

THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA



**HMS PRINCE OF WALES
COMMAND OF THE SEA**

**THE BRITISH ROYAL NAVY -
ROAD TO SALVATION? PART 2**

**SYSTEM VARIETY: COMPARING
RN & USN ENGINEERING - PART 2**

**DEALING WITH TWO
SUPERPOWERS**

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Front cover: Japan's second large helicopter carrier, the JMSDFS KAGA (DDH-184) entered service in March 2017.

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A CRITICAL JUNCTURE

In this issue, *The NAVY Magazine* begins with a prescient paper by George Galdorisi, a long standing contributor, on working with both America and China in these uncertain times. Or, as the outgoing Defence Secretary Dennis Richardson (apparently ahead of the 1 July putsch, to make room for the new broom of ADF Chiefs) put it: 'friends with both, allies with one'. A strategy *The NAVY Magazine* has suggested in the past and which plays directly into a maritime policy of asymmetric offshore counterbalancing. Papers 2 and 3 are the second parts of Jonathan Foreman's paper on RN Leadership and Thunderer's on RN Engineering. Both are powerful if not excoriating papers that arguably could not have been published first in the UK. Both papers have attracted considerable attention and are likely to be re-published in some shape or form with the author's permission. *The NAVY Magazine* takes no delight in publishing these papers. For the Australian, Indian, Canadian, New Zealand, South African, Pakistan, Singapore, Malaysian, Chilean, and indeed the Japanese, U.S., Israeli (and even Chinese [1]) Navies – the Royal Navy is the Parent Navy. Its loss from the high seas, due to leadership 'cowardice and rank incompetence' [2], is bad for Britain. More significantly, it is bad for the Liberal Democracies and the world as a whole, including Europe and the EU. The final paper by Andrew Ng examines the previous HMS PRINCE OF WALES (53) and its fate north of Singapore, off the east coast of Malaysia. Ng, concludes with an examination of the role of the new HMS PRINCE OF WALES (R09); raising useful questions regarding the 'focus on bigger, [fewer] and more expensive', when simplicity and scale (in numbers and size) is becoming more important and affordable. Particularly when up against a first world contender, when losses are going to be taken. This issue

also maintains Flash Traffic, The Red Duster (on the Merchant Marine), and *The NAVY Magazine* Book Review.

On 17 May 1987, the Oliver Hazard Perry-class (FFG-7) frigate USS STARK (FFG-31) was on patrol in the Arabian Gulf when it was struck by two Iraqi Exocets during the Iran-Iraq War. Thirty Seven sailors were killed, some 20% of the crew. They are not forgotten. In January 1988, the USS SAMUEL B. ROBERTS (FFG-58) was hit by a mine and ten sailors (5%) of the crew were badly injured. Both ships were saved by their crews who fought on, against the odds and all survivability design predictions. Criticised at the time for being underarmed and lacking in redundancy, the FFG-7 class were not initially regarded as being part of President Reagan's 500-ship Navy. In actual fact, the FFG-7 represented the last revolution in naval affairs (RNA): its designs creating a fundamental break with all ships that preceded it, and incorporated into all succeeding classes. The SAMUEL B. ROBERTS (motto 'No Higher Honor') decommissioned in 2015, twenty seven years later. The non-US FFG-7 class will last well into the 21st Century: HMAS NEWCASTLE (FFG-06) will probably not decommission until as late as 2023 (after 30 years' service) and the last Taiwanese built FFG-7, ROCS TIAN DAN (PFG-110) may be in service until the 2030s. The issue is not so much the length of service of this class (potentially up to 60 years) but that it also represents the last great Revolution in Naval Affairs. By the books, by the enormous changes occurring in society, and in the infotechnological synthetic systems emerging, complimented by quantum mathematics and artificial intelligence (AI), a Critical Juncture with all that went before is occurring – and with it, the next RNA. Put simply, ships being built today are unaffordable in the scale



USS STARK (FFG-31) 18 May 1987 after being hit by two Exocet. We will not forget.



HMS SHEFFIELD (D80) after being hit by an Exocet Missile 4 May 1982. We will remember.

that will be needed to contend effectively in the less certain and more unstable strategic context(s) emerging. In quantum-design terms, ships being designed and built today are already impacting the 22nd Century. Put another way, we have run out of the 21st Century – the last CO, of the last Future Submarine will not be born for another 20 years! This means two things – first, we don't want to be caught-out owning and building C21st pre-Dreadnought equivalents, and, secondly, we need to develop a more experimental approach to our ships, systems, crews and designs.

Paraphrasing Voltaire, 'perfection becomes the enemy of the good'. More seriously, if there is no error, then there can be no learning and therefore no innovation, adaptation and change. This raises significant philosophical questions regarding Quantum AI (QAI), which social scientists through acts of omission have largely chosen to ignore. For, if Alexander Pope is correct, and that 'to err is human; to forgive divine' [3] – without imperfection, there will be no divine! To counter the fixation on perfection, Sir Robert Watson-Watts (an engineer and inventor of the British Radar) developed the 'Cult of the Imperfect', sometimes translated as 'second best today': 'always strive to give them third best, because the best is impossible and second best is always too late.'

Returning to the attacks on USS STARK, USS SAMUEL B. ROBERTS, and more recently on USS COLE (DDG-67) – noting also the anti-ship missile attacks by IRG-Houthis against shipping in the Gulf of Aden, and the strike against the INCAT built UAE logistic ship SWIFT (HSV-2) – in any future conflict navies are going to take losses. The fact that US Ships STARK, SAMUEL B. ROBERTS, and COLE all survived was down to their crews – assisted by the technology they had to hand, and that could be made to work. This raises questions of mental toughness beyond resilience – being able to KBO (as the

RN did in the Falklands War), even after taking significant losses. The count is out. For example, how contemporary crews may fare? [4] Resilience in peacetime is not the same as toughness in war. Yet the Professional Political Elites, so divorced from empiricism and war – it would appear only Royalty and Les Deplorables (the 75%) serve today – continue to ignore Plato's maxim 'si vis pacem, para bellum'. We cannot afford to fail in war. Come the day of the races, we will have to make do with what we have. Which is why, ultimately, averaging becomes so important – the average performance and capability of our crews needs to be better than that of our enemies, and sustainable over-time.

Nelson won at Trafalgar for many reasons but critically, his officers and ratings were

more matured, educated and trained than the French and Spanish Fleets. In fact, the British Fleet was outgunned and outnumbered in terms of both ships and sailors and, ship-for-ship the French and Spanish had six more ships-of-the-line for which to concentrate fire. On the day, the average performance of British crews had to be more than twice that of the French and Spanish if they were to overmatch the quantitative and qualitative (in terms of ships) edge ranged against them. Nelson was nothing without his crews and the crews would have been less than the sum-of-their parts without him. While scale, numbers and size, matters, on this cusp of the next Revolution in Naval Affairs we need to experiment and scale the imperfect. Indeed, we should never pursue the perfect capability but the second best, available today (painted in grey if necessary); while cultivating first rate crews for all their perfect-imperfections.

Note: The font applied in this edition is experimental. The Editor and Editorial Board would be grateful for comments as to what readers think.



UAE Logistic Ship SWIFT (HSV-2) after allegedly being hit by an IRG-Houthis Missile off Aden 1 Oct 2016. There were injuries but no reported fatalities. Early confidential assessments suggest that an experienced crew and master could have brought the undefended ship home under its own power from the secondary steering position, despite not being designed or built to withstand battle damage.

1 Aeneas. Editor's Addendum: *AURORA - First PLAN Ship CHUNGKING*. The NAVY Magazine of the Navy League of Australia, 2016, Apr-Jun, Vol. 78, No. 2: pp. 28-29.

2 Foreman, J., *The British Royal Navy - Road to Salvation, Part I*. The NAVY Magazine of the Navy League of Australia, 2017, Apr-Jun 2017 Vol. No.2: pp. 12-17.

3 Alexander Pope in an Essay on Criticism (1711) in which Pope also opines, in Part II, that 'a little learning is a dangerous thing' and in Part III that '...Fools rush in where Angels fear to tread'.

4 Recently, in the wars of Iraq and Afghanistan, the British suffered 632 fatalities, of which 98.5% were male. Women made up almost 20% of the forces deployed, which was twice the percentage of women then serving in the British Military.

NAVAL SHIPBUILDING

The Prime Minister and the Minister for Defence Industry have recently announced the Naval Ship Building Plan. The Navy League of Australia welcomes the announcement. The Naval Shipbuilding Plan outlines the Government's vision for the Australian naval shipbuilding enterprise and the very large investment required in coming decades. The shipbuilding plan involves three programmes: submarines, major surface combatants and what are described as minor naval vessels.

As is by now well known, the Royal Australian Navy is to acquire 12 Shortfin Barracuda. This submarine has been described as a conventional variation of the nuclear powered Barracuda being built for the French Navy. Given the differences between nuclear and diesel submarines it will be interesting to see how much the two variants have in common, apart from the name Barracuda. The Shipbuilding Plan states that construction of the 12 future submarines will commence "around 2022-2023".

The major surface combatant programme will consist of nine frigates. According to the Plan construction is to commence in 2020. The choice of the frigate design is yet to be announced. The choice to be made is between BAE Systems Type 26 frigate, Fincantieri's FREMM frigate or a Navantia redesign of its F100. Whichever design is chosen will incorporate the Australian Phased Array Radar. I have seen a model of the Type 26 equipped with the phased array. It looks good. The submarines and the frigates are to be built at the Osborne Naval Shipyard, South Australia.

The minor naval vessel part of the Plan should perhaps really be described as two programmes. First is the Pacific Patrol Boat replacement project. This will commence in 2017. Up to 19 vessels are to be built at Henderson Western Australia. The second part of the minor naval vessels programme involves the construction of 12 Offshore Patrol Vessels (OPVs). As these vessels are likely to be up to 2000 tonnes I am not so sure how minor they will be. At the time of writing no announcement has been made as to which design will be chosen. The contenders on the short list are Damen from the Netherlands and Fassmer and Lurssen from Germany. As, according to the Plan, construction is to start next year, an announcement cannot be too far away.

It is planned to construct the first two OPVs at the Osborne Naval Shipyard in Adelaide with the remaining ten vessels to be built at Henderson. The proposed arrangement is intended to maintain work at Osborne Shipyard until the frigate build begins.

The government has also made a commitment to invest in shipyard infrastructure. At Osborne it intends to spend up to \$535 million for surface ship infrastructure. The Government considers that the current infrastructure at Osborne is not suitable for construction of the future submarines and that the yard will require development to support submarine construction. The amount involved in this work is unstated.

The Government announced that it will spend \$100 million between 2017 and 2020 on naval-related infrastructure at Henderson and at HMAS Stirling. It is perhaps not fully appreciated on the east coast, but Western Australia has a quite large and very active maritime industrial capability. Many firms, BAE Systems and Austal being among the best known names, are engaged in work.

