

# THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA



**CRESWELL ORATION 2018**

**SUBMARINE SERVICE  
FOR AUSTRALIA**

**THE ANGELS' SHARE  
AND THE DEVIL'S CUT**

**A NAVY FOR  
A DANGEROUS  
NEIGHBOURHOOD**

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## Front cover:

USS ZUMWALT (DDG 1000) and USS INDEPENDENCE (LCS-2) on patrol - the USN took delivery of USS MICHAEL MONSOOR (DDG 1001) in May 2018.

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## THINK NOT WHAT YOU ARE ENTITLED TO!

This issue of *The NAVY Magazine* begins with the 2018 Creswell Oration by Rear Admiral Jonathan Mead AM PhD, the new RAN Fleet Commander. Paper 2 is a follow-up to a previous issue by Nicholas Bellamy and Robert Blake [1] dealing with marine engineering, synchros and propulsion; entitled, rather mysteriously, *The Angels' Share and the Devil's Cut*. Paper 3, by Captain George Galdorisi USN (Ret.) returns to the South China Sea and our increasingly 'dangerous neighbourhood'; while Paper 4 considers the development of Australia's Submarine Service.

Knowingly or unknowingly Navy may be at a critical juncture, potentially dealing with three interconnected existential crises that may not be considered separately. In the 1992 Film *A Few Good Men* Colonel Nathan Roy Jessup USMC (played by Jack Nicholson) steals the film with his gritty juxtaposition of ethics and morality. Paraphrasing his 90 second court-room-drama speech, Jessup might today have said:

It is not about what you think you are entitled to!

We live in a world that has walls and those walls and its rules-based order have to be defended by sailors, soldiers, and aircrews with guns who can deal with the bullets, and the bombs, and the blood. Who's going to do it – tell you the truth and go behind and beyond your walls in order to defend your walls? You?

We have a greater responsibility than you could possibly fathom. We have a moral responsibility to our country to see to it that the men and women from all backgrounds charged with its defence are commissioned in the discipline and rules of war. You weep, sneer, dismiss, and you curse us. You have that luxury. You have the luxury of not knowing what we know; that how we think and what we do probably saves lives. That our very existence, while grotesque, incomprehensible, atavistic and no doubt unethical by your 'civil' PC standards, saves lives.

You don't want the truth to be told because deep down in places you don't talk about in your safe-spaces, you want us on those steel decks. You need us on those decks. We use words like honour, honesty, courage, integrity, loyalty, mateship. Beyond your ethics, norms and rules, we infuse these virtues as the moral backbone of lives spent defending something we value – our people, our sovereignty, our common-wealth. You use them simply as straplines to your tweets. Yet we subordinate ourselves to the political professional elites who rise and sleep under the blanket of the very freedom that we provide and who would never consider picking up a weapon, and keeping a vigil, or standing a lonely watch.

The first crisis is senior leadership. The new Chiefs have just been announced and rightly – having stemmed the decline of thinking in Army – Lieutenant General Angus Campbell, AO, DSC, MPhil is to be the next Chief of Defence Force. The crisis for Navy is that assuming Campbell does his four years, it will be at least twenty years (or 5-7 leadership cycles) since the post was last held by Navy – Admiral Chris Barrie AC in 2002! [2] A reasonable

question may be why? Why are Army and RAAF Chiefs being selected ahead of Navy? And what is Navy doing to position its future leaders to compete for the position in 2022?

Navy currently has systemic gapping of many 100s from a complement of about 16,000, including Reservists. In June 2016, 19.1% of Navy's complement was female. According to *Women in the ADF Report (2015-2016)*, 'success in gender diversity and inclusion in attraction and recruitment' will be achieved when Key Performance Indicators (KPIs) show:

- The number of women recruited is at or above the number required to meet each Service's 2023 female participation targets
  - initially 25% for Navy; increased to an aspirational target of 35% in Feb 2018;
- Women remain in the recruiting pathways at rates comparable to men;
- And Women's satisfaction with the recruitment process is comparable to that of men.

In November 2017, Fleet was signalled the command directive: 'the Navy Guide to Breastfeeding in the Workplace', which reportedly:

...endorsed [*inter alia*] breastfeeding in the workplace... as a tool to start a conversation between managers, supervisors, and breastfeeding mothers... facilitating support for working mothers [...critical] to delivering Navy's Warfighting effect [and] future capability [...as] a diverse and inclusive organisation that continues to execute our mission to fight and win at sea...

BBC and *Guardian* [3] reporting on UK Military deaths in Afghanistan and Iraq between 2002 and 2014 identified 632 UK Service fatalities, of which: approximately 98.5% were male, with an average age of 27.8; 80% were British Army; 13% Royal Navy and Royal Marines; and, 7% RAF. During this time there were 7,100 Combat Field Hospital Admissions; 2,200 Wounded in Action and approx. 7000 Casualty Evacuations. [4] Setting aside that servicemen may be 50 times as likely as servicewomen to be killed or seriously injured in combat (although tragically



Keeping Watch 28 Jan 1945, AB John Conway on board HMAS ML 802 Jacquotin Bay (Image AWM) - also showing at the Nerves and Steel exhibition, 'The RAN in the Pacific, 1941-45', The Shrine of Remembrance, Melbourne, 22 July 2017 - 29 July 2018.



Hon Christopher Pyne MP with M Hervé Guillou Chairman and CEO at (now) NAVAL Group Cherbourg shipyard FS SUF-FREN (8) in background.

the impact upon defended-less women and children in ‘civil’ conflicts is worse than ever) and the impact upon morale and burden sharing, a question that emerges is ‘on what empirical grounds do these KPIs show that the ADF will be better prepared for war?’

This links to the second crisis Navy may be facing: recruitment and retention. Even allowing for the modest increases in complement provided in the 2016 *Defence White Paper*, these will not in themselves plug existing gaps. Notwithstanding, if gender-based KPIs are to be met by 2023 using historical retention rates (which are understandably higher for men than for women); allowing for the current proportion of men to women (80.9: 19.1), and an increase in annual recruiting to over 2250 a year (about a 10% increase over reported levels), 25% of recruits would need to be female for the next 5 years. If the 25% target is to be met without increasing recruiting further, it would mean 35% female recruits (including all-women entries, which are already occurring) for the next 5 years. Noting tokenism and the impact upon morale for all those serving (putting off male and female volunteers alike) – other than up to 55% female recruiting for the next 14-15 years, and ‘reducing’ the male workforce by 11% over and above ‘natural wastage’, may the 35% aspirational target be reached. Questions that arise seemingly pit ethical aspirations, against social morality, and political expediency, versus national interest. All this before addressing the elephant in the room – that by the 2030s Navy will need a complement in the 20,000s to crew the big-ship Fleet emerging.

The third crisis concerns the way in which Commonwealth is setting about building the future Fleet (see *Flash Traffic*). For example, the Future Submarine is supposed

to be a sovereign capability, but where is the evidence to support this? The workforce is increasingly being imported from Europe (principally the UK) and North America, and key leadership roles for the build have been offshored. The \$M Naval Shipbuilding Advisory Board reporting directly to the Minister for Defence Industry, the Hon Christopher Pyne MP, is 80% U.S.; 10% UK and 10% Australian – only one of whom may stand for Parliament. Not a single APS, Navy, Defence, CSIRO, or Australian Industrialist / Unionist other than an ex-Telstra CIO and a dual-citizen academic sits on the board. It is to be wondered what the French must think – or the Senate Economic References Committee in front of whom the Board was initially refusing to appear. Government talks about a sovereign capability; yet self-

evidently Australia is currently procuring a U.S. submarine capability; not even a French one – let alone sovereign!

The connected element of all three crises – senior Navy-ADF appointing; crewing Navy; and establishing a sovereign capability over the future Fleet – all come down to strategic leadership, competence, confidence and knowing how to conceive, conceptualise, build and crew a Navy that can ‘think, fight, win’. It is unclear exactly who will be standing watch in the future, and how they will deter the ‘bullets, and the bombs, and the blood’ feared to be coming our way.

*Australia is at risk of creating a perfectly ethical ADF, potentially incapable of securing and defending its own walls.* ■



Resuscitation Room in HMAS CANBERRA (L02) Hospital - ‘if you are serious about war, you are serious about looking after your people’.

#### REFERENCES

1. Blake RC, & N., Bellamy. (2016) Before you strike hard and fast: first clutch the engines (the adventure of SSS Gears). *The NAVY Magazine* of the Navy League of Australia Vol. 78, No. 2.
2. The next RAN CDF is likely to have been born in the 1970s (Gen X / Y) and to have joined Navy at the end of the Cold War, in the late 1980s.
3. See <http://www.bbc.com/news/uk-10634102>, and <http://www.theguardian.com/news/datablog/2009/sep/17/afghanistan-casualties-dead-wounded-british-data>, visited Jan 2018.
4. In 2008/9 at the height of the Iraq and Afghanistan Wars, 9.4% of the British Armed Forces were female when it was estimated twenty percent of the deployed personnel were women. Bone, V., *BBC News*, ‘Women in the British Armed Forces’, 19 Jun 2008. <http://news.bbc.co.uk/2/hi/7463636.stm>. By this estimate, servicewomen were twice as likely to deploy to Afghanistan and Iraq as servicemen.

# STATEMENT OF POLICY

CURRENT AS AT 1 JULY 2018

## For the maintenance of the Maritime wellbeing of the nation.

The Navy League is intent upon keeping before the Australian people the fact that we are a maritime nation and that a strong Navy and capable maritime industry are elements of our national wellbeing and vital to the freedom of Australia. The League seeks to promote Defence self-reliance by actively supporting defence manufacturing, and the shipping and transport industries.

The strategic background to Australia's security is changing and in many respects has become much less certain following increasing tensions, particularly in East Asia involving major powers, and in Europe and the Middle East. The League believes that Australia should rapidly increase the capability to defend itself, paying particular attention to maritime defence. Through geographical necessity Australia's prosperity, strength, and safety depend to a great extent upon the security of the surrounding seas and island areas, and on unrestricted seaborne trade.

### The Navy League:

- Believes Australia can be defended against attack by other than a major maritime power and that the prime requirement of our defence is an evident ability to control the sea and air space around us and to contribute to defending essential lines of sea and air communication with our allies.
  - Supports a continuing strong alliance with the US.
  - Supports close relationships with all nations in our general area particularly New Zealand, PNG and the South Pacific island States.
  - Advocates the acquisition of the most capable modern armaments, surveillance systems and sensors to ensure technological advantage over forces in our general area.
  - Advocates a strong deterrent element in the ADF enabling powerful retaliation at significant distances from our shores.
  - Believes the ADF must be capable of protecting commercial shipping both within Australian waters and beyond, in conjunction with allies.
  - Endorses the development of the capability for the patrol and surveillance of all of Australia's ocean areas, its island territories and the Southern Ocean.
  - Advocates Government initiatives for rebuilding an Australian commercial fleet capable of supporting the ADF and the carriage of essential cargoes to and from Australia in times of conflict.
  - Welcomes the 2016 Defence White Paper and the Government intention to increase maritime preparedness and gradually increase defence expenditure to 2% of GDP.
  - Urges the strength and capabilities of the Army (including particularly the Army Reserve) and Air Force be enhanced, and the weaponry, intelligence, surveillance, reconnaissance, cyberspace and electronic capabilities of the ADF be increased, including an expansion in its UAV capability.
- escort requirements of our 5 new major warships and the many other essential maritime tasks.
  - Recommends bringing forward the start date of the replacement frigate program to both strengthen the RAN and mitigate the local industry capability gap on completion of the current guided missile destroyer program.
  - Recommends the timely replacement and increase in numbers of the current mine-countermeasure force.
  - Strongly supports the early acquisition of large, long range and endurance, fast submarines and notes the deterrent value, reliability and huge operational advantages of nuclear powered submarines and their value in training anti-submarine forces.
  - The League is concerned at the very long time before the projected 12 new conventional submarines can enter operational service, noting very serious tensions in the NW Pacific involving major maritime powers.
  - Recommends very early action to provide a submarine base on the Eastern seaboard.
  - Notes the potential combat effectiveness and flexibility of the STOVL version of the Joint Strike Fighter (F35 Lightning II) and supports further examination of its application within the ADF.
  - Supports the development of Australia's defence industry, including strong research and design organisations capable of the construction and maintenance of all warships, submarines and support vessels in the Navy's order of battle, and welcomes the Government decision to provide a stable and continuous shipbuilding program.
  - Supports the efforts by Navy to rebuild the engineering capability to ensure effective Fleet maintenance and sustainability.
  - Advocates the retention in maintained reserve of operationally capable ships that are required to be paid off for resource or other economic reasons.
  - Supports a strong Naval Reserve and Australian Navy Cadets organisation.
  - Advocates a strong focus on conditions of service as an effective means of combating recruitment and retention difficulties.

**As to the RAN, the League,** while noting vital national peacetime tasks conducted by Navy, including border protection, flag showing/diplomacy, disaster relief, maritime rescue, hydrography and aid to the civil power:

- Supports the concept of a Navy capable of effective action in war off both the east and west coasts simultaneously and advocates a gradual build-up of the fleet and its afloat support elements to ensure that, in conjunction with the RAAF, this can be sustained against any force which could be deployed in our general area.
- Considers that the level of both the offensive and defensive capabilities of the RAN should be strengthened, in particular with a further increase in the number of new proposed replacement frigates and Offshore Patrol Vessels, noting the

### The League:

- Calls for a bipartisan political approach to national defence with a commitment to a steady long-term build-up in Australia's defence capability including the required industrial infrastructure.
- While recognising budgetary constraints believes that, given leadership by successive governments, Australia can defend itself in the longer term, within acceptable financial, economic and manpower parameters.

## FUTURE FRIGATES DECISION IMMINENT?

At the time of this edition going to press all eyes were out and looking for a decision on the SEA 5000 Future Frigate project announcement. The \$35billion project, to replace the ANZAC Class frigates with nine future frigates, has shortlisted the British BAE Systems Type 26 Global Combat Ship – Australia, the Italian Fincantieri FREMM Frigate and the Spanish Navantia F-5000 evolved from the Hobart class air warfare destroyers currently being built in Adelaide.

Whether an announcement of the successful bidder, or a further shortlisting to two contenders, is imminent the Navy League calls on government to ensure the final vessel design provides to the RAN the capability it needs to protect our maritime borders, manage the emerging ASW threat and broader taskings for a life that is likely to last 50 years. The task is a complex one, with the initial undertaking primarily the delivery of an anti-submarine warfare platform, as the project has evolved the expectations on the vessel design have become much broader and now include anti-ship missile defence and anti-air capabilities. With growing regional force capabilities, getting the decision right is an imperative to our ongoing regional capability superiority.

Building the ships locally (in Adelaide) will add to the cost, with the Navy League buoyed by the equally important aspect of the process delivering improvements to Australian defence industry capability now and into the future. Each of the contenders argues its vessel design offers the most advanced capabilities and with a requirement to be 'cutting steel' by 2020 there is no time to lose on getting started on the right design.

## DISCOVERY AND MAPPING OF AE1

Much work has been undertaken since the discovery of the 103 year-old wreck of HMAS AE1 last December, as a result of a joint expedition involving the RAN, Microsoft co-founder Paul Allen, the Australian National Maritime Museum and several other institutions. The research vessel Petrel, using a remotely operated vehicle, has captured some amazing images of AE1 which has been at rest in 300 metres of water off the Duke of York Island group since it was lost with all hands on 14 September 1914 while patrolling with HMAS PARRAMATTA around Rabaul. Initial images suggest the submarine encountered trouble when diving and was subsequently crushed and sank to the ocean floor.

The loss of AE1 was a great tragedy early in the war. The Navy League pays tribute to the men who lost their lives in the sinking and commends the Australian government decision not to release the exact location of the wreck. Those who interfere with it should forever be condemned.

We look forward to bringing you further details in a future edition.

## FAREWELL TOO SOON: ADMIRAL HARRIS HEADS TO SOUTH KOREA

In our last edition we were excited by the announcement of Admiral Harry Harris to be US Ambassador to Australia. We are equally excited to hear that Admiral Harris will take on a leading role in regional stability by his appointment as Ambassador to South Korea.



The Casing of HMAS AE1 (Image Australian Department of Defence) - see also Paper 4.

Recent developments toward peace on the Korean Peninsula are encouraging enough to soften the blow of missing out on such a high calibre appointment as Ambassador.

While the eventuality of the planned talks between the US and North Korea remained questionable at the time of printing this edition, the appointment of Admiral Harris to the role in South Korea highlights US focus on stability in the region. While we are disappointed at the pier head leap of Admiral Harris from the US Ambassador to Australia role, the new appointment and the potential for US talks with the North Korean regime show promise for progress toward regional stability.

