. The complexity of the changes required should not be under estimated, however it is worth repeating, such changes are not new to Defence, they are part of the process for all new Defence acquisition projects. We do not suggest that we should not have 5th generation aircraft in the future Australian Defence Force because the fundamental inputs to capability will require significant change.

A SUBMARINE COST COMPARISON

An often repeated claim is that 'nuclear powered submarines are three times more expensive than conventional diesel-powered vessels.'[9] Let me present some baseline figures.

NUCLEAR POWERED ATTACK SUBMARINE COMPARISON

This table is based upon information available from *Jane's Online*. Costs for foreign types are derived from published official sources, converted into Australian dollars and updated using the Reserve Bank of Australia's inflation calculator. The cost estimate for the Australia's future submarine was prepared by the author. They are parametric estimates only, that is, they vary by +/- 30%, but they are also based upon a number of technical assumptions, essentially the new submarines use the latest technologies and minimise risk by limiting the use of leading edge technologies. Without such underlying assumptions the estimate could range from say A$0.8b for a low-tech boat to over A$3b for a futuristic submarine. Of course actual costs for Australia's future submarine can only be known when the detailed design is complete, the configuration is fully defined and when all associated procurement contracts have been signed. Even then it is common for the Department of Defence not to release full capability costs but rather the value of individual procurement contracts.

Comparison	Type 214 (Ge)	Scorpene (Fr/Sp)	Souryu (Japan)	Collins (Aust)
type	conventional	conventional	conventional	conventional
surface displacement	1700t	1580t	2900t	3050t
length	65m	67m	84m	77.8m
beam	6.3m	6.2m	9.1m	7.8m
operating depth	>400m	>300m	>300m	>250m
air independent propulsion	fuel cells	none	stirling engine	none
submerged speed	20 knots (sprint)	20 knots (sprint)	20 knots (sprint)	20 knots (sprint)
crew	27	37	65	45
entered service	2007	2005	2009	1996
estimated cost/boat	A$0.7b (2009)	A$0.8b (2009)	A$0.7b (2009)	A$1.0b (2009)

I have previously suggested that the sustainable future for the Australian submarine industry may lie with small conventional submarines, like the Type 214, *Scorpene*, *Souryu* or an improved version of the Swedish *Gotland* class submarines. It is worthwhile comparing such small conventional submarines.

SMALL CONVENTIONAL SUBMARINE COMPARISON

This table is based upon information available from Jane's online and other open sources. Costs, other than for *Collins* are indicative estimates only and are subject to large fluctuations based on international agreements, extent of in-country technology transfer and the total number of submarines in each order, that is 12 boats would be cheaper on average than two.

One may make a few simple observations from these comparisons. Firstly, an Australian built large conventional submarine is likely to cost about the same as an American, British or French nuclear powered boats. Now if, on average, a single nuclear powered submarine is operationally equivalent to three conventional submarines, then the nuclear powered boats are more cost effective, two nuclear powered submarines can perform the tasks of six long range conventional ones.

My second observation is that small conventional submarines should be able to be built in Australia at a significantly lower unit cost than we spent on the *Collins* class. The

9 . Cameron Stewart, 'Navy must rule out nuclear-subs', *The Australian*, 27 December 2007.

The attack submarine USS Virginia departs Naval Submarine Base New London to begin her first scheduled full-length deployment. The Virginia-class submarines are the first US nuclear attack submarines designed for battle space dominance across a broad spectrum of missions, and are equipped with advanced sensors and other special features that enable them to execute numerous war fighting tasks simultaneously. (US Navy photo by Mass Communication Specialist 1st Class Steven Myers)

reason for this is that the *Collins* class was designed as an 'Australian-only' compromise solution between a large nuclear powered submarine and a small conventional one. The program involved the design and build of a unique submarine with associated high technical risk and little opportunity for piggy-backing off existing technological solutions. The experience gained by the Royal Navy's submarine force over 80 years and by the RAN with the *Oberon* class submarines was discarded in a short-sighted and costly attempt to make a 'fresh start' with the *Collins* class. Once again we seem to be heading for another 'fresh start' with the future large conventional submarine. In my view, the future of the Australian submarine industry will only be assured if they can design and build a large number of small conventional submarines at a reasonable price.

Girgis is a pseudonym.

A Follow-Up on Nuclear Powered Submarines

View of the main diving and control station onboard the Los Angeles class nuclear-powered fast attack submarine USS Hartford. (US Navy photo by Don S. Montgomery)

Chief of Army's Address To Seapower 2010 Conference Darling Harbour - 27 Jan 2010

LIEUTENANT GENERAL KEN GILLESPIE, CHIEF OF ARMY

Ladies and Gentlemen good morning and welcome to Sydney and the Sea Power Conference 2010. May I start by thanking CN for inviting me here today. I think it says something about the ADF when you see the three Service Chiefs delivering a key note address at what many would see as a purely naval event. Russ, thank you for the privilege.

A New Era

The Army is in the midst of a significant transformation. Not only are we changing structurally we're about to undergo a period of major re-equipping. In addition to JP2048, a range of related projects, such as L121 (vehicles), L400 (armoured vehicles), L17 (artillery), A9000 (helicopters) and JP2072 (communications), will soon provide a world class Amphibious Deployment and Sustainment capability with increased networking, more capable helicopters, enhanced joint firepower and a complete range of protected and unprotected vehicles.

This large scale platform improvement must be accompanied by an equally large cultural and doctrinal change if our nation is to best benefit from this significant investment in capability. Within Army we are currently having the necessary broad based debate about what change is required to maximise on our emerging amphibious capability.

Basil Liddell Hart once observed: *"A small but highly trained [amphibious] force striking 'out of the blue' at a vital spot can produce a strategic effect out of all proportion to its slight numbers.*' I think this observation offers an insight into the opportunities for Australia's small Army and its sister Services.

Yesterday

Surprisingly for many students of history, Australia's initial engagement in the First World War was a successful campaign by the Australian Naval and Military Expeditionary Force to capture German held territory in New Guinea. Six companies from the Royal Australian Naval Brigade and an infantry battalion, with signals, medical and other enablers made up the Landing Force.

The naval element consisted of three cruisers, a transport and three destroyers under the command of a Rear Admiral. The maritime and land commanders worked together in what we today call a "supporting and supported" role to conduct an expeditionary campaign in the early days of the war. All these decades later, the decision by our Government to introduce the Amphibious Deployment and Sustainment system, with the centre piece being the two LHD, will enable Australia to not only reproduce past amphibious capability, but exceed it.

Strategic Guidance

The recent Defence White Paper reinforces the notion of amphibious

manoeuvre for Australia's land force, facilitated by the amphibious and sea lift ships. Indeed, the ability to project military power throughout our region and beyond, by deployment and sustainment from the sea, places land force maritime manoeuvre in the littoral environment as a key component of future ADF capability.

In platform terms, the LHDs will allow the ADF to achieve world's best amphibious practice and increase our interoperability with our allies. We will be capable of projecting military force beyond Australian shores without the requirement for coalition key force projection enablers. The suite of amphibious operations that Army can contribute to, including humanitarian and disaster relief, is well articulated in Australia's Amphibious Concept that has already been mentioned by the CN. Army also has amphibious doctrine but this needs to be reviewed, especially when analysed against emerging Coalition doctrine. This work is currently being conducted by the Modernisation and Strategic Planning staff at Army Headquarters.

In the Adaptive Army's Training and Education stream, we continue to review the strategic environment to ensure our concepts, doctrine, training

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and education are relevant, and that we prepare our people appropriately for contemporary and future operations. To this end, I recently released our latest version of *Adaptive Campaigning.* This document is Army's Future Land Operating Concept and provides the conceptual and philosophical framework, and force modernisation guidance, to achieve these requirements, including our amphibious aspirations.

Adaptive Campaigning incorporates recent operational lessons and insights and is informed by current scientific research, worldwide trends, as well as domestic and international developments. Most importantly, it describes the actions of an integrated Land Force response, as part of a Joint and Whole of Government approach, to the demands of the types of operations that we will face in the future, where the amphibious capability will be a key component of national resolve.

Tactical Guidance

The Joint Amphibious Capability Implementation Team, in conjunction with Army's Forces Command, has produced the Amphibious Landing Force Concept of Employment, which proposes an Army amphibious capability drawn from emerging and practised international doctrine. Australia's Amphibious Concept highlights a number of areas where the amphibious capability will provide a significant force multiplier, such as Ship to Objective Manoeuvre.

But to reinforce CN's point: while STOM, Distributed Manoeuvre and Sea Basing are currently defined in the Australian operational lexicon, they need to become better understood as the new amphibious era approaches. These concepts are beyond single service wherewithal, and require the application of Joint, Integrated and Combined capabilities to achieve mission success.

In an amphibious operation it is feasible, indeed highly likely, that, while Navy maintains maritime security and Army conducts land operations, Air Force will be conducting ISR, combat air patrol and commencing air bridge operations. Other agencies, such as the Australian Federal Police and AusAID will be concurrently coordinating activities to enhance stabilisation. Consequently, all Services will need to embrace the Joint and often multi-agency nature of amphibious warfare as it will be intrinsic to Australia's success in the future.

The complexity of Joint requirements in amphibious warfare runs parallel with command and control requirements and we have a good deal more thinking to do on this topic.

Command and Control

The Australian Army has no standing Commander Landing Forces, while Australia's coalition partners have standing Landing and Amphibious command organisations that are generally co-located and plan together for exercises and operations. The USMC and the USN, and the UK's RM and RN, maintain these standing arrangements and respectively share the specialist amphibious capability role in their nations' inventories – they provide forces permanently structured to achieve effects on land, operating from the sea.

Command and control of the landing force requires Army to reflect on past experiences as it looks forward to the challenges ahead. A Commander Land Force organisation embedded in the formation that will conduct the amphibious operation, and co-located with the Commander Amphibious Task Force, is a natural would appear to be a natural fit. While the RAN will base the LHD at Fleet Base East, in Sydney, it may be that a potential location of any CLF/CATF HQ is in Brisbane. Brisbane would allow for co-location with HQ 1 Div our DJFHQ. Such co-location would provide a COMAUSATG, bolstered with additional Army staff, as a sound C2 solution while we mature our amphibious capability.

Army's Contribution

The Operational Concept Document for JP2048 defines Army's Amphibious Ready Group (ARG) as a battle group based organisation with enablers such as armour, medium artillery, aviation, engineers and logistics. The ARG will have approximately 2200 personnel and reflects the USMC and the UK's RM models. The ARG is articulated in detail in the Forces Command Landing Force Concept of Employment.

The Concept recognises that amphibious related individual and collective training requirements exceed baseline infantry skills, as the landing force requires exposure to the maritime environment of surface and air assault. Additionally, the Concept appreciates that contemporary amphibious warfare is about being able to operate congested flight decks, hazardous well docks, operating a range of vehicles on and off moving platforms and over beaches through surf. It recognises our need to tailor logistic support

requirements, manage the joint battle space, support joint fires and command from a Joint Operations Room afloat without recourse to operating ashore.

The training necessary to safely operate in the maritime environment has been well articulated by Australia's Allies. I intend that Army moves forward quickly by drawing heavily on this knowledge to produce an amphibious force with similar training regimes. I believe that survivability at sea will be a mandatory training requirement for all the Landing Force, and not just specialist Army personnel attached to the ships.

Force Generation

Shortly, Army will have 10 Battle Groups and a Commando Regiment available for tasking; however, with three amphibious ships there is insufficient capacity to generate 10 amphibiously trained Battle Groups. The UK model yields three Battle Groups, with one 'on-line', and this is facilitated through a slightly greater Royal Navy ship availability than RAN will have available. Army is currently conducting analysis into how we can best achieve the ARG construct. I think that we need to focus on providing one 'on-line' battle group for the conduct of amphibious operations, at the same certification level as our coalition partners. Also important, is the requirement for exposure to sea-lift and follow-on operations for the remainder of the Army. Potentially, various options exist but as a guide for consideration I have highlighted three, which covers the spectrum of capability levels achievable:

Option One: Placing one Battle Group as the amphibious specialist battalion, similar to an Airborne Battle Group, and group enablers, such as fires, comms and logistics assets in support. This option would allow a high level of capability to be achieved, certifiable to US and UK standards. This option would however introduce significant force rotation and sustainment issues for Army, especially with our current operational commitments.

Option Two: Similar to the USMC MEUs and the UK's 3 Cdo Bde (RM), an Australian Bde, grouped as a combined arms task force, may be best placed to be the Army's amphibious specialist, providing entry and allowing heavier, or follow-on, forces to penetrate subsequent to the amphibious operation.[1] This would provide capability comparable to the US and UK certifications levels.

Option Three: Similar to the French model where, until recently, annual changeovers occurred between battle groups as this would permit Army's 10 Battle Groups exposure to amphibious capability. This would allow capability development to be broad but would potentially not achieve US and UK certification standards.

Linked to these options, the 2nd Commando Regiment will also be incorporated into the 'on-line' Landing Force as part of the advance force component. Similar to the MEU (SOC) approach of the USMC, or the Bde Recce Force of the UK RM, it will be necessary to rotate a Cdo Coy with the Landing Force.

Cultural Change

The notion that Army only uses Navy for sea-lift and Air Force for airlift must be changed. The introduction of enhanced C2 architecture and other forms of sea-based support, as highlighted in the White Paper 2009, will allow Army units conducting disaster relief, or patrolling in complex terrain, to call upon Navy and Air Force for supplementary support. Furthermore, the introduction of emerging amphibious doctrine, such as STOM, Distributed Manoeuvre and Sea Basing highlights that this capability is beyond just delivering Army to the Amphibious Objective Area. It's clear to me that Army needs to learn how to live, deploy, operate in, and operate from the LHDs to maximise Government's investment in this capability.

Certification

Navy, Army and Airforce will certify the discrete sea, land and air elements of the amphibious capability prior to melding the force for Joint certification. However, we are looking with open minds at the creation of a Joint agency in the ADF to certify the entire Joint amphibious capability. This could potentially be part of the Joint Capability Coordinator's responsibility inside VCDF's Division. This certifying office would ensure that areas requiring attention are addressed from a Joint perspective. Combined certification could be achieved with US, UK, NZ and other allies' amphibious forces through activities such as Exercises TAILSMAN SABRE and COMMANDO RAJAH.

Logistics

Another area we are focussing on is in material management. Operating and maintaining equipment in the embarked environment will place additional challenges and demands on Army's people and resources. This will attract an additional training bill for our soldiers, but we are examining methods to reduce this burden, such as providing advanced knowledge of the amphibious environment. As an example, vehicle preparation prior to embarking will extend the life of any vehicles and reduce recovery requirements while on the beach. Furthermore, knowledge of the watercraft freight procedures will expedite loading and enhance logistic throughput. We also acknowledge that aviation platforms require additional servicing and maintenance when in a maritime environment, but the clean

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hangar will provide a dust free and environmentally controlled working space for maintenance crews.

In essence, we are reviewing all our ground vehicle, watercraft and aircraft fleets to ensure we have the most effective and efficient maintenance and usage procedures. For example, we have found that we maintain our Blackhawks about a third more than the US Army. And in one fleet of light ground vehicles, simply reducing the requirement for monthly non-technical inspections to every second month has had saving in nearly 100 000 man hours per year with no detrimental capability impact. These examples will give you a flavour of how I intend to create more agility in the Force and to make our resources go further without capability impact. There are many facets to the logistic component and the US and the UK have dedicated units to complement the respective Landing Forces. We are drawing on their experience and knowledge to help guide our thinking on amphibious logistics.

Conclusion

The LHDs, whilst Navy owned, are the centre of a new Joint force designed primarily to support Army, as a leading part of the amphibious capability. In order to maximise the inherent capabilities of the future amphibious system, Army needs to prepare itself for the arrival of the first LHD in March 2014. These requirements generate several issues for Army, which include: selecting a formation with attached enablers as the amphibious specialists; introducing an appropriate C2 structure for amphibious operations; interoperability with allies; and implementing a robust logistic capability to deal in the amphibious arena.

Ultimately for Army it is about effectiveness, through the careful assessment and decision making necessary to select a Landing Force model in order to manage identified

risks, and then realise efficiencies.

- Efficiencies in time by reducing individual and collective training.
- Efficiencies in space through optimising training areas and opportunities.
- Efficiencies in equipment holdings through every day fleet management procedures.

Lastly, we'll seek capability certification with Allies to ensure the necessary interoperability. Our Army does not want to be called Marines, but because of its size and structure it needs to train, look and fight like Marines (a force that is trained, configured and optimised to conduct operations over the land but launched from the sea).

Finally, is it important to be conscious of my view that, *'We are, and seek to remain, the best small Army in the world'*. The introduction into service of the LHDs will provide an additional means of reinforcing this position. Army must prepare for an era that will see battle groups operating in the wider Joint operating arena, spending frequent and sometimes extended periods at sea. Army must be prepared to exploit the inherent capabilities offered by a future ADAS system. In summary, if we are to remain the best small Army in the world then we need to be able to demonstrate an ability to adapt, prepare, sustain and excel as a component of a future ADF and regionally dominant amphibious capability.

Thank you for listening.

Chief of Army Lieutenant General Ken Gillespie, AO, DSC, CSM enlisted in the Australian Army as an apprentice in 1968. He graduated from the Officer Cadet School, Portsea in 1972 and was commissioned into the corps of the Royal Australian Engineers. Lieutenant General Gillespie has held a range of regimental and staff appointments. These include: instructor appointments at the School of Military Engineering and 1st Recruit Training Battalion; regimental appointments in the rank of Captain and Major in the 2nd, 5th, and 2nd/3rd Field Engineer Regiments and the 1st Construction Regiment; Company Commander at the Army Apprentices School; and Senior Instructor at the School of Military Engineering.

Marine 'refugia' in the Keppel region of the Great Barrier Reef

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The concept of marine no-take areas has historically been used as a tool for managing ecosystem function on coral reefs. Reserves have flow-on benefits to the fish stocks on surrounding reefs (Hughes, Bellwood *et al.* 2006) and promote resilience to chronic traumas such as anchoring and bleaching. While no-take marine reserves have now been firmly established as management tools globally, the choice of most has been typically based on a range of human socio-economic values and biophysical representativeness rather than on the potential resilience of corals (Riegl and Piller 2003).

Understandably, given the size of the reef areas under their jurisdiction, few marine managers have had the resources to conduct robust biophysical assessments on which to base these choices. Unfortunately, many established marine reserves are now located in regions deemed vulnerable to temperature-induced coral mortality (Maxmen 2008) and a recent study has highlighted their failure to have a positive effect on ecosystem response to large-scale disturbance (Graham, McClanahan *et al.* 2008).

While the current system of marine reserves has a vital role in protecting fish stocks and enhancing recovery, they may do little to provide reef-wide resilience from the compounding threats posed by increased temperature, ocean acidification, rising sea level, land runoff, changing hydrodynamics and increasing severity of storms and floods.

Considering predictions that these threats will escalate and the likelihood of a corresponding decline in the resources available to protect them, it may be necessary to earmark reefs based on the resilience of corals and their potential to provide the seed stock for surrounding reef regeneration when conditions improve: Noah's arks for reefs. Extending protection of small pockets of highly diverse but ecologically resilient corals by way of improved water quality and protection from extractive activities may improve the capacity of these 'refugia' to seed regeneration on a reef-wide scale following climate-induced catastrophic destruction in the future.

It seems likely that coral refugia exist, as recovery from past catastrophic disturbance events must surely have been driven by recruitment generated from within them. 'Modern' corals have recovered from three climate driven extinction events over the past ~240 million years (Kiessling, Aberhan *et al.* 2007).