While a very large amount of Government funding, State and Federal, has gone into the development at Osborne, what you see at Henderson is in the main the work of businesses big and small. Much of what was announced by the Prime Minister and the Minister was already known. Nonetheless it is pleasing to have the Shipbuilding Plan confirmed and to have the Government committed to its



The latest Design of BAE Type 26 Global Combat Ship a lead contender for SEA 5000 and potentially for the Royal Canadian Navy and the U.S. Navy under its rapid expansion plans.



Austal Pacific Patrol Boat Replacement Design.



Damen Design Offshore Patrol Vessel.

implementation. The announcements about infrastructure are also most welcome.

CORAL SEA. A POSTSCRIPT

In the previous edition of The Navy I wrote of the tremendous celebrations that took place on the occasion of the 50th anniversary of the Battle of the Coral Sea in 1992. I added that "It is clear that the 75th anniversary of the Battle of the Coral sea will not be recognized in the same way, or on the same scale as the 50th anniversary". In most places that forecast proved to be correct. There were some functions or commemorative activities, but essentially it was all low key. It was all a long way from 1992. Except in Queensland and New York. Major commemorations were held in Queensland, particularly in Townsville, Cardwell, off the coast in HMAS Choules and in Brisbane.

In Brisbane a commemorative service was held at the Australian-

American War Memorial attended by the Governor of Queensland, the United States Consul General, Federal and State parliamentarians, a USS Lexington survivor and Rear Admiral Charles Williams, Commander Task Force 70, Battleforce, 7th Fleet, USN.

At a Memorial Dinner at Parliament House Admiral Williams gave an excellent address. Receptions were held at Government House by the Governor and at City Hall by the Lord Mayor. Our Queensland Navy

League members were involved in all these activities.

In New York a dinner was held aboard the WWII carrier USS Intrepid. The President of the United States attended. So too did Prime Minister Turnbull. We in the League were delighted to see Rear Admiral Andrew Robertson, our former long-term Federal Vice President, one of five Australian veterans invited to the event, recognised on TV and in other media.

LETTERS

Reference *The NAVY Magazine* Vol. 79, No. 2:

Dear Editor,

I am the Editor of the RN's Naval Review of which you may have heard.

I have been shown the article by Jonathan Foreman on the state of the RN in the latest edition of your journal, an article with which I agree most strongly. I feel that it is of great interest and concern to members past and present of the RN, and a real wake-up call to the RN - and indeed should also be to the British government.

I am therefore writing to seek your permission exceptionally to place this article on the Naval Review web site, in the section that is closed to all but members. You may be aware of the NR. It is 104 years old, an independent professional journal whose circulation is confined to its 1800 members (who include several senior former and present Australian members), who are all past or present officers of Commonwealth Navies and a few other academics and naval experts approved by the Editor. The journal, and the membership section of the website, are not available to the wider public.

This very important article seems to me to be of immense value to the RN, and will not really achieve its main aims if the view it expresses of the RN does not get read by the RN. I very much hope that you will be able to agree in this instance that we might place it on the website private side. I would be most grateful if you could reply as early as is convenient to you.

With best regards,

*Jeremy Vice Admiral Sir Jeremy Blackham
KCB MA Retd London*

Dear Vice Admiral Sir Jeremy,

Thank you for your kind email. I have confirmed with the editorial board and with Jonathan Foreman and am delighted to approve the posting of Jonathan's article.

Separately, there are many ex-RN and

RM serving in RAN, many of whom share the concerns expressed by Jonathan and Thunderer. And all of us really do want to see the UK and RN returning to the scene - the world is a much less safe place without you. Brexit should be an opportunity to begin the essential rebuild of UK, Democracy and Royal Navy. The three are inimitably entwined - the one may not exist without the other. It is not the same for your Army or Air Force, which is why the RN is of global value.

*With Kind Regards
Aeneas*

Comment

Sir Jeremy retires as editor of the Naval Review this August. The NLA and *The NAVY Magazine*, in many respects sister publications with shared RAN / RN Membership and contributors, wish Sir Jeremy well and plane sailing for a successful third retirement! Sadly, Rear Admiral John Richard Hill Royal Navy the previous editor, died in March 2017. Both principled men led the Naval Review in difficult times. They picked up both the weapon and the pen, when they could have done neither. They will be missed.

Redacted

Dear Editor,

Congratulations on a job really well done, to pull [Vol. 79, No. 2] together. I'm glad to see that Jonathan Foreman flagged the Cornwall boarding debacle. I'm sure the report is in the public domain, the only redactions covered personnel names with possible SF connotations. It's not obvious, but all three Cornwall related reports were released under FOI at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/482260/20151120-Report_Redacted-FINAL_Redacted.pdf

Regards Thunderer

Comment

Discussions with the inquiry author(s) at the time of the incident and subsequently, confirmed grave reservations regarding RN leadership fitness. For obvious reasons, given also the delimited nature of the inquiry, these were not covered in detail in the redacted report.

Nonetheless, as a result of a subsequent review by a senior Royal Marine Officer, core maritime skills (CMS) were introduced to the RN, which included emphasis on Sea Sense. The question remains as to 'what was actually learned, and will be applied in the future?' For exactly these reasons, RN Leadership should have required a court martial at the time, which would a) have necessarily gone to the top; and b) have cleared the decks.

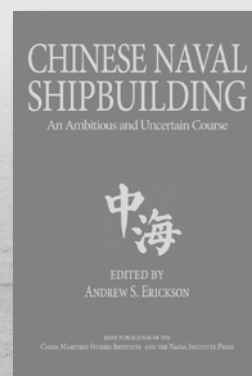
Editorial Board

Erratum

With apologies, Chinese Naval Shipbuilding was wrongly attributed in the Book Review (Vol. 79, No.2) and is correctly detailed below:

Chinese Naval Shipbuilding An Ambitious and Uncertain Course

Professor Andrew S. Erickson
Naval Institute Press (15 January, 2017)
Hardcover ISBN-10: 1682470814;
Paperback ISBN-13: 9781682470817.
\$US39.95; \$AS54.50



ABC-Sea 75

As noted in the President's Page, except in Queensland and New York major commemorations were not held to mark the 75th Anniversary of the Battle of the Coral Sea. Nonetheless, it was remembered. Recognised by Curtin, this was The Battle for Australia when, paraphrasing Churchill 'Never was so much owed by so many to so few': the '2000 RAN personnel and our remaining 2 cruisers, coast watchers and code breakers as well as some RAAF'. At extremely short notice, for carrying off the events involving Presidents, Prime Ministers, Governor Generals, and Chiefs of Defence Staff in both USS INTREPID (CV-11) and HMAS CHOULES (L100), both the RAN and the USN are to be congratulated. In particular Commodore Peter Leavy RAN, the Australian Naval Attaché to the United States and member of Australian Defence Staff, Washington, who did so much to pull it all together.

As readers will recall, Admiral Robertson wrote on the Battle of the Coral Sea in *The NAVY Magazine*. Copies of this paper were made available (with permission) at the New York commemoration:

Robertson A. (2015) Coral Sea 2017: We Will Remember (by Rear Admiral Andrew Robertson AO DSC RAN (Rtd)). *The NAVY Magazine* of the Navy League of Australia Vol 77, No. 4, Oct-Dec: pp. 28-31.



Admiral Andrew Robertson AO DSC RAN (Rtd) [NT] and Commodore Peter Leavy RAN on board USS INTREPID (CV-11) for New York ABC-Sea 75 Commemorations.

PMs Address

The Prime Minister in his address stated, *inter alia*:

...but there are none more distinguished than the Veterans of the Battle of the Coral Sea. From the Royal Australian Navy Rear Admiral Andrew Robertson, Norm Tame, Gordon Johnson, Bill White, Derek Holyoake and from the US Navy John Hancock, Wendell Thrasher and Roger Spooner.

For the first time, Australian ships were under the overall command of the United States Commander, Rear Admiral Fletcher, and within Task Force 44 itself, Australian Rear Admiral John Crace commanded American ships. Unity of purpose, unity of command, shared and collaborative signals intelligence - the Battle of the Coral Sea took to the water and the sky, the mateship that had fought and won the Battle of Hamel 99 years ago.

Each of our great nations defines its national identity, not by race or religion or ethnicity as so many others do, but by a commitment to shared political values, as timeless as they are inclusive - freedom, democracy and the rule of law. Shared values. A shared destiny.

We thank all those Australians and Americans who served — and remember the more than 600 who died—in the Battle of the Coral Sea.

Thank you.

The Hon Malcolm Turnbull MP



RAN and USN Veterans of the Battle of the Coral Sea with Malcolm Turnbull on USS INTREPID, New York. Rear Row Left to Right: John Hancock, Roger Spooner, Derek Holyoake, Malcolm Turnbull, Andrew Robertson, Bill White Front Row Left to Right: Gordon Johnson, Norm Tame, Wendell E. Thrasher.

NERVES & STEEL

22 July 2017 – 1 July 2018

Nerves and Steel explores the role of the Royal Australian Navy in the Pacific resulting in ultimate Allied victory. It features paintings on loan from the Australian War Memorial, original memorabilia from the Shrine's own collection, as well as items sourced from the RAN Heritage Collection and still living veterans—HMAS Perth survivor, David Manning, and former corvette gunnery officer James Paizis.

Shrine of Remembrance

South Gallery, Melbourne, Victoria

shrine.org.au



Hearts of Oak and Steel - HMAS YARRA (II)'s Last Stand by David Marshall, currently hanging in the Wardroom, HMAS CRESWELL.

At Sea in CHOULES

Guests and ship's company of HMAS CHOULES gather for the the Naval Prayer, led by Chaplain Ian Lindsay RAN at the commemoration for the 75th Anniversary of the Battle of the Coral Sea.



VIPs included Chief of Navy, Vice Admiral Tim Barrett AO CSC, The Governor General, His Excellency General the Honourable Sir Peter Cosgrove AK, MC, and Lady Cosgrove, Minister for Defence, The Hon Marise Payne, Mr Tadayuki Miyashita, representing the Ambassador of Japan to Australia, and the Hon Amanda Rishworth MP, representing the Leader of the Opposition.



THE NAVY LEAGUE OF AUSTRALIA ANNUAL MARITIME AFFAIRS ESSAY COMPETITION 2017



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OR

Emailed to: editorthenavy@hotmail.com

Submissions should include the writer's name, address, telephone and email contacts, and the nominated entry category.

DEADLINE

Saturday 26 August 2017

Prize-winners announced in the January-March 2018 Issue of *THE NAVY*.



DEALING WITH TWO SUPERPOWERS: AUSTRALIA MUST UNDERSTAND WHAT CHINA AND THE UNITED STATES WANT

By George Galdorisi

As readers of *The NAVY Magazine* know, Australia is an increasingly important nation in the Indo-Asia-Pacific. This nation's values and energy percolate throughout the region in a wide-range of positive diplomatic, economic and security avenues. And given the maritime-dominated geography of this area, for many nations, the face of Australia is represented by the Royal Australian Navy and it is the RAN that is on the forefront of maritime security and humanitarian actions throughout the Indo-Asia-Pacific.