All-in-all good news for Australia.

## PRESENTATION OF LIFE MEMBERSHIP BADGE TO RAY GRIGGS

Since our last edition our Vice President Mark Schweikert presented Vice Chief of the Defence Force, Vice-Admiral Ray Griggs AO CSC RAN, with a life membership badge of the Navy League.

Admiral Griggs has been a longstanding friend of the Navy League of Australia both as VCDF and during his earlier career. From his staff and operational command positions, to his UN and border protection duties, as well as his strategic roles within ADF headquarters, Admiral Griggs has served Australia and the defence of our country with distinction. BZ.

We wish him well in his future endeavours and look forward to his long ongoing contribution to the League.

## THE NAVY LEAGUE STATEMENT OF POLICY

In recent editions I have encouraged readers of *The NAVY Magazine* and members of the Navy League to revisit our Statement of Policy. We are a maritime nation and a strong Navy and a capable maritime industry are indispensable to our national wellbeing and freedom. You will see that much of the content in this edition is aligned with our Statement of Policy.

Until recently the Statement of Policy was inside the back cover of each edition of *The NAVY Magazine*. The Statement of Policy is our guiding principle and if we are to fulfil our objectives it is important that we continue to reference it and annually we refine it. As you can see in this edition, to highlight the importance we place on the Statement of Policy we have moved it up forward, in the preceding pages to ensure we stay on track.

Australia's strategic position continues to evolve and the situation in the region is, in many ways, less certain than ever. In this environment and within real and recognised budgetary constraints the Navy League encourages a bipartisan political approach to national defence with a commitment to steady, long term build-up in our capabilities, including industrial infrastructure.

Our articles and editorial approach is driven by this determination. I encourage you to revisit the Statement of Policy along with your reading of this edition.

Let us have your feedback at [editorthenavy@hotmail.com](mailto:editorthenavy@hotmail.com)



Navy League of Australia Vice President Mark Schweikert presents Vice Admiral Ray Griggs RAN (VCDF) with the first ever NLA life time membership badge.

## NAVAL REVIEW POTENTIAL LIASON

Noting an initiative to exchange papers and work together, the Editor of the Royal Navy *Naval Review* wrote, *inter alia*:

### Good morning Aeneas,

Some years ago the trustees decided to do away with the stipend for each article printed and moved to expand its prize awards. So clearly we paralleled your thinking. Why you might ask? Quite simply to redress the membership balance and most importantly develop the habit of intellectual discourse – for too many years junior officers have been swamped by more short term professional pursuits that don't necessarily prepare them for later life in the Service.

[*The Naval Review* (like *The NAVY Magazine*) is] fiercely jealous of [its] independence. But alongside that we foster a special relationship with the Naval Service that permits anyone serving to write for the review without reference to their respective chain of command – after all our purpose is wholly focussed on bettering the UK's Naval Service so having a very close understanding as a critical friend is not entirely surprising. In doing so, we support the development of UK Defence's approach to intellectual challenge, especially after the *Chilcott Enquiry Report* on Iraq, by providing a relatively 'safe' space in a members-by-subscription-only environment.

I think sharing of articles is entirely possible but, perhaps, we need to do so on a case-by-case basis. Might I suggest we establish a reciprocal corporate membership arrangement between *The NAVY Magazine* and the NR. In that regard I'm much taken by 'Quo Vadis Australia' and would like to publish it, with due recognition of permission from *The NAVY Magazine* in our August edition of the NR.

Do hope this all works for you. Look forward to hearing from you.

Regards

Editor

*The Naval Review*

### By Editorial Board

The Paper 'Quo Vadis Australia', with the approval of Professors Reay Atkinson and Bogais, has been provided to Admiral Williams for publishing in the August issue of *The Naval Review* as a test case along with examining other reciprocal arrangements.

## QUO VADIS NLA?

Dear Sir,

I have taken *The NAVY Magazine* for almost twenty years and have seen the way in which it has developed current issues; whilst reflecting on naval history, strategy, science and procurement. I noted yet again, that despite recent reports claiming that 'the Chinese encroachment of the South China Seas was something new' (by so-called experts and think tanks) *The NAVY Magazine* has been articulating and chronicling this threat for at least a decade. Similarly, *The NAVY Magazine* also championed the acquisition of our mini-carriers (CANBERRA and ADELAIDE), long before they were taken up and actually procured – and at a time when to take forward such a strategy was dismissed as 'being utterly far-fetched'. Similarly on submarines and putting forward the need to procure an effective Naval Gunfire Support weapon. In all these cases, the magazine has proven to be both accurate and prescient.

My question then is 'why, despite the plethora of think tanks, newspaper articles, and alternative media sources (often Government / Defence sponsored) has NLA thinking and reporting proved far more perceptive than all of the above?' And 'why is Government apparently no longer able / capable of listening to the NLA?' It would appear to me that the Commonwealth is wasting \$Millions on these so-called experts – when for \$35.00 a year they could get all the trusted intel (and more) they need from the Navy League of Australia; its webpage; and magazine. Talk about value for money...

Sincerely

*Name and Address Supplied*

Canberra, ACT

### By Editorial Board

Dear Sir,

Thank you for your kind comments.

There is a concern amongst the Fourth Estate that the independent voice of critical reasoning is being drowned out by a combination of new media, and Government sponsored / approved publications and funded think tanks – including also ABC and SBS! This is a very real threat to the NLA and to *The NAVY Magazine*, if it is to survive into the 21st Century and celebrate its 100th year (in 2038) – just after RAN takes delivery of its initial future submarines! Copies of the magazines are generally circulated to Federal MPs and Senators – and it is clear they are being read. For example, in last month's issue it was stated by Reay Atkinson and Bogais in Quo Vadis that 'the 'conflict' in the South China Sea may already be over...'

– based also on previous observations by Blake and Thornhill (writing in *The NAVY Magazine*) going back to 2015. A view now widely being taken forward by the think tanks, and journos – and almost certainly ascribable to *The NAVY Magazine*, yet with no recognition of source or progeny... If you have any ideas how we might better engage, or better still noting your location, get some MPs, Senators, and senior officials to write a paper for *The NAVY Magazine*, please let us know.

## THE BALKAN FRONT

Dear Editor,

I don't know whether you are able to assist me with an enquiry.

I am part of a group researching the lives and stories of those Australians who served in World War One on the Serbian/Macedonian/Balkan front. There were several hundred medical personnel, as well as Australians attached to British units. Our group is putting together a book and there will be a ceremony in Canberra this September in their honour.

One group we are interested in finding more about are the crews of the Australian ships who were operating in the Aegean/Adriatic and Mediterranean Seas at the time. We can locate the names of the Captains, but the names of the crews are a little harder to locate.

I was wondering if perhaps you have a section in your magazine or a blog or website where a story could appear about this project. I am hoping that maybe some of your members may know of any sailors operating in these ships and /or their descendants.

The ships involved were – HMAS HUON (D50), PARRAMATTA (D55), SWAN (D61), TORRENS (D67), WARREGO (D70), and YARRA (D79). They operated in the Adriatic/ Aegean and Mediterranean during 1917-1919.

Thank you so much for your help.

Regards

*Margaret Brown*

### By Aeneas

Ms Brown provided her personal details; any responses can be forwarded to Margaret via the editor at: [editorthenavy@hotmail.com](mailto:editorthenavy@hotmail.com)

### Erratum

**Note:** The incorrect email was provided for correspondence in the April issue. The correct email for all correspondence to the *Editor and Editorial Board* is as above, rpt: [editorthenavy@hotmail.com](mailto:editorthenavy@hotmail.com)

*Aeneas*



# CRESWELL ORATION 2018: THE STATE OF THE FLEET

By Jonathan Mead

An elegant luncheon was served with wine at the William Angliss Institute Restaurant in the city of Melbourne on Thursday 22 March 2018 in celebration of the Australian Navy in 1901. The guest speaker, Rear Admiral Jonathan D Mead AM PhD RAN, Commander of the Australian Fleet, presented the “Creswell Oration”. Admiral Mead was introduced by Commodore Warren Gately RAN. Commodore Jim Dixon gave the toast to Her Majesty The Queen and the Royal Australian Navy. While acknowledging the foresight of Vice Admiral Sir William Creswell, Admiral Mead noted “he probably didn’t fully grasp what the Navy would be like in 2018 with Defence personnel challenging the status quo and having to innovate to keep up with worldwide developments”. Key to “keeping up” is training and exercising: war games are used to sharpen skills, such as *Ocean Raider* in 2016 and *Talisman Sabre* in 2017. UAVs and cyber are continuing to advance and Navy needs sharp minds that can ethically and critically envision, abstract, conceptualise and design the art, science and technologies of the future.

## INTRODUCTION

Distinguished Guests, Ladies and Gentleman, well, what a great Navy day it is. Thank you for giving me the great honour in presenting the 2018 Creswell Oration, entitled:

*The State of the Fleet.*

The Fleet Commander began by expressing his most sincere appreciation to the:

- The Navy League of Australia; particularly the Australian Navy Foundation Day Organising Committee;
- The Naval Historical Society in Victoria;
- The Naval Officers Club in Victoria; and,
- The Naval Association of Australia in Victoria.

[He continued]: events like the *Creswell Oration* hold monumental value and importance:

First, they honour the legacy that has come before us and pay tribute to those whom have had a tremendous influence in what the Royal Australian Navy is today;

Secondly, they give us the chance to come together to share and contribute to the story that started 117 years ago.

For 18 years this forum has gathered to commemorate one of our most important and influential forefathers, Vice Admiral Sir William Rooke Creswell. The establishment of a permanent and sovereign Navy that we now know as the Royal Australian Navy was in no small part due to the vision of Creswell. It seems quite fitting that annually we continue to remember this contribution.

Creswell envisioned a Navy of grandeur. A Navy that has the ability to patrol our expansive seas, equipped with state of the art technology and a ship building industry to support it. He advocated and pioneered for Australia to stand up and protect its national interests – a Navy that could hold its own on the outskirts of the Empire.

Eight weeks ago I took over as Commander of the Australian Fleet. Today I command and serve a Navy that I believe would be



Vice Admiral Sir William Rooke Creswell (Image AWM).

inconceivable to Creswell – a Navy that far exceeds anything that he could have envisioned all those years ago. I feel an immense sense of pride to serve a Fleet of this calibre, filled with people who continue to challenge and innovate far beyond our original vision.

Today I want to give you a close insight into the ‘the state of the



Know our Fleet Commander: Rear Admiral Jonathan Dallas Mead RAN.

fleet' – the Navy of Today – the Navy we have forged out of what was once a grand idea – which has been realised as a powerful, lethal and professional force within our region. To start off with I have a short film to show you. This film highlights the immense capability of the Australian Fleet and speaks volumes of the formidable force that we are.

It is truly remarkable to reflect on the achievements of our Navy. Most of the pictures that you just saw were taken in the last 12 months. These pictures, while they capture moments, represent months and years of hard work and planning – I'm excited to share the 'State of the fleet' with you today.



HMAS HOBART (D39) Visiting Hobart Feb 2018.

### AT SEA - AUSTRALIAN EXERCISES

A key part in what we do to achieve professional excellence is the training and exercising that we do in our own backyard. Over the last 12 months we have accomplished many key milestones and developed a capability that we have not exercised to this level before – Task Group operations.

*Talisman Saber 2017* was the largest joint multinational exercise that we have hosted in the waters off the east coast of Australia. A staggering 33,000 Australian, American and New Zealand sailors, soldiers and airman and women participated proving Australia as a lethal force. Our own amphibious ships coordinated one of the biggest amphibious landings ever conducted by Australian forces.

The firsts continued later on in the year when we completed Exercise *Ocean Raider*. Although a lot smaller than *Talisman Sabre* again our LHDs led a task group through complex Air, surface and subsurface wargames. Notably was the embarkation and employment of 2 MH-60 Romeos.

Two weeks ago - we achieved something not many Navies can boast. All of our Surface Units, with the exception of our two frigates in deep maintenance were at sea. Doing what they were designed and made to do. We had at sea almost 50-60% of our entire Navy.



HMA Ships BALLARAT (F155) and BATHURST (ACPB 85) exercise with USS JOHN S. McCAIN (DDG 56)

## AT SEA - AUSTRALIAN OPERATIONS

To the north of Australia we have continued with border protection operations. We have maintained a presence of 5–6 ships continuously deployed for a number of years. Our northern border will continue to remain important and operations in this region will not slow.

## AT SEA - OVERSEAS DEPLOYMENTS

Further from home, the last 12 months have been busy for the RAN in overseas operational deployments. Our most significant and biggest contribution remains in the Middle East Region where we are conducting our 66th Major Fleet Unit rotation since 1990.

HMAS WARRAMUNGA (F152) is the unit currently deployed in the region. What they have achieved in the last 4 months since they deployed is remarkable.

She has intercepted 10 vessels, confiscated 19.5 tonnes of hashish and more than 1.6 tonnes of heroin valued in excess of \$1.47 Billion. In a couple of months HMAS BALLARAT (F155) will deploy on the 67th rotation and she will continue to be an important force in the region.

We continue with the deployment of our Collins Class submarines, four of which are at sea and during 2017 supported twelve national and international exercises.

## IN THE AIR

In December 2017 the S-70 Bravo Seahawk and Squirrel helicopters were formally retired from active service in the Royal Australian Navy. The Bravo Seahawk serviced the RAN for 29 years, flying in excess of 88,000 hours and completing 64 Middle East operational deployments.

The Romeo helicopters now become the forefront of our Fleet Air Arm and since their introduction in 2013 have passed the fleet milestone of 10,000 flying hours. They have now completed more than 3,500 sorties all around the world and remain the most cutting edge and lethal Anti-Submarine Warfare technology.

As we continue to build and develop our aviation capability we have most recently introduced MV Sycamore – our first multi-role aviation training vessel. It provides a dedicated flight deck equipped vessel to train our aircrew, saving time, money and freeing up our surface units. This new capability is game-changing and shows how we have become innovative in the way we train our people – a necessity in our dynamic and rapidly changing environment.

## INTO THE FUTURE

Our achievements over the last 12 months have been truly exceptional. We continue to meet and exceed the goals we set for ourselves, albeit with its challenges. And it doesn't stop there. Over the next five years our Navy will continue to grow and evolve - We cannot keep up with tomorrow's challenges with today's technology.

Last year we commissioned the first Hobart Class Air Warfare Destroyer HMAS HOBART (D39). She has met the demands of introduction to service with zeal. This multi-mission capability is equipped with the most sophisticated and advanced weapon system able to combat both conventional and asymmetric threats.

This year we will see the introduction of our second Hobart Class Air Warfare destroyer 'HMAS BRISBANE (D41)' and the third the following year. These ships will continue to be at the forefront of our fleet and bring with it a technology that we will undoubtedly continue to master.

In the next 12 months we will see the decommissioning of the Auxiliary Oil Replenishment Ship HMAS SUCCESS (OR304) – the First Lady of our fleet - as we make way for our new supply class replenishment ships HMAS SUPPLY (AOR195?) and STALWART (AOR215?) scheduled to be introduced the following year. The steel for the first of the two ships HMAS SUPPLY has already been laid in Spain and its introduction to service will ensure our ability to maintain a strong and continuous presence at sea.

In the not too distant future we will also introduce twelve new offshore patrol vessels or OPVs - all of them built right here in Australia. The vessels will be fitted with a 40mm gun for self-protection, three 8.4m sea boats, state of the art sensors as well as command and communication systems. This will allow the OPVs to operate alongside Australian Border Force vessels, other Australian Defence Force units and our regional partners.

Our local shipbuilding industry will continue to build a large proportion of our ships going into the future. Nine new Anti-Submarine Warfare Frigates will begin construction in Adelaide at the Osborne Shipyard in 2020. These vessels will replace our existing ANZAC class frigates equipped with the newest and state of the art suite of offensive and self-protection systems.

The building of these two classes of ship represents the nation's largest ever program of naval shipbuilding and sustainment and will be one of the most complex and technically challenging endeavours Australia has ever committed to. The plan involves an investment of about \$90 Billion. This is a significant endeavour – which will undoubtedly bring challenges yet to be anticipated.



HMA Ships MELBOURNE (FFG 05) and PARRAMATTA (F154) leave Sydney Harbour to take part in Exercise Ocean Raider November 2017.



HMAS WARRAMUNGA (F152) seized \$Millions of Drugs in the Middle East March 2018 (Image DoD).

## CONCLUSION

The best is yet to come - The Navy of today and the Navy of the future is exciting, it's powerful, its state of the art and it will continue to evolve and develop as we respond to environment around us.

We have only just begun to scrape the surface of Autonomous unmanned vehicles, a technology that will soon dominate the water space which we conventionally operated in. Cyber warfare will become increasingly prevalent and we will need to continue to transform ourselves in this space.