Given that the current rate of climatic change is 3-4 times greater than that seen during these events, and that it is highly likely that the species that survived did so without their skeletons, modern reefs may be about to undergo dramatic changes in community structure. Reefs dominated by scleractinian (hard) corals may be superseded by those dominated by soft fleshy macro-algal species and soft corals (Figure 1). The loss of structural scleractinian corals will have significant flow-on effects to other marine species unless at least some small pockets of corals survive to seed regeneration when conditions improve (Jones, McCormick et al. 2004). It is therefore vital that we identify and protect these pockets as an insurance against catastrophic changes.

Reefs that are deeper, shaded, exposed to cooler ocean currents or at high latitudes might be better placed to survive in a scenario of raised global temperatures and atmospheric CO_2 (Glynn 1996). Recent studies have confirmed that reefs that are geographically isolated survive disturbance better than shallow fringing reef flats adjacent to land (Riegl and Piller 2003; Idjadi, Lee *et al.* 2006; Wen, Hsu *et al.* 2007; Riegl, Purkis *et al.* 2009). On a region-wide scale, cooler, high latitude reefs with high rates of coral growth may act as refuges for warmer northern reefs (Smith-Keune and van Oppen 2006; Diaz-Pulido, McCook *et al.* 2009). Deeper reefs on which there is a buffering effect by strong oceanic circulation or tidal currents could act as refuges for corals to survive bleaching or freshwater influx. Shading can help corals cope with warmer conditions because it reduces the excess light that can trigger bleaching.

Conversely, continued exposure

Figure 1. Healthy, bleached and a degraded reef in the Keppel region of the southern Great Barrier Reef.

Photos courtesy of the authors and James Tan

Marine 'refugia' in the Keppel region of the Great Barrier Reef

to mild, but non-lethal stress could result in a process of natural selection which creates a refuge for particularly stress tolerant species. The challenge facing us is which environmental variables to choose to identify coral 'refugia' to earmark for augmented protection as 'arks' for a climatically grim future (Nick Flloyd, personal communication).

This study sets out to provide a new model of coral reef management which prioritises small pockets of highly diverse corals that are likely to have higher resilience to climatic disturbance compared to nearby reefs. A small, isolated region of the southern Great Barrier Reef comprising 15 islands in the Keppels group (23.1°S, 150.9°E) was chosen for the study (Figure 2). Their inshore location at the mouth of the Fitzroy River Catchment makes the Keppels particularly vulnerable to climate change-induced sea temperature rise and accompanying increased acidification, freshwater runoff and the effects of land use along the adjacent catchment.

A number of disturbances have impacted on the Keppel reef communities in the last few decades. These include floods in 1991 and 2008 (van Woesik 1991; Packett 2007) and bleaching in 1998, 2002 and 2006 (Berkelmans and Oliver 1999; Berkelmans, De'ath *et al.* 2004; Elvidge, Dietz *et al.* 2004). The floods in 1991 caused up to 100% mortality on the shallow reefs facing the river but were followed by almost complete recovery within 13 years. Since that recovery, bleaching killed 40% of corals in 2006 followed by almost complete recovery within a year (Figure 3).

In spite of surviving at the southern latitudinal extremity of reef accretion, the extraordinary high coral growth observed in the Keppels appears to provide local reefs with an unexpectedly strong capacity for recovery and maintenance of high coral cover, despite this high disturbance regime (Diaz-Pulido, McCook *et al.* 2009). This makes them ideal to study disturbance and regenerative processes.

Between April 2008 and December 2009 six ecological parameters were studied at 18 locations spread around the fringing reefs of the Keppel group. The six parameters (light extinction coefficient, average daily temperature, percent hard coral and macro-algal cover, hard coral species richness and abundance, the presence of thermally tolerant algal types and depth profile) were chosen because of their potential relevance to coral resilience. Based on the results of the measurements, three characteristics were chosen as the most relevant to coral refuges and four sites were identified as having the highest 'refuge' value for the region. The following paragraphs describe the six ecological characteristics, discuss how they relate to coral resilience and describe the decision-making process that lead to the identification of these four refugia.

Methods and Results

Coral species richness and abundance

Two of the key characteristics of reefs that have high ecological conservation value are species diversity and the amount of live coral (De Vantier, De'ath *et al.* 1998). Reefs with high coral cover comprising a diverse range of species have a proven history of avoiding disturbance, at least in recent

Figure 2. The Keppel region lies at the mouth of the Fitzroy Catchment and Fitzroy River (marked in blue on the map) in the southern section of the Great Barrier Reef Marine Park (green section on the map) in Central Queensland

times (1-2 decades), and although mechanisms are unclear, these sites may serve as a guide to avoiding future disturbances and are more likely to regenerate quickly should future damage occur.

Between March 2008 and April 2009 coral species richness and abundance was assessed during a random swim at each of the 18 sites (~60 minutes). Each species was ranked in terms of abundance compared the total live hard coral cover (0 = none present, 1 = 1-10%, 2 = 11-30%, 3 = 31-50%, 4 = 51-75%).

In total 155 species from 138 genera in 12 scleractinian families were recorded in the 18 sites This suggests that the species richness in the Keppels is moderately high in spite of previous

Figure 3. Extraordinarily high coral growth in the Keppel region of the southern Great Barrier Reef makes it an ideal site to study reef regeneration processes. Photos courtesy of the authors and James Tan

studies describing diversity as 'relatively low' (van Woesik 1991). This apparent anomaly is probably a result of the much higher number of sites surveyed (18 sites using 200m^2 transects) compared to the 1991 study (8 sites using 200m^2 transects). In addition, we focused specifically on species-rich sites because they were more likely to represent refuges. De Vantier *et al.* (2006) also conducted surveys of the Keppels in 1997, six years after the 1991 flood and found relatively low species richness. De Vantier attributed this to the high disturbance history and the fact that although they were present, many of the sub-tropical indicator species were sparsely distributed in the Keppels compared to more northern reefs.

Species from the branching coral Family Acroporidae (58 species) dominated all sites in both species richness (58 out of 155 species) and abundance (11-75% of total live hard coral cover). The remaining ~10% coral community was made up of non-Acroporids (mostly non-branching species except for Pocilloporids) with a site mean abundance of < 10%.

Benthic cover

The types and amount of benthic cover at a location can help to assess past disturbance history and predict conditions favourable for coral recruitment and regeneration. Detailed benthic surveys were conducted at the 18 study sites between April 2008 and April 2009. All surveys were conducted as close together as possible as macro-algal cover (mostly *Lobophora variegata*) can vary by up to ~30% annually (Diaz-Pulido, McCook *et al.* 2009). At each site two haphazard 50m transects were laid on the reef flat (0-6.0m at chart datum, 2.4-8.4m at mean sea level) and reef slope (6.0-12.0m at chart datum, 6.4-14.4m at mean sea level). The substrate was photographed every 2m at a height of 1m above the substratum using a digital still camera (4Mp) fitted with a 16mm wide angle lens. A GPS track was recorded using a towed GPS (Garmin Map76CS). Digital still images were analysed using 20 random points per image with the program Coral Point Count with extensions™ v3.1 (www.nova.edu/ocean/cpce/). Benthic cover along each transect was classified into the proportion of macro-algae, abiotic, coralline algae, turf algae, hard live coral and soft coral.

Estimates of coral cover ranged from 3-94% with a mean coral cover of 51% (±16%). Coral cover was highly variable however; reef flats had only slightly lower coral cover than reef slopes (49% cf 53% ± 20%). The highest coral cover was found on the southern side of Humpy Island (88%) and the lowest cover was at Shelving reef (27%). The mean cover of soft corals was low, comprising 6% of the benthic cover. Macro algal cover was dominated by a single species *Lobophora variegata* which comprised on average about 8% of the benthic cover.

Light attenuation/ extinction coefficient

The amount of photosynthetically active radiation (PAR) available to corals plays an important role in promoting reef growth because light enhances calcification (Barnes and Chalker 1990). The amount of PAR reaching corals is reduced by refraction at the surface and absorption and reflection by sediment, chlorophyll and particulate matter in the water column. Deeper corals are therefore likely to have reduced growth rates compared to those in shallow water. However, the role of light is complex as heterotrophic feeding on the very particulate matter that reduces light can be beneficial to some coral species (Anthony and Fabricius 2000).

Conversely, deeper reefs are likely to be cooler, acting as a temperature refuge for adjacent flats. On the reef flat, the combined stress of high light and temperature can reduce productivity by inhibiting photosynthesis and reducing pigment and zooxanthellae densities (Fitt, McFarland *et al.* 2000; Hoogenboom, Anthony *et al.* 2006). To complicate matters even further, dealing with the stress of turbidity caused by sediment can reduce growth in some Acropora species (Anthony and Connolly 2004) but high turbidity can shade corals from excess light, thereby helping them cope with temperature stress.

The amount of light reaching corals in seawater (I) is dependent on the attenuation of light at the surface ($I_{surface}$), scattering due to suspended solids, and absorption due to dissolved organic matter and chlorophyll. Light attenuation can be described by the diffuse attenuation coefficient (kd) whereby the net effect of attenuation of the incident light by particles in seawater would be a decrease in

Figure 4. A volunteer deploys a light logger attached to a wiper robot designed by the Australian Institute of Marine Science.

Marine 'refugia' in the Keppel region of the Great Barrier Reef

the measured irradiance (I), and a corresponding increase in kd (Equation 1, where z is the depth of measured underwater irradiance).

$$I = I_{surface} * (e^{-kd * z}) \quad (1)$$

To estimate kd for each study site, the amount of light reaching the reef surface was monitored using Odyssey light loggers (Figure 4, Integrated Monitoring Technologies) attached to a robot developed at the Australian Institute of Marine Science. The robots were programmed to wipe the surface of the light sensor with a brush every 2 hours to prevent the obstruction of light by sediment and algal growth. Light was recorded every 10 minutes for periods of 1-12 weeks.

Data for the cumulative PAR between 10 am and 3pm at each study site were averaged over the monitoring period. Underwater irradiance values were compared to theoretical values for light ($I_{surface}$) measured in air close to sea level on a clear cloudless day, derived using the sensor calibration software PARCAL (version 01.03.08, April 1999, AIMS). Maximum daily theoretical values were checked using recently calibrated Licor light sensors with a maximum error of <3%. Air readings were multiplied by a correction factor of 0.758 to correct for the "immersion factor" which is considered as a constant for Licor underwater sensors.

The light extinction coefficient kd_{site} was determined for each site by solving equation 2 using the average cumulative underwater irradiance (I), logger depths (z) and the theoretical irradiance at the surface ($I_{surface}$).

$$kd_{site} = Ln\,[(I/I_{surface})] / z \quad (2)$$

To make appropriate corrections for seasonal variation, values for kd for each site were divided by values calculated from concurrent measurements at Miall Island. A light attenuation coefficient index (kd_{site} / kd_{Miall}) was calculated for each site.

Temperature

In spite of their apparent resilience through geological timescales of millions of years, corals are extremely sensitive to temperatures only 1.0-1.5°C above their normal ranges (Berkelmans and van Oppen 2006). Temperatures that exceed this, in combination with high light can cause bleaching, disease and mortality.

Figure 5. A volunteer deploys a temperature logger on the reef flat in the Keppels.

Sea temperatures were continually recorded at half-hourly intervals by data loggers deployed at the 18 reefs in the study between April 2008 and December 2009 (Figure 5, Dataflow Systems, New Zealand). On reefs with a well-formed reef flat (0-6m at LAT) and reef slope (6-18m at LAT) loggers were deployed in both the habitats. At sites without an overt reef flat only one logger was deployed (Outer, Man and Wife Rocks, Egg Rock, Wreck Beach, Passage Rocks). Data were averaged over 48 readings per day taken between November 2008 and March 2009 to obtain an average daily temperature for each site. Temperature data were averaged over the reef flat and slope at sites where two loggers were deployed. Average daily temperatures were compared to the coolest site (Halfway Island) to calculate a 'coolness' index for each site.

Symbiont types

Reef-building corals harbour multiple types of algae (zooxanthellae) within their tissues which provide them with energy through photosynthetic carbon fixation. This light-dependent process also helps to drive calcification. The association underwrites the success and productivity of reefs which build up on old calcium carbonate structures. The photosynthetic capacity of their algal partners may determine how much energy is available to drive calcification (Little, van Oppen *et al.* 2004; Jones and Berkelmans in press). The photosynthetic capacity of the symbionts is inseparable from the sensitivity of their photosystems to temperature (Tchernov, Gorbunov *et al.* 2004).

Algae with high photosynthetic productivity may be beneficial to their host under normal conditions but as conditions become warmer and more stressful and the photosynthetic processes become toxic to the host coral, sensitive types are more likely to be expelled than more stress tolerant types (Figure 6, Berkelmans and van Oppen 2006). The capacity of some corals to shuffle their algal types to more thermally tolerant but less energetically beneficial types as a trade-off for increased temperature tolerance is a key component of reef resilience.

The relative abundance of *Symbiodinium* types within some of the most common reef-building corals at 14 of the study sites were identified based on the nuclear ribosomal DNA internal transcribed spacer 1 (ITS1) region using single stranded conformation polymorphism (SSCP)

and sequencing analysis (van Oppen, Palstra *et al.* 2001; Ulstrup and van Oppen 2003). SSCP bands that were faint compared with another more intense band in the same sample were identified as background and predominant types, respectively although the presence of algal types below the 5-10% detection limits of this method are not ruled out (Fabricius and De'ath 2004).

Three principal *Symbiodinium* genotypes (C2, D and C1) were identified in the main reef-building corals sampled randomly at the 18 sites. Type C2 was the predominant symbiont type at all sites except Pelican Island and Bald Rocks. No type D symbionts were found at four sites (Outer, Man & Wife, Humpy Island and Pelican Island). Only type C2 symbionts were found in the four coral taxa sampled at Humpy Island whereas corals at Outer, Man and Wife Rocks and Pelican Island hosted type C1 but not type D symbionts.

Depth profiles

A variety of habitats available for coral growth promotes taxonomic diversity. Coral 'refugia' are therefore likely to have more overt depth profiles to promote maximum habitat and diversity.

The 18 reefs in the study were described as having either shallow (0-6m), deep (6-18m) or shallow and deep (0-18m) profiles. Only two sites (Humpy Island and Pumpkin Island) had both shallow and deep profiles (0-6m and 6-18 m LAT).

Discussion

Four key coral refuges in the Keppel region were identified by systematically splitting the 18 sites into two groups based on the six ecological parameters (Figure 7). Data for the six parameters were visualised using Google Earth Pro (v 5.1 2009, Figure 8). Initially, two groups were formed by comparing measurements of species richness to the mean value (38 species). In the second split, the nine sites with species counts ≥ 38 were further split into two groups of sites based on the mean of live hard coral cover (≥ 51%). Finally, the six sites with coral cover ≥ 51% were again split into two groups based on the mean value for light extinction coefficient kd. Five of the six sites have kd higher than the mean value of 0.447 (i.e. low light levels). In the fourth grouping the remaining five sites were separated into two final groups based on the symbiont distribution and depth profile. Sites with both shallow and deep profiles (Humpy Island and Pumpkin Island) were included over those with either shallow or deep profiles.

Pumpkin Island reef (eastern side) was included in the third grouping in spite of having a kd value above the mean 0.447 because of the presence of thermally tolerant ITS1 type D and C1 symbionts in four *Acropora* species. Pumpkin Island also has a strong depth profile (0-4m to 13-17m LAT) which helps to explain the relatively high species richness and coral cover (in spite of warm temperatures). The deeper corals at Pumpkin Island are probably more critical to its value as a refuge because the shallow corals are prone to breakage from swell. This site may

Figure 6. Thermally tolerant symbionts are less likely to be expelled during temperature stress than thermally sensitive types (left in the photo).

Figure 9.

Marine 'refugia' in the Keppel region of the Great Barrier Reef

be a refuge for stress tolerant species. This is confirmed by the good representation of corals from the Family Faviidae (13 out of 47 species, Figure 9) which are relatively tolerant to warmer conditions (Strychar 2008).

Bald Rocks was discarded in the fourth grouping due to the complete absence of thermally tolerant symbiont types (> 5% abundance) in the main reef building corals and because it has a relatively weak depth profile. Middle Island and Miall Island were also discarded as both sites have shallow depth profiles and because of the low coral cover on the reef flats, evidence of past bleaching and freshwater damage. The slopes have higher cover but are relatively shallow compared to sites like Humpy Island and Pumpkin Island. As such, the slopes at Miall Island and Middle Island may act as refuges for regeneration of the adjacent flats but are probably not critical to regeneration on surrounding reefs.

Humpy Island (southern side only) was included as a potential refuge site in spite of not having any thermally tolerant symbionts in the main reef building corals because it was one of the two sites (along with Pumpkin Island) with a strong depth profile. All the corals sampled on the southern side of Humpy Island had C2 symbionts which have been shown to be the most beneficial endosymbiont in terms of coral growth, lipid stores and reproduction (Jones and Berkelmans, unpublished data). The high coral cover and high species richness combined with the absence of type D and C1 symbionts, demonstrates that there has been little previous bleaching or salinity stress at the site. Types D and C1 tend to appear following bleaching or in stressed, marginal habitats such as at the edge of shallow reef flats where temperatures can vary dramatically on a daily basis. Their absence at Humpy Island suggests that the southern side is a relatively stress-free environment for corals. The prevailing south easterly winds probably push cooler waters into the south facing bay at Humpy Island which is strongly mixed due to the strong depth profile. High light levels, cooler waters and the presence of beneficial C2 symbionts make Humpy Island an ideal location for coral growth.

However, whether these corals could acclimatise by "symbiont shuffling" if conditions become more stressful in the future, or whether the lack of tolerant symbionts would place them at a disadvantage remains to be seen. The former is probably correct as there is evidence that corals can acquire their symbionts from the sediments (Garren, Walsh *et al.* 2006). Further investigation of the distribution of symbionts in the Keppels is required to fully understand the acclimation potential of the corals at Humpy Island.