PERSPECTIVE

In a review of an earlier Australian Defence White Paper in the Asia-Pacific-focused journal, *The Diplomat*, The Lowy Institute's Rory Medcalf noted:

Australia has set out to define its military strategy—with China and the U.S. very much in mind.

This is easy to understand. It is difficult—if not impossible—to think of another nation other than Australia that must keep a “weather eye” on what the 21st Century's two superpowers are about.

The reasons for this are clear: Australia has increasingly close cultural, diplomatic, economic, and security ties with both China and the United States. But it's not lost on Australia's policy-makers that

these two super-powers have contentious issues they will continue to need to reconcile. The challenge for Australia is to continue to have close relationships with China and the United States without getting caught in the middle of any squabbles these two nations might have.

KEEPING A WEATHER EYE ON TWO GIANTS

While Australia's leaders—politicians, diplomats, and military—all must develop a nuanced look at what China and the United States want, why they want it, and what's keeping them from getting it, a good place to start developing this understanding is to examine what each nation says about its strategy—especially its strategy in the Indo-Asia-Pacific region.

April 2017 China's new unnamed carrier 001A launched - based on the Soviet-era Kuznetsov-class design.





Chinese Island Building and Weaponisation of the South China Sea apparently increased as US focuses forces on North Korea (Image: NY Times).

It wasn't that long ago that most nations kept their strategies closely held. There were good reasons for this, not the least of which was to not let potential adversaries know in advance what their intentions were. This would keep those who would oppose them from devising an effective counter to their strategy. For the decades of the Cold War, when military capabilities dominated all else, this made perfect sense.

As the Cold War ended and new international alignments emerged, nations came to realize that a spectrum of instruments of national power—cultural, diplomatic, economic and others—were as important, often more important, than military power. This led most nations to become more forthcoming with their national strategies—even their security strategies. This is true for both China and the United States.

Both nations have newly released security strategies that are focused, unsurprisingly, on the Indo-Asia-Pacific region. In 2015 China released its first defense white paper that was primarily focused on military strategy, appropriately named China's Military Strategy. That same year, the United States released its first ever Asia-Pacific Maritime Security Strategy. Examining—even “deconstructing”—both strategies is important for Australia as it continues to walk a somewhat fine line as these two superpowers face off in areas close to Australia.

Australia is at the precipice of needing to make important strategic choices regarding its relationship with China and the United States. Here is how Richard Fontaine, President of the Center for a New American Security in Washington and the inaugural Alliance 21 Fellow at the University of Sydney's U.S. Studies Center, put the conundrum in an Op-ed in *The Wall Street Journal*:

With Washington's rising focus on Asia, America's close and longstanding alliance with Australia has taken on new significance. Australia today is boosting its military strength and regional activism, tightening a raft of security partnerships, and enhancing defense and intelligence ties with the U.S.

In many ways the relationship has never been stronger. And yet the alliance hasn't been tested in the region where it matters most—Asia. It is in Asia where tests are likeliest to arise, and where there is the greatest divergence between Australia's national-security establishment and public opinion.

At the same time, Australia's economic dependence on China has created worrying vulnerabilities. A third of its exports go to China, a higher percentage than any other G-20 country. This includes more than half of Australia's exported iron ore. China's investment in Australia is also on the rise, and would have included a bid for a major electricity grid in New South Wales had Canberra not recently rejected it on national-security grounds. Nearly 50,000 Chinese students started courses in Australian universities and schools over the past year, boosting the country's “education export” industry.

Beijing has also been fanning Australia's fears of becoming trapped between a U.S. enforcing regional rules and a China seeking to flout them. After Canberra called on Beijing to respect the Permanent Court of Arbitration's judgment on the South China Sea, China's *Global Times* newspaper called Australia a “paper cat” and warned that if it “steps into the South China Sea waters, it will be an ideal target for China to warn and strike.”

Fontaine is not alone in identifying the balancing act Australia faces with respect to China and the United States—especially where the interests of those two superpowers collide. Australia's forward-thinkers have echoed these same concerns. Now that China and the United States have “put their cards on the table,” with their strategies, it is vital for Australian politicians, diplomats, and military leaders to conduct a “deep-dive” into China's Military Strategy as well as the United States' Asia-Pacific Maritime Security Strategy. This is the only way to avoid strategic surprise.

DECONSTRUCTING CHINA'S MILITARY STRATEGY

Last year, China released its first defense white paper that was primarily focused on military strategy. This is the ninth defense white paper issued by China since 1998, but all previous defense white papers have focused on broader facts and figures about the country's military. This document is markedly different in content and tone from previous white papers and has been the subject of widespread international reporting.

It is worth asking several questions, among them: Why did China issue this military strategy white paper? Why is this one so different from previous papers which led with "defense" and not "military?" And perhaps most importantly, what does this new white paper reveal about China's ambitions and intentions and what does it comport for nations of the region?

The full text of the strategy was posted by China's state-run news agency, Xinhua. The Preface in China's Military Strategy sets the tone for the rest of the document:

Building a strong national defense and powerful armed forces is a strategic task of China's modernization drive and a security guarantee for China's peaceful development. Subordinate to and serving the national strategic goal, China's military strategy is an overarching guidance for blueprinting and directing the building and employment of the country's armed forces.

At this new historical starting point, China's armed forces will adapt themselves to new changes in the national security environment, firmly follow the goal of the Communist Party of China (CPC) to build a strong military for the new situation, implement the military strategic guideline of active defense in the new situation, accelerate the modernization of national defense and armed forces, resolutely safeguard China's sovereignty, security and development interests, and provide a strong guarantee for achieving the national strategic goal of the "two centenaries" and for realizing the Chinese Dream of achieving the great rejuvenation of the Chinese nation.

It is worth noting that the issuance of China's Military Strategy comes at a time when China has also announced a major reorganization of the Chinese People's Liberation Army (PLA). This reorganization, the result of many years of study and planning, is widely thought to be designed to make the PLA better able to support China's Military Strategy and make the PLA (and especially the Chinese People's Liberation Army (Navy)—the PLAN) better able to shift from, as China's Military Strategy terms it: "offshore waters defense" to "open ocean protection."

China's Military Strategy outlines the threat environment China faces as well as China's operational plans to deal with these rising challenges. This white paper highlights threats to China's maritime rights, citing, "provocative actions of some offshore neighbors," illegal military presences in Chinese territory," and "outside parties involving themselves in South China Sea affairs." This pointed reference to the South China Sea is especially important, given the growing regional stakes in that body of water. The military strategy also notes that the PLA Navy will focus on "offshore waters defense and open seas protection" in response to rising regional challenges.

The body of China's Military Strategy focuses on the specific roles of



May 2017 US Vice President Mike Pence vows overwhelming response to North Korea USS RONALD REAGAN (CVN 76).

China's armed forces. The white paper lists the "strategic tasks" the PLA must shoulder:

- To deal with a wide range of emergencies and military threats, and effectively safeguard the sovereignty and security of China's territorial land, air and sea.
- To resolutely safeguard the unification of the motherland.
- To safeguard China's security and interests in new domains
- To safeguard the security of China's overseas interests
- To maintain strategic deterrence and carry out nuclear counterattack.
- To participate in regional and international security cooperation and maintain regional and world peace
- To strengthen efforts in operations against infiltration, separatism and terrorism so as to maintain China's political security and social stability.
- To perform such tasks as emergency rescue and disaster relief, rights and interests protection, guard duties, and support for national economic and social development.

As the familiar saying goes, "Where you stand depends on where you sit." For those who look at China's Military Strategy as a primarily "defensive" document, there is sufficient verbiage in this white paper to assert that point of view. Conversely, for those who look at China's Military Strategy as a primarily "offensive" document, there is ample prose to look at it in that fashion.

DECONSTRUCTING THE UNITED STATES' ASIA-PACIFIC MARITIME SECURITY STRATEGY

Like many nations, there is typically a cycle and a fairly predictable "battle rhythm" to the United States publication of various strategies. Rather than follow a regular flow—with a new level of strategy coming out once a year or so—these strategies tend to be issued in bunches. This is no more so than the present. In little more than two years, the United States government has issued:

- An updated National Security Strategy
- An updated Quadrennial Defense Review
- An updated National Military Strategy



May 2015 General Yang Yujun spokesman for the Ministry of National Defense of the PRC briefs on China's first white paper on military strategy.

- An updated Cooperative Strategy for 21st Century Seapower.
- A first-ever Asia-Pacific Maritime Security Strategy.

We will pay particular attention to the unprecedented U.S. Department of Defense Asia-Pacific Maritime Security Strategy because it provides the clearest understanding of what U.S. intentions are in the Indo-Asia-Pacific and how that might influence Australia's security calculus. Although issued by the U.S. Department of Defense, this strategy was mandated by the U.S. Congress when it approved the budget for the U.S. Department of Defense. This is an important distinction—especially in naval terms.

The U.S. Asia-Pacific Maritime Security Strategy is an important document for Australia as well as for other nations of the Indo-Asia-Pacific. First and foremost, it provides clarity surrounding how the U.S. Department of Defense will support the Asia-Pacific rebalance. It begins by identifying maritime security challenges facing the region—issues Australia grapples with every day. The three key challenges called out in this document are: competing territorial and maritime claims; military and maritime law enforcement modernization; and maritime challenges. Readers of The Navy are well-familiar with these issues.

This new U.S. strategy provides an overarching approach on the part of the United States to address these primarily maritime challenges in the Indo-Asia-Pacific. It defines and elaborates on three maritime objectives in the region: safeguarding freedom of the seas; deterring conflict and coercion; and promoting adherence to international law and standards. A close reading of Australian defence and naval documents reveals similar objectives.

The U.S. Asia-Pacific Maritime Security Strategy acknowledges that much of the logic behind these objectives is rooted in economics—something Australia and her sister nations in the Indo-Asia-Pacific live on a daily basis. It notes that two-thirds of world oil shipments transit the Indian Ocean, with more than 15 million barrels of oil transiting the Malacca Strait daily in 2014. It also states that nearly 30% of global maritime trade transits through the South China Sea annually, including about \$1.2

trillion in ship-borne trade bound for U.S. ports.

It is not an overstatement to say that the prosperity of the entire Asia-Pacific region is dependent on the security of these vital transit routes. Indeed, as the developing East Asian economies serve as the engine driving the global economy—responsible for about one-third of the world's GDP growth—the prosperity of the world hinges, in large part, on freedom of navigation through the Asia-Pacific region.