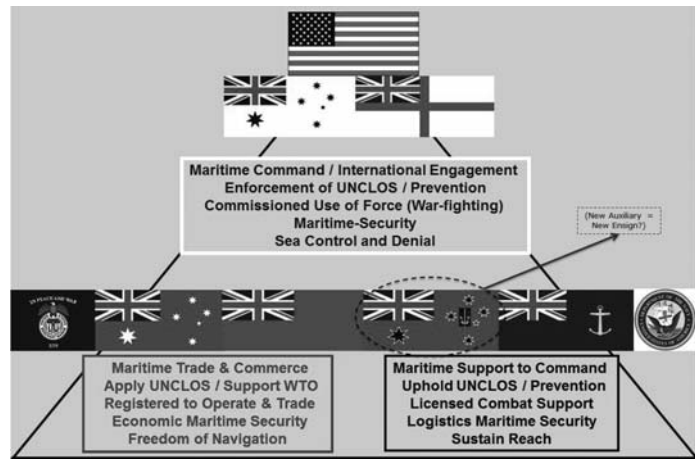
The Navy of today may be unrecognisable to those who fought for its creation all those years ago. I don't think Creswell could have even imagined the force we have made ourselves into. But where we are today is because of minds like his. Minds that envisioned something more and fought – with their blood, sweat and tears – for its actualisation. Creswell's vision is not far from what we continue to forge ourselves into today albeit in different words.

Our ability to project power, exert influence and control those parts of the sea which matters most to us is our core business. I recently returned from sea commanding our Fleet exercising in Bass Strait - and I can attest that our Fleet is not one to be messed with.

We owe an extreme debt of gratitude to architects of our past and I am extremely honoured, grateful and proud that I can add to this legacy. Thank you for giving me this opportunity to share the excitement and passion that I have for this fleet and this Navy. I am extremely fortunate to be in this position and will continue to make this Navy great in the same way Creswell fought 117 years ago.

Thank you to the great institution of the Navy League of Australia and your great people who help the RAN keep this legacy alive. I admire and respect your passion and commitment and I hope this tradition remains for many years to come. ■

**About the Fleet Commander:** Rear Admiral Jonathan Mead joined the RAN in 1984 and specialised in Mine Clearance Diving and Explosive Ordnance disposal. In 2005, he commanded HMAS PARRAMATTA (F154) in the North Arabian Gulf. In 2011, he was promoted to Commodore and deployed to the Middle East, responsible for maritime counter terrorism. In 2018, he was appointed Commander Royal Australian Fleet. As Fleet Commander, he is responsible for the strategy and staffing for the 21st Century Navy. He has a Master's degree and Doctorate in International Relations and a Master's degree in Management. He has published a book on Indian national security: *Indian National Security: Misguided Men and Guided Missiles* (2010), KW Publishers Pvt Ltd: New Delhi, India.



The Maritime Trinity - Command and Control of the Seas, Robert Cuthbert Blake (2014).

**By Editorial Board:** The crewing of Future Navy remains a pressing issue. It is understood that active consideration is being given to creating an *Auxiliary Service* within Navy, with parallels to the USNC and the British Royal Fleet Auxiliary, as potentially suggested / advocated by *Robert Cuthbert Blake* in:

'Return to the Seas - an RFA for Australia' (2012), *The NAVY Magazine* Vol. 74, No. 1: pp. 11-14; 'A New Model Navy' (2014), *Headmark*, Journal of the Australian Naval Institute, No. 153: pp. 31-35; and 'One Capital Ship does not an Amphibious Readiness Group Make, nor one first class submarine, destroyer or frigate' (2017), *The NAVY Magazine*, Vol. 79, No. 4: pp. 7-11.

Additionally, in the Statement of Policy (p. 4) the *Navy League of Australia* advocates, *inter alia*:

- [The] strong deterrent element [of] the ADF enabling powerful retaliation at significant distances from our shores; for which:
- The ADF must be capable of protecting commercial shipping both within Australian waters and beyond, in conjunction with Allies.
- Endorses the development of the capability for the patrol and surveillance of all of Australia's ocean areas, its island territories and the Southern Ocean.
- Advocates Government initiatives for rebuilding an Australian commercial fleet capable of supporting the ADF and the carriage of essential cargoes to and from Australia in times of conflict.
- Considers that the level of both the offensive and defensive capabilities of the RAN should be strengthened, in particular with a further increase in the number of new proposed replacement frigates and Offshore Patrol Vessels, noting the escort requirements of our 5 new major warships (including HMA Ships SUPPLY and STALWART) and the many other essential maritime tasks.

To support a Future Navy up to 50% larger in terms of hulls than today, will require new crewing and combat support models; including the use of perfectly adequate merchant / civil hulls and designs. This would have the added advantage of re-instantiating Australia's Merchant Marine, see also Red Duster.

# THE ANGELS' SHARE AND THE DEVIL'S CUT

By Nicholas Bellamy and Robert Cuthbert Blake

**A successful Bourbon Whiskey marketing campaign depicts a sultry actress explaining that when whisky is aged some of the liquid in the barrels is lost to evaporation, this is called the Angel's Share, but some soaks into the wood and stays there. The shares are roughly 2% per annum evaporation and 5% absorption. Whisky connoisseurs agree that losing almost a quarter of beautifully crafted 15 year old single malt, is heartbreaking. The angels will no doubt disagree. Considering that ships are propelled by a distilled spirit, one can make broad comparisons. The spirit wasted in counteracting mechanical and hydrodynamic deficiencies, ultimately sent up the stack, can be considered as "The Angels' Share"; while the devil makes his cut by choking the angels with those emissions developed when producing the angels' share.**

## IN A DOCKLANDS FAR, FAR AWAY

The Defence and Security Equipment International (DSEI) exhibition 2017 was held in London's Docklands with HMS ARGYLL (F231) alongside to showcase the Royal Navy. Inside the main exhibition centre and the SSS Stand gather an eclectic group of power-engineers, professors and marine technologists drawn from the US, UK, Germany, Denmark, Japan, Australia and Korea – preparing for their visit to HMS ARGYLL. They descend on the ship and are met professionally by a smart ship's company.

The visit takes in the upper deck, the 4.5inch Mk 8 gun, a detailed damage control and firefighting brief, everything one could ever want to know about the Wildcat, by the Flight Commander himself, then proceeds to the Bridge and takes in a brief by the navigator. There is some twitching in the group by this stage and comments about "engines, synchro's, gearing, frictionless clutches" and other matters regarding the dark arts of power propulsion – but the group presses on.

The briefs by the ship's company are superlative – each officer and rating clearly knows their ship and takes huge pride in the delivery. Yet something is missing and, unlike all the other groups who want to know about the whiz-bangs, this group strangely does not. At almost the last minute, a boiler-suited Chief fresh from the bowels approaches the group. He tries out a little technoguesse and immediately all eyes are suddenly on him. The Chief tries some more – and now he has the group's full attention. The torpedo maintainer continues his talk and slowly tails off... This has never happened before, he thinks. The Chief Artificer (Tiff) thinks the same. He tries out a few more words to do with "gas

turbines, clutches, synchro's", and other such oily engine room speak. To his amazement, he has the first best question he can remember in his entire naval career, all to do with torque, and changing gears, synchro's and meshing.

Quietly, stealthily even the Chief Tiff steals the group away and they make their way like a group of happy school-children into his holy-of-engineering holy's, the Machinery Control Room (MCR).

The discussion is now enlivened. The ship's Principal Warfare Officer ducks in, and as quickly ducks out muttering darkly under his breath about

"angels and synchro's... should be \*\*\*\*\* seen but not heard" This is definitely something the Marine Engineering Officer (MEO) needs to be part of, he thinks – "Engines!!!!". By now the group is stood by the very grail itself, the SSS Clutch in the Engine Room. The Chief is almost in tears as he talks through the SSS Clutch, and his crew eagerly demonstrate the LOCKOUT – RATCHETING – ENGAGE – DISENGAGE – LOCKOUT sequence; while the SSS Clutch floats effortlessly and smoothly to each position; performing dutifully, as she has flawlessly for the past 30 years of unfaltering service (with minimal servicing and maintenance requirements). The Chief without thinking gently pats his Gas Turbines with clear affection.

The Engine Room has never been so busy – and full of folk in suits taking it all in, and asking great questions! A crowd of engineering mechanics joins the throng – they too have never seen anything quite like it. No one visits their spaces – something is clearly going on.

The Chief Tiff has almost finished his pitch, when Nicholas Bellamy





HMS ARGYLL (F231) alongside HMS BELFAST (C35) Port of London Jan 2014.

asks the final question. "Chief can I just confirm the serial number of the SSS Clutch, I think it's R4795. If it is, it was tested personally by Mr Clements, Chairman and Managing Director of SSS in 1989 [at the height of the Cold War. . . .] He was obsessed with getting SSS Clutches for the Type 23s absolutely perfect to ensure quiet and smooth running". There is a hushed silence. The Chief Tiff knows perfectly well that the number is right – and the bronze serial number has clearly recently been polished. Nevertheless he confirms the number and reads it back, letter by number. There are tears from all sides now and a quiet toast is proposed to Mr Clements who sadly died earlier in 2017, and to his great SSS Clutch, and to HMS ARGYLL. The Chief Tiff is now standing eight foot tall, almost bumping his head on the plates – the group slowly, reverently depart having toasted absent friends, distant spirits, and their guardian angels. The MEO joins the group in the MCR and relieves the Chief Tiff, who is last seen telling a bemused sailor "that there is a God, and he lives in HIS Engine Room".

The MEO politely, discretely, sacredly even escorts the group ashore – there is not a Captain, PWO, or Flight Commander in sight. Though they share the pride in their ship and its engines, they know that, most unexpectedly, this is the Marine Engineering Department's day! By Authors: With a special thanks and some liberty in the story telling to all those who attended.

## ANGELS, WHISKY, AND MODERN HYBRID ELECTRIC PROPULSION – SPOT THE LOSSES!

Both terms (Angel's Share and Devil's cut) refer to the spirit lost during maturation, through wood (casks) absorption and alcohol evaporation. The shares are roughly 2% per annum evaporation and 5% absorption. The root causes of most losses in a ship are hull fouling and mechanical propulsion deficiency. This article focuses on those mechanical propulsion losses and explains important, lesser-known benefits.

Propulsion machinery designers cover a wide range of ships' operational requirements by combining the best propulsors (propeller, pump jet etc.) and driving machinery (diesel engine, gas turbine, electric motor etc.) Large warships (4000+ tons displacement) require efficient low speed driving machines for "cruise" and much higher powered engines for their "combat boost" or "sprint" modes (say 25+ knots). The fundamental advantage of this approach stems back to 1950's Admiralty developments striving for better synergy

in efficiency, weight and range. Cube law helps ensure that the power required from the "boost mode" engine for these large, fast warships requires a power density exclusively available from gas turbines.

Warship gearbox designers also have various options available, whereby marginal gains make for excellent overall performance. One of those options is the clutch design, which connects and disconnects the various driving and driven machines as required. Generally, two devices are prevalent; SSS Clutch type overrunning clutches or friction clutches.

Whilst both solutions are well referenced in marine propulsion systems, the finer points of their pro's and con's are not always obvious. Critically, the comparisons whilst "disengaged and locked out" (SSS Clutch) or "open" (friction clutch plates) are only obvious to those with detailed design experience of

both. Considering both clutch designs spend the majority of their life "disengaged" or "open", whilst the warship operates in low speed cruise mode (anti-submarine warfare or "ASW" in the case of a frigate), small improvements have massive knock-on effects. As frigates seem to currently offer the best global opportunities in naval shipbuilding, this article focusses on such designs.

...SHE'S FROM ANGEL SHARES INC. TO DISCUSS SELF-SYNCHRONISING WITH THE MEO

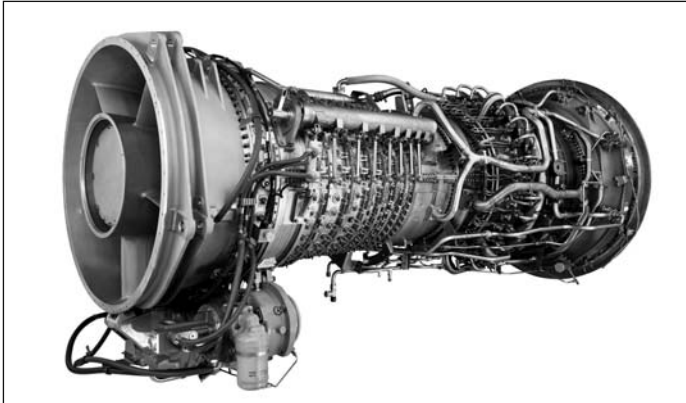


Self Synchronising after Tugg.

## GENERAL TRENDS

Before considering options of propulsion components, the general trends in overall propulsion layout should be considered. Whilst “all-electric propulsion ships” continues in development, hybrid and mechanical drive seem the most popular current options for large and fast frigates.

Giant strides in aviation jet engine development are continually made. A combination of design genius and material technology gives us higher than ever compression ratios and burning temperatures, with thermal efficiency exceeding 40%. As airlines compete with their passengers for leg room, their efficiency demands push jet engine designers into admirable competition amongst manufacturers.



General Electric LM2500+G4 gas turbine (Courtesy of GE Marine).



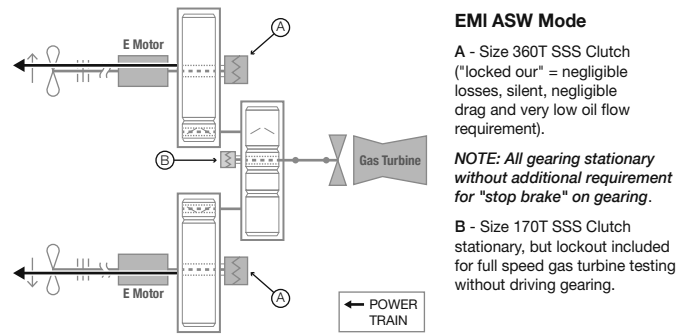
Rolls Royce MT30 gas turbine Credit - Rolls Royce C 2018.

The conclusion for the jet engine’s naval cousin, is a marine gas turbine ranging in power from 32 MW to 42 MW, depending on the chosen manufacturer. Power density comparisons are staggering; a gas turbine the size of a builder’s van, develops the same power as a diesel engine the size of a modest family home. In turn, this gives propulsion designers enough “bang for their buck” to consider one single boost gas turbine on a large, fast frigate.

Whilst a single gas turbine for “boost” might worry a navy which is rightfully concerned with redundancy, the lure of reduced engine footprint, combined with the reassurance of modern gas turbine reliability has resulted in a handful of 6000+ ton, 120+ metre warships, capable of 26+ knots with only a single “boost” gas turbine.

## PROPULSION SOLUTIONS & SEA 5000

Alternative propulsion solutions for the Royal Australian Navy’s SEA 5000 Frigate concept are the well-established CODOG (combined diesel or gas) propulsion or gas turbine hybrid “CODELOG” /



Hybrid CODELOG-CODELAG propulsion in (ASW) Electric Motor mode.

### EMI ASW Mode

A - Size 360T SSS Clutch (“locked out” = negligible losses, silent, negligible drag and very low oil flow requirement).

NOTE: All gearing stationary without additional requirement for “stop brake” on gearing.

B - Size 170T SSS Clutch stationary, but lockout included for full speed gas turbine testing without driving gearing.

“CODELAG” (combined diesel electric or / and gas). CODOG is already prevalent within many global frigate solutions and the AWD Hobart class destroyers. Whilst CODOG uses lower powered gas turbines, the total “boost” power requirement for the propulsion drive is met by using two gas turbines. In this arrangement, redundancy concerns are checked by 2 x GT’s, and 2 x (cruise) diesel engines.

Whilst a modernist may argue that hybrid EM drive has noise advantages for ASW, CODOG designers will counter that simple design improvements are available to reduce noise. Additionally, with one of the 3 proposals under consideration by Australian Defence being based on AWD Hobart Class CODOG propulsion, obvious commonality of supply advantages exist.

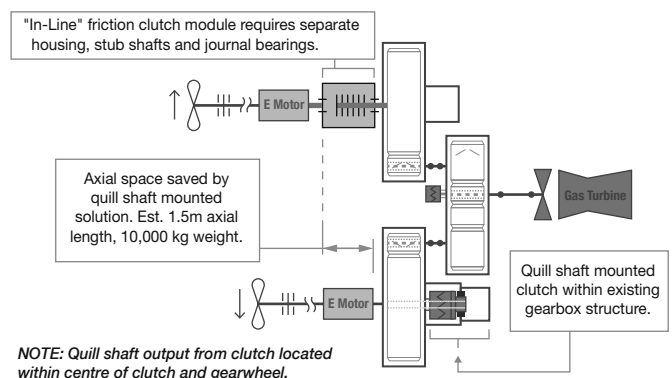
With hybrid CODELOG / CODELAG, the single (higher powered) gas turbine option is possible by splitting the massive power output from the GT onto two shafts, through what most now refer to as a “cross connect gearbox”. A further geared reduction to shaft speed, allows hybrid motor manufacturers to supply designs which mount directly to the propeller shaft.