Outer Rocks (southern side) was included in the final 'refugia' group on the basis of having high coral cover, high species diversity, and high light

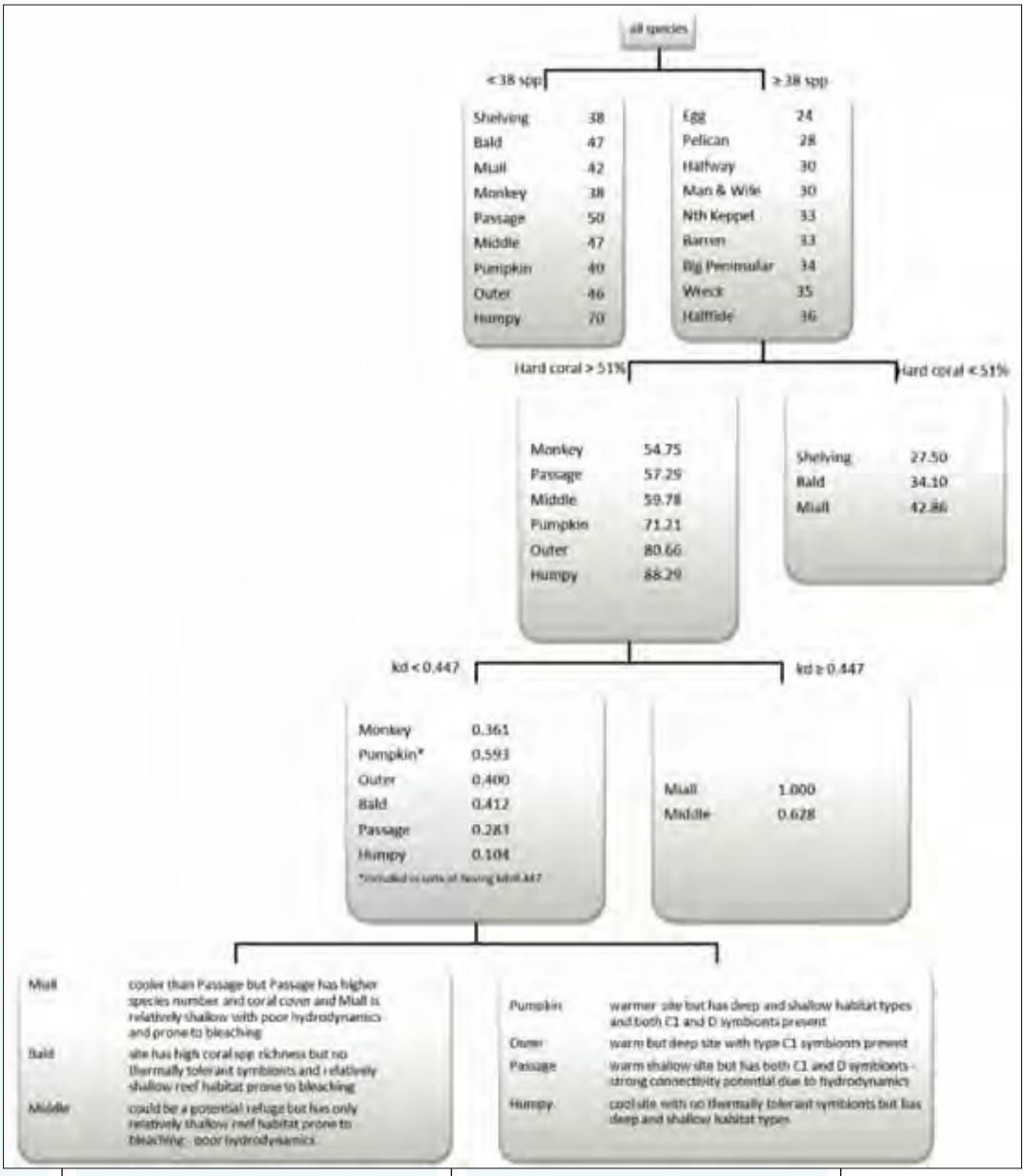

Figure 7. Eighteen sites in the Keppel region of the Great Barrier Reef were grouped using three primary ecological parameters, species richness (# of species), % hard coral cover and light attenuation coefficient (kd). Final groups were decided using the secondary parameters of temperature, the presence of thermally tolerant symbionts and depth profile.

levels and in spite a being relatively warm. The deeper reef at Outer probably acts as a refuge more than the shallow reef adjacent to the rock which is vulnerable to damage from swell.

Passage Rocks was also included in the final group as it had the second highest species richness of the 18 sites, high coral cover, high light and relatively cool water. The presence of thermally tolerant type D and C1 symbionts suggest previous thermal stress, probably because it is relatively shallow (0-6m LAT). However, the high species richness at Passage Rocks combined with strong tidal flushing makes this site a good potential 'refuge' in spite of this. Strong tidal currents tend to ensure waters are well mixed, ameliorating stratification during bleaching events and assist in carry coral propagules (juveniles) to surrounding sites during annual spawning.

The role played by recruitment following the annual spawning is critical to the regeneration of reefs (Riegl and Purkis 2009). Most reef building corals reproduce by synchronous spawning annually in early Spring. During the annual spawning event, millions of positively buoyant egg and sperm bundles are released into the water, initially floating to the surface where they are carried on wind and tide driven surface currents to surrounding reefs. Once fertilised, the propagules attach to the substrate. It is the direction and strength of this flow of new coral recruits that determines the success of a refuge in seeding regeneration on surrounding reefs. While this project did not study the local scale hydrodynamics in the Keppels, the prevailing northerly winds during the annual spawning in November are likely to increase the connectivity of these refuges to surrounding reefs. Winds typically blow from the North in the afternoon in spring/summer but can swing around to south easterly in the mornings. This improves the distribution of eggs around the sites. This oscillation is enhanced by tidal movement.

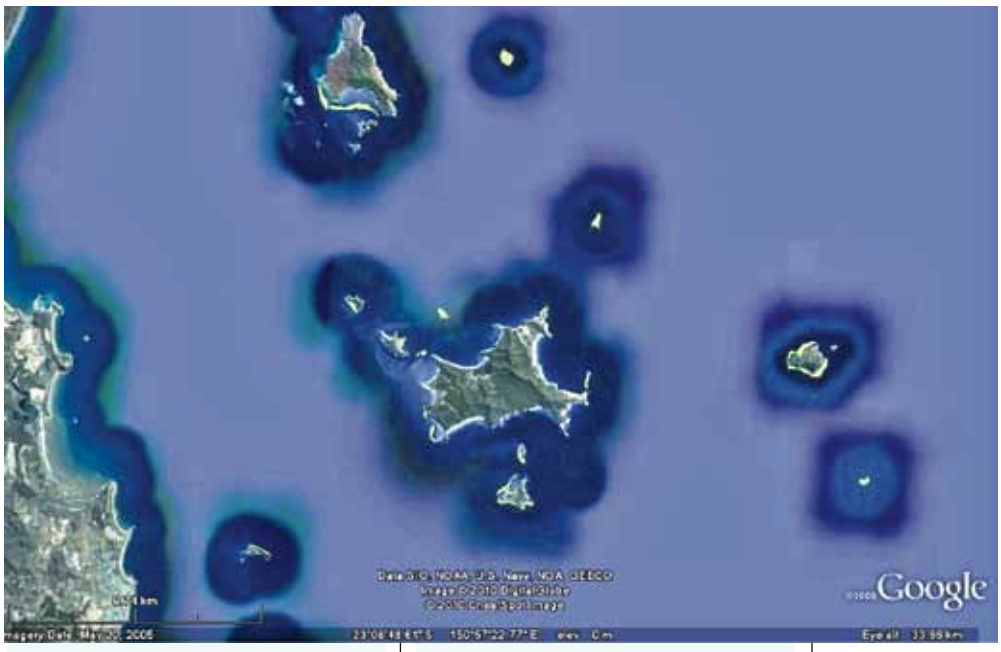

Figure 8. Google Earth Pro image of the study site in the Keppel region of the southern Great Barrier Reef showing the 18 sites (white circles) and the four coral 'refugia' (red circles and an asterix in the table).

1	Bald Rocks	10	Middle Island
2	Barren Island	11	Monkey reef
3	Big Peninsular	12	Nth Keppel
4	Egg Rock	13	Outer Rocks*
5	Halftide Rocks	14	Passage Rocks*
6	Halfway Island	15	Pelican Island
7	Humpy Island*	16	Pumpkin Island*
8	Man & Wife	17	Shelving reef
9	Miall Island	18	Wreck Beach

It is anticipated that a future project looking at the genetic connectivity of one of the main reef-building coral species, *A. millepora* will identify more accurately the direction of flow between reefs in the Keppels. Notwithstanding the direction and rate of flow between sites, what is clear is that as the threat of climate changes increases, marine reserves should comprise a series of pockets of highly diverse corals which have proven resilience to climatic disturbance and are connected via ocean, wind-driven or tidal currents rather than a patchwork of larger and unconnected no-take areas based on fish stocks and socio-economic values.

The protection of critical reef habitats from anthropogenic damage plays an important part in maintaining the resilience of marine ecosystems. Mumby *et al.* (2007) and Hughes *et al.* (2006) argue that the implementation of marine no-take areas can help to prevent phase shifts from coral- to algal dominated systems by increasing the number of grazing fishes, reducing macro-algal species and enhancing coral recruitment. There is now little doubt that marine reserves can improve the capacity of reefs to recover from mortality caused by bleaching and floods. However, there is evidence that existing no-take marine reserves have no positive effect on ecosystem response to large-scale disturbance (Graham, McClanahan et al. 2008). It is obvious that no amount of protection can actually prevent wholesale coral mortality from climate-induced temperature stress.

On the Great Barrier Reef, 33% of reefs are currently protected by no-take 'green' zones. While there is recent evidence that these reserves are working to promote fish stocks (Russ, Cheal et al. 2008), the landmark GBRMPA re-zoning could be refined further. Very little of the zoning was based on comprehensive ecological assessments (De Vantier, De'ath *et al.* 1998). In the Keppel region, only

Marine 'refugia' in the Keppel region of the Great Barrier Reef

six areas are currently fully protected from fishing. A further four high-use sites (only one of these coincides with a green zone) have recently been afforded further protection by the installation of small 'no-anchor' zones. The six Keppel green zones are generally low in coral cover and species richness, indicating that they are highly vulnerable to bleaching and freshwater influx. Although protecting vulnerable reefs has merit when management resources are not limited and the threat is mild, what is critical in a climate change scenario is to protect coral reefs that are already resilient to stress; those with higher coral cover and scleractinian species diversity, which have the capacity to seed regeneration on surrounding reefs, rather than focusing on reefs that are climate-vulnerable.

Historically, reef managers have focused on protecting reefs that are vulnerable to anthropogenic impacts. A reef management model that favours the diversion of resources to protecting vulnerable reefs is appropriate when the threat of impact is minor and resources are not limited however, it is highly likely that as the threat increases with climate variation, resources will restrict intervention to only a fraction of reefs (Schneider, Semenov *et al.* 2007). If this is the case then a triage model of management is more appropriate. The principle is based on the division of reefs into those that will not survive no matter what protection is put in place, those that will survive regardless of what we do, and those that will survive if timely and effective protective intervention is implemented. Thus, precious resources are not wasted in protecting reefs that will surely die. Managing reefs on the triage model will ensure that as the threat of impact increases resources are diverted to protecting sites which will ensure the wider reefs viability.

A range of protective measures could benefit the capacity of key coral refuges in maintaining the resilience of the wider reef community. These could include the establishment of no-anchor areas and reduction in the rate of extraction of both fish and marine invertebrates that graze on algae. In particular, coral collecting, which targets less abundant species could potentially reduce biodiversity in a refuge area. However, of particular importance is the part played by water quality. Over geologic time, runoff from land can be a stronger factor in shaping coral community structure than even temperature variability (Pandolfi 1999). Runoff not only damages corals, it also diminishes substrate quality for larval settlement and can lead to algal proliferation, which is a key factor for declining recruitment success (Mumby, Harborne *et al.* 2007). Inputs of sediment and nutrients from land have increased fourfold since European settlement (Williams 2001; McCulloch, Fallon *et al.* 2003). Wooldridge (2009) has established a quantitative linkage between terrestrially-sourced dissolved inorganic nitrogen (DIN) loading and the upper thermal bleaching thresholds of inshore reefs on the GBR. Wooldridge estimates that improved local management has a potential benefit that is equivalent to 2.0-2.5 °C improvement in temperature tolerance to inshore reefs that run the highest risk of damage from sediment runoff. Therefore, improved water quality in reef lagoons is one of the key protective measures to augment the capacity of reefs to survive climate change.

The way that we manage our reefs now is critical to Australia's future maritime security. Reefs protect our vulnerable coastlines and provide food, employment and recreation. On an international level, the collapse of critical marine food chains in surrounding regions could have flow-on effects for food and maritime security in Australia. It is vital that we do everything we can now to ensure that there are at least some pockets of reef that might survive the current pace of climate-induced change. This project offers a clear, practical model to identify those pockets.

Dr Alison Jones is a coral researcher with the Centre for Environmental Management at Central Queensland University in Rockhampton. After working for years in the dive and tourism industries, Dr Jones became involved in coral research because of her belief that natural resource management decisions should be based on scientific evidence of benefit.

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Is there a Better Alternative to the Current Rank Structure used by Navies?

BY RAY BELL

To ascertain an alternative to the current rank structure of navies, I will first review current rank structure. Then a look will be taken at contemporary navies such as the Royal Australian Navy, Royal Navy and the United States Navy and the various benefits offered through such structures such as historical importance and a basis for status development.

It is proposed here that current structures should be updated and modernised concurrent with technological advances.[1] A proposed model of a five tier system rank structure is more in keeping with modern organisations and business systems models. Not only does the rank structure need to be altered to allow for a flatter system with fewer rank structures to be more efficient and transparent, but methods of promotion needs to reviewed and be made more equitable. The way people are managed needs to updated to enhance the role of the individual, creating a more harmonious and effective team structure. The world is changing and the world of navies needs to change along with it by creating a new vision, strategy and practice for a new era.

Current Navy Rank Structure

Rank structure in the navy is the chain of command and it is composed of the delegated authority layers or ranks from the top to the bottom. Sailors at the lowest rank receive their orders from and report to the next layer. These ranks are given titles such as Admiral, Captain, Warrant Officer, Petty Officer, and Able Seaman. At the higher levels of the rank structure there is a greater concentration of formal supervisory power, lawful authority and responsibility than those at lower levels. With each higher rank, there is often a greater number of people under their command.

A variety of ranks from two different countries - Admiral Gary Roughead receives a tour of the bridge aboard the People's Liberation Army Navy type 920 hospital ship Daishandao while visiting senior PLA naval leadership in Qingdao, China (USN photo)

Current navy rank structures in western countries such as Australia have tall rank structures.[2] In the RAN there are 18 tiers that fall into two parallel categories of progression: non-commissioned and commissioned ranks. The RAN like many navies in the Commonwealth is based on the Royal Navy. The United States Navy with 25 categories is also a tall rank structure.[3]

Benefits of the Current Rank Structure

The traditional approach of organisational design and management of the Royal Australian Navy has been established on the principles of command, control and compartmentalisation.[4] This can be thought of as either a benefit or a disadvantage. As a benefit, this can be an attractive feature to potential new recruits who admire the historical structure and long held and well respected tradition of the navy. Similarly, the rank structure also may be seen as a source of status where pride is established in climbing the various ranks to higher levels of command and authority.[5] Such a hierarchical system with a lifetime career of continuous opportunities for promotion may appeal to personnel.

Proposed Model

The proposed model has five tiers rather than 18.

1. *Leadership/Expert Professional*: Senior level directors/managers develop and translate strategic objectives into tactical plans and

Table 1: Royal Australian Navy Non-Commissioned and Commissioned Rank Structure.

Non-Commissioned Ranks	Commissioned Ranks
	Admiral
	Vice Admiral
	Rear Admiral
	Commodore
Warrant Officer of the Navy	Captain
Warrant Officer	Commander
Chief Petty Officer	Lieutenant Commander
Petty Officer	Lieutenant
Leading Seaman	Sub Lieutenant
Able Seaman	Acting Sub Lieutenant
Seaman	Midshipman

lead core functions or expert level professionals.

2. *Management/Senior Professional*: Mid/senior level managers develop and implement operational plans for a functional area or highly seasoned professionals.

3. *Supervisor/Professional*: First line supervisors/mid level managers focused on the short-term execution of operational plans or entry to mid-level professionals. This layer ensures the delivery of services either by their own effort or through the supervision of others.

4. *Core Support Specialist*: Positions that provide administrative and/or technical support performing duties, functions and procedures that require specific knowledge, training and skills.

5. *Entry Level*: Initial training and development roles.

Benefits of Proposed Structure–Fewer Rank Categories to Improve Efficiency

Navies need to release themselves from excessive managerial levels and move to fewer hierarchical layers for an array of reasons. To reduce layers, would increase efficiency, increase transparency, improve communication channels, reduce narrowing of skills eventuating in increased productivity and saving money.[6]

The nature of tall rank structure itself is a principal obstacle to the *effective communication* of new values throughout the organisation.[7] This is because it consists of many thin layers, which add little or no value and disrupt synergy.[8] One of the most effective ways of developing responsiveness and enhance internal communication is to eliminate layers of bureaucratic management. These are responsible for information bottlenecks and complex decision loops. With fewer levels, information flows more naturally, problems get solved faster and decision making accelerated.[9] The duplication of managerial staff and multiple layers causes communication to slow down and creates excessive filters in the decision making process. They are often "in-betweeners" – not cognisant of any first hand information and are merely transmitters. Vertical rank compression will encourage the flow of ideas and influence from below.[10]

A reduced number of layers also enables *increased transparency*. There are less layers to allow those in a managerial role to keep delegating down the ranks and provides more accountability of tasks performed. There is a closer relationship between those that manage and those that carry out the tasks leading to greater responsibility as one can no longer keep delegating or blaming various other tiers when tasks are not completed appropriately. This enhances workplace efficiency. The margining of rank structure within the organisation will leave leaders and managers with more responsibility, more authority and greater spans of control.[11]

Fewer layers also *reduces narrowing of the individual's skills*. Rank structure limits discretion of core personnel, and standardizes procedures, often thinning worker duties and the use of skills.[12] Taller organisations centralise power and grant more power to senior personnel for most decisions rather than allowing workers to take on the certain decision making processes.[13] Taller organisations are more likely to measure maintenance related worker outputs rather than true reflections of particular skills obtained. Each of these organisational layers can be defined as reporting levels.[14]

Many major organisations such as Pepsi-Cola and Hewlett-Packard[15] have de-layerised and decentralised, thus requiring people to utilise a broader range of skills and take on new responsibilities.[16] They learn to exercise judgement and develop self-regulated control. This improves efficiency and can be more rewarding to the individual.

Benefits of Proposed Structure – A More Equitable Set of Criteria for Promotion

A promotion is traditionally viewed as advancement from one rank to another of greater authority, impact, complexity, responsibility and income. As such, a promotion increase should be larger than a normal merit increase or annual cost of living.

It is important to change the advancement criteria so that personnel are paid for performance and promoted for ability. The traditional practice

Non-Commissioned Ranks	Commissioned Ranks	Proposed Ranks
	Admiral	Leadership/Expert Professional
	Vice Admiral	
	Rear Admiral	
	Commodore	
Warrant Officer of the Navy	Captain	Management/Senior Professional
Warrant Officer	Commander	
Chief Petty Officer	Lieutenant Commander	Supervisor/Professional
Petty Officer	Lieutenant	
Leading Seaman	Sub Lieutenant	Core Support Specialist
Able Seaman	Acting Sub Lieutenant	
Seaman	Midshipman	Entry Level

Table 2: Royal Australian Navy Non-Commissioned, Commissioned and Proposed Rank Structure.

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indicates that anybody who can work well can manage. However, this should not be the main criteria. For example, if a Seamanship Officer is a great Officer of the Watch, conventional thinking in navies indicates that they will be a good manager. That is not necessarily true and this promotion could result in acquiring a bad manager at the cost of a good Officer of the Watch. Advancement to another job within navies should be the result of ability required for the next level, not performance in a particular category alone. It should be a progression for those that hold the necessary skills for the next level.

In a flatter organisation, promotion is not just based on the basis of 'years in service and along the hierarchical line'. It focuses on personnel gaining relevant experience through job rotation and developing knowledge and skills through education, training and regular assessment. This helps to get the right person in the right place, which is important for the relationship between employees and employees and management.[17]

What is proposed is that all personnel interested in joining the Navy, enlist at the basic entry level regardless of employment specialisation. Therefore, all personnel receive the same initial training prior to specialisation. Here they are inculcated with the same core values and underpinning organisational knowledge. After completing and consolidating training in their primary specialisation, they can then nominate for selection as a manager. All candidates are then assessed on their merit in competition with their peers and promoted in a linear fashion. This results in a greater pool of personnel to actually complete the real work and avoids the pitfalls of personnel shortages at the core level. Personnel are renumerated on the skill for their category, knowledge and experience.[18]

Where possible, miniaturisation of the existing structure can occur by reclassifying upwards or downwards.[19] Changing the architecture of rank by amalgamating existing management groups such as Lieutenant and Petty officer will improve the work process flow and avoid duplication. By providing education, training and skills closely linked to pay incentives and reward systems, will intrinsically encourage training and development and lead to a better skilled navy.[20] This structure provides various pay grades and levels to maintain the navy's ability to differentiate their workforce whilst providing incentive for upskilling. There should be remunerative increases for motivated personnel. But since flatter organisations offer fewer opportunities to move up the ladder, wider salary bands allow people to earn salary increases without necessarily changing job titles.