The U.S. Asia-Pacific Maritime Security Strategy next articulates the U.S. DoD's strategy for achieving the objectives stated above. It notes that DoD is pursuing four specific lines of effort:

- Enhancing U.S. military capacity in Maritime Asia.
 - Building ally and partner capacity.
 - Leveraging military diplomacy to reduce risk and build transparency.
 - Building regional architecture and supporting the rule of law
- Australia and her sister nations in the Indo-Asia-Pacific know that it is one thing for another nation to issue a strategy, but quite another if it doesn't back that up with the capability and capacity to execute this strategy. Therefore, it is the first line of effort in U.S. Asia-Pacific Maritime Security Strategy that is arguably the most important. Indeed, six pages of this short document are dedicated to addressing how the United States intends to enhance its capability and capacity Maritime Asia. Here is what this strategy identifies as enhanced U.S. military capacity in this critical region:
- The USS RONALD REAGAN (CVN-76), one of the U.S. Navy's most modern aircraft carriers, has replaced the USS GEORGE WASHINGTON (CVN-73) as the Japan-based forward-deployed U.S. Navy aircraft carrier.
 - The U.S. Navy is deploying its newest air-operations-oriented amphibious assault ship, USS America, to the Asia-Pacific region.



PM Malcolm Turnbull meets with Admiral Harry Harris (PACOM) and Air Chief Marshal Mark Binskin RAAF (CDF) during the 75th Anniversary of the Battle of the Coral Sea commemorations in New York.

- More Aegis Ballistic Missile Defense-capable U.S. Navy ships are being assigned to the U.S. Pacific Fleet and two additional Aegis-capable destroyers are moving to Japan.
- The U.S. Navy is forward-staging four Littoral Combat Ships in Singapore and rotating crews from the United States.
- The United States presence—especially U.S. Navy presence—in Guam is growing year-over-year with additional—and more capable—submarines as well as the new Joint High Speed Vessel.
- The U.S. Air Force and U.S. Marine Corps are forward staging forces in Australia on a routine, rotational basis as part of a new bilateral force posture agreement.
- The U.S. Navy is Pivoting to the Pacific, and by 2020, 60% of the U.S. Navy fleet will be in the Pacific region while only 40% will be in the Atlantic.
- The U.S. Navy's newest assets are being fielded in the Pacific first. These include the P-8A Poseidon aircraft, the MQ-4C Triton UAS, and the F-35 Lightning Joint Strike Fighter.

The U.S. Asia-Pacific Maritime Security Strategy operationalizes a historic strategic shift, and in concrete terms, demonstrates how the United States government, the U.S. military, and the especially the U.S. Navy have begun a real rebalance to the Indo-Asia-Pacific. For Australia, this window into the strategic intent of United States reveals a great deal regarding what to expect from this allied nation in the future.

WHAT AUSTRALIA CAN LEARN FROM THESE TWO STRATEGIES

Australians can learn a great deal from these two strategies, China's Military Strategy, and the United States Asia-Pacific Maritime

Security Strategy. Reading each individually provides insights into the role each of these two superpowers sees for itself in the Indo-Asia-Pacific region. And most international commentary has been positive regarding how transparent both China and the United States have been in declaring their strategic intentions in widely circulated documents.

But reading both strategies together and juxtaposing each nation's strategy against the other conveys the most value and is important—even crucial—for Australia's political, diplomatic and military leaders. As we suggested at the outset, understanding what China and the United States want, why they want it, and what's keeping them from getting it is important in order to maintain Australia's security and prosperity.

This is especially important for the ADF and the RAN. Why? Because a close reading of China's Military Strategy and the United States Asia-Pacific Maritime Security Strategy reveals that the most contentious issues between these two superpowers are maritime in nature. And events in the past several years have confirmed that this friction is growing. It is the RAN that will likely be at sea—and potentially in harm's way—should China and the United States fail to settle their maritime disputes peacefully.

As the old saying goes, "Forewarned is forearmed." As a modern, blue water, naval force, the RAN may well be asked to be the balancer and even peacemaker should China and the United States—as well as other Southeast Asian nations—face off at sea. Having these two strategies as context will enable Australia to play its increasingly important international role in the most successful way. ■



USNS SPEARHEAD (T-EFF-1) - Joint High Speed Vessels to be deployed to Guam by 2018.

THE BRITISH ROYAL NAVY – ROAD TO SALVATION? PART 2

By Jonathan Foreman

This paper develops the argument set out in Part I, that the Royal Navy cannot be saved in its current form and frequently noted in recent years by other, often non-British, publications. The need for reforming, redesigning and rescaling UK Royal Navy has taken on an extra urgency since Brexit and the June elections based on creating new co-dependencies and negotiating away old dependencies. The 17th-20th Century United Kingdom was its Navy and the Royal Navy became an expression of the UK. As one withered, so did the other. Part II looks not simply at the salvation of the Royal Navy, but also potentially the re-connecting of the United Kingdom as part of such a Grand Liberal Democratic Experiment.

RN LEADERSHIP AND THE DECLINE IN BRITISH NAVAL DESIGN

It is a sad fact that RN leadership bears (along with MOD's bureaucrats, Treasury salami-slicers and the country's monopoly shipbuilder) a major portion of the responsibility for the steep decline in British naval design, once known for its imagination and innovation.

That said, it's not really the RN's fault that it takes some twenty years for a British warship like the Type 26 frigate to go from conception to launch – a delay that ensures that its design philosophy and even purpose may be out of date given technological and geopolitical change. But the RN's leadership does bear responsibility for the fact that British warships tend to be conceived – like the Type 45 “destroyer” – without proper consideration of financial realities (ie the likelihood of severely underfunded defence budgets).

One result of this attitude is warships that are progressively stripped of their planned capabilities in order to save money during the long process of planning and construction, until their final fitness for purpose is dubious at best.

This tendency to plan new classes of ships as if money were no object, as if the fleet were still the size it was during the Falklands war is linked to a parallel failure to take into account the obvious reality that major surface combatants commissioned for a small or very small Navy need to be especially versatile.

Common sense dictates that the few destroyers and frigates fielded by a mini-navy should be genuine general purpose warships with a speciality, not specialist ships whose designs make minimal concessions to the reality that you don't always get to fight the enemy you want in the way to plan to.

The Type 45 air warfare destroyers so often proclaimed to be ‘the best in the world’ by the RN and its cheerleaders in the British media are a case in point. They may well field the best anti-aircraft and anti-missile systems available to any Navy. But in almost every other respect the Type 45s are inferior to contemporary competitors around the world and pathetically, unforgivably vulnerable to submarine and surface threats

unless escorted by other vessels.

Indeed, even if one discounts the teething problems of the Type 45's engines and the design flaw that means the Daring class ships don't produce enough electric power to run their advanced systems while on the move, the Type 45 looks troublingly like a TABPUS boat – technically advanced but practically useless, or as rather, as Iain Ballantine has pointed out, an analogue of the 1930s battlecruisers which proved impotent against big-gunned battleships like the Bismarck [1].

To justify the frequently made claim that the type 45 is superior to the latest American Arleigh Burkes and their derivatives, the RN and its media boosters necessarily imagine conflict situations in which the Type 45 will invariably always be accompanied by other vessels with appropriate capabilities, and therefore will be able to survive and win despite its inability to defend itself against other warships, submarines and shore batteries. (It goes almost without saying that no other major navy and certainly no serious naval thinkers anywhere in the world outside the UK believe that single purpose/otherwise defenseless warships like the Type 45 are a sensible idea.) In other words, the current philosophy behind the Type 45 depends on a cosy fantasy of future naval warfare.

Claims made and export expectations for the long delayed Type 26 frigate may be similarly deluded. Although its boosters claim it will



HMS-DEFENDER (D36) off Gibraltar - increasingly being contested by Spain post Brexit.



FS LANGUEDOC (D653) the third FREMM frigate delivered to La Royale by DCNS.

be superior to France's new FREMM frigates, thus negating the fact that the French Navy has more ships than the RN, the FREMMs are already in service while the Type 26 won't be delivered until 2023 at the earliest. Moreover, its manufacturers have already found a bigger export market (Greece, Egypt, Morocco and possibly Canada and Australia) than any British warship in the last three decades, suggesting that such confidence may be misplaced.

Just the fact that British naval shipbuilding has not had a major export success since the Leander class frigates of the 1970s ought theoretically to have prompted both the RN and successive governments to consider the wisdom of reflexively buying British – which in practice has meant buying from BAe Systems.

MONOPOLIES AND CAPITAL SHIPS DESIGNED BY CIVIL SERVANTS

One of the extraordinary revelations that came out of the recent Defence Select Committee report was that the thinking behind the design and purpose of Britain's new carriers had apparently come from not the Admiralty or any identifiable group of defence thinkers, but, in the words of Lord West "Policy people at the centre and the Permanent Secretary."

Some of the baffling flaws in the conception of the two Queen Elizabeth carriers may well be a result of their strange origins. The foggy origins of the carriers means that no one knows if there was any serious consideration of giving them nuclear propulsion, not least on the grounds that if you're going to spend billions on what is almost a full size carrier (or two) you might as well have one that can travel for months without needing to be refueled. However, those anonymous "policy people" are certainly not to blame for the fact that the carriers will come into service without an adequate number of aircraft, and will only have the benefit of adequate escorts if the RN abandons most of its missions.



HMS QUEEN ELIZABETH (R08) 'will only have the benefit of escorts if the RN abandons most of its missions'.

Nor are policy people or civil servants responsible for the greatest defects of the two carriers, namely the lack of 'cats and traps' that effectively limits their use to the F35B aircraft. The choice of a gas turbine propulsion system instead of nuclear meant the carriers would not be able to carry steam catapults. However the UK government's contract with BAE Systems stipulated that the ships should be designed to accommodate electric catapults and arrestor wires in case, as was rightly expected, someone invented a non-steam electric catapult system. After the US Navy came up with the EMALS electromagnetic aircraft launch system, the Cameron government decided to buy it for at least one of the carriers and asked BAE to make the necessary changes as per its contractual obligations. Equipped with EMALS the carriers would now be able to fly alternatives to the already fabulously

expensive and troubled F35B, including F/A18s, Rafales, and the longer range, more effective F35C, not to mention fixed wing AEW aircraft like the Hawkeye which can fly higher, longer and in worse weather than any helicopter.

However, BAE, which happens to be a prime contractor of the F35B took over a year to respond to the Cameron government and when it did so claimed that putting catapults in the ships would now add more than £2 billion a piece, rather than £900 million as planned. The UK government then gave up on cats and traps (it never considered the alternative of a STOBAR short take off but assisted recovery system used by Russia, India and China), dooming the carriers to be usable only by an aircraft so expensive that the UK cannot afford to field enough for each carrier to carry a complement large enough for both defensive and offensive operations.

NUMBERS

Stalin is supposed to have said that "quantity has a quality all its own". The opposite is even more true. Lack of Quantity has a negative quality all its own. If your six new destroyers are technologically superior to the twelve you just retired (which in the UK means scrapping them rather than putting them in mothballs) the fact that you cannot deploy your ships in half as many different places around the world means that you have ended up with an inherently diminished naval capability and a fundamentally different kind of Navy. The result is that you are no longer the same country with the same global influence and prestige. Which means that your interests and trade routes are more vulnerable, and also that other countries are less likely to buy your defence products.