The added bonus of this modern arrangement for frigates, is that adding a clutch between the entire reduction gear and electric motor, allows the gearing to be completely disconnected and kept stationary when in motor / ASW mode, thus significantly reducing noise.

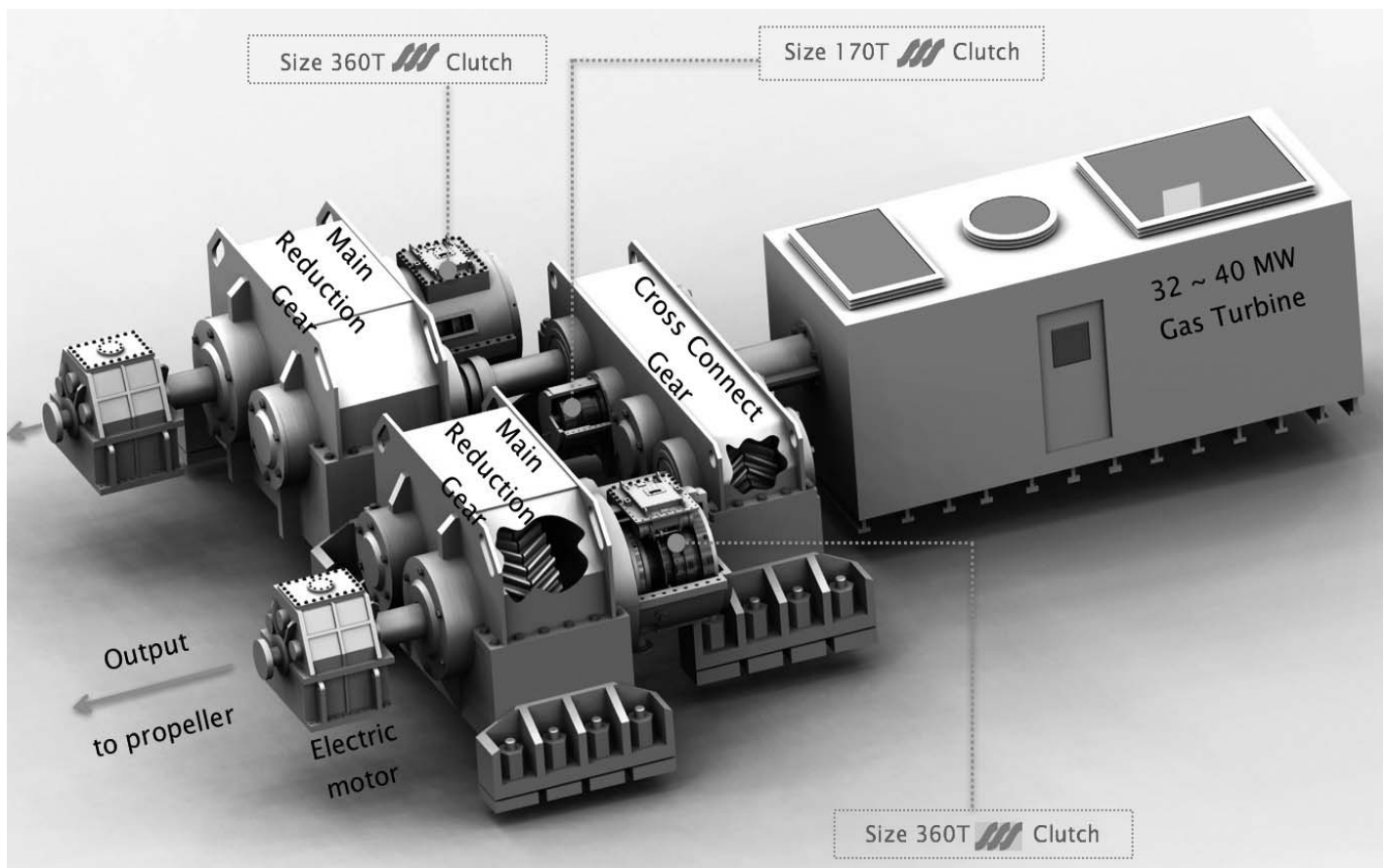
## LESSONS LEARNED – FALKLANDS (MALVINAS) 1982

This propulsion concept (motor aft of SSS Clutch, decoupling entire gearbox in ASW mode, allowing auxiliary oil pump shutdown) was first realised in the Royal Navy Type 23 (T23) design, a frigate design which was based around towed array sonar and received final development after lessons learned from the Falklands conflict [1].

When pondering noise and its overall effect upon effective sonar, it is



Quill shaft solution versus in-line friction clutch modules.



Hybrid CODELOG-CODELAG propulsion train as supplied for Asia-Pacific frigate program (figures above give more detail).

important to consider several printed reports of the ARA SAN LUIS diesel electric submarine avoiding the Royal Navy's anti-submarine defences and firing torpedoes upon major surface vessels in the British task force [2, 3, 4, 5, 6, 14]. Despite the "need to know" aspect of finer detail, anybody loosely connected to shipbuilding can draw an obvious parallel between quiet propulsion platforms and effective sonar.

Back to the lessons learned, effected within T23 designs. As recently as 2012, despite newer European frigate designs having been launched and operated, the Royal Navy laud T23 "Duke Class" as "most potent anti-submarine warfare platform of any navy at sea today" [7]. A key noise reduction feature of T23 propulsion platform was the ability to disconnect the entire gas turbine reduction gear from the ASW mode electric motor with an SSS Clutch design, which includes "lockout". The resultant low oil flow requirement, only possible with SSS Clutches, also allows T23 to shut down auxiliary oil pumps, relying instead on a simple oil scraper to supply a minimal oil flow requirement to the SSS Clutch, main propeller bearings and thrust block [8]. 30 years later, the Royal Navy are so confident in that clutch design, they have dispensed inspecting it, citing that clutch performance offers less risk than its inspection [9].

## DESIGNED TO FIGHT

During the T23 design phase, the Royal Navy engineers who arrived at that propulsion layout worried "what might happen" if a clutch, mounted on the propeller shaft line, might suffer from damage. As such, the SSS Clutch design was manufactured in "split halves" to allow in situ inspection and repair and concluded several key advantages over friction plate devices:

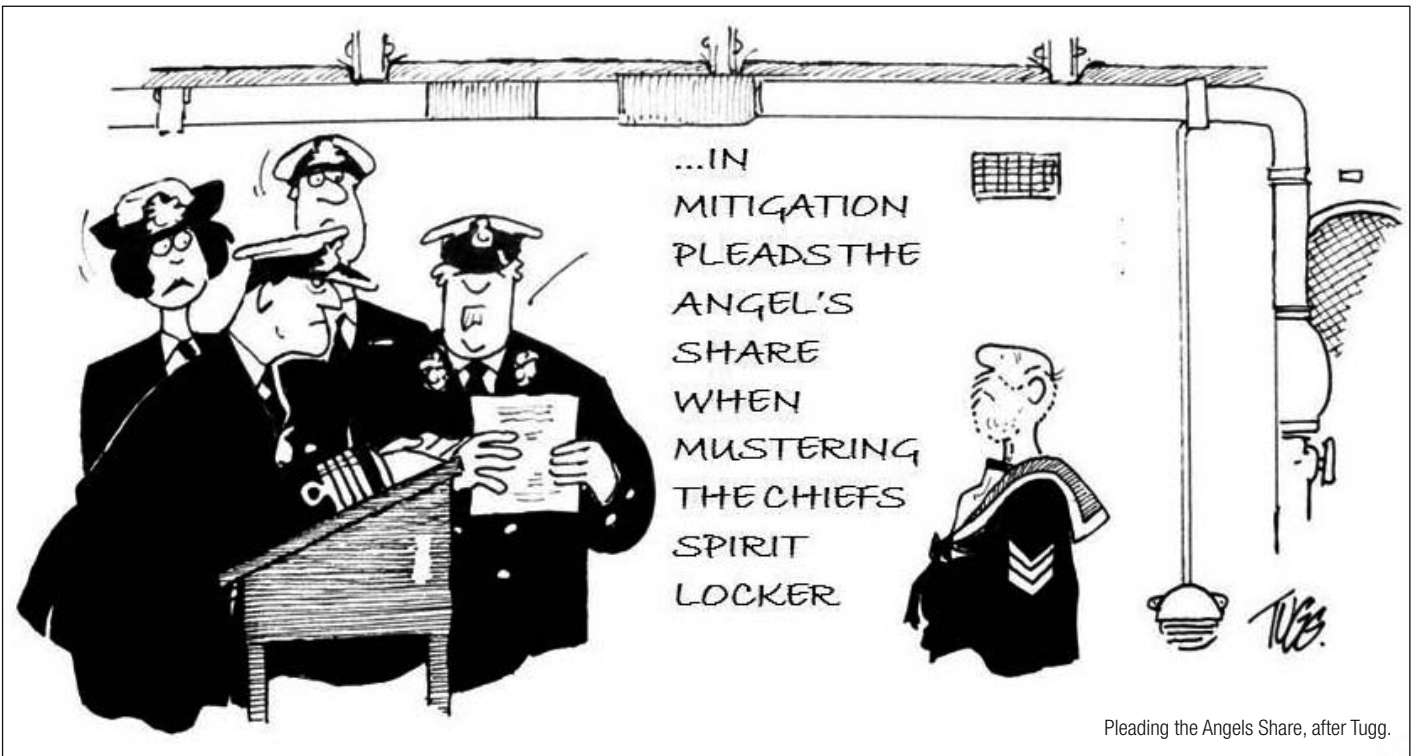
1. Robust, proven performance even at hard rudder / high power turns within rough seaway conditions during South Atlantic battle conditions.
2. Automated operation without complicated controls or high pressure oil pump required.
3. Mechanical protection against operator error.
4. Greatly reduced oil flow, power loss and therefore lower operating cost (fuel / servicing), increased range and reduced emissions.
5. Reduced weight, more compact propulsion system.

Expanding point 2, all SSS Clutches engage using a pawl and ratchet mechanism [10] and a helical spline, unlike friction devices which require high pressure oil to push their friction plates together. Additionally, friction plate designs require careful control of the driven and driving sides to specific speed differential envelopes before engagement. This can be a dilemma when comparing the gas turbine idle speed with that of the electric motor, especially with fixed pitch propeller design. Controllable pitch offers fine adjustment during changeover, but also, critically, adds another level of complexity to the controls for friction clutch engagement. Clearly, more friction plates are required to disperse temporarily (at engagement) larger heat loads and these "extra plates" cause higher losses in EM drive / ASW mode [11].

Expanding on point 4, compared with friction devices, SSS Clutches do not require large oil flows when "LOCKED OUT" (ASW / EM mode) simply because lubrication requirements are limited to a small baulk bearing.

Conversely, a 16 MW (split from 32 MW gas turbine) rated friction plate module which includes 13 double sided plates, each plate being





Pleading the Angels Share, after Tugg.

approx. 950 mm o/dia by 700 mm i/dia requires large coolant flow. As ever, the question is how much heat load does this add to the propulsion system? Whilst friction plate designers might claim low losses “per plate”, that figure must be multiplied by:

- 13 plates x 2 surfaces (double sided plates) x 2 propeller shafts.
- Pumping losses (seawater heat exchanger + friction plate oil pumps).
- Number of years of operation.
- Number of frigates.
- Fuel cost + fuel storage costs + delivery costs.
- Additional cost to replenish at sea (RAS).

All these losses combine to become a parasitic loss against the diesel electric generators, all of which effects fuel efficiency (for the angels to sniff) and the devil makes a bigger cut of emissions. Another negative for friction devices, in comparison with the babbitt layered SSS haulk bearing, is that friction material is purposely designed to be “prickly”, thus compounding the pumping and heat load losses explained above.

## BEAN COUNTER’S DELIGHT

“Spreadsheet Phil” always wants to know “how much?” and rightly so.

This is where the advice of highly respected ship and propulsion designers is entirely useful. Generally, in hybrid propulsion a ship displacing 1,800 tons will burn approximately 280 kg/hour of diesel fuel at 14 knots [12] [13]. 14 knots is a reasonable average cruise speed assumption for a frigate, however the Australian SEA 5000 and Canadian CSC options will displace approx. 7,000 tons. Since consumption and displacement increase proportionally, a 7,000 tons frigate @ 14 knots will consume 1,100 kg or 1,300 litres / hour.

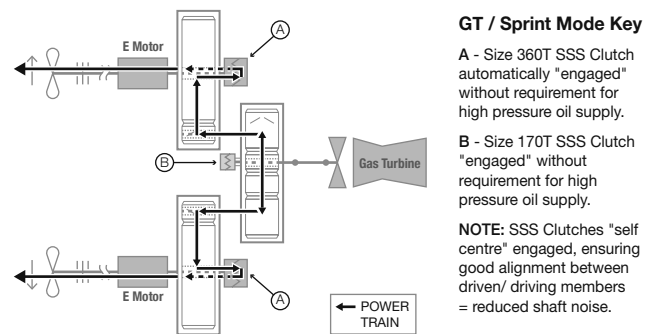
**Conclusion;** “hidden” losses or “The Angel’s Share and the Devil’s Cut” must be scrutinised carefully.

Some may claim that the inefficiency of a friction clutch is a marginal loss, but then we must consider that the marginal gain which an overrunning clutch adds has those other benefits of improved ASW

qualities, simplicity of control and again very few friction clutches have proven success in gas turbine propelled warship design under battle conditions, let alone additional stress due to control system errors on the high seas.

Before pondering the advantage of tax-free fuel for HM Armed Forces, one should also note that oil prices have doubled, even in real terms, since FFG Adelaide Class was commissioned ([www.inflationdata.com](http://www.inflationdata.com)). Should this trend continue as the ships are operated, then the angel’s share will not be “a cheap night out”.

Point 5 above should be explained in more detail. The majority of modern CODELOG / CODELAG propulsion systems install their friction clutches, fitted within separate modules, aft of the main



Hybrid CODELOG / CODELAG propulsion in (GT) Sprint Model.

gearing. Conversely, an SSS Clutch can be quill shaft mounted as shown in figure below.

## THE DEVIL’S ANGEL

Each friction clutch module requires a separate casing and two additional stub shafts, whereas quill shaft mounted SSS Clutches can be fitted within an extension to the existing main reduction gear, thus the SSS solution yields an overall footprint and weight reduction.

Friction clutch module weights in excess of 13,000 kg (or 26,000 kg



NUSHIP BRISBANE (D41) - CODOG (using less powerful Gas Turbines) is already fitted in many global frigate solutions and the AWD Hobart class destroyers.

per ship) are not uncommon within their hosts, yielding a weight saving of 10,000 kg for 2 x SSS Clutches incorporated within the main reduction gear. As well as saving around 1.5 metres in overall length (see figure above), friction clutch modules must be supported from struts or a sub-frame, fixing it to the ship's hull, adding yet more weight. Clearly 10,000 kg of additional equipment (or troops) is an easy choice when the overrunning clutch design has additional advantages [11].

A common misconception regarding SSS Clutch design has previously been the "ratcheting noise". To be clear, SSS Clutches do not "ratchet" in ASW motor (or diesel drive) mode, simply because the SSS Clutch is "LOCKED OUT". The entire point of "LOCK OUT" is that it moves the pawl axially clear of the ratchet. Additionally, SSS Clutches without lock out make clever use of centrifugal force to ensure that ratcheting occurs only when the boost gas turbine is about to take over the drive. Critically, it is only the SSS Clutch design which includes :

- Mechanical protection from a "Baulk mechanism" which prevents incorrect mode shift.

- The dashpot mechanism to cushion engagement/ disengagement.
- A UK MOD "fit and forget" rating [9].

"The devil is in the detail"... a simple decision only becomes simple once the surface is skimmed to expose hidden detail.

Those details (efficiency, noise and ease of operation) aside, the key reason behind any decision must be that our armed forces are able to deploy from a robust platform. As such, we should conclude by quoting the late H.A Clements, former Chairman and Managing Director of SSS Gears:

Sir, you are building a warship... warships need to be driven by robust, battle ready propulsion equipment, which will not fail when a mission critical manoeuvre is required to avoid a threat.