The roll-out of Royal Australian Navy Graded Other Ranks Pay Structure is a step towards such a salary restructure. This remuneration reform project in rationalising and modernising military pay structures allows greater flexibility to reward personnel according to their work contribution, whilst meeting new and continuing capability requirements. Organisations with remuneration

The present rank structure is fairly common across nations - Vice Admiral Tohru Izumi, commander in chief, Self-Defense Fleet, Japan Maritime Self-Defense Force sits at ship's control panel aboard USS Seawolf (USN photos)

reforms established can de-emphasise upward mobility and offer new reward mechanisms associated with an individual's personal, professional and career development. The structure with wide salary bands often emphasises career development and lateral movers within and across functions. As such, an employee could spend many years in one band, earning more and more money, gaining new skills and taking on greater responsibilities.

Thus a means for promotion needs to also be reviewed so it remunerates the motivated, skilled and qualified first and foremost irrespective of those who have been in service for certain number of years. This makes it more equitable, and also creates a more capable Navy.

Benefits of the Proposed Structure – Enlightened Management and Driving Decisions Lower

One of the main benefits of a flatter organisation is that it requires enlightened management to provide more of a mentoring role, drives decision making and responsibility to lower ranks and improves group performance as it enhances the role of the individual.[21]

A high-involvement organisation or egalitarian structure genuinely empowers subordinates.[22] Tall rank structures impede group processes, damages knowledge creation, impacts on performance and harms workers. One layer groups of four members solve more problems than two layered, four member groups.[23] Furthermore, a division of labour arrangement with three members outperforms both a two layer hierarchy and a committee.[24] Egalitarian groups operate with greater candour, collaboration and participation. Moreover, they foster entrepreneurship, innovation and increase productivity.[25]

There is a negative relationship between rank structure and group processes. Rank structure encumbers the performance of small groups of roughly less than five members.[26] Groups with one layer of rank structure solve problems more quickly and take more risks than two layered groups.[27] Tall rank structures create more tension and conflict in organisations.[28] Hence organisations with fewer tiers appear to be more effective and efficient with less stress created.

As in any structured organisation, traditional authority is met with skepticism or resentment.[29] Tall rank structures negatively impact on people's attitudes and perceptions. We can no longer assume a coincidence of interest between the worker and the organisation, but with some ingenuity mutual interests can be created.[30] If we accept the premise that people are essentially contractors of their services in the workplace, then the solution to enlisting their cooperation is to create collaborative projects that enhance their professional development while advancing the strategic objectives of the organisation.[31]

People will work more enthusiastically if it is clearly going to benefit their career.[32] The focus of the art of leadership shifts from directing, correcting and instructing to facilitating, coaching and enabling. Currently, the navy supervisors design and allocate work. They supervise, monitor, control and check work. In a de-layered workplace, the new work teams do that for themselves.[33] Managers change from a dictatorial supervisory role to becoming a coach, mentor or a facilitator. This will allow them to supervise a greater number of personnel to enable workers and provide advice to help solve problems.

A new lean rank structure provides recognition for members on a number of fronts, such as leadership ability, merit, qualifications and experience. It also aids retention, which is one of the most confronting issues for commonwealth naval forces. A new rank structure needs to be developed to ensure that skills and expertise of personnel are not lost to the Navy, and incentives are developed to retain experienced personnel.

Such enlightened management approaches would empower the individual without necessarily compromising on respect for more senior personnel.[34] This would aid in retention and continue motivating the workforce as there is more alignment of organisational goals with personnel goals.

The question of an alternate rank structure is a difficult one to answer. Times are changing and so too are organisational structures to help improve efficiency and effective management. Navies throughout the world are based on historical structure steeped high with tradition. The proposal outlined here is not only describing a means for a revision of current rank structure, but along with that is the need to review also the means for promotion and how to manage in a more facilatory role rather than the old style dictatorial way.

The benefits for such proposals have been discussed, but the main arguments for such a proposal are that it improves efficiency, is more cost effective, is more rewarding for individuals and would aid in retention of personnel. Though the change proposed is quite radical, it would be important that navies do update themselves and modernise in order to reap the above benefits for the future.

Ray Bell has had a long association with the Royal Australian Navy.

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Bligh after the Bounty: Flexible & Personable Leadership Qualities in Tandem with Naval Officers' Professional Competencies

BY MIDSHIPMAN WILLIAM H JACKMAN

In 1787 Lieutenant William Bligh RN, a British Naval Officer, recently sailing master to Captain James Cook on his South Pacific voyages, was commissioned by the British Admiralty to undertake a voyage in His Majesty's Armed Vessel Bounty (often referred to as HMS Bounty).[1] The goal of the voyage, organised by Sir Joseph Banks and other scientists, was to obtain breadfruit plantings to be taken to the Caribbean where they would be transplanted to provide food for those colonies.

After a long stay in Tahiti to enable gathering and stowing of breadfruit plantings, the Bounty began its voyage to the Caribbean and then back to England. On 28 April 1789, led by Master's Mate Fletcher Christian, 12 of the crew staged a mutiny, capturing the ship, and setting Bligh and his supporters adrift in the ship's launch.

The Bounty was sailed to Pitcairn Island, where it was deliberately wrecked and burnt. Bligh and the others survived their voyage to what is now Indonesia, and were eventually taken back to Britain. A vengeful Navy sent out forces to capture the mutineers, and several were brought back and executed.

The mutiny has been the subject of at least five films and thousands of books and papers. Christian and his friend's descendants live on Pitcairn Island to this day.

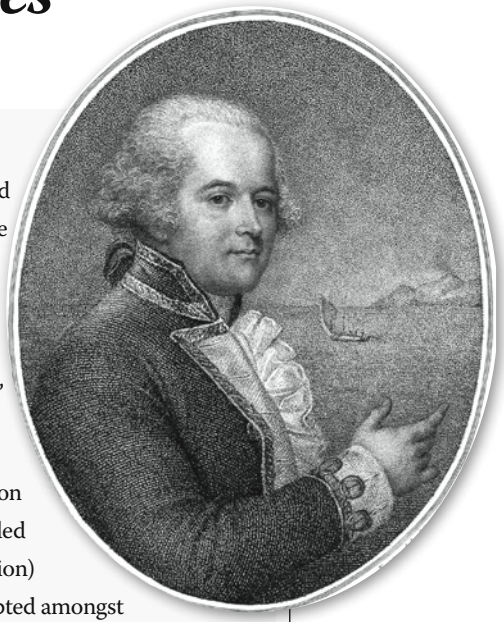
1 A vessel with the prefix HMS was commanded by an officer rated as "master and commander" and who generally was given such a rank because his vessel was capable of lying in the line of battle; that is, being one of the First to Sixth rate of ships described by the Admiralty. Bligh was the only officer on board a cutter, which lay outside the rating system.

William Bligh RN (1754-1817) had an extraordinary naval career, equally juxtaposed between achievement and controversy, both personal and professional.

Far from simply being "that *Bounty* bastard"[1] of popular historical renown, his professional achievements and overall contribution to naval and wider history were many. For instance, Bligh made important and longstanding contributions to the sciences of navigation,[2] natural history,[3] botany[4], and engineering.[5] Moreover, as an individual mariner, he commanded one of the most extraordinary open boat voyages in recorded history; served with distinction as a fighting captain in several naval[6] engagements; and also undertook the daunting responsibility of becoming Governor of the fledgling colony of New South Wales.

Conversely, however, William Bligh was in some way involved in, or responsible for, an equally extraordinary number of professional disputes and quarrels with individual associates and subordinates. Moreover, at a wider level, several outright insurrections, mutinies, and rebellions occurred amongst those in his charge, arguably predominantly as a result of Bligh's leadership characteristics.

But neither professional competency, nor courage - two of the core tenets[7] by which a competent officer is judged, were in any way in deficit in Bligh's character. Secondly, and in contrast, a dearth of effective leadership and interpersonal skills directly contributed to the three mutinies, numerous minor grievances, and especially, one rebellion (the so-called rum rebellion) which erupted amongst Bligh's subordinates at well-separated periods during his tenure as an officer of the Royal Navy.



Through the medium of the professional career of William Bligh, paying especial attention to his time as Governor of NSW, it is possible to demonstrate that professional competency in a leader alone - even when supported by valued and inspiring personal qualities such as courage, honour, determination, and stringent discipline - can in no way ensure loyalty or fellowship amongst subordinates, particularly if the leader lacks effective levels of charisma, interpersonal communication, and empathy with subordinates, as was repeatedly demonstrated by Bligh RN.

HMAS Collins and the modern Bounty replica (Courtesy RAN)

COURAGE AND COMPETENCY AS A NAVAL OFFICER UNDENIABLE

Bligh exhibited and combined a high degree of personal courage and professional competency, as a leader, throughout his long career as a professional naval officer. This is evidenced several times over. As captain of *HMS Director* in 1797, Bligh brazenly engaged three heavily-armed Dutch warships. Through excellent seamanship, command, and tactical brilliance, Bligh caused the Dutch to suffer serious casualties and damage, whilst only seven seamen were wounded in *Director*.[8]

Bligh's courage and competency were again validated at the Battle of Copenhagen in 1801. At this engagement, Bligh demonstrated a high degree of level-headed professional skill by safely navigating his ship *HMS Glatton* safely between narrow banks whilst three other vessels ran aground. Bligh undeniably demonstrated both courage and fighting spirit on the very same day. When Admiral Nelson famously pretended not to be able to see Admiral Parker's signal "stop the battle", and instead kept the signal "continue the engagement" hoisted, Bligh was the only captain in the squadron who could see that the two signals were in conflict. By choosing to repeat Nelson's signal, he ensured that all the vessels behind him kept fighting.[9]

Perhaps most telling of all was Bligh's conduct following the mutiny aboard HM Armed Vessel *Bounty*. Bligh certainly showed courage by violently protesting in the face of the loaded muskets of the mutineers.[10] Moreover, once bound and physically forced into an open launch, Bligh displayed a feat of maritime professional competency that has, arguably, never been equalled. The successful 3, 618 nautical mile journey, in a cramped seven metre vessel, without compass or charts, and with all sorts of other trials to be overcome, was a truly extraordinary display of navigational skill and seafaring accomplishment.

Bligh showed his tenacity and high sense of duty by transporting breadfruit from Tahiti to the West Indies, this time successfully, from 1791-1793.[11] Finally, as governor of NSW some years later, Bligh took decisive and effective action to organise the distribution of flood relief and other assistance for the hard-pressed citizens of the colony.[12]

HMS Bounty leaves Greenock on the River Clyde, UK (Public domain)

POOR INTERPERSONAL SKILLS CONSISTENTLY DEMONSTRATED

Although demonstrably not lacking in either professional competency or personal courage, Bligh consistently displayed an inability to effectively interrelate with people. In fact, Bligh never appeared to possess a sense of empathy or effective two-way communication in his entire career, as evidenced by a long list of recorded grievances from superiors, equals, and subordinates alike.

In addition to the well documented mutiny on the *Bounty*, Bligh was also linked with the mutinies at Spithead and Nore (both 1797). Although found not to be directly responsible, Bligh's personal demeanour did nothing to help avert the unrest:

The stern windows of Bounty (Tom Lewis)

> *"Bligh was. . . extremely hot-tempered; he swore well and vigorously and was infuriated by any incompetence shown by his subordinates. . ."*[13]

Bligh's tomb in the garden Museum of Britain (Public domain)

In 1804 Bligh ordered the immediate arrest of one of his lieutenants for neglect of duty, even though the man had suffered an injury that made him unfit for duty. Such incidents continued to occur, perhaps increasingly so, during Bligh's tenure as Governor of NSW, during which time the infamous 'Rum Rebellion' took place, arguably as a result of poor leadership and Bligh's unyielding and

Bligh after the Bounty: Flexible & Personable Leadership Qualities in Tandem with Naval Officers' Professional Competencies

proud personality.

On the voyage to NSW to begin his tenure as governor, Bligh quarrelled incessantly with an associate, thus displaying what the associate described as "an unfortunate capacity to breed rebellion."[14] Furthermore, as Governor of New South Wales, Bligh was to find that:

"…his zeal to obey orders, his anxiety for their immediate and unquestioning execution, and his apparent unwillingness either to modify his policy or to initiate action without authority, would meet stronger opposition than on the quarter-deck of any of His Majesty's ships."[15]

Moreover, Bligh failed to lead by example. That was by proudly proclaiming to run a 'model' farm within the colony, when in fact the high profits generated were due to the government paying for all stores and flocks, something which the average farmer could in no way count upon. Not only did this cause resentment but, in addition, Bligh suspended one D'Arcy Wentworth for employing 'invalids' from the hospital to work on Wentworth's own private land. Bligh then refused to tell Mr. Wentworth his reasons for doing so.[16] Such actions and behaviour continued to increase the opposition raised to his otherwise much needed and efficient reforms.

Bligh continued to annoy and frustrate the people of the colony, especially the officers of the New South Wales Corps, with his constant interference in their concerns and his abuse of its members – the irascible John Macarthur was only one of many. In short, Bligh successfully and repeatedly antagonised, through his poor interpersonal manner, a number of leading men in the colony, thus unwittingly forming the catalyst for open insurrection.

Even following the rebellion, having being forcibly removed from power, and thereafter making an escape to Hobart on *HMS Porpoise*, Bligh:

'…interfered with boats on the river, stirred up local animosities and became such an intolerable nuisance that his conduct was found to be "unhandsome in several respects"'.[17]

Bligh was an unfortunate choice for governor because, despite a truly outstanding record as a navigator, mariner, and tactician – to name just three of his professional skills - he clearly lacked sufficient inter-personal skills, and in endeavouring to uphold the law he precipitated a major crisis.

The crisis was, in fact, the only successful armed takeover of government in Australia's recorded history. Bligh's inflexible personality and method of relating with others, given the evidence, almost certainly contributed greatly to such a regrettable state of affairs for the colony of New South Wales, and indeed the history of the nation.

It can be ascertained, therefore, that leadership is indeed inextricably linked to personality and character, and can essentially never be measured by professional competency alone, no matter how impressive that competency may be.

Midshipman William Jackman RAN lives in Cairns, Queensland. Formerly a primary school teacher, he joined the RAN for the excitement, adventure, and career opportunities that only the defence force can offer. Midshipman Jackman had an ancestor on the infamous Bounty voyage, hence his choice of Captain Bligh as an essay topic.

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Fairey Firefly VX381

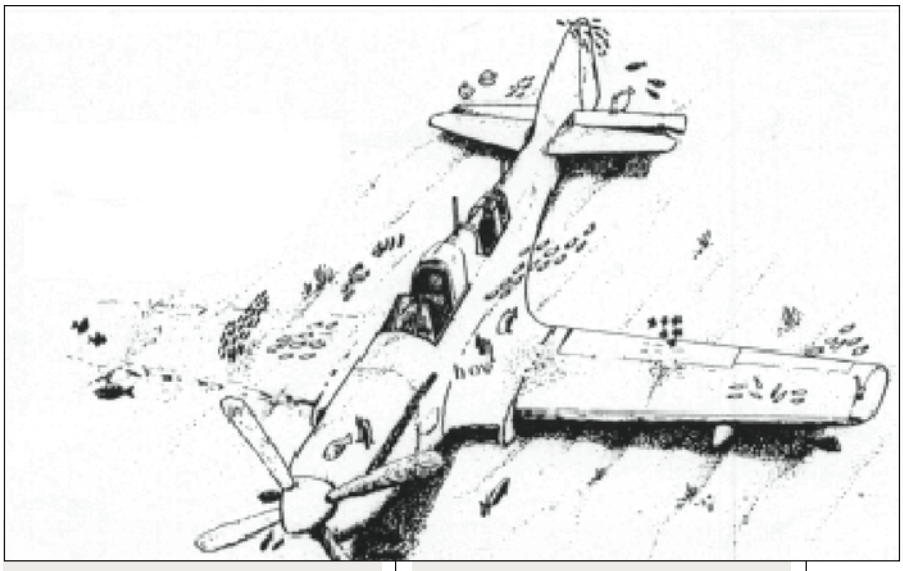
BY MIDSHIPMAN NICK O'BRIEN

Jervis Bay Marine Park is home to many different forms of marine, animal and bird life. It is government protected and treasured by all who come to live there or visit it. With its quiet sleepy towns, picturesque bushland, white sandy beaches and crystal clear waters, it is a place that touches all. Be it on land, on or under the sea, "JB", as it is affectionately known by the locals, is a special place. It is also home to the Royal Australian Naval College. On a daily basis various forms of naval ships and aircraft can be spotted cruising on the bay or circling from above. The residents love the area and want it preserved, as does the Navy.

Throughout the many years the Navy has been located in the area, few incidents have occurred involving naval aircraft, but one in particular concerned Fairey Firely VX381 in 1956.

The Firefly was a carrier borne anti-submarine torpedo bomber which first flew in 1941.[2] From 1948 until 1966 the Royal Australian Navy operated two versions of the Fairey Firefly, Mark 5 and Mark 6. Squadrons 816 and 817 were onboard the aircraft carrier *HMAS Sydney* and they were also based at *HMAS Albatross*. Squadrons 723, 724, 725 and 851 were used for training at *Albatross* and they also saw action during the Korean War when operating onboard *Sydney*. It is possible that VX381 saw service in the Korean War on the *Sydney*. In March 1953, 20 new Fairey Fireflies were delivered to the RAN. The planes were deployed to *HMAS Vengeance.*[3]

On 27 November 1956 four aircraft from 851 Squadron, part of the Fleet Air Arm of the RAN, based at *HMAS Albatross* at nearby Nowra, were part of a training mission to familiarise crews with a navigation technique that allowed them to determine the wind speed and direction and thereby fly to the aircraft carrier after a mission. After training to seaward of Jervis Bay the four aircraft were to rendezvous near the bayside town of Huskisson before flying back to *Albatross*. VX381 and WD887 were flying circles in opposite directions when they had a mid-air collision, during which the starboard (right) wingtip of VX381 collided with WD887 that tumbled and crashed into Jervis Bay near Huskisson. About one third of VX381's wingtip was gone, and it continued flying north-east for a short time during which the pilot made a Mayday radio call and then ditched it in the northern area of Jervis Bay where it quickly sank. Within minutes of the Mayday a Bristol Sycamore helicopter was despatched from *Albatross* to the area and recover the crews.