Operating a very small number of relatively high quality, extremely costly vessels whose designs were conceived two decades ago and for a much larger fleet – the current situation of the Royal Navy - is arguably a pointless even masturbatory exercise, and not just because at any one time at least half and probably two thirds of your mini-fleet will be undergoing repairs or on its way to or from repair.

Essentially, once you get below a certain tipping point number of frigates and destroyers, you cease to have a force simultaneously capable of defending home waters, escorting convoys essential for the survival of an island nation at war, and carrying out offensive operations against an enemy. In other words you don't have an actual navy; you have something akin to a platinum plated coast guard whose primary functions are more to do with domestic political symbolism and industrial policy than defence. Arguably the RN has already reached this point.



ADMIRAL KUZNETSOV and its Battle Group pass through the Dover Straits en-route to Syria 21 October 2016.

After all, in January 2014 when Russia sent a missile cruiser through the North Sea, the RN only had one major warship available to guard the entire United Kingdom. Unfortunately the Daring class destroyer HMS DEFENDER was in Portsmouth a full day's sailing away from the Russian cruiser when the latter passed within 30 miles of Scotland.

The Russian cruiser, part of a task force led by the ADMIRAL KUZNETSOV (063) carrier, waited in the Moray Firth to test the RN's response time. While the MOD's press releases and the British press were full of patriotic blather about Britain's most modern and capable warship racing to meet the Russian force, the truth is that DEFENDER posed little threat to the Russian cruiser, let alone the KUZNETSOV Battle Group, its only anti-ship weapon at the time being a 4.5in gun.

Amusingly the Royal Navy's boosters try to spin the RN's lack of fighting ships by pointing out that the Type 45 destroyer and Type 26 frigate are larger and (they say) much more capable than their more numerous predecessors of the 1970s and 1980s, and vastly more powerful than cruisers and even battleships of World War II. This ignores two salient facts: first that RN's likely adversaries also field modern warships with modern weapons systems; second that the oceans have not shrunk in the last two decades and even the much vaunted Type 45 cannot be in two places at once.

BETRAYING THE OFFENSIVE

The RN's leadership bears even more responsibility for three decades of warship design that has all but ignored the importance of offensive capabilities and the challenges of surface combat against hostile vessels. The astonishing fact that the RN will shortly be without anti-ship missiles, as ageing Harpoons are taken out of service without an immediate replacement, symbolizes this bizarre lack of interest in the traditional ship-sinking function.

In the 1930s and 1940s, the cash-strapped Royal Navy simply made do with obsolete, even ancient kit, most famously the Swordfish biplane. It would never have occurred to the admirals of that era to have gone to sea unarmed in the hope that war wouldn't start until new, state of the art equipment became available. As things turned out the service's ageing ships and aircraft proved invaluable to the nation's survival.

It's painful to say this, but the difference between the two generations of naval leaders is arguably that the Admiralty of the war years (and decades afterwards) took warfare seriously, treating it not as an abstraction or a phenomenon unlikely to be repeated in their lifetimes. They were wrong about many things, not least

the transformation of naval warfare by the aircraft carrier, but their primary concern was the defence of the realm (not the short term political interests of a particular government, the bottom line of a particular arms supplier, or the possibility of a berth in the House of Lords upon retirement). Moreover, they knew first hand that the exigencies of real-life war mean that warships may find themselves in less than ideal combat situations – without air or submarine protection, outnumbered, operating in extremely cold or hot conditions, facing powerful and unpredictable enemies.

That said, many naval planners of the 1930s were fighting the last war, just as the men who thought it a good idea to put billions of pounds into the Type 45 could only envision future conflicts that resembled the Falklands: wars in which there was no threat from enemy surface combatants but terrible danger from air attack.

One of the lessons of the Falklands that has not been learned by the RN and British naval designers is that shore bombardment is far from a thing of the past, (especially for a Navy that wishes to support an expeditionary capability) and that single 4.5 inch guns may be inadequate for the task. Other conflicts since 1982 in places like Lebanon and Yemen have underlined the importance of a shore-bombardment capability while also demonstrating its perils (see e.g. the disabling of INS HANIT by a shore-launched Hezbollah C-802 anti-ship missile), especially as more countries and even guerilla forces get access to antiship missile systems, and littoral warfare becomes more likely in strategic waterways like the Gulf. A RN genuinely seeking to build world-beating warships for the 2020s and beyond would be thinking of creative ways to mount 155mm naval guns, tomahawk missiles and other land-attack weapons on a variety of vessels.



Italian Navy AV-8B Harrier II Operating from INS GIUSEPPE GARIBALDI (551).

However, for the last three decades, every significant procurement and spending decision made by successive defence ministers, the UK MoD and the Royal Navy's leadership has been based on the implicit or explicit assumption that there is no chance that the Navy might find itself at war for decades to come. At the same time tremendous efforts have been made by politicians, civil servants and senior naval officers to deny, disguise or distract from the resulting decline in British naval capacity and capability. These public relations have been largely, even remarkably successful. For example, in 2012 the

UK was able to quietly pull out from the international anti-piracy effort off the Horn of Africa without attracting notice, let alone criticism at home.

(On the other hand in 2014 the publicity given to allied operations off Syria, and in particular the new status of the French Navy as the key partner of the United States Navy, made it impossible to pretend that the RN was the blue water powerhouse it had been even a decade ago. Lacking fixed wing carrier aircraft following the premature retirement of the Sea Harriers – a major institutional victory for the RAF at a great cost in British influence – the Royal Navy was arguably no longer in the same major league as the Spanish, Italian, Indian, Thai and Brazilian Navies.)

Anyone who even vaguely follows the news knows that the last few years have seen a dangerous transformation of the international order, with much increasingly aggressive Russian air and naval activity in the Mediterranean, the Baltic and the North Sea, as well as Chinese-provoked tensions in the Pacific, and Iranian threats to shipping in the Persian Gulf. None of these developments seem to have had much impact on those who decide British naval policy beyond making it impossible for the Cameron government to go back on the long-delayed and reluctant decision to buy Poseidon P-8 maritime patrol aircraft, and inciting more insistent communiqués about the brilliance of the Navy's six Type 45 air warfare destroyers.



Maersk Line ISO Container Ship with potential as an Air Deck Platform (ADP) with HNLMS EVERTSEN (F805) Gulf of Aden.

Given the increased threats to the UK's maritime security that have arisen while warship numbers have declined, it seems all the more regrettable and surprising that the UK never even considered buying or making under license the US Arleigh Burke destroyers or similarly powerful Burke-inspired Aegis destroyers built by Spain and South Korea. While even the latest Burkes arguably lack some of the air defence virtuosity of the Type 45's systems, they provide considerably more bang for the buck in a proven platform. There is certainly no question that a Russian carrier battle group confronted by an HMS ARLEIGH BURKE off the Moray Firth would have rather more reason to back off in rapid order.

While it makes sense for a maritime country like the UK to foster and preserve a naval shipbuilding capacity if it can afford to do so with reasonable efficiency, the last three decades have shown that Britain is not in that position. (Perhaps it would have been different if there was still competition between British shipbuilders or the monopoly shipbuilder did not have the clout that comes from being the main arms supplier to all three services). In any case it is not

clear that buying American (or Spanish or Korean) destroyers would have meant killing off British naval shipbuilding and losing a vital strategic industrial asset. After all, India's experience of assembling foreign ship designs has actually enabled it to develop impressive new warship designs of its own.

A ROYAL NAVY FIT FOR THIS ERA

There is an argument for wholesale reconsideration of naval strategy as we enter an era in which anti-ship weapons systems have evolved more quickly than countermeasures against them. Among the threats that the RN's latest ships will likely face are attacks by large swarms of small boats, some of which may be remotely piloted or on suicide missions. Fast patrol craft and corvettes operated by enemy governments may well carry supersonic anti-ship missiles like the Indo-Russian Brahmos, making them even more deadly threat to major surface ships than they were when the INS EILAT and the PNS KHAIBAR (both former RN destroyers) were sunk by Osa class missiles boats in 1967 and 1971. (The Brahmos is of course already in service, and the Indian Kolkata-class destroyers that carry it would make short work of almost any RN ship afloat; a trio of them could probably take out the entire Royal Navy in its current form).

Then there is the matter of the vulnerability of aircraft carriers in the face of new (possibly overhyped) threats like "carrier-killer" ballistic missiles, supercavitating torpedoes, and large supersonic/hypersonic anti-ship missiles that can be launched in swarms. The peril that these weapons present does not, as some commentators have argued, mean that carriers have been rendered obsolete or useless (unless of course they carry insufficient aircraft even to protect themselves). After all, carriers provide an expeditionary reach and means of projecting force that make the difference between a major power and a minor one. But it does mean that it is foolishly dangerous to have only one or two large carriers in a navy: the loss of one such an expensive and symbolically important vessel could be a war ending disaster.

Arguably this risk would be mitigated and the Navy much empowered by having more and cheaper carriers, not unlike the "jeep carrier" and "Woolworth carrier" flat tops of World War II. These [Air Deck Platforms (ADPs) [2]] could, like their predecessors, be built cheaply and quickly on commercial hulls and equipped with flight decks suitable for the V/Stol F-35s that the UK has perhaps foolishly committed to buy as well as helicopters, and ideally, some version of the V22-Osprey.

One of the more painful aspects of the Royal Navy's decline – and one of the manifestations of its failed leadership culture – is that so little effort has been made to come up with similarly radical solutions to its current and future problems. This dereliction is all the worse given that in recent years a variety of maritime countries have come with innovations that could be useful or even transformative for the RN. A less insular naval establishment would have paid (and should still pay) serious attention to the potential of "versatile modular systems (VMS)", as pioneered in part by the Royal Danish Navy and its Absalon-class combat support ships.

Indeed, if the proposed Type 31 general purpose frigate is to be something more than an overpriced and under-armed corvette from BAE systems, one of the alternatives the Admiralty would do well to consider along with French and German designs is the Danish Ivar Huitfeldt class [3].

NOTE: The VMS concept is actually about more than interchangeable boxes and slots on ships. At its heart is a commercially disciplined organisational structure (with the Admiralty and RN embedded in its DNA), which drives the flexibility and ‘unbundling’ of infotechnologies, capability and capacity. This allows content to be applied at scale across a common platform. It is what the big Telcos/Pharmacos/Energy providers do every day. The model essentially works from a common strategy and shared scale of ambition; to develop a systems plan that delivers assets to the tasks required to achieve desired outcomes; along with finances to provide the assets and meet strategic objectives. It is not just about boxes! The remarkable thing is, it has been done before in 1694 by ‘incorporating Admiralty with the newly formed Bank of England and the City of London...for the purpose of “financing, development and deployment of the Royal Navy – and the prosecution of war”. The model kick-started the Industrial Revolution and had a benign impact on the economies of the regions; including Scotland and Ireland.’ [2] This distinguishes and moves VMS significantly away from the sub-asset-level, box like / fork-liftable combat support ships to the system-of-systems level.’