**Acknowledgement:** To the Editor of the Review of Naval Engineering for permission to re-use Tugg's timeless cartoons. JNE articles are available via [www.jneweb.com](http://www.jneweb.com) ■

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## TIGERS RETURN TO SCOTLAND

Navy MH-60R Seahawk helicopters from 816 Squadron and Royal Navy Merlin helicopters from 820 Squadron joined forces during Exercise JOINT WARRIOR 18 off Scotland. Navy's ability to track and hunt submarines was put to the test in a high-end warfare exercises – a NATO-run anti-submarine warfare activity, involving eleven nations. Commanding Officer 816 Squadron, Commander Anthony Savage said both MH-60R 'Romeo' and teams are taking full advantage of the realistic scenarios they are facing: "ASW is what this Squadron does best". Both aircraft were dismantled and flown to Scotland in RAAF C-17s. Commander Fleet Air Arm, Commodore Chris Smallhorn noted "The Fleet Air Arm is by definition expeditionary in that we deploy as a largely self-contained unit to our surface ships". He went on to say: "It's been a truly impressive team effort from our Navy and wider ADF alongside our allies. We are sending the message that Australia is serious about being the best we can be in maritime warfare."

## SOUTH KOREA CARRIER FORCE

Working closely with the British Royal Navy and sending personnel out to UK to standby the LPH HMS OCEAN (L12 – 1998-2018), Korea embarked upon the successful design of its Dokdo-class helicopter carrier; launching the first ship ROKS DOKDO (LPH-6111) in 2005. Originally South Korea had intended to build a class of three but funding constraints caused Seoul to cancel the third and temporarily, defer the second in the class. Funding was subsequently restored and the ROKS MARADO (LPH-6112) was launched in May 2018.

The original design for the LPH HMS OCEAN was based on a minimalistic approach applying both Lloyds Standards and Naval Engineering Standards. Designed for an in-Service life of 20 years, HMS OCEAN was decommissioned in March 2018. With 15 years life remaining, she has recently been sold to the Brazilian Navy.



RAN MH-60R Seahawk helicopter from 816 Squadron and RN Merlin helicopter from 820 Squadron off the Scottish coastline during Exercise Joint Warrior 18.

Critically, the British failed to learn. The future was in continuing to design and develop the LPH into mini-carriers such as Japan's Izumo-class, and South Korea's Dokdo-class. The White Elephants of the Queen Elizabeth Class simply are too costly to build, and too politically, economically, and militarily costly to use or indeed lose. The future for the UK Royal Navy was always to have taken forward designs for the LPH and expand them into useful, applicable units such as the Dokdo and Izumo class. Ahead of the hunt 25 years ago, Britain is now playing catch-up – including buying its replenishment ships from South Korea. At the same time the costs of owning the QE Class are crippling British Defence, not just the Royal Navy. And crises in recruiting and retention of sailors means that the RN is struggling even to crew the few remaining ships it has – despite high youth unemployment in its traditional recruiting grounds.

South Korea is thinking of refitting the class to be able to carry the F-35B Joint Strike Fighter. Senior officers have recently discussed whether they can retrofit a small number of F-35Bs to the class. It makes absolute sense – moreover Australia's LHDs (CANBERRA and ADELAIDE) are better

able to operate F35Bs than the Izumo and Dokdo classes. They could operate them today. The reason they do not is through lack of imagination and rank politics that for reasons more to do with Air Force are preventing Australia and Navy taking the next logical step. There is no engineering reason why they could not operate today – and sustain from sea tomorrow.

South Korea like Australia is part of the Joint Strike Fighter program, having decided to buy forty F-35A fighters in 2014 for \$9B. This is the conventional version of the fighter jets – the F-35Bs have the short takeoff and vertical landing (STOVL) capability that would be necessary to operate the planes from the Dokdo-class ships. Turkey has also expressed an interest in adapting its amphibious assault (based on the Navantia LHD designs) ships to carry F-35Bs.

## MALIBAR-EXIT

An increasing concern is Australia's policy-driven-strategy approach to foreign affairs: 'policy-driven strategies give the enemy the opportunity to harness and so fix one's own policies to their advantage. They confuse diplomacy and capabilities, with political objectives and lead one to define one's enemies in terms of their politics rather than their strategy.' [1] In practice they are no strategy at all. Combined with an un-assumed sovereignty leaves Australia vulnerable: 'without a clear understanding of [Australia's] own Knowledge Sovereignty and therefore being able to pursue Australian interests within the new emerging world order, Australia's lack of self-awareness becomes a danger to existing and potential allies alike'. [2] In this context the rejection by India to Australia re-joining India's Malabar naval exercises (previously between the U.S.; Japan, India and Australia (the Quadrilateral)) should not have come as a surprise to the Minister for Foreign Affairs and the Prime Minister. But it clearly did.



The Launch of ROKS MARADO (LPH-6112) May 2018.



USS HAWAII (SSN 776) a Virginia class submarine at Garden Island, Rockingham, Fleet Base West circa 2010.

Policy Wonk Tank (PWT) 'experts' claimed Australia's exclusion 'as a casualty of India's warming ties with China and a blow to efforts to revive the Quadrilateral Security Dialogue, which the Turnbull government has been pushing'. It was – but it is also a clear signal from India that they do not trust Australia and having been burnt before (for example regarding uranium exports) they are unwilling to expend more gold until Australia thinks and behaves appropriately. Which means having a strategy driven foreign policy...

### INDIA-FRANCE SOUTH PACIFIC COOPERATION

President Emmanuel Macron and Indian Prime Minister Narendra Modi (before Macron's brief visit to Sydney en-route to New Caledonia) announced a maritime cooperation agreement allowing the Republic of India Navy to use France's naval facilities in the Indian Ocean and the southern Pacific Ocean. France is the biggest maritime power in the Indian Ocean, with bases in Reunion and Mayotte, and a presence in the Southern Pacific, with bases in French Polynesia and New Caledonia. Retired Navy Commander Abhijit Singh RIN noted 'the agreement with France will send a message to China that we are preparing to expand our own presence in our own backyard, which is the Indian Ocean, as well as near the South China Sea, which is considered as China's sphere of influence'.

### CLOSING THE GAP

May: Indian Prime Minister Narendra Modi and Indonesian President Joko Widodo signed an agreement to develop strategically located ports on either side of the eastern side of the strategic choke point created by the Malacca Strait; connecting the Indian Ocean and South China Sea. Beijing signalled its displeasure through the *Global Times*, indicating: 'it would not turn a blind eye to

possible military co-operation between India and Indonesia at Sabang and warning that any attempt to militarise the zone could ignite a regional military race'. India and Indonesia will jointly develop maritime and economic infrastructure on India's Andaman Islands and Indonesia's Sabang Island in Aceh Province, ostensibly to improve trade and tourism on either side of their shared sea border. *Shades of Empire...*

### EMERGING FRENCH GEO-ECONOMIC STRATEGY?

French *l'Ecole de Guerre Economique* researcher Dr Christian Harbulot provided interesting analysis of France's emerging geostrategy towards Australia. [3] Harbulot saw France drawing a new Indo-Pacific axis between Australia, India and France, potentially involving Malaysia, Singapore and Japan. This opening of France on the Pacific zone is based on the unavoidable referendum in New Caledonia. He believes that 'through this new axis Paris-Delhi-Canberra, Emmanuel Macron finally leaves the beaten track borrowed by his predecessors'. For example, the facilities that France discreetly offered India to help break Chinese encirclement. Australia, for long time hostile to the territorial presence of France in the Pacific region, is now closer to Paris than at any time since WWI. Harbulot noted that 'Beijing does not hesitate to interfere in this debate by criticizing the merits of criticism by the Australian [professional] political [elite] on foreign influence strategies harmful to the interests of their country:... even though it did not specifically refer to media, in the recent past the [Chinese] embassy was very critical of investigations by the Australian Broadcasting Corporation (ABC) and Fairfax Media [into Chinese influence at Australian universities] undermining [academic] freedom of expression'. Christian Harbulot concluded that:

For the first time in a long time, France is emerging from a static or purely defensive stance. Will this thinking be enough to counterbalance France's concessions on other geo-economic issues? The policy followed by Donald Trump has a variable geometry that is becoming risky for his own allies. The consequences of this rivalry with its 'imperial' undertones will not necessarily have positive consequences for relations between the United States and Europe.

**Note:** it is interesting that this French report singled out the ABC and Fairfax Press for their criticism of Chinese influence in Australian universities – and not News Corps or *The Australian*.

### US ATTACK SUBMARINES TO PERTH?

US nuclear attack submarines should be based in Perth a US report By Michael Green and Andrew Shearer (an ex national security adviser to Tony Abbott), the Centre for Strategic and International Studies, has argued. The report states that the Allies must stand against China's stepped-up efforts to project power and build military infrastructure in the region. The report was launched in the same week Australian warships were challenged by the Chinese military as they transited the South China Sea in May exercising their right of freedom of navigation. The incident has been largely downplayed by Australia but is understood to be more serious than initially reported, with parallels to the ADELAIDE (L01) 'intercept' late last year.

China's ambassador to Australia warned that the relationship was being damaged 'by systematic, irresponsible and negative remarks'. China is right to criticise Australia for being reactive and reactionary. At the same time, China really does not want Australia to develop a coherent strategy-driven-foreign policy with which it would need to engage and which would seek to unite rather than divide. China is probably relieved that no Australian Government has recently appeared able to competently develop such a coherent and responsive foreign policy.

### JAPAN-AUSTRALIA-SINGAPORE-INDIA AMPHIBIOUS TASK GROUP

*The NAVY Magazine* has for some time been a supporter of the development of a standing Japanese Australian Singapore Indian Amphibious Task Group (JASI ATG), see Blake [4]. Such a ATG would potentially have parallels with the United Kingdom/Netherlands Amphibious Force (UK/NL AF) celebrating its 45th anniversary this May. It would provide for a strategy driven foreign policy and combine Australia's unique strengths and current bilateral arrangements

providing for training of Singaporean and Japanese forces in Australia. It would also provide some asymmetry to the Quadrilateral and allow Australia to be creative and negotiate from a position of relative co-adaptive advantage. The most asymmetric of regional powers is Australia. A JASI ATG would naturally provide for an asymmetric offshore counterbalancing (AOCB) strategy that would act to support the U.S. variable geometry strategy and offset China's 'String of Pearls' and 'Dragon's Spear' strategies. [2] But this would mean doing some critical thinking and having some cunning and guile in developing a responsive and responsible strategic foreign policy that might also in time include the Philippines and Indonesia and join the dots with France and the Five Power Defence Arrangement...

### CHINA OBOR ARCTIC

As Brexit and separatist movements threaten to tear apart the 'old Europe', Greenland is moving away from rule by Copenhagen. And local politicians are seemingly making overtures to China and China is responding – perhaps in a way not dissimilar to the ceding of the port of Darwin on a 99 year lease. Greenland, an island of 2 million square kilometres, much of it covered by ice, is a geopolitical nexus between Russia, the EU, Europe and the U.S. With new maritime roads opening across the Arctic and a greener Greenland emerging, the Chinese are a growing presence in Greenland. The Danes and the U.S. are increasingly nervous; notably when a Chinese company sought to buy a former US naval base.

China, through its one belt and one road (OBOR) strategy (see *Quo Vadis Australia* [2]) promotes itself as a benevolent, non-partisan investor, one ready to build ports in Pakistan, Djibouti, Kenya, and Australia. China also regards positioning its resources in places like Greenland as extending its strategic global reach – even creating the potential for a South China Sea in the

northern seas; connecting pole to pole. At some point it appears likely that separatism and strategic geo-politics are going to demand a response – as already seen in the EU's fierce opposition of Catalan separatism, despite the democratically expressed wishes of its people.

### US BRINGS BACK 2ND FLEET

The US is to re-establish the 2nd Fleet, which was decommissioned in 2011 when risk was taken against Russia. The 2nd Fleet command headquarters, in Norfolk, Virginia, will operate from 1 July 2018. It will be responsible for deploying warships and maritime patrol aircraft along the east coast of the US and throughout the North Atlantic. The decision is part of the revamping of the U.S.'s force structures, moving away from counter-terrorism and counter-insurgency and focusing instead on the counterbalancing of potential conflicts posed by emerging state on state threats.

The 2nd Fleet was established in 1950 to support NATO. Its area of responsibility covers the Atlantic Ocean from the North Pole to the Caribbean. In 2011 the 2nd Fleet had 130 ships, 4500 aircraft and 90,000 personnel under its command and responsibility for 17 million square miles of the Atlantic Ocean.

### DEMISE OF AUSTRALIAN RESEARCH S&T

While on the one hand talking up a sovereign capability; on the other the Commonwealth over the last 20 years has been content to degrade its sovereign research capability in both CSIRO and DSTG (previously DSTO). The current Australian of the Year, a Quantum physicist, Professor Michelle Yvonne Simmons, receives her funding from the US Defense Advanced Research Projects Agency (DARPA). Research at universities (and increasingly its funding) is dominated by [old style] "457 scientists" (80% plus in most Labs) drawn significantly from China, the sub-Continent and the Middle East (predominantly Iran).

Defence S&T really only works when it has its customer up close and personal with the S&T support team. In the early 2000s CSIRO and Australian Defence S&T was admired throughout the Five Eyes Community and the Global West. A series of Defence Reviews from the 2000s (a euphemism for cuts) broke DSTO. Uniformed Capability Groups took 'all the S out of S&T and replaced it with "BS" by virtue of the US led descent into PowerPoint Science (and Engineering) and either instituting or agreeing to the one on one Client Reporting System'. Meaning that no one else, unless approved by the client, could see what S&T was being done to support the client. That had two impacts:

1. A scientist's stock in trade is their reputation in their field: the client reporting system meant that no one in the field could see if it was doing good or bad science, so their CV rather than their science became their selling point; and;
2. It prevented operators talking critically to scientists and so turning a 'fragile PhD controlled thing into a sailor-proof brick outhouse that could operate in all tempests and be sustained on the smell of a dirty rag'.

The Capability Group that emerged from multiple reviews kept the bad part of the old Operational Requirements Group i.e. a habit of telling the scientists what answer would be really nice if they knew what was good for them and then made that piece of nastiness virtually untraceable via the closed client reporting system.

With a 3 year posting cycle in the Capability Groups, the quality of S&T is reliant on the integrity of the long term scientists, any move to undermine that, however small, can only be a bad thing. Yet one in three entry-level scientists newly recruited to the Defence Department this year will be hired into non-permanent roles, following massive cuts to its science division's headcount. Defence science and technology has signed off on hiring 150 new staff but it expects 50 of these will arrive at the department with temporary work. This apes recruitment methods of universities, which employ research staff as casuals or other non-ongoing positions, and where permanent positions are rare and coveted. A Defence Department email shows PhD graduates will receive non-ongoing positions lasting 18 months. New recruits won't have a guaranteed path to permanent work, which will depend on gaining their PhD, strong performance and "a continued need for the work program". *Professionals Australia's* ACT Director, David Smith said Defence had set the bar too high for recruits to get permanent jobs: "Setting the performance bar to ongoing employment at 'outstanding' is a level not even Einstein would have been able to meet in his graduate year". He went on to say: "Looking to employ



USMC F35Bs Operating from USS AMERICA (LHA-6) November 2016.



Research Vessel Triton (1998) built for UK Royal Navy Research into trimarans (note similarity with Austal LCS Independence-class); gifted to QinetiQ; rented by Australian Border Force (2012-16), and now back in UK.

Defence scientists on a non-ongoing basis is utterly crazy". A Defence spokesperson said the majority of roles its science and technology division is offering in 2018 "were permanent and recently qualified PhDs, postdoctoral fellowships will be offered on a non-ongoing basis to undertake defined research over a specific period". Which the spokesperson claimed "was consistent with other research agencies and academic institutions for post-doctoral employment programs". That is exactly so – but does not make it right or effective!!

Despite unprecedented need with respect to enabling sovereign capability and achieving knowledge transfer, Defence's 2100-strong science and technology arm (Australia's second or third largest employer of scientists and engineers), has been cut by 20% since 2013. Morale amongst DSTG staff is reportedly at rock bottom – with absolutely no confidence in its leadership.

**By Editor:** A response by DSTG (perhaps by the Chief Defence Scientist Alexander "Alex" Zelinsky AO (who has been in post since 2012)) would be welcomed. If suitable it would be run as a paper.

## RESEARCH UNIVERSITIES SOLD OUT TO CHINA

Academic Clive Hamilton, author of *Silent Invasion* chronicling China's attempts to suborn Australian sovereignty, was invited to speak to the Congressional-Executive Commission on China reported that Australian universities are so financially

beholden to China that they have abandoned their principles of academic freedom. Senator Rubio was quoted in *The Australian* saying "America, Australia and other like-minded nations must contend with the long arm of China and the growing threat it poses to our open, democratic systems."