Sketch of VX381 Wreck[1]

CREWS

VX381

Pilot:

Acting Sub-Lieutenant Eagles, RN

Observer: Midshipman Don Debus, RAN

WD887

Pilot:

Acting Sub-Lieutenant Rundel, RN

Observer: Midshipman Foggety, RAN[5]

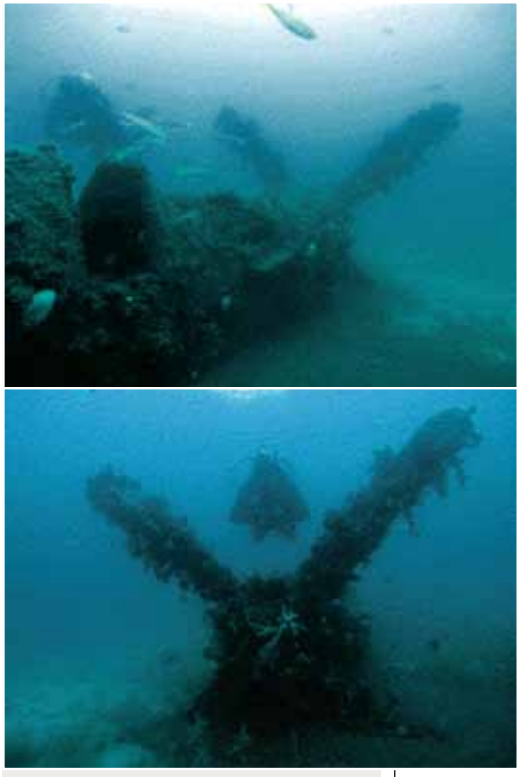
Both Acting Sub-Lieutenant Eagles and Midshipman Don Debus were rescued, but the bodies of Acting Sub-Lieutenant Rundel and Midshipman Foggety were never found.[6]

VX381 was re-discovered in 1982 by a local scuba diver, Charles Pickering, and has become a popular diving site - the position of WD887 in Jervis Bay is unknown.[8] The wreck is upright with the right wing barely buried in the sandy bottom. The aircraft is largely intact. The propeller and tail planes are visible on high definition sonar. VX381 is located in just 13 meters of water, although difficult to detect due to its low relief. The NSW Heritage Office obtained GPS (Global Positioning System) coordinates for the wreck following a successful magnetometer survey in 1995. Navy personnel stationed at *HMAS Creswell* proposed an additional survey in 2002 (Lewis, 2002:9). Unfortunately divers have recovered many of the cockpit instruments over the years.[9]

The Firefly wreck is a unique dive, not only because it's an aircraft, but because of its good condition. The cockpit is open, though half filled with sand, with the navigator's sliding window now firmly

Fairey Firefly[4]

Fairey Firefly VX381



Above: Underwater photos of VX381[10]

Top left: Location of VX831, Hare Bay, just off Callala Bay[7]

closed. Alas, all the cockpit instruments have been ripped out and are no doubt sit gathering dust in the back of someone's shed….. The starboard wing sits under the sand so it's not possible to see the extent of the reported damage to it… This could perhaps be a small project for a few people with full tanks, a small brush and a gentle touch.[11]

There are not a lot of surviving Fairey Fireflies left in the world. The current number of viewable aircraft is 24, including three that are airworthy and at least one that has been completely restored to flying condition. One of these is at the Naval Aviation Museum at *HMAS Albatross.*

In the turbulent times we live in, all the world's militaries are constantly under the spotlight and the RAN is no exception. With all the many good things the Navy does it always seems to be the limited amount of unpleasant things that make most of the headlines. In relation to my introduction where I was focusing on the beauty of Jervis Bay and the need to keep it that way, also the strengthening of relationships between the RAN and the residents and visitors of "JB", I believe the story of VX381 and WD887 is an important one. The RAN could have recovered the crash site in the guise of "National Security", but instead, they chose to leave the crash site where it is and in return hundreds, if not thousands, of people on dive trips, dolphin cruises or even having a bite at the "Husky Pub", may hear the tragic story of VX381/WD887 collision. Hopefully one day the site of WD887 will be found and these brave men's lives will be immortalised for years to come as a constant reminder to all that hear it, that the men and women of our entire Defence Force deserve respect for putting their lives on the line, every day.

Midshipman Nick O'Brien RAN was at the time of publication undertaking Phase 1 JWAC training at HMAS Watson. Before joining the navy he spent 15 years in the acting industry after receiving a diploma in theatre. Through those years he completed many TV commercials, short films and theatre roles, as well as working for five years as a tour guide and co-ordinator on The Sydney Harbour Bridge with Bridgeclimb.

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OBITUARY:
Commodore Allen Nelson Dollard

BY MICHAEL FOGARTY

As a young officer, "Bollard" was renowned throughout the fleet for his consistent reputation. He was charged by naval tribunals in three successive years, from 1939 to 1941. The first at a disciplinary court, he was then twice court-martialed. His offences included breaking leave, striking a British army provost martial at a cabaret in Alexandria and missing his ship on sailing from Melbourne. He had guts too. When a sailor fell off a ship-side painting-stage, he dived into the water to rescue him. Yet his career resumed and he retired as a much decorated flag officer. He was a witness and participant in much of the history of the Royal Australian Navy from 1932 to 1973.

Commodore Allen Nelson Dollard, aged 92, died on Christmas Eve 2010. Encouraged by his mother, he joined the Royal Australian Naval College in 1932. Allen (also known as "Ed") was born on 23 July, 1917 at Prospect, South Australia. His family farmed at nearby Mannum and he was the youngest of eight children, four boys and four girls.

On graduation, Ed served in *HMS Repulse* during the pre-war Palestine campaign. A Roman Catholic, he viewed the stable where Christ was born. He then served in *HMAS Sydney*, in the Mediterranean, when his ship out-gunned the Italian cruiser, *Bartolomeo Colleoni*. He was dismissed from Sydney before her own sinking in late 1941. It was a personal tragedy, for he knew most of those onboard. He lost many good mates.

Allen served in *HMAS Australia* from 1941 to 1944. He was high up the mast, directing fire, during the Battle of the Coral Sea. He then served in *HMAS Warramunga* from 1944 to 1947, fighting for the liberation of the Philippines and in the occupation of Japan. Commodore John Collins wryly observed: "Six years of war have effected a great improvement in this officer". He needed responsibility, not punishment. In 1947, he married a wartime WRAN code-breaker, Lesley Joan Davis. They had two children.

Lieutenant-Commander Dollard then served at *HMAS Cerberus* before being appointed as the commanding officer of *HMAS Murchison* in 1950. During the Korean War, he took part in the battle for the Han River, from 1951 to 1952. He was awarded the Distinguished Service Cross and the US Legion of Merit (officer). For his coolness during many

OBITUARY:
Commodore Allen Nelson Dollard

Frigate HMAS Murchison served in Korean waters from May 1951 To January 1952 rendering distinguished service in the Han Estuary (Photo courtesy RAN)

"warm moments", a British admiral unofficially dubbed him "Baron of the Han". His naval percussion on the river was audible at the cease-fire conference tables.

On return to Australia, now a commander, Allen held several staff positions before joining the carrier *HMAS Sydney*, as its executive officer, from 1955 to 1956. It was his last sea-going appointment. For his medical category, he reverted to the "dry list", as further service would be ashore. His selection as the Australian Services Attaché in Saigon, from 1956 to 1958, was an inspired choice. His talent as a naval diplomat was much respected. His intelligence reports on Indo China were instructive. "The taxis are small and uncomfortable, but the price is fixed. The taxi-girls are also small, but comfortable, and the prices depend on how far you want to go."

After Vietnam, Dollard held more senior staff roles in Australia before returning to the Foreign Service. In late 1961, now a captain, he was attached to the Australian Embassy in Tokyo. During the next two years, he facilitated many ships' visits. He was dismayed by Captain Duncan Stevens, whose drinking problems brought disrepute to his ship and service. In 1964, *HMAS Voyager* was lost at sea; her captain with it, and his personal conduct was later ruled as a contributing factor. Stevens was unfit for command.

Allen ran *HMAS Penguin* throughout 1964. External Affairs needed him back in Asia, to discharge a politically sensitive assignment, to head the Royal Malaysian Navy, as its chief of naval staff, from 1965 to 1967. Promoted to acting commodore, he was last RAN officer to do so in that role. It was not without controversy. He assumed charge at the height of the war. Indonesia was in free-fall. A proud people had surrendered their nationhood to its errant leader. Their newspapers criticized Ed's appointment as evidence of Australia's complicity in a so-called neo-imperialist plot. Australia was also dismissed as a lackey. There was still much work to be done to keep an uneasy relationship on keel.

President Sukarno had launched an ill-conceived plan of "confrontation" with Malaysia. He vowed the destruction of Malaysia "by the time the cock crows on January 1, 1965". By then, Dollard had mastered the diplomatic nuance, for he was not an easy man to deceive. He conceded that this demagogue was talking arrant rubbish. At confrontation's end, Dollard was still in the building. It was Sukarno who had left the stage. Relations with our neighbor improved. Indonesia had re-claimed its own history. Ed returned to Australia in late 1967, twice decorated by the Malaysians for his role.

Reverting to captain, Dollard commanded *HMAS Albatross* for the next three years, until he resumed his one star rank as commodore on his posting to the Sydney naval command in early 1971. He was chief of staff to the Flag Officer Commanding East Australia Area at Garden Island, and retired in early 1973 after 41 years service. His "salted" diet, and concern for his wife's health, ensured annual visits to Magnetic Island, Queensland. They also lived at Neutral Bay before moving to Narrabeen. His beloved Lesley (also known as "Cissy") died on June 22, 2007.

Allen Dollard was the father of Simon and Sandal. He is also survived by his sisters Molly and Daphne of Canberra. Simon also joined the navy and served as a midshipman in *HMAS Sydney* off Vietnam.

Lessons in Maritime Counter-Insurgency

BY SERGEI DESILVA-RANASINGHE

The Sri Lanka Navy's (SLN) recent spectacular success against the Sea Tigers, the now defeated maritime wing of the Liberation Tigers of Tamil Eelam (LTTE), was in large measure due to the enhancement of its littoral warfare capabilities emphasized by its Rapid Action Boat Squadron (RABS).

Evolution

The genesis of the RABS took root during the Norwegian-moderated Ceasefire Agreement (2002-2006, CFA), when the temporary lull in hostilities enabled the SLN to rethink its strategy to counter its most formidable threat, the high-speed suicide attack boats manned by a subunit known as the Black Sea Tigers.

During previous phases of conflict, namely Eelam War 2 (1990-1995) and Eelam War 3 (1995-2002), particularly after the formation of the Black Sea Tigers in 1990, the Sea Tigers steadily expanded and developed capabilities that enabled it to openly challenge the SLN. The older models of SLN Inshore Patrol Craft (IPCs), which were mostly manufactured in Sri Lanka, were frequently outgunned and overwhelmed by superior Sea Tiger firepower, tactics and boats. In addition, the powerful Israeli-built Dvoras, which formed the backbone of SLN Fast Attack Craft (FAC) squadrons, found it challenging to confront Sea Tiger clusters of 20-30 heavily armed small boats, which included 5-6 suicide boats with powerful outboard motors.

As suggested by the previous SLN Commander Admiral Wasantha Karannagoda to the government-owned Daily News, who led the SLN from 2005-2009: "Whenever, we had sea battles, the LTTE used to outnumber us. For example," he says "when we put 15 FACs the LTTE put 30 high-speed boats mixed with suicide boats. In this situation, if we miss a suicide boat, that will be a huge threat for us." As such, the combined use of Black Sea Tigers and swarming tactics led to regular SLN losses.

During running engagements and sea battles, the Sea Tigers tried to force Dvora's towards the coastline where they were vulnerable to attacks from high-speed suicide boats. The loss of a Dvora, Super Dvora and other types of FACs was considered a major setback, which apart from monetary value, also entailed the loss of over 12 experienced crew members. Due to the limited numbers of Dvoras the SLN possessed and also the cost of purchasing Dvoras (each valued at around US$10 million inclusive of operational configurations); the SLN simply lacked the funds to expand its fleet, which compelled it to examine other alternatives.

Formation

During the CFA, efforts were made to study Sea Tiger boat designs as part of a renewed SLN interest in developing a modern seaworthy IPC capable of countering the Sea Tigers. This process was given a significant boost with the election of Mahinda Rajapakse as Sri Lanka's President in November 2005, who in the face of escalating LTTE aggression, presided over the largest reorganization of the military in Sri Lanka's history. Upon assuming office, Gotabaya Rajapakse – a retired Colonel and reformer – was appointed to the key post of Defence Secretary to oversee the military's transformation, which included the appointment of experienced and aggressive commanders to lead each military arm. As such, Admiral Karannagoda, then a Rear Admiral and a leading proponent of transforming the Navy's way of war, was promoted in late 2005 to command the SLN. Accordingly, detailed analyses were conducted, examining the Sea Tigers' capabilities with particular emphasis on the specifications of its four main boat designs, namely the 10m *Muraj*, the 8m *Sudai,* the 6m *Thrikka* and the 6m *Idayan*.

As such, throughout 2006, designs and moulds that emulated Sea Tiger boats were made, which culminated

Lessons in Maritime Counter-Insurgency

into an initiative to mass produce a new range of IPCs in what the SLN coined as the 'Small Boat Concept'. After an extensive trial period, by mid-2007 SLN marine engineers designed and produced the 'Arrow' model IPC in three versions.

According to *Janes Navy International,* the two largest Arrow versions were respectively armed with a 40mm automatic grenade launcher and either a double-barrelled 23mm gun or two 12.7mm machine guns, and fitted with four 250hp engines that enabled a top speed of 37kt. The smallest version of the Arrow IPC was armed with an automatic grenade launcher, a 23mm gun or a 12.7mm machine gun and fitted with two 250hp engines which enabled a top speed of 35kt. Previously, the SLN seldom manufactured its own boats, but instead purchased vessels from Israel, India and also, from two local manufacturers, namely Colombo Dockyard Limited and Neil Marine Limited. Aptly, what made the RABS unique was that its vessels were entirely manufactured by the SLN in large numbers and at low cost.

After much consideration and deliberation, the formation of the RABS in September 2007 signalled the SLN's intent to augment its brown water capabilities to supplement the Special Boat Squadron (SBS) and FAC squadrons. Prior to the formation of the RABS, the elite SBS, which specialized in amphibious warfare, was the Navy's main unit that engaged in riverine and inshore operations. Each RABS vessel had a minimum of 2-3 sailors per boat and 60-70 sailors were initially chosen from hundreds of volunteers, the majority of whom were applicants who were unable to meet the selection criteria into the elite SBS, but had adequate fitness and skills to be assigned to the RABS.

The SLN sought to rapidly expand its Arrow IPC fleet as the exigencies of warfare demanded faster production, hence, as mentioned by Admiral Karannagoda to the Daily News, the SLN embarked on a round the clock crash program to build new IPCs: "These small boats carried the same punch as Dvora crafts. We improved constructing boats, every ten days a boat was completed. We imported engines and weapons for them. Then, we were able to put larger number of boats in the battles to counter the LTTE tactics by doubling our boats against the LTTE boats." He further elaborated on the state-owned Independent Television Network (ITN) that Arrow IPCs "were equipped with modern weaponry and night vision cameras which enabled us to literally see the battle they were involved in and direct them from our Operations Room in Colombo."

Operations

Initially, in 2007, nearly 20 IPC units were deployed near Nilaweli, north of Trincomalee, but by October 2008 RABS units were deployed in strength at another four strategic locations, namely Point Pedro, Kilali, Nayaru and Pulmoddai. The high-speed of Arrow IPCs ensured units could rapidly amass a force of 25-35 IPCs and due to its ability to operate in conditions reaching Sea State 3, there was also operational flexibility for RABS units to enter and operate in territorial waters. The advantages of the Arrow IPC was its low profile and radar signature, which made it harder for the LTTE to track their movements and also enabled RABS units to retain the element of surprise. Another advantage was that Arrow IPCs also tended to cause confusion in close-quarter sea battles and engagements against Sea Tiger clusters, due to its resemblance to Sea Tiger vessels.

The mass production of Arrow IPCs easily replaced losses in battle,

where from July-2007 to September 2008, according to the Asian Tribune the SLN built 100 Arrow IPCs, and by the end of the insurgency in May 2009, the RABS comprised of over 400 servicemen with over 200 boats. Its expansion and deployment had a worsening impact on Sea Tiger operations and capabilities, as with each passing year the RABS inflicted heavier casualties.

Cumulatively, by September 2007 the SLN made significant gains against the Sea Tigers: "During the last two years SLN was able to destroy…nearly 40-50 Sea Tiger boats and inflicted heavy damages to many boats. It is estimated that approximately 800 Sea Tiger cadres perished in these naval battles, which included a large number of senior Sea Tigers and Black Sea Tigers," stated Admiral Karannagoda to the government-owned *Sunday Observer*. Consequently, especially after 2007, the Sea Tigers often sought to actively avoid combat with the SLN, and were less likely to engage in offensive operations unless it appeared that the odds were in their favour. Hence, in 2006 there were 21 major engagements with the SLN; in 2007 there were 11; and in 2008, only two.

In essence, the SLN countered the swarming tactics of the Sea Tigers with counter-swarming tactics on a larger scale, but with better boats, weaponry and firepower, which ultimately overwhelmed the Sea Tigers. Hence, the impact of the RABS units saw the Sea Tigers seldom able to venture into Sri Lanka's territorial waters, which hindered its operational flexibility to launch attacks, amphibious operations and even smuggling/shuttling operations between Sri Lanka and the southern Indian state of Tamil Nadu. Eventually, the expansion of the RABS was one of the major contributing factors that eventually turned the tide against the Sea Tigers.

Throughout Eelam War 4 (2006-2009), the SLN claims that the Sea Tigers in total lost over 300 boats of various sizes and perhaps around 1000 personnel, which led to a critical shortfall of veterans and sophisticated boats. In human and material terms, the Sea Tigers could not replace their losses, notably its veterans. In fact, as quoted in the *Sunday Leader* the SLN claimed to have eliminated throughout the entire insurgency 295 Black Sea Tiger suicide attack boats out of an estimated total of 400 Black Tiger suicide attacks conducted on land, air and sea. The Sea Tigers' capabilities were also further diminished by the high attrition rates among frontline LTTE units engaged in land warfare; which forced the LTTE to redeploy increasingly larger numbers of Sea Tigers in ground operations as the counter-insurgency campaign intensified. Also, the destruction of eight LTTE warehouse ships ensured, according to the SLN, that replacement equipment and spare parts necessary to sustain heavy operational commitments were unable to be brought into LTTE-controlled areas.

Furthermore, the Sri Lanka Army recaptured LTTE-controlled coastline and effectively dismantled the land-based Sea Tiger infrastructure, including boat construction yards and eventually its 20 Sea Tiger bases. In the final months of the insurgency, while the Army was engaged in overrunning the last pocket of LTTE resistance in northeastern Sri Lanka, the SLN enforced a four-tier naval blockade starting in January 2009, as described by a senior SLN official to the Sunday Observer: "The barricade consists of around twenty five Naval vessels including offshore patrol craft and fast gun boats supported by Special Boat Squadron and the Rapid Action Boat Squadron which could be described as the biggest blockade created so far in the Naval history of the island."

As the coastline under LTTE control shrunk with each passing month, the naval forces assigned to enforce the cordon grew in size, and contributed to the ultimate defeat of the LTTE in May 2009 by destroying remaining Sea Tiger boats and preventing the escape of senior LTTE leaders and hardcore fighters. In doing so, the SLN made history, which according to *Janes Defence Weekly* was "the first naval force in the modern era to defeat a well-armed insurgent group at sea."

Since the end of Sri Lanka's insurgency the SLN appears to be rethinking its approach to developing an enduring maritime policy to address peacetime challenges. As such, in June 2009, the newly appointed SLN Commander, Vice-Admiral Tisara Samarasinghe articulated his vision in an interview with *The Nation*: "Improvement of a sustainable fleet along with required infrastructure for at least the next 30 years is my prime concern." He also said, "total control of fishing activity on the coastal line specially emphasizing on the Northwest, North and Northeast to ensure fishing activity is not exploited by undesirables. Protection of harbours is of paramount importance to protect trade and support the economy." Since May, RABS units been heavily utilized in patrols and interdiction operations in the Palk Straits, Gulf of Mannar and the Bay of Bengal against smugglers and illegal fishing trawlers. Given the perennial lack of financial resources the SLN faces to build a fleet of large vessels, the Arrow IPCs for the time being offer a cost effective and reliable solution to monitor and secure its littoral waters.

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RAN Communications - Into The Future

BY CAPTAIN PETER LEAVY

In this paper I outline my views on how the RAN needs to manage Communications and Information Systems (CIS) into the future if we are to fully capitalise on technological advances. I offer what, for some, will be the radical suggestion that our current CIS sailors need to have their role re-defined so they become solely devoted to the provision of Information Technology (IT) services, with the visual signalling component of their current branch transferred elsewhere. I also believe that the time has come for CIS management to become a Weapons Engineering responsibility: that is, the CIS branch needs to come under the WEEO.