The modular revolution also has implications for another conceptual shift that could enable the Royal Navy to maintain global presence and combat effectiveness despite its inadequate number of warships. Already the RN has begun using Royal Fleet Auxiliary vessels, like the tanker WAVE KNIGHT (which broke down [4] in St Vincent last year) for anti-drug patrols. The RFA could contribute greatly to the RN’s potential combat power if intelligent use was made of modular systems. There is certainly no reason why future RFA vessels, much cheaper to produce than RN warships, could not be designed with a view to using the VMS Intermodal ISO containerization central to VMS technology, and potentially field a variety of weapons systems ranging from vertically launched missiles to UAVs.

It might also be useful for the RN to consider returning to a mix of conventional and nuclear submarines, or rather to add to its capabilities by buying from abroad some of the new AIP diesel sub designs being considered by the RAN.

IS THERE HOPE?

The culture that made the Royal Navy great is far from dead; it’s merely on the back foot and challenged from within and without. That there are still senior officers who believe in and exemplify the old virtues of courage, personal responsibility and patriotism was recently demonstrated by Vice Admiral Simon Lister, the current Chief of Materiel (Fleet) and Chief of Support. Admiral Lister broke with current custom by taking a public stand against the running down of the Navy, writing what newspapers called a “scathing attack” [5] on government cuts, diminished readiness and overreliance on civilian support, in *The Naval Engineer*. It is hard to convey just how remarkable this was. During the last two decades the only British generals or admirals willing to come out and criticize the degree and



Sir Michael Fallon UK Minister for Defence humbled by Emily Thornberry MP over alleged links with Syrian President Bashar Assad 14 May - imaginative leadership [and Fallon’s replacement] may enable RN to start thinking again. (Image BBC).

manner of defence cuts have been those who are already retired and have received their gongs - and therefore lost much of their leverage and ability to get public attention. Lister’s courage will almost certainly have foreclosed any chance of his receiving knighthood and reaching the topmost heights of the defence establishment. But as a demonstration of honesty and loyalty to the service it boosted morale despite its gloomy message.

Even by the traditionally abysmal standards of modern Conservative governments those led by David Cameron wrought catastrophic damage on the Royal Navy. However, there is evidence that by the time of the 2015 SDSR the Cameron government had finally begun to understand that British naval cuts had gone too far [6], and that its own 2010 SDSR had done significant damage [7]. Although the Theresa May government has kept on Cameron’s foolishly short-sighted, dissembling and strategically clueless defence minister Michael Fallon, there are indications that it intends to spend a genuine 2% of GDP on defence (unlike the Cameron Government, which planned to hit 2% by dishonestly including non-defence items), to speed up delivery of the Type 26 frigate and to fund the supposedly economical Type 31 or general purpose frigate. None of these commitments signals a genuine understanding of the changes that need to take place but they indicate an attitude that is not as irresponsible and destructive as its predecessors.

It may be that the prospect of a Brexit inspires the UK government to look abroad and see how other, allied governments [8] are confronting the new dangers to international peace, stability and prosperity. All it would take is some imaginative leadership (and ideally the replacement of Michael Fallon at the MOD after the elections) for the RN to start thinking more creatively about ways of increasing its capability and capacities. ■

ENDNOTES

1. See Warship IFR “The Familiar Old Problem of Building Warships fit for Fighting Purpose” http://www.warshipsifr.com/index.php?option=com_content&view=article&id=186:the-familiar-old-problem-of-building-warships-fit-for-fighting-purpose&catid=36:commentary&Itemid=65
2. See, for example, “Versatile Modular System (VMS) designs for a Versatile Modular Fleet”, (2011), paper presented at EAWWIV Conference. Old RN College, Greenwich, London.
3. <http://intercepts.defensenews.com/2014/11/sleek-modern-and-built-on-a-budget-denmarks-latest-frigate/>
4. <http://www.forces.net/news/tri-service/prince-harry-stranded-rfa-wave-knight-breaks-down>
5. <http://www.dailymail.co.uk/news/article-2638452/Not-sailors-ships-ground-halt-second-rate-equipment-Admiral-unleashes-broadside-broken-Nav.html>
6. See UKNDA Commentary no 12 (March 2015) on the UK’s recent NSS and SDSR.
7. The International Institute for Strategic Studies (IISS) pointed out the 2010 SDSR’s 8% defence spending reduction over five years, produced an effective 20%-30% reduction in overall conventional military combat. capability across the three Services – a datum that the PM, the Chancellor and Defence Minister were all unlikely to appreciate given their proven lack of interest and understanding of military and strategic matters.
8. Australia may also be showing the UK the way in its planned purchase of 12 submarines. This will especially be true if Australian political class can get its head around choosing nuclear propulsion systems for those submarines, a choice that would vastly increase the RAN’s ability to protect Australia’s maritime interests and sovereignty as the Pacific enters a new era of perilous uncertainty.



01 SOUTH EAST ASIA CARRIER FORCE

With Japan's second big destroyer helicopter (DDH), the KAGA (184), entering service in April 2017, and the reformation of the Japanese Marine Corps (initially in Army) this provides Japan with an expeditionary capability for the first time since World War Two.

JS KAGA has a length of 248 metres and a displacement of 27,000 tons (on full load); the same size as the IJN's WWII aircraft carriers. Described initially as being an anti-submarine destroyer (which belies the definition of destroyers as being anti-air warships), the Izumo-class (like the RAN's Canberra class Landing Helicopter Docks (LHDs)) is designed to operate the F35B Lightning II joint-strike fighter, and could operate the F22 Osprey and AV-8B Harrier, today.

NOTE: There has been a degree of subterfuge more for treasury departments and politicians in the classification of carriers since the introduction of Britain's CVS (Through Deck Cruisers) in the late 1970s. HMS OCEAN (L12), for example, is classified as a Landing Platform Helicopter (LPH). The reason its forward phalanx was placed in the position it was, was exactly to prevent GR7 / GR9 FAA / RAF Harriers operating from the deck. The problem is that the subterfuge is now confusing own thinking, but not potential enemies. If it looks like a duck...

01.1 KAGA (I)

The Imperial Japanese Navy (IJN) carrier KAGA (I) was originally built as a Tosa-class battleship before being converted to an aircraft carrier under the terms of the Washington Naval Treaty. The KAGA figured prominently in the development of IJN carrier strike force doctrine – based on delivering rapid strategic effect – the knock-out blow. The failure of the doctrine at Pearl Harbour (in which KAGA (I) participated) was that – by good fortune for the U.S. and its subsequent Allies – the carriers were not alongside at the time of the strike. KAGA (I) supported Japanese troops in China during the 1932 Shanghai Incident and participated in the Second Sino-Japanese War in the late 1930s. Fighting in the Battle of Midway, she was attacked by aircraft from ENTERPRISE, HORNET, and YORKTOWN and severely damaged by dive bombers from ENTERPRISE. Unable to save the ship and not wanting the KAGA to fall into enemy hands, she was sunk by Japanese destroyers. The loss of four large attack carriers, including KAGA at Midway, and previous losses incurred at the Battle of the Coral Sea

was a crucial setback for Japan, from which she never recovered.

01.2 RSN Fiftieth

In May, the KAGA's sister ship JS IZUMO (DDH-183) deployed with its associated Readiness Group into the South China Sea. IZUMO's deployment began with the Republic of Singapore Navy (RSN) International Maritime Review, in commemoration of its 50th anniversary. Naval vessels from 20 other countries attended including HMNZS ENDEAVOUR (A11), HMNZS TE KAHA (F77), HMAS BALLARAT (F155); Commonwealth naval ships from Canada, Indian, Pakistan, Sri Lanka, Bangladesh, Malaysia, and from France, Thailand, Japan, Vietnam, Indonesia, the U.S., Myanmar, Philippines, and China. The founding Navy – the Royal British Navy – was most notable by its absence, as per the 75th Anniversary of the Royal New Zealand Navy, November 2016.

During the RSN IMR, the Littoral Manoeuvre Vessel (LMV) RSS INDEPENDENCE (15) was commissioned. Additionally, the RSN has four Amphibious Transport Docks (ATDs – equivalent (in effect) to the Landing Platform Dock (LPD), HMAS CHOULES (L100)); RSS ENDURANCE (207); RSS RESOLUTION (208); RSS PERSISTENCE (209); and RSS ENDEAVOUR (210).

Hidden away at the March 2014 Singapore Air Show was a model for a Landing Helicopter Dock purporting to be 'a variant of the Endurance-class LPDs (Joint Multi Mission Ship (JMMS)). Taken together with the need to replace the Endurance-class in the next few years, and Singapore's acquisition of the F-35B, a logical move would be to build an LHD capable of carrying an Embarked Military Force; Helicopters and fixed wing aircraft, such as the F-35B.

02 IZUMO DEPLOYMENT

After visiting Vietnam, JS IZUMO, will call

at ports in Indonesia, the Philippines and Sri Lanka before taking part in the Malabar series of naval exercises with the U.S. and India in July. The Malabar exercise began as a joint naval exercise between India and the U.S. Japan has now been inculcated as a permanent member of the exercise and its standing secretariat. Apparently Australia has been invited to consider joining the Malabar exercise series. The maturing, highly effective (significantly under-rated) COLLINS Class submarines and West Coast units deploying from Fleet Base West, would play a significant exercise role. Such alignment may also help underpin and enable an ambitious Four Party agreement between Japan, the United States of America, India, and Australia.

02.1 Chinese Response

China's Foreign Ministry Spokesperson Hua Chunying protested the IZUMO deployment when it was announced in March:

I want to remind the Japanese side that they are not a party concerned in the South China Sea issue, and that they have a disgraceful history of occupying China's Xisha and Nansha Islands during its war of aggression against China.

She continued:

The Japanese side should reflect upon the history, and be discreet with its words and deeds, instead of making waves in the South China Sea and impairing regional peace and stability.

02.2 Trumped

President Trump's successful meetings with Prime Minister Shinzo Abe, also sent a succinct message – that Japan is part of strategic geopolitics and will continue to play a major role in the region. It also potentially enables the US Navy to do more up threat – for example off North Korea – by relieving them of other maritime duties



2014 Model of Republic of Singapore Navy Landing Helicopter Dock without a ski ramp

and responsibilities, further south. Where China's island building and weaponisation programme reportedly continues apace.

03 FORWARD THINKING

Japan's forward deployment of the IZUMO Readiness Group is significant in many regards, not least in the training opportunities this will provide the JMSDF and for Prime Minister Shinzo Abe to begin preparing the ground for changing Article 9 of the Constitution; formally allowing 'land, sea and air forces with war potential to be maintained'. The IZUMO is scheduled to dock at the Subic Bay naval base in the Philippines in June, when President Duterte is almost certain to attend – noting his growing rapprochement with the more pragmatic Trump administration, and Japan's long-standing foreign aid and investment in the country.