## ANAO WARNING RED

The Australian National Audit Office (ANAO) has warned that the government's decision to fit a missile defence system into Australia's new frigates was a key risk to the projects' development. It has also questioned defence's risk mitigation strategy for the navy's \$89 Billion surface-ship and submarine construction programs and called for new cost modelling to be undertaken.

The ANAO is auditing the naval construction programs due to increasing concerns as to how the budget is to be spent, in time while achieving a true sovereign capability, see Editorial. Programmes under review include the 12 offshore patrol vessels, costing \$4B, the nine Future Frigates, costing \$35B and the 12 future submarines costing \$50B.

A breakdown of the \$50B submarine budget has never been detailed, despite calls to do so by *The Navy Magazine*, amongst others. Estimates applying, for example RADER™ modelling to the \$50B build costs indicates that a cost blow out of up to 80% may occur over the build programme. A blowout of over 10% (\$5B) has already been declared before any steel has been cut!

The ANAO says Defence should revisit the cost assumptions for the building program. In responding to the report, Defence said it noted the recommendation that Defence advise the government of the additional funding required to deliver these programs. Officials went on to say that the plan was subject to 'unprecedented levels of oversight and accountability including six-monthly reviews by Government and independent oversight by the Government's Naval Shipbuilding Advisory Board'. See Editorial.

## GREENWHICH STATION

The UK Ministry of Defence (as previously reported) was warned by the Public Accounts Committee (PAC) that it is \$40B short of the funding it needs for equipment between 2017 and 2027. In a damning indictment the PAC accused the department of 'lacking cost control' and that its 10 year equipment plan was 'unrealistic'. A significant affordability gap of as much as \$52B more than the budget has been estimated. The PAC expressed scepticism at the MOD's ability to fix systemic unaffordability and that the 'Modernising Defence Programme will be able to return the department to a balanced position.'

Meanwhile the US is reportedly increasingly concerned by the UK's inability to support its seat at the top table (UN Security Council

Permanent Five); to be a reliable nuclear deterrent power, and to be a dependable global ally (compared with France) and has urged Britain to ensure its military is sufficiently funded.

The Modernising Defence Programme is another of a long series of disastrous defence reviews commencing in the 1990s and led by the Accountancy Consultancy Companies (ACCs) – that in actuality now run UK MoD and that have ripped the heart out of the UK Armed Forces. The Accrual Based Accounting systems robs from the future to pay for the past – removing covenant from country. It nihilistically demands yet more efficiencies from a force that is no longer effective and is dying on its feet.

Post Brexit if the UK is to mean anything globally it will need to restore its once much vaunted Armed Forces, or accept a non-deployable Defence Force capability. Yet the new the Defence Secretary Gavin Williamson continues to talk up rather than deliver: Britain has entered a new era of warfare, he states, with Russia and other nations moving combat into cyberspace, the UK and its allies must be primed and ready to tackle intensifying online threats to energy, infrastructure, finance and public services.

Russia is ripping up the rule book by undermining democracy, wrecking livelihoods by targeting critical infrastructure, and weaponising information.

And the answer? Yup, yet another review by UK MOD using the very same four ACCs that have destroyed it over the past 30 years...

## DIAMOND BACKED

HMS DIAMOND (D34) which was due to have been deployed to the Far East on high profile 'show the flag' and FON Operations but broke down on deploying (as reported *The NAVY Magazine* Jan-Mar 18) was recently called on to shadow the Russian Cyber Surveillance Research Vessel, RV *Yantar*. As also reported in *The NAVY Magazine*, the *Yantar's* primary peacetime task is to surveille western maritime high speed cyber cables and terrestrial microwave connections so as to mount intercept operation in war – and potentially denial operations in peace. The *Yantar* has the capability to act as a Cyber-switch and is more advanced than anything currently mounted by the West. ■

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## SHIPPING INTO A CHANGING WORLD

The International Shipping Industry still remains the only way to move the majority of minerals, energy products and manufactured goods between the nations of the world. Indeed it is still estimated that shipping carries 90% of World Physical Trade. However given the huge changes that have occurred in many countries there is concern that the demand for shipping services may not grow but in fact decline. As the various conferences that meet annually at this time of year discuss the economics and operational issues of the shipping industry it is concerning that the shipping companies that are publically traded in a few stock markets represent the worst performing sector in those markets. Furthermore the banks that have historically financed shipping have mostly withdrawn and a few of the remaining German banks are showing billions of dollars of losses and provisions. Private equity and hedge funds looking to buy these banks are not showing support for shipping but the ability to liquidate the portfolios over the next few years at a profit.

Meanwhile the biggest financiers of shipping today are the huge Chinese Leasing companies which together with the Chinese and Korean Exim banks are financing new ships being built in China and Korea with the objective of keeping freight rates down for the benefit of Chinese and Korean industries that rely on ships for the import of raw materials and export of manufactured goods.

The arrival of the speculative equity and hedge funds at the beginning of this decade changed the way shipping companies had traditionally operated, namely as the service industry to world trade. The security of longterm time charters with major cargo interests whose own credit standing supported the cash flow was discarded in favor of the spot markets enabling the ships to be sold as soon as their values generated a profit. The longer this speculative period went on so the cash flow problems worsened as the spot markets failed to produce constant income while the operating and financing costs continued. Furthermore the major charterers became reluctant to charter these speculative ships or allow their charters to be included in any sale. This was clear evidence of the importance of the relationships between shipowners and charterers which have always been important given the issues that always exist in operating ships in the oceans of the world. Shipowners and particularly those that appeared in the equity markets, were encouraged to order new ships in the false belief that the Chinese would continue to



The aground Wahine with Steeple Rock in foreground.

pay high freight rates as their manufacturing economy continued to expand.

It took some 5 years for the cargo interests to react to the high freight rates which for instance had caused the shipping cost of a ton of iron ore from Brazil to China to reach 60% of the landed price of the cargo. The cargo interests understood that by encouraging more newbuildings in both the raw material imports and the finished goods so the freight costs could be minimized.

Thus the Chinese have got the shipping cost of iron ore from Brazil down to 10% of the landed price. Add to this the Korean and Chinese Exim bank financing and the involvement of huge Chinese leasing companies and we continue to see the orderbook grow while few shipowners show any profits. False optimism that "dry bulk markets look positive" or that "the USA exporting crude oil will be good for the VLCC markets" simply encourage new orders for ships and will not improve the operating profits for these sectors.

Hence it is the cargo interests that control the economics of the shipping industry today and ship values will continue to depreciate if they continue to trade in the spot markets. Consolidation of shipping companies will have no effect unless it enables the shipowners to secure period charters and improve their income streams, fully maintain the ships, employ quality crews and afford the new costs of ballast water treatment and cleaning up the engine exhausts. (Source: Paul Slater, First International Corp.)

## WAHINE

April 10th marked the 50th anniversary of New Zealand's worst modern maritime disaster, the sinking of the Cook Strait ferry, Wahine with the loss of 53 lives. The two year old, 149 m, inter-island ferry owned by the Union Steamship Co. of New Zealand, encountered a fierce cyclonic storm (later classified Cyclone Giselle) as she entered

Wellington harbour. After losing steerage way the vessel broached and eventually grounded on Barretts Reef close to the entrance of the Harbour. Although a tug managed to get a line aboard the tow line broke.

The weather continued to deteriorate as the ship lay aground and a hurried evacuation was carried out in extreme conditions as the ship developed an increasing list. Four of the starboard lifeboats were launched, one capsized, with significant loss of life, three boats reached shore, one towed by the tug Tapuhi and the reserve Pilot boat Arahina rescued 55 people from the water. Of the 734 people on board 51 died from drowning, exposure or injuries suffered the evacuation that day and 2 others subsequently died from injuries sustained.

A Court of Inquiry was convened and whilst the Master and Officers were cleared of wrongful acts, the Court found that they had made serious errors of judgement under conditions of great difficulty and took no action against their Certificates. However, they did not escape the censure of their peers. Three of the four nautical and engineering assessors who sat as advisers to the Court, issued their own 15 page Appendix to the Report condemning the actions of the Master, Chief Officer and Chief Engineer.

The sinking had a profound effect upon the New Zealand population and is viewed as the country's Titanic. ■



# A NAVY FOR A DANGEROUS NEIGHBOURHOOD

By George Galdorisi

**The Ministerial Foreword to a recent Australian Government Budget White Paper put it, “The first responsibility of a national government is the safety and security of its people.” As most Australians know, this is a daunting task, for despite the sense of security some feel by virtue of living in an island nation, the threats to Australia’s security and prosperity are real – and growing – and it is the most important task of the elected Government, the Australian Defence Force, and especially the Royal Australian Navy to ensure the nation’s security and prosperity.**

## INTRODUCTION

Readers of *The NAVY Magazine* also know that the oceans—not the land—define the region, and those oceans and the global commons are more important to Australia’s security and prosperity than ever before. Indeed, during the past decade, Australia has shifted from fielding a defence force with a continental focus to building one that is predominantly maritime. For this reason, the Australian Government, the ADF, and the RAN are investing in robust maritime capabilities.

## A STRATEGIC PLAN?

As laid out in the 2016 Defence White Paper, and further amplified in the recently issued Naval Shipbuilding Blueprint, Australia is investing in a navy of large, modern, capital ships and submarines that will be second-to-none when compared to other blue water navies in the region. Chief among them are the Canberra Class Amphibious Assault Ship (LHD), which promises to be one of the most capable and sophisticated amphibious deployment systems in the world; the Hobart Class Air Warfare Destroyer (AWD), which will be one of the world’s most capable all-purpose warships; as well as a new submarine force based on the French Navy “Barracuda” class.

In addition to these capital ships, Australia is also building new Pacific Patrol Boats and Offshore Patrol Vessels. These new ships will join a fleet of capable RAN ships, including: Anzac-class frigates, Adelaide-class frigates,



Collins-class submarines, Armidale-class patrol boats, Huron-class mine hunters, and a number of amphibious, replenishment, and survey ships of various classes. Together, these ships represent an already formidable capability which will be enhanced by these newly-arriving vessels.

## A PLAN IS JUST A PLAN

A wide range of Australian national and defence level documents from the 2016 Defence White Paper, to the Naval Shipbuilding Blueprint, to a host of others, all affirm the need for a strong ADF and especially a capable RAN. And plans are on the drawing board to build an Australian

navy that will be the most powerful maritime force fielded by the nation since World War II.

But no nation’s coffers are unlimited, and the desire to build up the RAN to the planned force will have to survive in an often-challenging budget environment. At the end of the day, Government leaders in all branches, as well as the Australian people, must agree that the tremendous investment in building a first-class RAN is a high enough priority to merit spending money that other worthy constituencies could use for their purposes.

How this process evolves and eventually plays out will likely come down to Australian’s







HMAS CANBERRA (L02) Taking part in Ex OCEAN EXPLORER 2018 (Image ABIS Bonny Gassner).

perceptions as to how dangerous Australia's neighbourhood really is. Earlier, we suggested that there are compelling threats to Australia's security and prosperity. That is far more than just an assertion, but is the consensus of the most respected international analysis of the geopolitical landscape.

## HOW DO WE ASSESS THE THREAT LANDSCAPE?

While Australian Government documents such as 2016 Defence White Paper do a good job of describing the threat landscape facing Australia, it is useful to validate these findings by mining other publications that take a global view of worldwide threats, and that also drill down to security threats in various regions.

Two comprehensive reports – one from the United States and one from the United Kingdom – provide strategic foresight regarding the future geopolitical landscape. Together, these unique – but complementary – reports can help Australians – as well as other citizens in the region – prepare for a future that while uncertain, isn't completely opaque.

The first report comes from the United States and is titled, "Global Trends: Paradox of Progress." Global Trends is a product of the Director of National Intelligence, who has stewardship over the sixteen agencies that comprise the U.S. Intelligence Community. The public-facing arm of the Director of National Intelligence is the National Intelligence Council (NIC), which is the center of gravity for mid-term and long-term strategic thinking within the United States Intelligence Community. The National Intelligence Council was formed in 1979, and its goal is to provide policymakers with the best information: unvarnished, unbiased and without regard to whether the analytic judgments conform to current U.S. policy. "Global Trends: Paradox of Progress," is the sixth report of the series.

The second report comes from the United Kingdom and is titled, "Strategic Trends Programme: Global Strategic Trends – Out to 2045." This report, issued by the United Kingdom Ministry of Defence (MOD), is the fifth Global Strategic Trends analysis in the series. Within the U.K. MOD, the Development, Concepts and Doctrine Centre (DCDC), is responsible for this series of reports. Importantly, in a similar manner

as the Global Trends series issued by the United States National Intelligence Council, the cadre that writes the United Kingdom MOD DCDC report remains in place year-over-year to study and analyse global trends and build on earlier reports.

This process is dramatically different from the practice used for most reports issued by many governments where a group of people are gathered up to write a report or study only to disperse, leaving behind no corporate knowledge. This is precisely why the U.S. NIC reports and the U.K. MOD DCDC reports are so valuable and valued. And it should come as no surprise that the staffs that produce these reports have a high degree of interconnectedness, sharing resources and findings between staffs, and vetting preliminary conclusions amongst each other's staffs. That said, these reports are in no way clones of each other, but rather, come by their findings independently.

## WHAT DO THESE REPORTS SAY ABOUT AUSTRALIA'S NEIGHBOURHOOD?

While Global Trends: Paradox of Progress and Strategic Trends Programme: Global

Strategic Trends – Out to 2045 both provide a well-nuanced view of the global geopolitical landscape, they also drill down by region. A total of ten regions are addressed, and it should come as no surprise that of the regions examined, East and Southeast Asia represent the first region reported on, with South Asia following right behind.

Australians – as well others living in the region – recognize the countries in this greater Indo-Asia-Pacific region, both individually and collectively, comprise the engine of progress for the 21st Century. Said another way, whether the metric is gross domestic product, size of population, size of military, or anything else, the dynamic combination of East and Southeast Asia with South Asia is a powerful force. But with this progress comes dangers.

The analysis in the two reports we called out above suggests that for these two regions, there will be continued instability and significant political, economic, social, and environmental adjustments in the near and further term. Significantly, these regions will experience urbanization; migration; and stresses related to environmental, ecological, technological, and climate changes. The reports strongly suggest that these two regions will remain centre stage for geopolitical competition in the near future.

These reports note that for China, many factors are increasing political uncertainty: a slowing economy; Beijing's attempt to advance its primacy in Asia; a shrinking labour force as a result of population aging; and President Xi's concentration of power. The reports' analysis suggest that this uncertainty casts a shadow over the peace and prosperity of the region, since China is deeply integrated into the global economy and anchors the region economically, but also selectively embraces and seeks to shape international norms and rules to advance its interests.

This analysis also suggests that China's assertions of sovereignty on issues such as the South China Sea are provoking reactions among its neighbours and stirring nationalist sentiment at home that could reduce Beijing's room for maneuver. The interplay between security competition, regime stability, and economic cooperation will color most regional interactions, with middle powers and smaller states alike seeking assurances against Chinese assertiveness that will not sacrifice economic opportunities with China; the risk of a less-robust Chinese economy is a further complication. The reports suggest

that the actions of the United States and Japan vis-à-vis China, as well as those of emerging powers like India and Indonesia, will also shape the assessment of risks and opportunities by countries in the region.

Beyond China, Global Trends: Paradox of Progress and Strategic Trends Programme: Global Strategic Trends – Out to 2045, focus on the most compelling security issues envisioned for East and Southeast Asia as well as for South Asia. These lists are by no means comprehensive – much ink has been spilled regarding the security challenges of the individual nations in each region – and readers of The Navy are likely familiar with many specifics. Rather, the reports look at the scope of the security issues in Australia's neighbourhood.

- Indonesia has the world's largest Muslim population and some of the world's greatest biodiversity, and it could take on a global role.
- Major economic shifts, demographic changes, and urban stresses—driven by ongoing migration to cities—are likely to become more significant in Asian countries.
- Climate change—through severe weather, storm surges, sea level rise, and flooding—disproportionately affects East and Southeast Asian countries. Shanghai, Ho Chi Min City and Bangkok are especially vulnerable. The impact of sea-level rise on low-lying island countries such as the Maldives and Vanuatu may lead to wholesale



Future Submarine SEA1000 Shortfin Barracuda (Image NAVAL Group (DCNS)).

### East and Southeast Asia Security Issues

- The region's many longstanding territorial and maritime disputes are unlikely to be resolved in the next five years and will instead keep tension simmering.
- Beijing may judge that China has a closing “window of strategic opportunity” to secure greater influence in the region before stronger pushback against its rise develops.
- An increasingly self-reliant Japan will take on more international engagement—potentially increasing its involvement in regional and global security affairs.
- India is likely to insert itself further into East and Southeast Asian economic and security matters, especially if its relationship with Japan continues to strengthen.

international migration by these small nations.