While this is a major break with tradition, the realities of modern technology are such that "communications" today really means long haul, Internet Protocol based systems, usually over satellite bearers. Flags and flashing light certainly remain valuable skills, but in my view they are now seamanship tools – not communications in the wider sense of the modern term. Technology advance in the commercial world of IT are driving such rapid changes that our branch structures are no longer well aligned with the tasks we expect our sailors to perform.

The starting point must be an understanding of our future requirements. Maritime warfare is becoming increasingly complex with an ever-increasing array of high tech weapons and sensors entering the market. We can no longer rely on the "technological advantage" in weaponry that the ADF has traditionally cited, and we'll be even less able to do so in the future. Most countries can now buy high tech weapons from a variety of other countries and/or global companies – they do not have to spend years developing their own or be a "technologically advanced" nation. Hence we are seeing a levelling of weapon capabilities with the victor in future combat likely to be the one who *employs* his weapons the best, not just whoever *has* the best weapon. That said, Australia can still expect to retain a certain technological edge in some areas; it just won't be as great, or as widespread, as it has been.

Communications Electricians perform maintenance aboard the multi-purpose amphibious assault ship USS Bataan

We must position ourselves to *use* our combat systems and weapons to best effect – and this does not just mean being more proficient at running through the mechanics of an engagement sequence. It means understanding a wide range of ever-evolving circumstances at the *tactical*, *operational* and – given capabilities of the modern media - *strategic* levels, and reacting in the right manner at the right time. This requires a strong focus on intelligence (better understanding what the adversary might do) and an absolute reliance on situational awareness (having a Common Operating Picture (COP)).

The key warfare skill will be in deciding if/when to engage a contact and not the actual mechanics of undertaking the engagement. Consequently the ability to move information quickly around networks, both within a ship and too/from external units and agencies – national and international, military and civil - will increasingly become the battleground of the future. Our key activity will be the fight *for* information upon which to make the correct decision at the right time – the physical employment of weapons will simply be the mechanical act at the end of the decision making process (although clearly one we will still have to work very hard to practice and maintain proficiency in – it just won't be the 'main game'.)

The future ADF is envisaged to be a joint, networked series of nodes amongst all three services fighting seamlessly together under a unified, joint (and where necessary, combined) command.[1] This requires all nodes (in Navy case ships, submarines, and aircraft) to be "connected" electronically so that a wide range of information and data can be

moved around the various sensor, weapons and command and control (C2) networks. Of course, moving electronic data around and between ships is nothing new for Navy; we have had electronic combat systems and Link 11 in service for many years. However, we are seeing that concept significantly increase both in complexity and importance, and this trend will continue over the coming decades.

C2 systems are now fundamental to a warship's core fighting ability: so much so that the ability to communicate (that is, move the right data and information at the right time) will be *the* key component of a combat system. Indeed, even the term 'combat system' as we currently understand it is undergoing a fundamental change. With the envisaged "Networked ADF" of the future a ship will be increasingly viewed as a series of nodes, albeit co-located, in the wider networked (operational level) 'combat system'. For example all sensors in the force will be linked electronically in a single sensor network to provide the Common Operating Picture upon which everyone draws, while the ship's weapons will be part of the wider selection of options the commander (who may or may not be in the ship) has at his disposal. There won't be any need for a contact detected by a ship to be engaged by her own weapons – there will be a transfer of sensor and C2 information between all nodes in the network and the most appropriate weapons system will be tasked with the engagement. Admittedly, this is still some way off, and there are a number of legal implications to be considered before this concept becomes practical, however, it is the concept to which the ADF, and many other military around the world, are working towards.

Command and Control systems are already web-based and require constant access to high bandwidth satellite bearers. Email, chat and other commercially based applications have become indispensable in the planning and execution of many C2 functions and if you are not in the appropriate network, then you are simply not part of the order-of-battle. The speed, stealth and lethality of modern weapons mean the flow of information needs to be fast, accurate and robust and there must be redundancy in key systems. In short, digital data flows, both within and external to our ships of the future, will be increasingly complex and absolutely vital to the success of maritime warfare.

A Communications Electrician on watch at the Integrated Launch and Recovery Television System on board USS Kitty Hawk.

While we must provide a range of communications routes for redundancy, moving data external to a ship is usually done via satellite bearers. Capabilities such as INMARSAT[2] and MASTIS[3] facilitate this, however most of our current ships were not designed with those capabilities in mind - they have been "add ons". This is not a criticism; these systems were not around when the ships were designed and our sailors do an outstanding job in making them work. The point is such capabilities will be integral to our next generation of ships and we must plan for both their optimal instillation as a core part of the ship's weapon system, and have the right people trained to operate and maintain them. We will be getting the hardware component of these systems, but do we have the skills and organisation within Navy to manage these increasingly complex electronic networks? I think we do have the skills in our sailors (and the ability to develop skills of the future) but we don't have the organisation quite right.

I would argue that the current branches that provide communications services are not well organized or structured to meet our future needs. Our current CIS and ET(C) categories (and their predecessor Signalman, Radio Operator and Electrical Technical Communication categories) were all appropriate for their time. While the current arrangement does work, it is not as efficient as it could be and relies too much on the good-will of our sailors. Importantly, however, I don't think the current arrangement will work into the future as software and IP based systems become more prolific and embedded in almost every facet of operations.

The advent of the Fleet Network

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Centre – Sydney in September 2009 is a very positive sign of progress in the right direction, and reflects recognition of the Navy's growing need for IT systems and professionally satisfying careers for our sailors. However, I believe that the current CIS category has retained too many of the "Radio Operator" and "Signalman" traits that characterized the two branches that amalgamated. It needs to re-position itself as the RAN's IT and software specialists (both internal and external), focusing on data communications, satellite communications and information management.

The skillsets required to operate a traditional COMCEN, together with an increasing array of satellite and IP based systems, are now far removed from the visual signalling (V/S) skills required for the Bridge. I accept that there is a need for flashing light, flags and tactical skills (ie the former 'Signalman') but believe they are more logically 'seamanship' tasks than 'communications'. One key problem we currently face is very few CIS sailors like working both with computers and V/S systems on the Bridge, yet they are forced to train in both areas to progress. The time has come to differentiate between the V/S skills (as important as they are) and the high-tech world of computers, satellite comms and data links. I cannot see how training in V/S can be of any assistance to maintaining IP based C2 systems, ship LANs, satellite bearers etc (or vice versa) and from experience I know that very few sailors are happy switching from one to the other. Indeed, I have had first hand experience of CIS sailors discharging for exactly that reason.

My sense is that most CIS sailors joining the Navy are now attracted by the computer based, high-tech side of the job, and not by the V/S and Bridge tasks that currently remain the category's responsibility. This reality is reflected in the significant drop that I have seen in the general standard of V/S services provided to Bridge staff over the last 5-10 years. While not acceptable, it is entirely understandable - many CIS sailors are simply not interested in Fleet Work and there is no real link (other than branch legacy) between it and what many see as their "core" job.

While beyond the scope of this paper those CIS sailors who prefer the fleet work and visual signalling aspects of the job could perhaps form the core of a new seamanship branch designed around supporting the Bridge. Their tasks could include the traditional V/S roles, Navigator's Yeoman and, in conjunction with the Bosun's Mates, watch-on-deck and seamanship tasks. At the more senior levels they could also become qualified as OOW in MWVs which would provide a significant "seaman" career progression. In short, we could establish two broad seamanship branches - both proficient in seamanship with one sub-specialised in small arms and gunnery (Bosuns' Mates) and one sub-specialised in Bridge/mariner services (Nav Yeoman and Visual Signalling).

Furthermore, there is significant overlap in the work currently undertaken by CIS and ET(C) sailors and a consequent need to rationalize these two streams. I have seen situations where work undertaken by one group is done in isolation from the other, with the result that the best people were not necessarily applied to the problem. While such issues are usually avoided through consultation with the sailors involved, our current branch structure – with CIS and ET(C) sailors both belonging to different departments and consequently regulated and managed separately – does not help. Our sailors make it work *despite* the way they are organized, not *because* of it.

I think that we are only just starting to accept that web based systems like CENTRIX[4] and CMFP[5] are now fundamental to our war fighting ability. Indeed, on a number of occasions when I have needed specific IP based systems (CMFP for RIMPAC 06 and CNFC[6] for Northern Trident 09) the systems have been installed immediately prior to the exercise/operation and then removed immediately on completion. The equipment fit has been ad-hoc, on a temporary station in the Operations Room and without extra manning to operate it. Again this is not a criticism, as our current ships were not designed with these capabilities in mind. However, this does not allow any expertise to be developed through experience and undermines the fact that these systems are the future (or in many cases, the present). This issue is a systemic one and is not directed at CIS or ET sailors – they do an outstanding job trying to provide a service from the resources they have, but Navy as a whole must continue to recognise these IP based systems as fundamental to our business. We need to position ourselves organisationally to recognise that fact, and to get the very best out of the systems.

Proper IT support is not just a war fighting necessity either. The administrative information flow within a ship now occurs via various LANs and it is fair to say that these days if the LAN is not operating, a large part of any ship's administration ceases. Also, the provision of Internet based services for the Ship's Company is becoming increasingly important not only from a quality of life perspective, but also from a personnel management standpoint. We have already seen activities such as pay, allowances, leave, personnel management and housing services move online, however, the facilities provided on many ships are

inadequate to allow all sailors suitable access to a computer to manage their lives and careers. In short, we have forced sailors to conduct a lot of their own management and administration online, yet have not provided the full services to allow them to do so. Whilst this is being rectified, it does highlight the need to have an adequate pool of people on board to manage the infrastructure behind these services.

What all this means is ships will increasingly need the skills onboard to maintain and operate very high data rate communications both within the ship and externally to other units. Access to satellite bearers will be absolutely vital, as will the skills to keep the communications paths open. Unfortunately the current situation appears to have our CIS sailors well trained but unable to do much of the work onboard the ship as many problems are configuration issues that they are not permitted to touch. This is not helped by technical support services often being provided by contractors and consequently some systems are unable to be configured by sailors on board. This is detrimental to the fighting efficiency of the ship and has a negative impact on the sailors' professional job satisfaction. This is then compounded when they have to simultaneously do Bridge watches.

Given that data flow and communications are becoming the central components of combat systems, it is also timely to review how these capabilities are provided to the command. Currently the CIS branch comes under the Executive Officer based on its heritage as one of the seamanship trades. However, modern "communications" has already become electronic and IP based, and will increasingly become the central component of combat systems. Hence, I believe it is more appropriate that the WEEO assume responsibility for providing this service to the command, as he/she currently does for all other components of the combat system. The Gunnery Officer would not proceed to the gun to fix a problem, so why would the SCO be actively involved in the mechanics of establishing satellite connectivity (as often happens)??

Ultimately what we need is a pool of experts that maintain the equipment, manage the configuration and monitor the performance of our increasing array of IT based systems. The operators (PWO and CSOs) need to be free to operate the systems as they see fit, but the provision and maintenance of the services should logically reside with the WEE Department.

I do not believe this is such a huge step for the Navy to take. We already have a pool of skilled and enthusiastic sailors (both CIS and ET(C)) who, generally, like working with these systems. We need to free them from mandated activities that detract from their (proposed new) core business – such as flashing light and flag hoists – and broaden their scope of responsibility to take on all LAN management, satellite communications and IT services and, increasingly, data transfers around and to/from the ship's combat system. It may even be that in the future the new "IT specialists" will become the core WE sailor, as high speed data communications becomes increasingly prevalent throughout systems everywhere. But, one step at a time…

I propose an amalgamation of the current CIS and ET(C) streams into one new branch who manage the flow of electronic information within and external to the ship, and who fall functionally under the Weapons Electrical Engineering Officer. They would have responsibility for:

- traditional ship-shore communications, which will

The electrical technical team of HMAS Anzac stand proudly in front of the ship after completing the capability upgrades, which consisted of MASTIS, NDS and capability for the new MU90 Torpedoes (Courtesy RAN)

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increasingly be satellite based;

- the internal transmission of information through various ship's LANs;
- the provision of command and control systems, such as CENTRIX and other IP based systems, together with the monitoring of system performance and maintenance of the appropriate communications path;
- quality of life services such as the provision of Internet and e-mail services for the ship's company, satellite TV etc; and
- increasingly, the maintenance and monitoring of data communications systems within the ship's combat system.

In order to adequately undertake these new responsibilities, these sailors would need to be heavily trained in high rate data and satellite communications and would be responsible for all LAN, data and voice services throughout the ship, both internal and external. They must also be freed from any commercial or training constraints that restrict their ability to manipulate the onboard systems and manage configuration.

We need the ability to use all our onboard systems to their fullest potential using sailors onboard. I believe that a re-think about how our communications services are provided is quite timely given the huge, ongoing technological advances that are happening in the commercial world and the obvious benefits to the RAN and ADF if we capitalise on these developments.

Captain Peter Leavy RAN joined the RAN in 1984 and completed the RAN Principle Warfare Officer's course in 1993. He has served in a wide number of ship classes, and has deployed as Chief of Staff to Commander Task Group 633.1 operating in the North Arabian Gulf during early 2003 and again as Commander Task Force 158.1 in the North Arabian Gulf in 2008. Ashore he has served in Electronic Warfare and Strategic Policy postings.

(Endnotes)

1 The networked future ADF has been articulated in numerous Defence documents, including the Defence White Paper 2009 – Defending Australia in the Asia-Pacific Century: Force 2030; Joint Operations in the 21st Century (FJOC 2007); Future Maritime Operational Concept 2025; and NCW Roadmap 2009 (dated 1 Oct 09)

2 INMARSAT is a global, commercial satellite system enabling telephone, fax and internet connectivity. Almost all RAN vessels have INMARSAT fitted, as do most ocean going commercial vessels.

3 MASTIS – "Maritime Advanced SATCOM Terrestrial Infrastructure System". MASTIS is a high data rate, broadband military satellite communications system, allowing classified email, chat, web services and voice connectivity from sea. In addition to its vital role in operational command and control, it supports many of a ship's administrative functions (pay, leave, personnel management etc) and is fitted to most large vessels in the RAN.

4 CENTRIX – "Combined ENTerprise Regional Information eXchange System" – a US sponsored, web based, global communications architecture that enables ship-to-ship and ship-to-shore Web replication,secure e-mail, chat communications etc between allied forces. It allows for real-time collaboration, information sharing and supports a range of planning tools. CENTRIX has a number of enclaves (or sub-systems) such as CENTRIXS Four eyes (AUS/CAN/UK/US); CENTRIXS Japan (J); CENTRIXS Korea (K); Global Counter Terrorism Task Force (GCTF) and Combined Naval Forces CENTCOM (CNFC)

5 CMFP – "Cooperative Maritime Forces Pacific" – An enclave of CENTRIX that resides within the Global Counter Terrorism Task Force (GCTF) net. CMFP was the primary C2 tool used in RIMPAC 2006 which was the first time all participants in a RIMPAC exercise were on the same network

6 CNFC – "Coalition Naval Forces Central Command" – An enclave of CENTRIX used in the US CENTCOM Area of Responsibility (including the Middle East)

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New Royal Malaysian Navy Scorpene-class submarine, Tunku Abdul Rahman. By Michael Nitz

New Royal Malaysian Navy Scorpene-class submarine, Tunku Abdul Rahman. By Michael Nitz

Royal Navy Response to Somali Pirate Attacks

BY SGT DAVE MORLEY

The RAN's first foray into anti-piracy operations off the Horn of Africa happened almost by accident when HMA Ships *Sydney* and *Ballarat* answered a distress call in the Gulf of Aden last May.

The ships were on their way to the UK as part of Northern Trident 2009 when they received a report a merchant vessel was under attack. The ships changed course to assist and received another report that a second ship was under attack.

The arrival of the Australian ships on the scene caused the pirate threat to subside and the merchant vessels were escorted to safety.

The RAN subsequently deployed *HMAS Toowoomba* in September 2009 to CTF-151, the anti-piracy task force.

The Royal Navy has been successfully involved in anti-piracy patrols around the Gulf of Aden since the inception of CTF-151 in January 2009. Much of their experience comes from years of very effective counter-narcotics operations in the Caribbean region.

Commander Mark Sheehan RN, from the Regional Directorate East Naval Air, spoke to *Headmark* about the RN's response to piracy, at the Pacific 2010 International Maritime Exposition, Darling Harbour, on January 27, 2010.

Q. Are we winning the campaign against the Somali pirates?

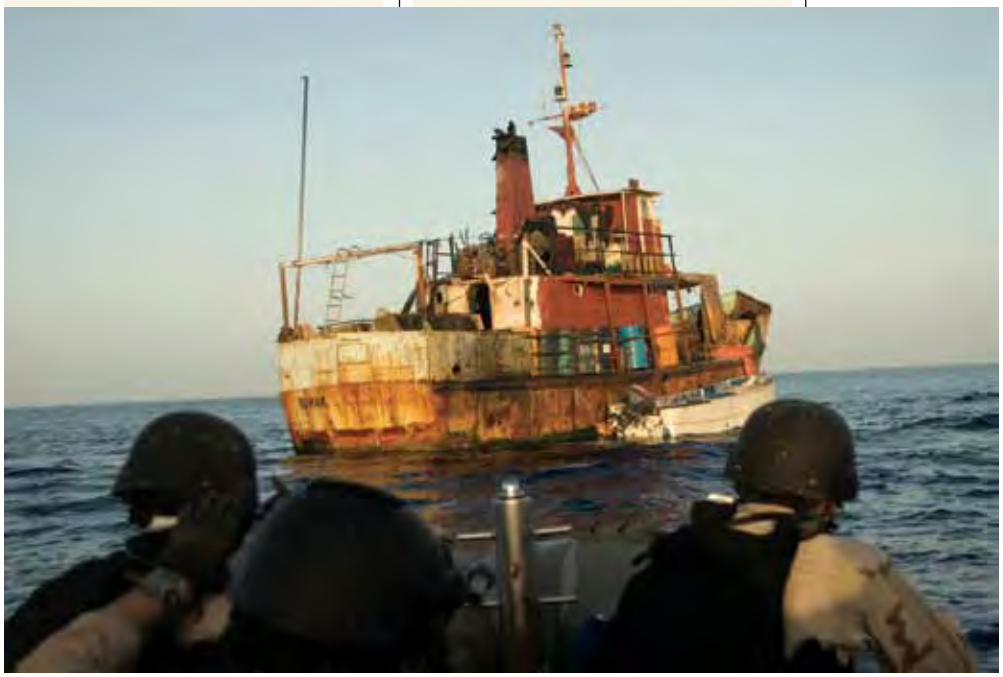
A. We are certainly very, very determined in providing Naval Forces to do the best they can to protect friendly shipping in one or two areas of the world where piracy is rife. The Royal Navy is working as part of NATO linked into the European Union.

Q. Is it a situation where the piracy can be defeated?

A. We will get ourselves into a position like that but it won't be until we can develop a series of tactics so we can actually stop the pirates from getting near the vessels. Tactics we have seen them use so far are hiding themselves among a fleet of fishing boats so they can ambush vessels.

We need to make a good maritime picture and let people know where they're operating and the tactics we think they are using. We can do that by conducting ship searches and by using embarked helicopters as an organic air platform. It's particularly good at doing a surveillance role to detect potential pirates at long range.

That's one of the difficulties we face, trying to identify these people. Are they innocent fishermen in a group, is there something more sinister within that group, are they armed, what are their intentions, are they operating from a mothership, do they have other vessels nearby? Do they have Intel or are they



Pirate mother ship being approached by members of a USN visit, board, search and seizure (VBSS) team. (U.S. Navy photo by Mass Communication Specialist 1st Class Eric L. Beauregard/ released)

randomly coming across a vessel, do they have procedures for trying to board the vessels? Are they looking for targets of opportunity?