The Izumo-class does not have a dock, unlike the Canberra Class, and LPDs. Only in 2016 did Japan re-instate its Marines, disbanded at the end of WWII, when they were known as the Special Naval Landing Forces. Singapore exercises significant elements of its defence forces in Australia – which is increasingly likely to have an amphibious and littoral manoeuvre element. Australia, while possessing and aspiring towards the development of two standing Amphibious Readiness Groups (under CANBERRA; ADELAIDE; and CHOULES), does not as yet have the support in depth of Frigates, Destroyers, Submarines and Oilers (Supply ships) necessary to have a worked-up group on permanent standby. Such a group, built around the LHDs and CHOULES, would require a force of 12 Submarines; 20 Frigates and Destroyers, and Five supply / support ships.

03.1 Japanese Australian Singapore sea-based contingency network

The U.S., as it rebuilds its Navy needs Allies to take up the slack and share the loading. A tripartite Japanese, Australian, Singapore (JAS) Sea-Based Contingency Network (SBCN) – with an emphasis on HADR, fishery protection, anti-smuggling (including people) and piracy, acting in accordance with Freedom of Navigation and UNCLOS – would provide a degree of asymmetry to contingently defuse current symmetries in the South China Sea. There are a number of countries in the region – including India, Vietnam, Indonesia and Myanmar – that feel a degree of empathy for Japan's role in supporting independence movements during WWII, not shared by the European Allies and China. Similarly, there are those countries that align historically



with the West but are anxious not to be too close to the U.S. or China. Working outside-in and inside-out (OIIO), such a tripartite network would have at its core an ability to liaise informally with other navies – with a liminal focus on including India – so creating two overlapping networks: one East and the other West facing, with Australia and Singapore as its interconnectors. The SBCN would work with the U.S., and China but it would also exercise a degree of co-dependence and co-adaptation, while retaining and sustaining a professional edge for the core Navies. Its intent would be to avoid strategic miscalculation by acting to maintain presence – so as to influence all sides. It is not in the interests of the region or any side to exacerbate aggression or the heating up of current disputes, through exclusion or containment. Apart from two decades between the 1920s and 1940s, since 1854 Australia has been closely allied with Japan and its Navy in particular. Having Japan, Australia, Singapore and potentially India on-board would help each network member develop core maritime skills, while providing essential asymmetries and alternative, contingent ways of thinking.

04 AUSTRALIAN NAVAL SHIPBUILDING PLAN, 16 MAY 2017

The Prime Minister Malcolm Turnbull announced the Commonwealth government's \$89 billion naval shipbuilding plan; stating that it was 'unashamedly nationalistic' and would help secure Australia's economic future. It includes \$1.3 billion to upgrade the Osborne Naval Shipyard in Adelaide and the plant at Henderson in Western Australia. The government will also establish a \$25 million naval shipbuilding college in Adelaide to train workers, with the workforce in SA set to triple to more than 5000 by 2026:

- This is a continuous shipbuilding commitment, not just for today or tomorrow but generations to come
- This is truly nation-building, a great national enterprise and it brings with it that enormous employment boost.
- My government believes that it is not only in the interests of securing the capabilities that our defence forces but also it secures our economic future, our industrial future.
- This is about national security and it's about economic security.

All sounds very good. Thinking about a submarine, it is: a), an existential artefact that forms a key element of a nation's deterrence force – critical to managing the deterrence escalator (up and down); b) is one of the most complex systems that can be imagined – with alternative weapons fits; multiple functions and numerous transverse constraints; and c), whereas much focus rightly remains on engineering build, fit and maintenance, it is essential to acknowledge the link between engineer and culture.

Australia does not yet have cross-institutional / disciplinary networks in-being or in the depth necessary to deliver an existential artefact, such as an advanced submarine programme – or to spend appropriately and quickly enough to de-risk programmes at the front end. If the programmes are to deliver successfully, many of these (private, public, industry, research, academic) knowledge integration teams will need to be identified and built, in collaboration with other governments and equivalent bodies, including in industry and academe. Australia needs a knowledge transfer network capacity with parallels to Admiral Rickover's (submarine) programme in the US, which is way beyond a technical shipbuilding college in Adelaide – much more a cross disciplinary, national-research, lyceum network-base with knowledge at its core: True nation building ■



USNS YUMA (T-EPF-8) being launched with USS MANCHESTER (LCS-14) in Background.

THINKING AS IF AT WAR

Due to the heavy losses suffered by the Allied merchant fleets during the early months of the World War II, a shipbuilding programme on a tremendous scale was implemented on the American continent. From 1941, Canada commenced building the "Fort" ships, of which 198 were built and given the pre-fix Fort. Whilst another 182 ships were given the suffix "Park". These ships were all steamships of 10,000 dwt, mainly coal fired, around 425 feet in length.

By 1941 the US had commenced to expand its shipbuilding industry, commencing with 60 "Ocean" class for the UK, a forerunner of the "Liberty" ship. The "Liberty" was the most famous wartime built merchant ship – a staggering 2,710 were completed between 1941 and 1945. All of the above ship types were based on a design by UK builder, J.L. Thompson, but welded construction revolutionised the speed of construction. The record, being "Robert E. Peary" which was built in 4 days, 15 hours and 29 mins, after keel laying! A successor to the "Liberty" was the "Victory", a faster improved cargo ship of which 534 were built by War's end.

Apart from saving the day during the darkest days of WWII, most survived the War to become the post-War transport workhorses, the last working into the 1980's.

ORDERED OUT

The fully loaded Panamanian bulk carrier "DL Marigold" has been ordered from New Zealand and Fijian waters after divers discovered dense fouling of barnacles and tube worm on the hull. This is the first time a loaded vessel has been ordered from an NZ port because of bio-fouling and is believed to be a world first. From May next year all international ships arriving in NZ will be required to have a clean hull. The South Korean owned ship is waiting mid-ocean for instructions. Some experts believe that the NZ Ministry of Primary Industries could be exposed to claims if it is unable to justify the expulsion.

KOW-TOWING TO BEIJING

Carnival and its subsidiary Royal Caribbean have indicated that they will cancel South

Korean port visits by their China based ships following 'pressure' from the Chinese government. China has voiced concerns over plans by South Korea and the USA to install the Terminal High Altitude Air Missile System in South Korea. Approximately 8m Chinese have visited South Korea over the past 5 years, nearly half of all foreign visitors.

SUB-SEA CLAIMS

Chinese scientists have become the first to collect material from the deepest part of the Marianas Trench, 10,994 m / 36,070 feet. The Trench is part of the Pacific Plate subduction zone and the Challenger Deep is where the plate dives nearly vertically towards the centre of the Earth, whereas in most other areas the slope of the subducted plate is more gradual. This is also a growing area of tension between Japan (the U.S.) and China.

SCALE MATTERS

MOL has taken delivery of the world's largest container ship (for now) "MOL Triumph". The ship is the first of six to be delivered by Samsung with a capacity of 20,170 teu. Details - LOA 400 m (1,312') ; Breadth 58.8 m (193') ; Depth 32.8 m (107.6') and DWT 192,672 tonnes. Consideration is being turned to versatile modularising such ships as Air Deck Platform (ADP) carriers.

LEADING FLAGS

The Republic of The Marshall Islands with 3,244 ships totalling 223,262,177 dwt tonnes has emerged as the second largest registry in the world. Greek shipping is the leading flag with 794 ships / 62,190,301 dwt accounting for 18.9% of its total fleet.

HEAVY LIFT

Allseas huge twin hull salvage vessel "Pioneering Spirit" has set a new record when it lifted the topside platform from an oil rig in the Brent Field in the North Sea. The lift, 24,200 tonnes was handled as a single lift (the vessel has a maximum lift capacity of 48,000 tonnes.) The platform will be towed to Hartlepool and broken up. Consideration is being given to versatile modularising such ships as a Sea Base Heavy Lift Dock (SBHLD).

MISSING

A South Korean ore carrier, "Stellar Daisy" is reported missing in the South Atlantic Ocean on a voyage from Brazil to China. Two Filipino crew members in a liferaft were picked up by a commercial vessel and a search of the area located another liferaft and two lifeboats with nobody on board. The 1993 vessel was carrying 260,000 tonnes of iron ore. The Marshall Islands registered vessel was converted from a crude oil carrier to an ore carrier.

RISE IN LOSSES

The International Union of Marine Insurers has issued a report on the rising frequency of major vessel casualties. For the second year in a row there has been a rise in major casualties – fire and explosions remained largely static but claims related to grounding and machinery damage are increasing significantly. IUMI members believe that the fall in ship values could be a contributing factor in the rising number of machinery related Constructive Total Losses (CTLs) as the cost of repair now often exceeds the value of the ship.

AUSTAL GIRT FAIR

Austal WA announced delivery of the 'Cape Fourcroy', first of two Cape-class patrol boats for the RAN. The 58 m vessels are to be chartered by the Commonwealth on behalf of the RAN. As well, the Company has an ongoing order for 12 new Offshore Patrol Vessels for the RAN. In the US, Austal has announced delivery of USNS YUMA at its Mobile, Alabama, an Expeditionary Fast Transport (EPF), one of 12 vessels in a \$ 1.9 bn order for 12 similar vessels. The 103m catamarans can transport troops and cargo up to 1200 n.m. at a speed of 35 knots.

THE MERCHANT NAVY UNIFORM

The late Capt. N. J. Mackie

The Oxford dictionary defines 'uniform' as conforming to the same standard or rules or pattern; hence uniform dress by members of the same body, eg, by soldiers, sailors, nurses etc. Until 1919, there was no legislation covering uniforms for the British merchant navy and prior to that date only a number of liner companies had adopted their own form of livery, these mainly being an adaptation of the Royal Navy uniforms. King George V – who had served as a Royal Naval officer – to recognized the heroism of merchant navy seafarers during World War I and was instrumental in the creation of a standard marine uniform. In 1919 Section 57 of the Merchant Shipping Act was introduced prescribing the merchant navy uniform, whose cap badge and button design feature the Naval or Tudor Crown were registered under the Patents Act. Whilst much of the UK legislation was adopted in the Australian Merchant Shipping Act the section on uniforms was omitted.

SYSTEM VARIETY: COMPARING RN & USN ENGINEERING – TAKING ‘THE LONG VIEW’ PART 2

By Thunderer

There are many things UK did very well, during the post WW2 period, using lesser resources than the US. The reasons are worth dissecting; more than 2/3 of project technology leads have appeared to have come from government sponsored work, whilst less than 1/3 came from industrial private ventures. Part II examines the essential cultural differences in air & marine engineering, plus the wider defence project management skills that are required for maritime systems to deliver in time and to evolve, over time.



Tugg's View of the WR-21 Trials Team.