- A growing population, increasing demand and the effects of climate change are likely to lead to food and water shortages. While cooperation over water has often overcome national differences, the potential for confrontation over shared water resources may increase.
- Terrorism will almost certainly remain an enduring factor in the region, particularly in South & East Asia, and a variety of terrorist organizations are likely to continue to operate in the region.

### South Asia Security Issues

The reports shift their analysis to South Asia. They note that significant internal and external changes will shape security and political stability in South Asia in the next five years as the planned drawdown

of international forces in Afghanistan; the deepening relationship between the United States and India; China's westward-facing development objectives under its One Belt, One Road initiative; and inroads by the Islamic State and other terrorist groups all have their impact. This all suggests that South Asia also will face continuing challenges from political turmoil—particularly Pakistan's struggle to maintain stability—as well as violent extremism, sectarian divisions, governance shortfalls, terrorism, identity politics, mounting environmental concerns, weak health systems, gender inequality, and demographic pressures. Other South Asia security challenges include:

- Insecurity on the Afghan-Pakistan border will perpetuate political turmoil, resilient insurgencies, and poor border security.
- Much of South Asia will see a massive increase in youth population, escalating demands for education and employment.
- Pakistan, unable to match India's economic prowess, will seek other methods to maintain even a semblance of balance.
- The border between China and India are likely to be areas of tension. The risk of a major state-on-state conflict in the region cannot be ruled out.
- Pollution almost inevitably increases with urbanization at South Asia's stage of development, creating atmospheric conditions that damage human health and crops and add to the economic costs of city living.
- Although megacities often contribute to national economic growth, they also spawn sharp contrasts between rich and poor and facilitate the forging of new identities, ideologies, and movements.
- Cereal production across South & East Asia is projected to decrease, particularly in the Indo-Gangetic Plains. Severe crop failure is likely to force millions of people to move, creating a deluge of economic refugees.
- Newly urbanized populations tend to be more religious, as well. In Pakistan and Bangladesh, the pressures of urban life may bolster political Islamic movements.
- Climate change almost certainly will affect South Asia in the form of higher temperatures that damage human health and food security.

As these two reports, *Global Trends: Paradox of Progress* and *Strategic Trends Programme: Global Strategic Trends – Out to 2045*, drill

down even further into security challenges, they leave little doubt that Australia's neighbourhood is indeed dangerous, and by any measure, it is likely to become more



UK MoD DCDC Global Strategic Trends - Out to 2045.

dangerous in the near- and distant future. This makes the national government's obligation to ensure the safety and security of its people even more challenging.

## WHAT DOES THIS MEAN FOR AUSTRALIA, THE ADF AND ESPECIALLY THE RAN?

For many years, *The NAVY Magazine* has provided a compelling and articulate vehicle to help Australians understand the need for – and value of – a strong Royal Australian Navy. Even from across the Pacific, by leveraging the analysis provided in world-class strategic publications, this observer can see that the security challenges in this region will stress the RAN over the next several decades. Australia's Navy must have not only the capability, but also the capacity, to respond to tomorrow's challenges.

While not every future challenge requiring a response from the Royal Australian Navy can be anticipated, based on the analysis above, some likely missions include:

- **Humanitarian Relief:** Climate change is already negatively impacting many nations in the region. A combination of rising sea levels, more frequent tsunamis, and other events have made this a mission Australia has done in the past, and one that it will likely do even more frequently going forward. The addition of

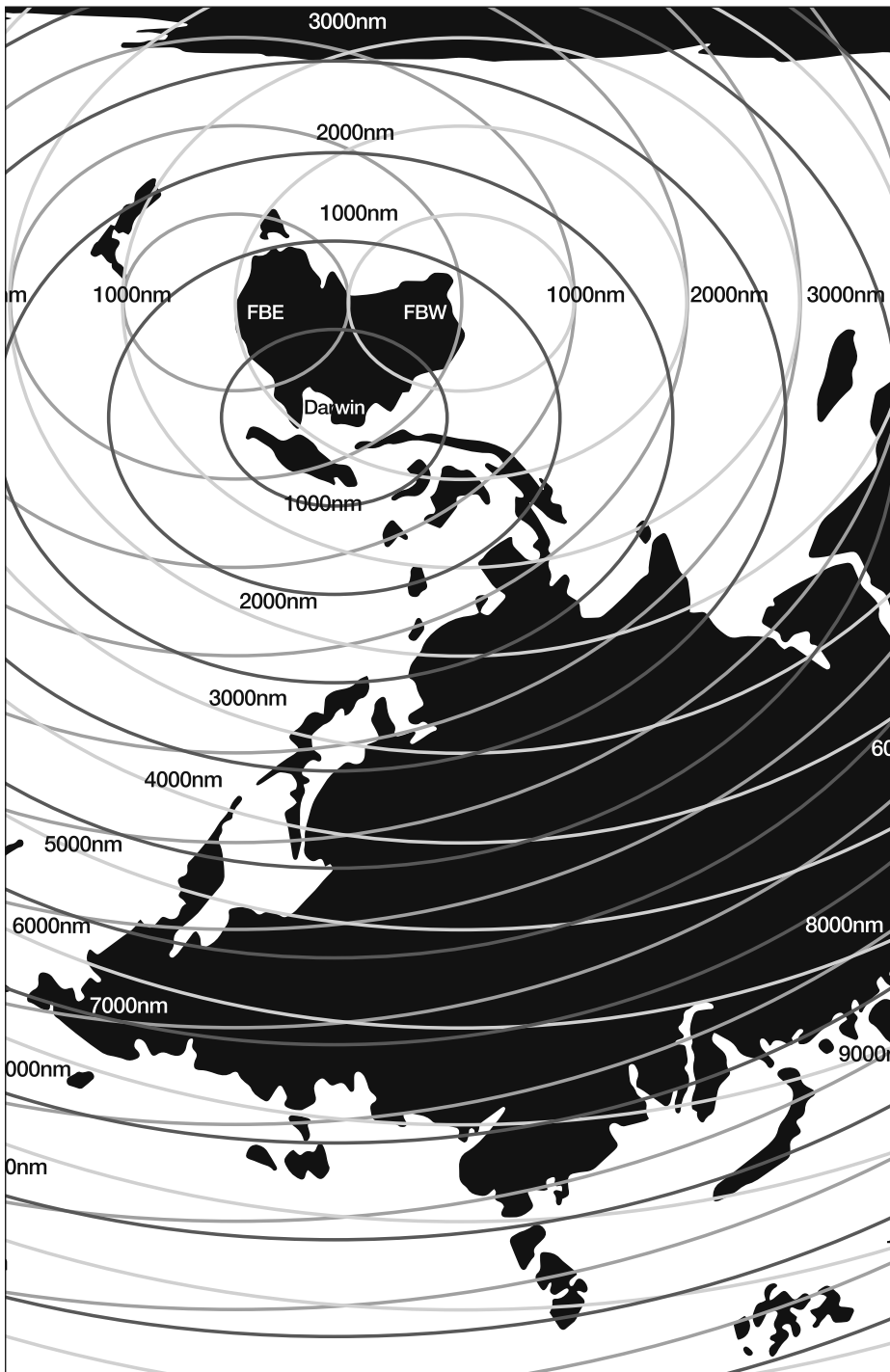
the Canberra Class Amphibious Assault Ship makes Australia a major player in this crucial life-saving mission of rescuing those in distress.

- **Non-Combatant Evacuation:** Given the unrest and periodic upheaval in some nations in the region – especially in Southeast Asia – the need to evacuate Australian citizens on short notice is a constant security concern. The Canberra Class Amphibious Assault Ship, along with the Pacific Patrol Boat and Offshore Patrol Vessel, are ships well suited to this mission. Simply put, leaving Australian citizens hostage in a nation that is unraveling is not an option.



Global Trends 2017 US National Intelligence Council.

- **Refugee Mitigation:** While East and Southeast Asia and South Asia have experienced unprecedented economic growth and have lifted hundreds of millions out of poverty, this growth has been uneven. As a result, the regions have millions of economic refugees who seek to enter Australia by any means possible – often illegally. The RAN remains the first line of defence to ensure that those entering the country are doing so legally with the permission of Australian authorities.
- **Barriers to Criminals:** In much the same way as economic and political refugees seek sanctuary in Australia, terrorists, drug traffickers, human smugglers, pirates, transnational criminals also seek to penetrate Australia's near-shore waters to operate from the vast Australian continent. This is an unrelenting RAN mission.



Australia Up Over, Image SRA&JJB© 2018.

- **Sea Area Protection:** Australian's benefit from a rich harvest from both the living and non-living resources of the sea. Other nations often illegally fish and draw other resources from the seas under Australia's purview. The RAN is the vehicle to protect Australia's sea resources.
- **Sea Lane Protection:** A huge part of the Australian economy relies on the export and import of raw and finished goods. The vast majority of those goods are carried by merchant ships, many of which pass through choke points where they can be threatened by state and

non-state actors. The RAN must be capable and ready to protect this economic lifeline.

- **Freedom of Navigation Operations:** Many nations close to Australia have competing maritime claims, many of which do not comply with the 1982 United Nations Convention on the Law of the Sea, and which seek to impose unlawful navigation restrictions on all types of vessels, especially warships. Australia must not only issue diplomatic protests regarding these claims, but the RAN must also sail through these waters to challenge these illegal declarations.

- **Combat Operations:** While Australia does not seek to engage in combat operations against its neighbours, Australia counts many nations of the region either as alliance partners or friends. The chance of Australia being drawn into a shooting war cannot be discounted. And given the fact that the region is dominated by the oceans and seas, the RAN is likely to bear the brunt of any combat operations.

## ANTICIPATING

As suggested at the outset, while it is not possible to anticipate every important mission the Royal Australian Navy might have to conduct in the near and distant future, this list provides some likely scenarios that the nation, the ADF and the RAN will need to be prepared to deal with.

This strongly suggests that an RAN that has the capability and capacity to address a wide range of contingencies is the Australian Government's best guarantee to ensure that the Australian people continue to enjoy the security and prosperity throughout this decade, and well into the future. The 2016 Defence White Paper, and Naval Shipbuilding Blueprint lay out a path to provide the navy Australia must have. It's time to commit to that plan. ■

**About the Author:** Captain George Galdorisi, USN (Ret.) is a naval aviator who began his writing career in 1978 with an article in *Proceedings* and is a regular contributor to *The NAVY Magazine*. His Navy career included four command tours and five years as a carrier strike group chief of staff. He has written seven books previously, including the *New York Times* best seller, *Tom Clancy Presents: Act of Valor*, the novelization of the Bandito Brothers/Relativity Media film starring U.S. Navy SEALs. He is currently the director of the Corporate Strategy Group at the Navy's C4ISR Center of Excellence in San Diego, California.



# A SUBMARINE SERVICE FOR AUSTRALIA

By Brendan Alderman

**The first Submarine Service of the Royal Australian Navy was formed just under a century ago with the introduction of the submarines AE1 and AE2 into the newly formed Royal Australian Navy in 1914. This milestone had a turbulent history leading up to it due to a number of significant political events and technological advances. The aim of this article is to examine the development of Australia's submarine-specific naval defence policies between 1901 and 1914. A variety of factors influenced Australia's naval defence and submarine policy during this period, such as significant international events, breakthroughs in British submarine technology and the efforts of key Australian and British military and political leaders.**



HM Submarine O1 Holland Class Submarine (Image RN).

## THE FIRST BRITISH SUBMARINES

The submarines that first caught the attention of Australian leaders and defence planners were the coastal submarines that were derived from the *Holland*-class submarines. Britain built five *Holland*-class submarines from 1901 to 1902, which was around the time submarines became more prominent in Australian media. The submarine was a small, single-hulled vessel that could not be operated on the high seas. The ballast and fuel tanks were also arranged inside the single-compartment hull itself, which made the interior of the submarine cramped for the crew members. [1]

Navigation was a hazardous task for crew of the *Holland*-class. The original submarines had no periscopes and were added in later to help the crew navigate whilst submerged. The submarine had to resurface often in order to navigate, as a normal magnetic compass was useless if used inside the hull of a submarine. [2] Regular resurfacing was also needed in order to replenish the oxygen supply. A *Holland*-class submarine was also powered by gasoline engines on the surfaces and by an electric motor when submerged. Hazardous

fumes built up inside the hull, so much so that the submarines carried mice in cages to help provide an early warning. The first accident involving a *Holland*-class submarine occurred in 1903, when gasoline fumes were ignited by a spark from unshielded electrical components. [3] Despite all of these problems, these "pre-Adamite" submarines managed to use their stealth and torpedoes to track and "sink" British dreadnoughts in military exercises without fear of retaliation. [4] Sir John Fisher witnessed the abilities of these submarines firsthand when he was Commander-In-Chief at Portsmouth in 1903-1904. Fisher's support of the development of British submarines played a large role in the formation of the first Submarine Service of the Royal Australian Navy.

The *Holland*-class submarines paved the way to the development of the first three British-designed military submarines, known as the A, B and C-class submarines respectively. Each class was a refinement of the *Holland*-class, increasing in size and displacement, but still being limited to the role of harbour defence. It was during the development of these submarines that Australia began to notice what these submarines could offer to the naval defence of Australia.

## EARLY AUSTRALIAN INTEREST IN SUBMARINES

The prospect of establishing an Australian navy was a key issue in the hearts and minds of many Australians at the time of Federation. Australia's naval defence largely relied on the Royal Navy and its Australia Station. Although the Royal Navy was the dominant naval power in the world at the time of Federation, events like the Crimean War of 1854-1859 showed that British warships could be transferred away from the defence of Australia in times of conflict. [5] Australia also relied on its isolation from foreign powers as a means of naval defence, as it would take an enormous amount of resources for any



The Honourable Alfred Deakin (Image National Library).

foreign power to launch a major attack on the Australian mainland. By 1900, several foreign powers (such as the United States, Japan and Germany) managed to gain territories in the Pacific. Although British and Australian military advisors agreed that the most likely threat to Australia would be in the form of “raiding cruisers”, this threat became more worrisome with strong naval powers like Germany gaining a strong foothold on Australia’s doorstep. [6]

The Colonial Conference of 1902 was held in order to renegotiate Australia’s pre-existing naval defence arrangements with Britain. The Conference was also held in order to address concerns posed by Defence Minister John Forrest regarding Australia’s inability to defend itself from threats like raiding cruisers. [7] A new Naval Agreement was formed as a result of the Conference, strengthening the British forces assigned to the Australia Station. In order to bring the Agreement into effect, the Naval Agreement Bill of 1903 had to be passed by the Australian Federal Parliament. There was much debate over the Naval Agreement Bill before it was passed. One of the MPs involved in the debate was Arthur Groom. He favoured the conditions of the Bill, which would lead to Australia increasing its contribution to the Royal Navy in order to strengthen the Australia Station. Groom also brought up the issue of submarines as a means of harbour defence. Groom stated that submarines would ‘at no distant date’ take the place of forts in the role of harbour defence. He also noted that submarines would be much cheaper to acquire than cruisers. [8] Australian and British interest in submarines continued to increase as British submarine technology was refined and developed. In December 1903, Defence Minister Sir Austin Chapman met with Vice-Admiral Edward Fanshawe of the British Admiralty. The concept of acquiring one or two submarines for the defence of Port Phillip was floated at this meeting. Chapman and

Fanshawe stated that the Admiralty would make an enquiry regarding the feasibility of the idea before any action was undertaken. [9] A contemporary commentator described the proposal as a “hopeful plan”, stating that “the presence of one submarine in the bay would be sufficient to scare away half a dozen of an enemy’s cruisers.” [10] Another prominent military leader to consider the purchase of a submarine for Australia was Sir George Clarke, who was part of the Committee for Imperial Defence. In 1904, Clarke left Victoria on a trip to Britain to enquire about the purchase of a submarine for Australia. After seeing the submarines in Britain, Clarke decided that no purchase of a submarine should be made on the grounds that submarines “were not yet clear of the inventor’s hands.” [11] It was not until 1905 that submarines truly became a part of the political debate regarding the composition of the Royal Australian Navy.

## NAVAL DEFENCE DEBATES OF 1905-1906

In 1905, Australia’s naval defence was still the Royal Navy warships attached to the Australia Station. The rivalry between Germany and Britain played a large part in the redistribution of the Royal Navy’s warships around the world. A lot of the more powerful warships were moved closer to British waters, which meant that the Pacific Fleets (including the Australia Station) were weakened. [12] The need for a local Australian navy was more important now than ever, as Britain could not be entirely relied upon for the defence of Australia. On the 12th of May in 1905, Defence Minister James McCay wrote that Australia should complete her harbour defences as a top priority. McCay also wrote that the best vessels suited for harbour defence would be destroyers, torpedo boats and submarines. [13] At the first Defence Council meeting in 1905, Director of Naval Forces (DNF) Captain William Rooke Creswell put forward his own plan for a local Australian Navy. It consisted of three cruiser-destroyers, sixteen torpedo destroyers and twelve torpedo boats. [14] There were no submarines in Creswell’s proposed navy, suggesting that Australia’s leading naval adviser did not believe that Australia should have submarines as part of its fleet.