Some of their vessels are now operating much further from the coast than they previously were. Sometimes they've been hundreds of miles away from the coastline.

It's been said that if the country got a proper government, a proper judicial system and some stability, the pirates would not be allowed to operate as they are. The coastline is uncontrollable due to the country being a failed state. It has no navy or coastguard. It has no exclusive economic zone like other countries. It cannot look after itself or its territorial waters.

Q. Are the ROE adequate?

A. The RN ship's CO will have a set of instructions and there will be certain things he can do, but it may not fit all circumstances. Invariably there will be Intel sent back to London about what's happening. It would depend on what's happening from scenario to scenario. It's also affected by the nationality of the ship being attacked. It depends too on where they are, what tactics they're using, what vessels they're trying to harass or board.

That is part of the problem – all situations are different. But the main problem is the guys have got to be in the act of committing piracy, and that's the issue. Just because it's a boat in the area, or even just a boat going fast with guys with guns on board, and obviously not fishermen, we can't take offensive action against them until we catch them in the act.

We need to be sure the people are actually engaging in acts of piracy. We've seen in the past where people have been found with weapons on board, but if they're not actually engaged in an act of piracy there's very little we can do except dispose of their weapons.

Certainly we've seen it in the past where other navies have engaged in prolonged gun battles with pirates and been in a position where they've engaged a mothership, and while they're doing this, the smaller vessels have escaped elsewhere with their high speed and manoeuvrability.

The anti-piracy task is a very challenging area of operations for us, because of the tactics they are using. They're getting more intelligent by the day in the way they're operating and the numbers of vessels they've already seized is quite staggering. The Royal Navy is committed to assisting where we can in preventing vessels from being attacked.

If there is a requirement to stop and search a merchant vessel we have to get permission from the nation where it's registered.

Q. So if the RN arrive to assist a ship that's just been attacked and see the pirates fleeing the scene, they are not permitted to engage the pirates?

A. If the act of piracy is actually finished, then they are evading, so all we can do is carry out surveillance, because these guys are going to run away for a little while and then start again. That's the challenge, once they've disengaged from the act of piracy we can't engage them. Clearly though it's in our interest to continue surveillance so we know where they are and what they're doing.

This is where we can rely on technology. And some of the merchant vessels have their own technology to help them counter the efforts of the pirates and so they'll use the ship's size, speed and manoeuvrability to evade the pirates. Some ships are more vulnerable than others, such as those with a low freeboard, the slower ones,

HMS Lancaster's PAC24 sea boat on patrol.

Royal Navy Response to Somali Pirate Attacks

and ones with blind arcs around them. Merchant vessels need to know what's going on around them. They need to post lookouts and remain alert.

Pirates have hidden among fishing fleets and come out to ambush vessels. Or they have disguised themselves among other merchant vessels. That's where the RN, by having assets like helicopters, decent electro-optic systems and so on have an advantage over the pirates. And pirates are now aware of the capabilities of helicopters and so helicopters are becoming a deterrent to them, but it will vary from case to case. Some pirates are much more sophisticated than others. There are pirates operating hundreds of miles off the coast as well as those operating along the coastline.

Q. Is there any reason why Special Forces troops haven't been used to recover ships already taken?

A. The French have used SF to recover a vessel. The Americans have certainly used SF when they rescued a captain of an American merchant vessel. They had people who were very capable in that instance.

Q. We hear about the ships that are seized, but we don't hear about the ones that are saved from attacks. How often do task force ships arrive on the scene in time to deter an attack?

A. It depends on the area they're operating in, such as the Gulf of Aden or elsewhere, and some periods will be busier than others. Once the pirates actually capture a vessel it keeps them busy for some time. We know it will bring them a substantial amount of money for their communities, and it takes a considerable some time to arrange the payment for that vessel. Some of the very large tankers that have been taken are quite valuable so you can understand why people are engaged in piracy.

Having a safe shipping corridor certainly makes a difference. And merchant vessels themselves share information with each other letting each other know where they are. Some insurance companies are also providing advice on how to avoid piracy. But there are still ships that are slow, have small crews and a low freeboard that are especially vulnerable.

The higher speed, higher freeboard vessels are less likely, but not impossible, to be pirated.

Piracy is not a new thing, it's been around for hundreds of years. And it's not just happening around the Horn of Africa, it's happening in the Malacca Straits. There's even been a suggestion a ship proceeding through the English Channel was boarded and taken, so it's becoming a global phenomenon. But clearly the centre of gravity appears to be the Horn of Africa.

Q. Can you tell me about the Royal Marine sniper teams on board the RN ships?

A. They're not on all ships. First of all the ship has to have a helicopter as a

Type 23 Frigate Statistics	
Displacement:	4,900 tonnes
Length:	133m / 436ft
Beam:	16.1m / 52.9ft
Complement:	185
Armament:	2 x Quad Harpoon Missile launchers Vertical Launch Sea Wolf anti-missile system 4.5in (114mm) MK 8 gun 2 x 30mm Close range guns 2 x Magazine launched anti submarine torpedo tubes NATO Seagnat and DLF3 Decoy Launchers
Sensors:	Type 1007 navigation radar Type 996 air/surface surveillance radar 2 x Type 911 Sea Wolf tracking radars UAT Electronic Surveillance System Type 2050 active sonar
Aircraft:	MK 8 Lynx helicopters: Armament: Sea Skua anti-ship missiles Stingray anti-submarine torpedoes Mk 11 depth charges Machine guns

platform for them. We've mainly used them on anti-narcotic operations in the Caribbean. The helicopters have a half inch calibre machine gun and a half inch calibre sniper rifle, the LW50, both very good deterrent capabilities. It allows us to be able to shoot out a boat's engine stopping them in their tracks. It also allows a proportionate response. They work in pairs with a spotter and a firer who operates the rifle or machine gun.

Q. Can you tell me which RN vessels are presently operating with the anti-piracy task force?

A. No, I can't name them because that would allow the pirates to change their tactics so they could counter our vessels' tactics. There will be at least one frigate there, but it will also depend on what other countries' navies have there in the task group. The RN ships will complement other navies' ships so we have a very wide range of capabilities. The RN put a lot of effort into making ships available to that role because it's important to us at the moment to focus on what's happening there. As our global commitments are quite significant we've had to prioritise in terms of what ones we'll undertake. Clearly the piracy situation is one in which we'll be engaged.

Q. Have you any personal experience of the RAN ships engaged in anti-piracy operations off Somalia?

A. I've not actually come into contact with the Australians and don't have any knowledge of how they perform. We've had briefings from other countries there, including Singapore who had a ship there for six weeks doing anti-piracy operations. They were very successful and part of that was they had embarked organic aviation with them. People are learning all the time and navies are learning how to deal with the problem. We're sharing information and intelligence together quite successfully and this is an area where we're improving our capabilities week by week.

Unfortunately people who are engaged in this sort of thing will also adapt their tactics and procedures to try to countermand what we're able to do so it's very much a cat and mouse scenario.

There have even been Chinese ships out there with the task group. Lots of nations are contributing giving a wide range of capabilities. The exchange of knowledge and experience is invaluable.

Author's note: HM Ships *St Albans* and *Lancaster*, both Type 23 frigates, were at the time of writing on patrol in the Gulf of Aden as part of CTF 151, according to the RN's *Navy News.*

Dubai Princess employing anti-piracy measures 17 May 2009. Courtesy Dept of Defence.

Advice to merchant ships to reduce likelihood of hijack:

- Use the International Recognized Transit Corridor
- Travel through high-risk areas in the dark
- Use convoys
- Sign in to the Horn of Africa's Maritime Security Center before entering high-risk areas
- Travel as fast as possible
- Maintain lookouts
- Set fire hoses and keep them running
- Use all available lighting
- Use lights and alerts to let the pirates know they've been spotted
- Conduct evasive manoeuvres when pirates attack
- Most importantly: Never stop the ship for pirates

HMS St Albans at sea.

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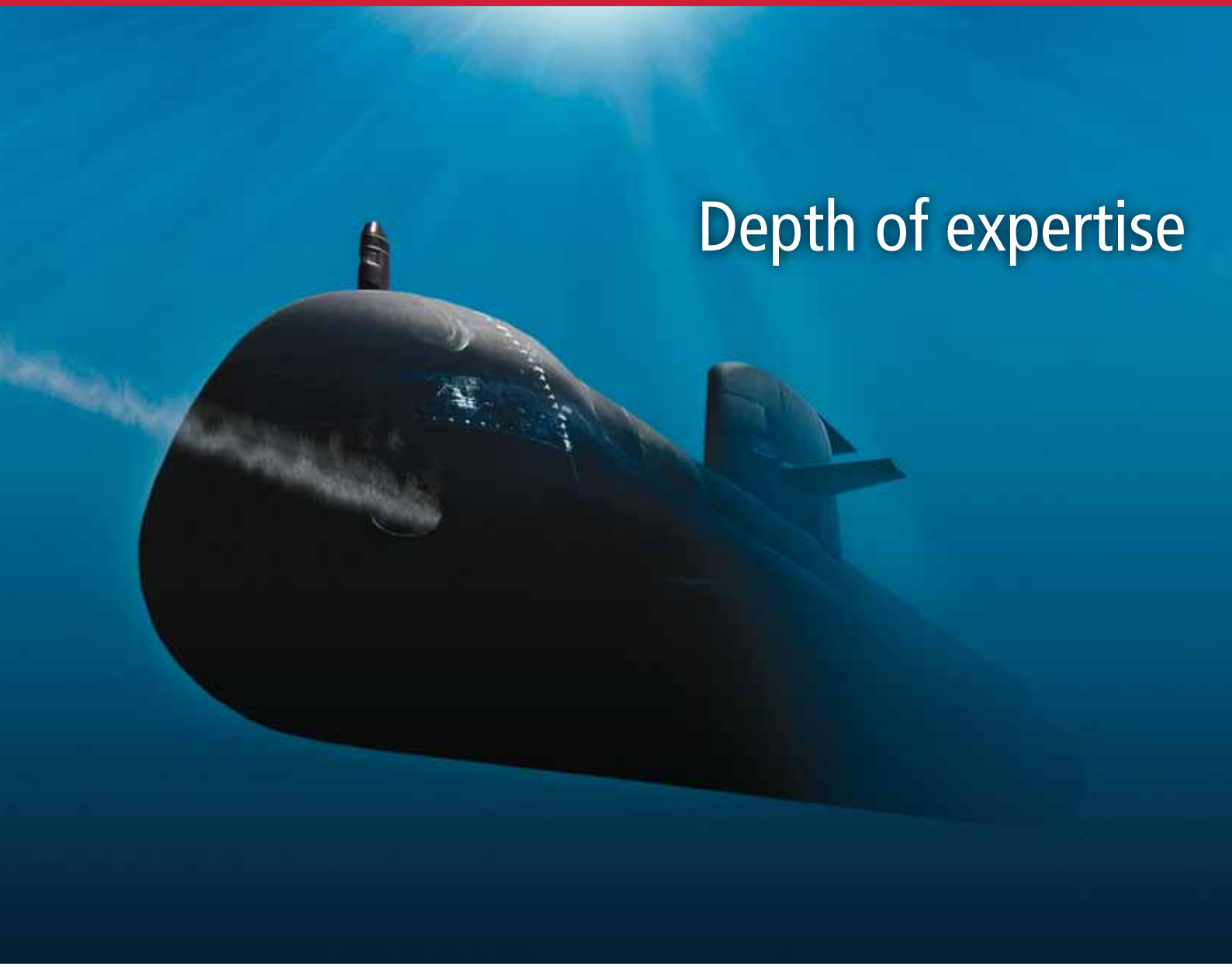

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Customer Success Is Our Mission

Image: Eye in the Sky

How to best spend the Christmas stand down period: *Commodore Harry Adams essay prize*

BY LIEUTENANT DANIEL BOETTGER

A white Christmas. Hogmanay in the Scottish Highlands. Taking in the view from the highest mountain in Wales. These weren't the experiences that I was expecting over the Christmas and New Year stand down period, but, along with a visit to the Britannia Royal Naval College (BRNC) Dartmouth and the defence technology company Qinetiq, they were just some of the highlights of a trip that was both professionally and personally rewarding, and one that I was lucky enough to undertake as the prize for the 2009 Commodore Harry Adams essay competition.

Now in its third year, the competition is open to all members of the ANI of the rank of Midshipmen and Sub Lieutenant (or equivalent), with the prize consisting of a visit to Britannia Royal Naval College (BRNC) Dartmouth, home to Royal Navy (RN) Officer training, as well as return airfares and $500 spending money.

As with the previous year's winner, I visited BRNC during their last week of term, an extremely busy period which culminates in the Passing Out Parade and the famous Winter Ball.

Perched atop a hill overlooking the village of Dartmouth, BRNC is an impressive sight for the first time visitor. With accommodation, messing and instructional facilities for around 300 officer cadets, the main building is filled with long, sweeping passageways that lend the appropriate resonance to your footsteps to engender the atmosphere of a grand and prestigious establishment. Masses of naval memorabilia decorating the walls remind you of the College's heritage which – although at its current location since only 1905 – stretches back to the training hulks HM Ships *Britannia* and *Hindostan*, and before that, the centuries of tradition of the RN. The Senior Gunroom, where cadets mess in their second term, features amazing wood panelling which is covered in portraits of famous naval figures, reminding cadets as they enjoy their meals that they have been granted a privileged position of responsibility in a proud organisation.

Britannia Royal Naval College

The quarterdeck, situated in front of the main building, is encircled by twin sweeping driveways which lead to the main entrance and allows for a unique format for the Passing Out Parade. December's parade was reviewed by HRH Prince Edward, Earl of Wessex and Commodore-in-Chief of the Royal Fleet Auxiliary and, after a month of characteristically wet and wild weather, was held in brilliant sunshine. I was honoured to be seated in the VIP section, giving me the best view of the parade without standing on the reviewing platform.

Over the week I was kept busy exploring everything that the College has to offer. This included driving a Type 45 destroyer into Sydney Harbour with the help of the bridge simulator in which all officer cadets learn the basics of navigation, as well as an afternoon on the Dart River in the College's various small boats. A highlight for me was a day exploring Dartmoor National Park, home to the final leadership exercise and often also home to the most miserable weather imaginable. I was 'lucky' enough to visit Dartmoor in all its glory with rolling banks of fog and intermittent rain showers prevailing, making the obligatory thermos of steaming hot tea carried here by all cadets all the more enjoyable.

With the strong historical ties between BRNC and the Royal Australian Naval College (RANC) at *HMAS Creswell* it was no surprise to

How to best spend the Christmas stand down period: *Commodore Harry Adams essay prize*

BRNC Passing Out Parade

see considerable similarities between the training program and philosophy of the colleges. However differences are apparent. With every BRNC cadet assessed on basic navigation skills and small boat work, as well as spending ten weeks at sea for initial sea training, there appears to be a much greater emphasis on traditional core mariner skills regardless of primary qualification. Although ships' programs and platform availability make extending sea training phase longer than the current four weeks impractical for RAN trainees, a greater concentration on core mariner skills could prove advantageous, especially given the trend towards minimum manning and the now common occurrence of duty watches lacking seamanship specialists.

As well as my visit to BRNC, I was invited to spend two days with one of the ANI's sponsors, Qinetiq. As a defence and technology consultancy, Qinetiq is heavily involved in many facets of the UK Ministry of Defence, and has also established a presence in Australia. With such a broad range of projects being undertaken the company is able to offer something of interest to those visiting regardless of primary qualification. As a seaman officer I was amazed at the facility that has become known as the 'ship on the hill'. Officially known as the Shore Integration facility, it has earned this name due to the Type 23 and Type 45 mast modules which dominate the facility. These are connected to fully functional combat systems, which allows testing of new equipment and systems and operator training to be conducted using both real and simulated aircraft, and also avoiding the requirement to tie up a ship until the system is nearing operational capability.

Engineers would enjoy the demonstration for SURVIVE, Qinetiq's vulnerability assessment tool. Using a highly detailed computer model of the ship in question, it is able to predict the damage to engineering and combat systems that would be sustained from general or specific threats, such as a missile hit to a particular section of the ship.

The aviation world was also covered in my visit as I was able to inspect the ultra-lightweight Zephyr unmanned aerial vehicle, which currently holds the world record for the longest duration unmanned flight. With a wingspan of 18 metres and only weighing 30 kilograms, the extreme engineering and construction techniques used were fascinating. From here I also visited the five metre wind tunnel, used to test military aircraft as well as being one

of the primary test sites for Boeing's aircraft. Also available to me was the opportunity to visit the Empire Test Pilot School, however unfortunately time constraints didn't allow me to make it there.

With a history spanning back many centuries the Royal Navy has an amazing heritage and with some advice from the staff at BRNC I took the opportunity to experience as much as I could. One notable experience was my visit to the 11,000 tonne cruiser *HMS Belfast*. Commissioned in 1939 *Belfast* saw action in both World War II and the Korean War and is now a museum piece moored on the River Thames. The opportunity to visit a warship of this era was fantastic. The Operations Room features a recorded transcript of the Battle of North Cape in which the German battleship *Scharnhorst* was sunk, and, although advances in naval warfare have obviously been made, the similarities, particularly within the warfare organisation, were readily apparent and it was not difficult to transport myself back in time and visualise every action in the battle.

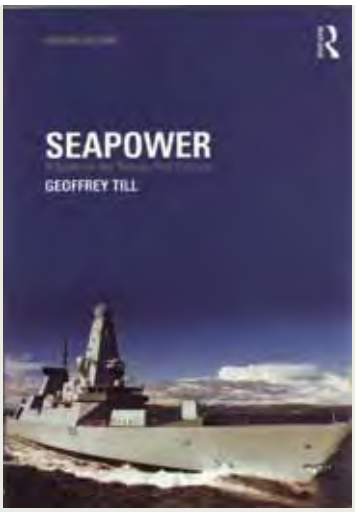
But without a doubt my greatest revelation concerned Vice Admiral Lord Nelson. I knew the history of the man but was unprepared for the extreme regard in which he is held. Memorials are abundant around Portsmouth and London, some of the more striking ones being *HMS Victory,* in commission for longer than Australia has been settled; the Nelson column taking centre stage in Trafalgar Square; his tomb which dominates the crypt in St Paul's Cathedral; and his uniform on display in the National Maritime Museum featuring the hole from the bullet that killed him. Seeing these things in person promotes an immense feeling of awe at the achievements of one man that include a great deal more than one afternoon off Cape Trafalgar, as well as an understanding of the culture of both the RN and RAN.

BRNC Bridge Simulator showing Sydney Harbour

Having the opportunity to see first hand how fellow officers in other navies are trained, as well as looking at the latest in military technology was a great experience professionally and was also a lot of fun. I thoroughly enjoyed my time with the RN and will be looking at exchange opportunities as soon as I can. I can highly recommend entering the Commodore Harry Adams essay competition; the rewards are amazing and the effort well worth it.

Lieutenant Daniel Boettger RAN joined the Navy in 2004 and graduated from the Australian Defence Force Academy in 2007 with a Bachelor of Science majoring in Oceanography. Awarded his Bridge Warfare Certificate in HMAS Parramatta in 2009, he was at the time of submission the Operations Officer in HMAS Tobruk.

Book Reviews



Seapower: a Guide for the Twenty-First Century (Second edition)

by Geoffrey Till
Published by Routledge,
Softback; 409 pp
Reviewed by "Caravel"

When this reviewer first had to read Geoffrey Till's *Maritime Strategy and the Nuclear Age* is was a lasting experience – one destined to live in the memory in fact because it was a damned hard read. Or then again, it could have been the stupidity of the reader…

Returning several years later and re-reading in the light of further learning it was evident how powerful indeed the Till text was. In this volume, the second edition of *Seapower: a Guide for the Twenty-First Century*, the redoubtable Professor of Maritime Studies has given us an updated version of this 2004 classic.

The chapters move through Seapower in a globalised world, and why this force concept still matters, before looking at technology and its impact. An assessment of today's forces at work follows, before the book takes a look at SE Asia for some case studies. This second edition is updated with some references to recent maritime experiences such as the 2006 Hezbollah-Israel war.

Some useful illustrations and tables round out *Seapower: a Guide for the Twenty-First Century,* which will undoubtedly be on the Christmas list of career naval officers and serious strategy people.

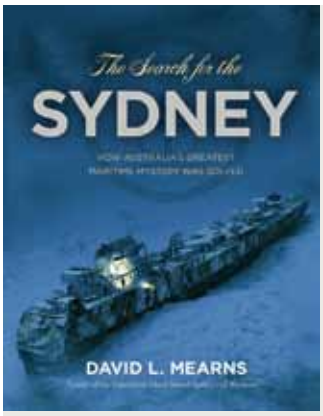
The Path of Infinite Sorrow

by Craig Collie and Hajime Marutani Published by Allen and Unwin. Hardback
Reviewed by "Caravel"

The story of the Kokoda Track has become increasingly well-known over the decades since WWII. Most of the narrative has been the work of the Allied forces, victors at the end of the conflict. This new work is based on the accounts of six Japanese soldiers, as well as some captured diaries. *The Path of Infinite Sorrow* tells some of the story of the other side.

The story is chronological in detail, and vivid in its detail and intensity. The words of the interviewed six are scattered effectively throughout. Black and white photographs help bring to life the protagonists: particularly as the pictures are both then and now, with the exception of one whose home was in one of the nuclear-bombed cities.

An extensive index and bibliography complement this useful book.



The Search for the Sydney

By David L Mearns
Harper Collins Publishers
2009 – RRP $55.
Reviewed by Sergeant Dave Morley

Myths surrounding the 1941 disappearance of *HMAS Sydney* (II) were finally laid to rest with its discovery off Western Australia in March 2008.

US-born shipwreck hunter David Mearns commenced searching for the wrecks of the *Sydney* and *Kormoran* after conducting six years of research and interviews.

Although Mearns had located twenty-one major shipwrecks, including *HMS Hood*, and been awarded three Guinness World Records, he said his biggest challenge was finding *Sydney*.

"The search appealed to me because two ships would be found in one expedition," he said. "Once we found the *Kormoran* we would find the *Sydney*."

Using information from wartime archives and former crew members of the *Kormoran*, Mearns located that ship 64 hours after commencing the search.

While *Kormoran*'s discovery was being announced by the Prime Minister and Navy, *HMAS Sydney* was found.

Mearns said within days of the ships being found there were 12 million hits on his website.

"I have never seen a similar case where there has been so much excitement in a ship being found," he said.

The book looks like a coffee table book but is a serious historical account of the *Sydney*'s service to Australia, the subsequent inquiries into its loss, interviews and its discovery.

"It was never my mission to get into the conspiracy theories or to debunk rumour – I'm just a shipwreck hunter," Mearns said.

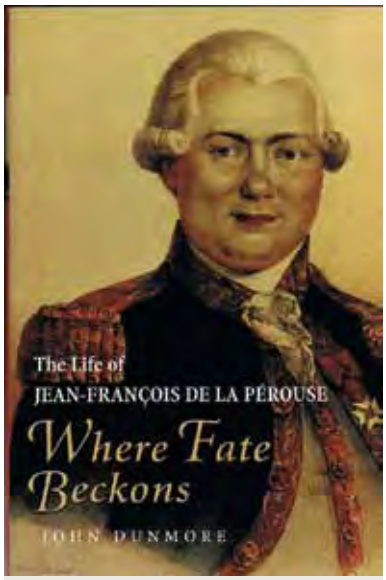
This is Mearns' second book and the publishers have done an outstanding job with it.

The inside of the dust jacket features a copy of the shipbuilder's plans of *Sydney* while the hard cover is embossed with the crest of the cruiser and the map reference of its final resting place.

The book includes dozens of never before seen photos of the wreckage of *Sydney* strewn over the sea floor.

Well worth a read regardless of what branch of the ADF you happen to be from.

Book Reviews



La Perouse: Where Fate Beckons

by John Dunmore

Reviewed by
LCDR Desmond Woods, RAN

In a small town north of Wellington, New Zealand, lives a retired professor who is the leading authority on the French exploration of the Pacific in the late eighteenth and early nineteenth centuries. John Dunmore was a long-serving professor of French at Massey University in Palmerston North. For his work on de Surville and his book, *The Fateful Voyage of the St Jean Baptiste* (1969) he was made a Knight of the Legion d'Honneur by the French Government in 1976. He was appointed an Officer of the Ordre des Palmes Academiques in 1986, made a Companion of the New Zealand Order of Merit in 2001 and in 2007 Paris promoted him within the Legion d'Honneur to the superior rank of 'Officier.' This rare distinction was awarded for his lifetime achievement in French Pacific History.

These well deserved honours recognise the extraordinary fact that the re-discovery, translation and publication of the journals of the great French explorers of the Pacific has been accomplished, not by a French historian, living in metropolitan Paris, but by a New Zealander who has devoted a lifetime of scholarship to getting to the truth concerning these often tragic voyages made in the wake of James Cook. After these explorers' journals were published by the Hakluyt Society Dunmore was able to write a series of highly readable, gripping, yet still scholarly books for the general reader interested in maritime history.

It has been said that '*history is the chronicle of the victorious*' and certainly the understanding of the heroic age of exploration in the Pacific that posterity has been left is largely Anglo-centric. The French voyages of science and discovery made by Jean de Surville, Nicolas Baudin, Marion du Fresne, Louis Antoine de Bougainville, Antoine Bruni d'Entrecasteaux, Jean Francois de La Perouse and Dumont d'Urville are less than well known even among scholars who are experts on Cook, Flinders, Bass, Vancouver and the later Antarctic explorers, Ross and Parry.

This is partly accounted for by the translation barrier but also, surprisingly, by the inaccessibility of the journals of these navigators which were filed, or misfiled, in the French National Archive and often unread for over a century. French historians had long since lost interest in the lives and deaths of these remarkable commanders, the majority of whom lost their lives in pursuit of what appeared to their fellow countrymen to be vain dreams. Consequently many of their journals were not published and French achievements left unrecognized. This pioneering maritime research was still to be done when the young John Dunmore, born in France but brought up in the Channel Islands, and therefore bilingual, emigrated to New Zealand in 1949 after spending the war years under German occupation in Jersey.

Dunmore began his work on the French explorers as a doctoral student in 1957 under the direction of Professor John Beaglehole at Victoria University, Wellington. This was at a time when New Zealand and Pacific history were just becoming accepted as new fields of academic research and teaching. Beaglehole provided all maritime historians following him with his definitive edition of Cook's journals. His former student has carried on his methodology of working from the primary sources and checking and researching every contemporary archive to achieve incontestable accuracy. This painstaking approach is the hallmark of an historian who takes responsibility for the accuracy of those who follow after them.[1]

1 Geoffrey Blainey in his 2005 examination of Cook's first voyage, *Sea of Dangers: Captain Cook and his Rivals*, relies on Dunmore's work: The Fateful Voyage of the St Jean Baptiste, in dealing with Jean de Surville's simultaneous and disastrous voyage in search of an alleged lost tribe of Israel believed to be living in the Pacific.

Dunmore's most recent biography is *Where Fate Beckons*, an account of the life and death of Jean-François de Galaup de La Pérouse. For most Australians the name La Perouse is a reference to a suburb of Sydney looking out on Botany Bay. If the great explorer's name is ever mentioned by Australian historians it is likely to be in connection with the five weeks that he spent there with his ships in 1788 observing, from a distance, Governor Arthur Phillip's efforts to found a convict settlement in nearby Sydney Cove.

Phillip and La Perouse dealt with one another with great courtesy and consideration. Phillip was fluent in French having been a secret agent in France during the Seven Years War. He could not help the French with supplies because he was desperately short of food and by necessity rationing it. He knew that La Perouse was not in Botany Bay by coincidence but was under instructions from Versailles to report back on the British convict settlement experiment. Who he was, where his naval career had taken him, and what tragic fate awaited him and his men once he sailed back into the Pacific are not part of Australia's story and have been consequently somewhat overlooked.

In Dunmore's biography this dedicated and courageous officer's whole career is vividly set against the history of pre-revolutionary France and its Royal Navy. Perouse was at sea during the loss of French Canada and later the French Navy's part in the American Revolutionary War. The account of the younger Perouse includes his war at sea as a junior officer, his capture by the British, his capture of the Hudson Bay company's fur trading stations, his years in command of a French frigate operating from Isle de France, modern day Mauritius, in the Indian Ocean. These chapters far from reading like a prelude to great events are as entertaining and fast paced as a Jack Aubrey novel. For students of the Royal Navy's history the account of life on the other side is most enlightening.

By 1785, with France at peace, La Perouse's record of service at sea and his fascination with science and navigation in the Pacific made him an obvious choice to command an expedition aiming to chart wherever Cook had not been. Perouse was commanded by Louis XVI to chart the globe in order to open new maritime routes. He left France on August 1, 1785 with two frigates. La Perouse was assigned two 500-ton ships: the *Astrolabe* and the *Boussole*. His crew of 114 included sailors, marines, scientists, a physicist, three draftsmen, three naturalists, clergymen, and a mathematician

The epic voyage and the scale of La Perouse's achievement in the northern Pacific on both the Asian and the North American coasts are given the recognition they merit in this account. He was the successor to Cook and Vancouver in charting the endless indented coast of North America from Alaska to southern California. He used the knowledge that Cook left to all mariners as to how to prevent and treat scurvy which debilitated and then destroyed men denied vitamin C for prolonged periods. La Perouse charted the frozen coastlines of the Kamchatka coastline and fortunately for posterity, he sent home to Paris from there by the safe hand of an intrepid messenger, Barthelemy de Lesseps, a Russian-speaking French civilian, his despatches and charts. Like Cook, La Perouse admired 'primitive' cultures which provided levels of contentment not common in Europe. He wrote of the friendly people of Sahkalin:

> *Since leaving France, we had not encountered others, who so excited our interest and admiration... It went against our preconceived ideas to find among a hunting and fishing people, who neither cultivated the earth nor raised domestic animals, manners which were in general more gentle and grave - and who perhaps had greater intelligence- than that to be found in any European nation*

Tragedy was never far away from La Perouse. He lost 21 scientists, officers and sailors by drowning in frozen inshore waters off Canada, and 12 more to a sudden and inexplicable attack by Samoans with whom he had assiduously cultivated friendship through gifts. In the latter tragedy he lost the loyal and able Captain De Langle of *La Boussole*.

La Perouse was an intellectual and had read widely the authors of the enlightenment but he had never been a particular follower of Rousseau or his belief in the inherent morality of his 'noble savage' After the massacre by Samoans he chose not to retaliate with the ship's guns, nor to take hostages as he was urged to do by his grieving crews. He overcame his anger and demonstrated wisdom and forbearance in the face of unprovoked random violence and murder – an enlightened response to a personal and professional disaster. He wrote in despatches to Paris:

> *It was not without difficulty that I could tear myself away from this fatal place and leave behind the bodies of our murdered companions. I had lost an old friend, one of the best officers in the French Navy. His humanity had caused his death. Had he allowed himself to fire on the first natives to enter the water to surround the boat he would have saved his own life and that of eleven other victims of savage ferocity. If my anger had required the death of only a*

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few natives I had an opportunity after the massacre of destroying a hundred canoes containing upwards of five hundred people, but I was afraid of being mistaken in my victims, and the voice of my conscience saved their lives.

Comparison between La Perouse and Cook's approach to native peoples are instructive. Cook having been a model of restraint and enlightened self-interest in his dealings with Pacific peoples throughout his first two voyages lost patience on his third voyage in the face of persistent theft. He courageously, but unwisely, confronted Hawaiians ashore who had stolen one of his ship's boats. Without boats inshore charting of restricted waters was impossible and the point of the voyage lost. His obvious anger was inexplicable to the Hawaiians and like De Langle he was casually clubbed to death.

However the major point of comparison between Cook and La Perouse relates to the matter of luck. Cook survived his 'near death experience' on his first voyage in 1770 when his ship struck Endeavour Reef. Through decisive action he was able to save his ship, his men and his expedition. He was very fortunate. When *Endeavour* struck the Barrier Reef a piece of coral broke off and lodged in the hole in the ship's hull planking. That piece of coral slowed down the intake of water until the combination of fothering the ship, with a sail full of tar drawn up under the hole, and the ship's pumps could get the flooding under control. Cook's determination and skill is not in doubt. He had the slimmest chance of saving his ship and he seized it. To lighten *Endeavour* he ditched first his heavy guns and then pumped tons of drinking water over the side, with no idea where or when he could replace it.

La Perouse had no such good fortune in 1788. He sailed from Botany Bay north into what is now Micronesia and disappeared. Dunmore makes clear that had he followed his plan to spend 1788 sailing from mid-Pacific around the western end of New Holland and east along the southern coast to Van Diemen's Land, charting the easternmost end of the Great Australian Bight it would have been La Perouse, not Flinders, who would have achieved the first circumnavigation of Australia. Instead he was claimed by a mid-Pacific coral reef every bit as dangerous as the one Cook escaped from.

Had Cook suffered a similar catastrophe to La Perouse all his astronomical calculations in Tahiti, his charts of New Zealand and the coast of New South Wales, including Botany Bay, would have been lost. Sir Joseph Banks would have drowned with him and his later championship of Botany Bay as a convict settlement could have never happened. Cook's name would be known to very few naval historians and his disappearance, like that of Perouse, would have been a mystery which it might have taken decades to resolve, if it ever was. Britain's interest in the Pacific and claim to New South Wales might have foundered with *Endeavour*, with incalculable consequences for the European settlement of Australia and New Zealand. Luck plays its part in all human affairs but the age of exploration under sail demonstrates the role of chance in history most starkly.

When La Perouse failed to re-appear from the Pacific in 1789 as anticipated an expedition was sent under the command of the experienced explorer Antoine de Bruni d'Entrecasteaux to find him, or what had happened to him. The expedition came very close to the scene of the catastrophe. Dunmore points out that the expedition sighted Vanikoro Island, at a time when it is probable that French survivors were still alive on the island. The would-be rescuers had no reason to believe that this particular island was central to their search and were deterred from attempting a landing due to the menacing reef surrounding the island. The hinge of fate swung shut on La Perouse and his men.

It is reported that Louis XVI, despite his travails after 1789, never lost interest in the fate of his expedition and its commander. On the morning of his execution in 1793, at the height of the French terror, he enquired of his gaolers: '*Is there any news of La Perouse?*' There was none and would not be for nearly another 40 years.

Finally in 1826 an English Captain Peter Dillon was offered some antique sword hilts. Suspecting they might belong to La Perouse he traced them to their source on Vanikoro and learned the story of the disaster and its aftermath as it was remembered by the islanders. La Perouse lost both his ships on the same night, smashed ashore in a gale onto coral reefs off Vanikoro. Many of the shipwrecked survivors who got ashore were murdered by the Vanikorons. Some survivors managed to construct a palisade for protection and within it constructed a small vessel from the wreckage of the frigates. At some point they sailed away never to be seen again.

According to the natives two survivors remained living on the island for nearly 40 years and died shortly before Vanikoro was identified as being the site of the disaster in 1827. Tantalisingly had they lived just a few more years a first-hand account of how La Perouse himself met his death might have been given to Dillon and made known to the world. Did he drown at sea, was he murdered by natives or was he the one who organised the building of the forlorn hope which carried his men into oblivion? We shall never know. Dillon took to Paris artefacts from the ships which de Lesseps, who was still alive, was able to positively identify as belonging to his long-dead ship mates. This solved the mystery. In recent decades many French-led expeditions have dived on the wreck sites and recovered many more items.

Like all of Dunmore's maritime writing this book is a beautifully crafted piece of naval history. It combines a dry wit with vivid imagery which lives in the imagination. It is assisted by useful maps and illustrations. The author has given his readers the fruits of a lifetime of scholarship, research and devotion to his subject.

Visions from the Vault

Elements of the US Combined Fleet berthed at Victoria Dock, Melbourne in August 1925

(State Library of Victoria)

Throughout the inter-war years senior officers of the US Navy wrestled with the problems posed by a future war with Japan. Chief among these was the political need to avoid provocation by deploying a large fleet too early, meaning that plans to project force for the relief of the Philippines were based on zero warning time and little in the way of logistics.

In late 1924 the Navy Department decided to test the US Navy's ability to conduct and support long-range operations in the Western Pacific by sending a large segment of the US Fleet to Australia and New Zealand. Recalling the success of the Great White Fleet's cruise in 1908, Australian authorities heartily supported the planned visit, but fearing that the 23,000 officers and men might overwhelm local resources arranged for the fleet to be split, with twelve battleships and one escort visiting Sydney, while the remainder, including the fleet flagship, *USS Seattle*, the cruiser and destroyer squadrons (43 vessels in all), went to Melbourne.

The visit to both ports lasted 15 days beginning on 23 July 1925. The Japanese reaction was predictably hostile, but the visit overall was judged a success, helping to develop the level of understanding between Australia and the US. The Commander-in-Chief of the Combined Fleet, Admiral Robert E Coontz, had been the executive officer of *USS Nebraska* when the Great White Fleet visited Australia, and according to him this latest cruise 'put in the shade' his previous experiences of Australian hospitality.

ANI On-line: A guide to the website.

Our website is now on-line! In addition to the features available on the previous site, the 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 all its features.

Figure 1

Obtaining an account

In order to access the 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).

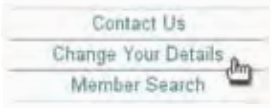

Figure 5

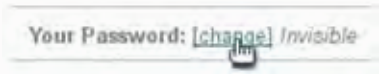

Figure 6

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

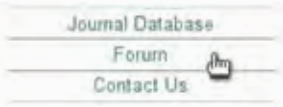

Figure 8

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.

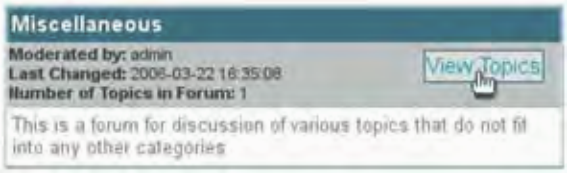

Figure 9

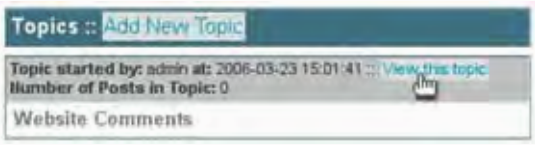

Figure 10

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!

Thinking of Making a Contribution?

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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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Endnotes rather than footnotes. Use footnotes to explain any points you want the reader to notice immediately. Book titles follow Author surname, first name, title if any. Title. Place of publication: publisher, year of that edition.

So:

Adkin, Mark. *Goose Green*. London: Leo Cooper, 1992.

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

Articles use quotation marks around their title, which is not in italics.

If citing web sites please use the convention:

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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Supply your everyday title for use at the beginning of the title, so: Lieutenant Commander Bill Crabbe, or Jack Aubrey, or Reverend James Moodie. At the end of the article, please supply full honours - Lieutenant Commander Bill Crabbe, CSC, RAN - unless you would prefer not to use them. Then please supply a paragraph on yourself, to a maximum of 50 words, including any qualifications you would like listed, and any interesting biographical aspects. **If possible please supply a colour or greyscale head and shoulders e-photo of yourself** for use alongside the article title.

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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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• *to provide a forum for the exchange of ideas concerning subjects related to the Navy and the maritime profession.*

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Email: a_n_i@bigpond.com and mark attention Editorial Board.

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