On the 12th of June in 1905, Alfred Deakin gave a speech outlining government policy for the next three years. Deakin stated that Australia should focus on making sure that its harbour defences were “in a fit state of readiness.” [15] Deakin also saw submarines as being essential to ensuring the defence of Australian harbours, in addition to a flotilla of destroyers and torpedo boats. [16] There were other Australian politicians who supported the idea of an Australian navy with submarines. On the 24th of October in 1905, MP Henry Bourne Higgins stated in the House of Representatives that “Australia needed coastal defences in the shape of torpedo boats and submarines.” [17] Other parliamentarians opposed submarines. In the same sitting, MP William Henry Kelly criticised Higgins’ comments, stating that “submarines would be useless in Australian waters, since the fastest of the type yet built could not travel more than ten knots an hour.” [18] Shortly after this sitting in Parliament, DNF Creswell proposed that the Commonwealth should purchase a fleet of torpedo boat destroyers. [19] Creswell emphasized the need for torpedo boat destroyers in an Australian fleet. Creswell did not recommend the purchase of any submarines, as they were “still in the experimental stage” and that “the forces acting on submerged vessels have not yet been accurately determined.” [20]

At the beginning of 1906, DNF Creswell released a report on the year 1905 to the Federal Parliament. He outlined a much stronger case for the need for a local defence flotilla. Creswell believed that Australia was very much at risk of attack from raiding cruisers. He stated that even on cruiser could maintain a state of panic if there was no fleet available to stop it. His preferred method of defence was in the form of torpedo craft and not submarines. [21] Shortly after delivering the report, Creswell was sent on a trip to Britain to “study



Sir William Rooke Creswell (Image RAN).



Admiral of the Fleet Sir John (Jackie) Fisher Royal Navy.

the latest achievements of the British Admiralty in connection with torpedoes and submarines..." [22] When Creswell returned from England, he stated that submarines, whilst much improved, could not be relied upon as an effective means of defence. [23] Whilst the debate for the establishment of a local Australian Navy continued throughout 1906, it was not until 1907 that submarines became a major part of the debate.

## AUSTRALIAN NAVAL DEFENCE POLICIES 1907-1909

On the 13th of December in 1907, Prime Minister Alfred Deakin presented his government's defence policy to the House of Representatives. It was during this speech that Deakin justified his decision to acquire nine submarines in addition to six torpedo boat destroyers. Deakin noted the "fragility" of the C-class submarines, as well as the needed to produce submariners with "expert knowledge and training." [24] Deakin also acknowledged that "though the submarine may prove to be the weapon of the future, its superiority has not been demonstrated as yet." [25] Deakin also referred to the advice of the then-First Lord of the Admiralty, Lord Tweedmouth, who "strongly recommended submarines", saying they were the weapon of the future. Drawing on his own experiences in London, Deakin explained how a modern submarine could use its stealth to severely demoralise and deter any attacking cruiser squadron. In short, submarines appeared to be the best means to provide the right defences for the threats that Australia could face. Deakin also added that whilst the first submarines would be built in London, he would endeavour to ensure that future submarines are built in Australia, in order to develop Australia's naval defence industry. [26] On the same date as Deakin's speech, DNF Creswell advised Defence Minister Thomas Ewing against the acquisition of any submarines. [27] Deakin's defence policy had not yet been implemented when Deakin lost office in 1908, so no destroyers or submarines were built

under this policy. On the 4th of February in 1909, DNF Creswell advised the new Fisher government to acquire an Australian navy composed of torpedo boat destroyers. [28] The Fisher government decided to enact Creswell's proposal, despite the advice given to the Deakin government in 1907 by Imperial authorities recommending the acquisition of submarines. By early March 1909, it appeared as though the new Australian navy would be entirely composed of destroyers and would not have a submarine service.

On the 16th of March in 1909, Sir Reginald McKenna (the First Lord of the Admiralty) announced that Britain would be accelerating the construction of new warships in response to the drastically increased rate of production of warships in Germany. Britain needed to do this, or else it would lose numerical superiority over the Germans. [29] This naval scare made the issue of imperial defence an urgent matter of the utmost importance. On the 30th of March in 1909, the Fisher government announced that it would increase the production of destroyers, stating that "the new boats will include four ocean-going destroyers... and also 16 other River-class, making a total, with the three on order, of four ocean-going destroyers and 19 River-class, or 23 in all." [30] This policy was never carried through, as Alfred Deakin was sworn into the office of Prime Minister on the 2nd of June in 1909. One of the Deakin government's first responsibilities was to contribute towards imperial defence. An Imperial Conference was to be held in London on the 28th of July in 1909. Deakin and Defence Minister Joseph Cook were unable to attend the Conference, so they delegated MP Justin Foxton to be the official representative of the Commonwealth of Australia at the Imperial Conference. [31] Foxton was accompanied by DNF Creswell and Colonel Bridges. The Australian delegation party took with them to London an offer from the Deakin government of an 'Australian dreadnought'. At the Imperial Conference, the Admiralty proposed a strategy for imperial defence that determined the final composition of the Royal Australian Navy.



HM Submarine D2 - D class submarine.

## THE AUSTRALIAN FLEET UNIT

The First Sea Lord of the Admiralty, Sir John Fisher, had developed a method of imperial defence known as the 'fleet unit' concept. Fisher proposed that Australia acquire a fleet of one dreadnought battlecruiser, complemented by a fleet of three cruisers, six destroyers and three submarines. These ships would form the Australian fleet unit. [32] According to Fisher's imperial naval strategy, the colonies would maintain fleet units based at Australia, China and the East Indies. In times of wars, these fleet units would combine to form a Pacific Fleet, which greatly aided the defence of the Empire. In peacetime, the fleet unit could defend Australia from the threat of foreign cruisers. [33] Submarines were included as a vital part of the fleet unit. The submarines complemented the coastal defences of the Australian fleet unit, essentially adding another layer to Australia's naval defences. The Australian delegation was originally hesitant to accept the proposal. The fleet unit was much larger than Australia could afford and most of the construction would be in Britain, instead of developing the Australian industry. The Australian delegation eventually decided to accept the fleet unit as the basis of the Royal Australian Navy.

Although Lord Fisher recommended C-class coastal defence submarines for the Australian fleet unit, he was preparing the Australian fleet for the future. Lord Fisher wanted the Australian fleet unit to give Australia the foundations of a permanent naval force. If submarines were the future, Australia needed submarines as part of its fleet unit. Lord Fisher considered submarines to be a part of an "impending revolution" were submarines will become powerful "offensive weapons of war." [34] The D-class submarine under development in Britain was the first British submarine that was designed for offensive operations. The D-class submarine was significantly larger than previous classes and featured external ballast tanks. This made the interior of the submarine more spacious and also made the submarine able to cope with rough weather on the high seas. It also carried more fuel, making able to operate on the high seas. The D-class submarine was also the first British submarine class to incorporate a diesel engine for propulsion (as opposed to the gasoline engines on previous classes). The use of diesel over gasoline significantly reduced the risk of explosions and hazardous fumes inside the submarine, making them safer. The submarine

carried two diesel engines, each one linked its own propeller shaft, making the D-class the first British twin propeller submarine. The use of twin propellers not only increased the horsepower available to the D-class, but it also provided a back-up in case one engine ceased functioning. Finally, the D-class was the first submarine to be fitted with wireless communication equipment. The equipment could not be used underwater, but it could be used for intelligence gathering on the surface. [35]

## SUBMARINES FOR WAR

On the 24th of November in 1909, Defence Minister Cook stated that "it is more likely that two submarines of the D class will be substituted for three of the C-class." [36] The Deakin government also delayed the acquisition of the submarines, even as construction on the other elements of the fleet unit began. On the 10th of December in 1909, Deakin announced that his government did not want to order submarines at that time, as "improvements were being made" and that they "only want the latest" for the Australian fleet. [37] No submarines had been ordered by the time Andrew Fisher was sworn in as Prime Minister in April 1910. A decision was not made until the end of 1910. The Admiralty advised the Fisher government to build two E class submarines in place of the three C class submarines. In December 1910, the Fisher government decided to acquire the E class submarines. [38] The E class submarine was a refinement of the D class submarine. It had an increased displacement over the D class, improving its endurance, habitability and sea-worthiness. The E-class was also the first British submarine to incorporate transverse bulkheads into its design. In the event of a hull breach, these bulkheads could be closed off in order to isolate the flooding section, increasing the survivability of the submarine. [39]

The construction of the Australian E-class submarines, AE1 and AE2, began in late 1911. It was not until the 24th of May in 1914 that the submarines arrived in Sydney and were officially accepted into the service of the Royal Australian Navy. [40] This event was the fruit of hazardous submarine pioneering and development and over a decade of intense political discussions and debates. The acquisition of AE1 and AE2 can be considered an enormous success, as it resulted in Australia gaining two of the world's most capable submarines at a time when they were most needed. ■





HMA Submarine AE1 - relocated following the writing of this paper, see President's Page.

## NOTES

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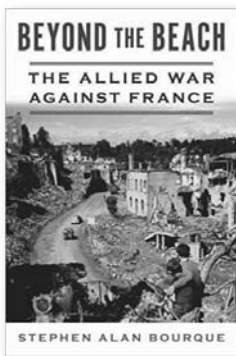
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## Beyond the Beach

**The Allied Air War Against France, 1944**

Stephen Alan Bourque

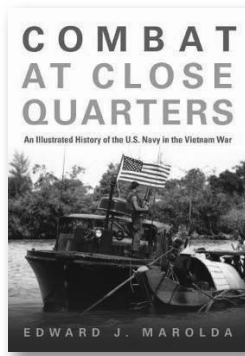
Naval Institute Press (15 April, 2018)

ISBN-10: 1612518737 / ISBN-13: 9781612518732

Hardcover: \$52.50

This is an important book and essential reading for those wishing to understand France today, and more specifically the actions of General de Gaulle (as President, 8 January 1959 – 28 April 1969); leading to the formation of the Fifth Republic (1958-). There are seemingly two untold stories that one encounters only in France, where the trauma remains connected. The first was the ‘surprise’ attack on 3 July 1940 by the British on the French Fleet then alongside at Mers-el-Kébir (Algeria), prior to the formation of Vichy France exactly a week later. The formation of which also ended the Third Republic (1873 – 1940). The French Navy (La Royale) remembers also that on 27 November 1942 they scuttled the rest of the French Fleet in Toulon, rather than allowing it to fall into the hands of Nazi Germany – so thwarting Operation Anton, a German attempt to seize the French Navy. The second is undoubtedly the Allied bombing (and strafing) campaign – including many Australian Air Crews – against France between January and August 1944, during which time 45% of all bombs in Europe were dropped on a less defended France (26% on Germany; 14% on Central Europe; and on Italy 14%). Bourque suggests that in total, some 60,000 French civilians were killed by the bombing campaign before France was ‘liberated’. Quite rightly, Bourque considers the impact on and importance of the national narrative in shaping a country’s sense of identity, belonging and purpose. For the U.K., he suggests The Spanish Armada; Waterloo, WWI, and the Battle of Britain – surprisingly not recognising The Battle of Trafalgar? For Australia (since Federation) this would be Anzac, Gallipoli; and Kokoda – with the Western Front (1916-1918) and the Battle of the Coral Sea being its missing narratives. For France, for reasons also to do with the complicity of the Vichy regime – the post WW2 saying of the French Maquis (La Résistance) was that ‘it had 15,000 members before D-Day, and 35 Million thereafter’ (‘Il y avait 15,000 membres de La Résistance avant D-Day et 35 millions de jours après’) – the narrative may be largely overlooked but it is not missed in numerous memorials to those killed by Allied bombing in French cities and towns (Mort pour la France). This well-written, humble, detailed book is an important addition to our histories and plugs an important gap in an ‘Allied’ understanding of France – that goes below the surface. It should be essential pre-reading for all diplomats and military officers serving in France. Note to all RAN / APS staffs deploying in support of the Future Submarine project!

Stephen Alan Bourque served twenty years in the U.S. Army and is now Emeritus Professor at the US Army Command and General Staff College.



## Combat at Close Quarters

**An illustrated history of the U.S. Navy in the Vietnam War**

Edward J. Marolda

Naval Institute Press (15 April, 2018)

ISBN-10: 1682471950 / ISBN-13: 9781682471951

Hardback: \$52.50

For Naval strategists and thinkers this book represents an important contribution. In some respects, it echoes and perhaps aligns with Harlan K. Ullman’s book *Anatomy of Failure – why America Loses every war it Starts* (USNI, 2017) reviewed *The NAVY Magazine*, Apr-Jun, 2018, in examining from a geo-strategic perspective the tactical and operational level successes (at close quarters) of the U.S. Navy in Vietnam. A war in which the U.S. – with its Allies, Australia, New Zealand, Thailand, South Korea and South Vietnam – won every battle of note but ended up losing the war. The book is well-written and provides a convincing (and illustrated) narrative that flows, signposts and readily connects its four chapters on: Naval Air Warfare; Riverine Warfare (Green Hell); Nixon’s Trident; and Knowing the Enemy.

The scholarship is impressive: Dr Edward J. Marolda has authored several books on the U.S. Navy in Vietnam, and is the Acting Director of Naval History and Senior Historian of the Navy. Contributing authors include Norman Polmar, a much published author specializing in Navy, aviation, and intelligence and as a major projects lead for the U.S. Department of Defense; the U.S. Navy, and foreign governments; R. Blake Dunnavent, a Professor of History at Louisiana State University specialising in maritime history and Vietnam; Dr John Darrell Sherwood a historian with the Naval History & Heritage Command and has written many books on the U.S. Navy and naval aviation in combat, in Korea and Vietnam; and Richard A. Mobley, a former naval intelligence officer and the author of *Flash Point Korea: The Pueblo and EC-121 Crises* (2001). The first chapter, it could be argued, is not so much about Naval Warfare as about Unity of Command (and effort):

Unity of command means that all forces operate under a single commander with the requisite authority to direct all forces employed in pursuit of a common purpose. During multinational operations and interagency coordination, unity of command may not be possible, but the requirement for unity of effort becomes paramount.

This book is really ‘four-in-one’; ultimately standing by the way the stories are told as connected by the editing author. A vital read – particularly for those contemplating future strategies for the Indo-Pacific region.



## Always at War

**The origins of Organizational Culture in Strategic Air Command, 1942-1962**

Melvin G. Deaile

Naval Institute Press (15 April, 2018)

ISBN-10: 1682472485 / ISBN-13: 9781682472484

Paperback: \$45.50

This is perhaps an overdue and welcome book on the Strategic Air Command (SAC) through its formative years to apparent success in 1962 during the Cuba Missile crisis. Interestingly, it is a book written by a retired USAF Colonel, a nuclear expert in strategy, and an historian and professor at the Air University (Maxwell AFB, AL), published by the USNI. Interesting for two reasons: first, because the USAF and SAC were fundamentally opposed to the U.S. Navy (and its carriers) during the 1950s ‘Revolt of the Admirals’ that pitted strategic bombers against super carriers. And secondly, that in many regards U.S. Navy SSBNs ultimately superseded – but did not replace – the SAC. There is potentially a third interesting perspective to do with strategic thinking – and those organizations with the capacity to think, abstract, design and scale forces twenty, thirty or even forty years hence. Traditionally, in maritime nations – such as the U.S., and the UK – strategic thinking has been done by their navies. They had had to manage the shipbuilding programs to ensure that the Fleets remain in being, over time. Yet between 1946 and 1962, a strategic culture grew within the USAF SAC that similarly developed its own language and ontology. An ontology rather than an epistemology, since the language was about the dynamic; thinking and designing anew. As the Author recognises the cultural perspective in command and leadership and within organisations is critical – it allows the organisation to think, solve complex problems, and to adapt (and overcome). In the first chapter, the editor gets at the necessary changes of culture in ‘a different breed of cat – the foundation of pilot culture’.

As Deaile attests, in October 1962 SAC held the line; arguably both deterring and preventing a nuclear conflict over Cuba between the U.S. and the USSR by demonstrating that the U.S. has the capability, capacity and will & intent to ‘press the button’. The book raises good questions. It will be interesting to see how Deaile writes the story between 1962 and 2017, when arguably the wheels came off. An excellent and well written book – well worth the read.



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