ENGINEERING DISCIPLINES

There are a complementary set of engineering disciplines that are involved in producing an overall warship:

NAVAL ARCHITECTURE (NA)

Constructive aspects include hull design and hydrodynamics, plus the balance of the overall ship design as a 'platform'. This was the responsibility of Constructors, as part of the RCNC (who when in uniform afloat, had a silver grey coloured branch stripe between the equivalent RN gold rings):

Major achievements. Generally good ship designs (within the limitations of a smaller size and margin compared to USN), that made major upgrades mid-life refits unnecessarily difficult; for example Leander conversions were not seen as representing good value. The RN had a habit of accepting constrained designs with insufficient margins for later life, only to have to stretch the later Batches (Types 22 and 42). The evidence is that the USN do better – c.f. Spruance → Aegis cruiser, or DDG51 → several flights.

Very competent Falklands STUFT enhancements, but South Atlantic operations drove strengthening of several warship hulls (T21, T42B1

and B3). There was a major issue of towed array patrol loadings (tail wagging dog) that wrecked Lowestoft and Leander conversions with 2031, and it was unlikely that T23 had proper hull strength margins to support the postulated larger arrays for 2038/2057.

The RCNC was unduly defensive about criticism, and disparaging about commercial competitors like Type 21. This led to suspicion and conspiracy theory (not invented here) that allowed Thornycroft Giles Associates (TGA) to lobby for their 'short fat' Sirius S-90 design; only resolved by Lloyd's hull design enquiry. The novel trimaran design effort was aimed at a Future Surface Combatant using RV Triton to prove scaling/powering and to validate the modelling, but the current Type 26 design does not exploit this work.

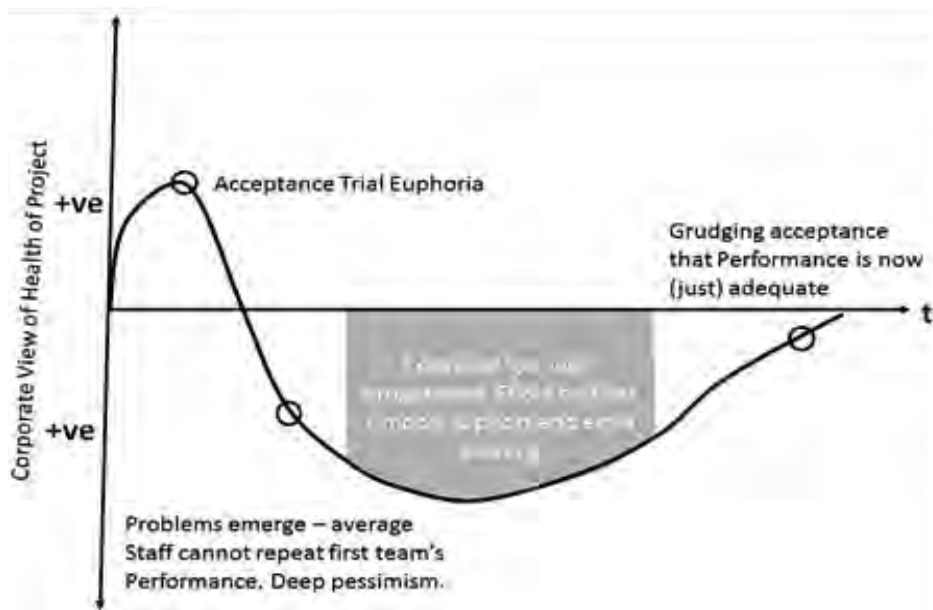
The ship designer needs to trade a wide range of factors: signature, noise, seakeeping & survivability, to arrive at an overall balanced design. Examples of bad practice are not just confined to UK, and include:

German precision engineering, building a perfect radar reflector (an Exocet trap) into the side of the ANZAC frigate as the boat bay; plus the Zumwalt class, where one feature (tumblehome for stealth) dominated to the exclusion of all else, resulting in a semi-submarine.

MARINE ENGINEERING (ME)

Covering the propulsion, shafting, and hotel services. Electrical generation and distribution has meandered between L, WE and ME branches, but has always been a DG Ships responsibility. Some of the RNES civil servants had similar training to RN engineers and the RCNC (but with a green cloth colour branch stripe). Major achievements: modern steam plants, a shift to gas turbines, and then the adoption of electric drive.

Wartime ME experience was reported by Louis Le Bailly, with an unflattering comparisons of legacy RN steam plants, versus modern USN plant that used higher pressure and steam temperatures. The impact of RN WW2 machinery was lower reliability and fuel efficiency, therefore reduced range; a key aspect of Pacific operations. Post-war remedial work was led by YARD and PAMETRADA to develop the YEAD-1 plant in Daring's, and then the Y100-Y136 series in frigates and DLG's. In this, the UK just caught up to contemporary US



Post-Project Honeymoon Period and Tugg's View of Post-Project Woes.

standards (of 550 psi/650 deg F), and did not move onto the ultimate US 1200psi plant that proved both fragile and temperamental.

UK made major innovations with the synchro-self-shifting (SSS) clutches (effectively a large version of a car synchromesh gearbox), allowing Gas Turbines to join the drive train whilst under power. UK also led the move to adopt gas turbines; initially as G6 in Tribal's and DLG's, then the Olympus/Tyne combination. UK then adopted a MV electric drive train in Type 23, moving to HV (as IFEP) in Type 45 and CVF.

Ships initially burned Furnace Fuel Oil (FFO) in their boilers, but the RN moved over to Dieso (F-77) as the universal fuel, with AVCAT (F-44, a refined Dieso) for helicopters. Steam atomisation gave greater 'turn down', making it easier to control (or modulate) burners remotely from a machinery control room, rather than requiring manual intervention at the boiler front for each change in power.

Wartime and the immediate post-war ships generated electricity at 220v DC, but the 1950's new construction shifted to 440v 60 Hz three phase AC, transformed down to 115v for domestics. It had been planned to shift up to 3.3kV generation in CVA-01.

NBCD. RN citadel and NBC collective protection systems were much better than the USN, but general firefighting and BA was somewhat unloved, until its importance was re-emphasised by the Falklands. Other ME led areas included: steering gear and stabilisers, upper deck hydraulic machinery, anchors & cables (especially the AC-14 series anchors), steam flash evaporators, supplemented by Reverse Osmosis for the Falklands STUFT, and Replenishment at Sea (RAS) gear.

AIR ENGINEERING (AE)

Including aircraft, airframe, engines and electronics, plus the shipboard facilities to support and operate aircraft. Major achievements: the WW2 armoured deck carriers with the flight deck as the strength deck and an enclosed hangar, influenced most subsequent Allied carriers. The RN then led all the significant post-war aircraft carrier innovations: angled deck, steam catapult and mirror landing sight; plus more recently: Sea Harrier and ski-jump. The RN also led

the introduction of small helicopters in frigates and destroyers: Wasp and Lynx, however Canada developed 'beartrap' to facilitate larger (Seaking sized) helicopter operations from escorts.

SHIP DESIGN

In terms of overall ship design, the Type 23 was a good balance, though there were some *Skoda* class aspects (stabilisers, steering gear, and the astronomic number of hull insert welds required at refit).

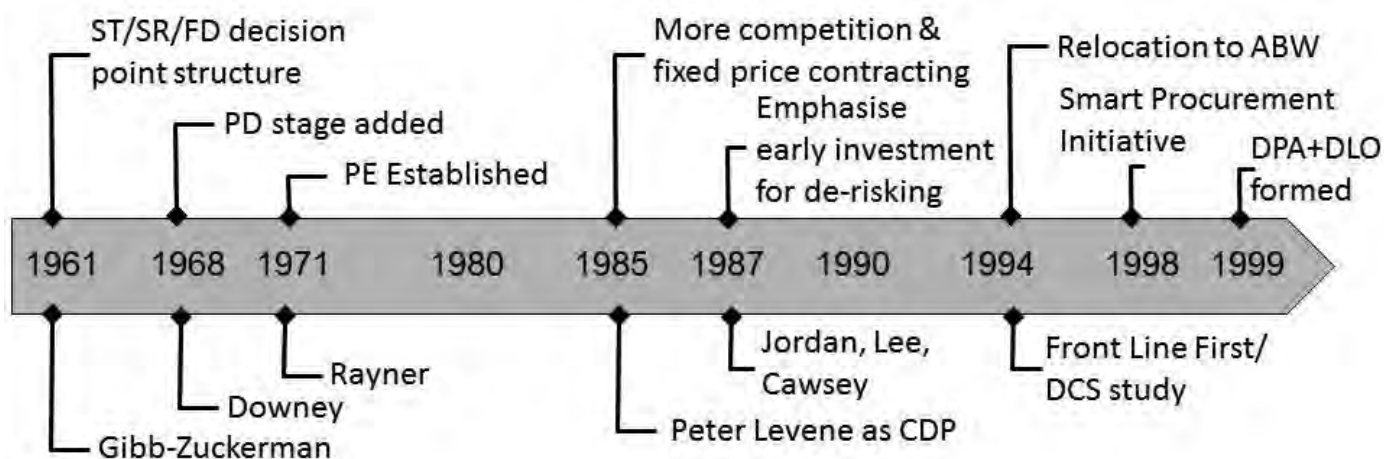
UK-US ship design practice was compared by Stonehouse and Ferreiro, benchmarking by weight group to highlight those areas that drove the US to larger solutions (especially their diesel generator vendors, and escape trunks based in WWII experience. UK has subsequently largely outsourced design (to Prime Contractors), but see later comments about Type 45. The alternative is to keep it in house – noting USN brought the DDG51 design back within government.

Industrial base; ship welders cannot be brought in at short notice from a Job Centre (a Barrow issue for both LPD and SSN), it needs a 'drum-beat' of assured orders to maintain sufficient Suitably Qualified and Experienced Personnel (SQEP). The option to build off-shore, and to fit-out in UK is being tried with the new fleet tankers. Both Australia and UK had to relearn lessons from the US on applying computer aided design to Collins, and to Astute.

I'M THINKING OF THE PROBATION SERVICE.
AFTER DEALING WITH AVIATORS AND SUBMARINERS—
ORDINARY DELINQUENTS WOULD BE A DODDIE.



Tuggs View of complex project management of submariners and aviators!



Key Procurement Reforms (from Review of Acquisition 2009 Annex C) 1.

Type 45. Type 45 machinery was a preference based decision, without good risk analysis of the number of diesel generators. This was swayed by the export potential (of WR-21 to the US), shortening the turbine proving trials, and then making manufacturing savings in the ICR heat exchanger. The overall design was cheapened by: fragile plant, the contracting mechanism (with multiple tiered overheads), and bought-in commercial designers (with cruise ship experience, that was reflected in the bridge and boat bay details).

Type 26. Requirement for: a mission bay (boats and UUV), an oversize hangar (Wildcat or Merlin plus UAV), and a Chinook sized flightdeck, all led to ratcheting upwards of the design spiral (size → overheads → powering → overall cost) into something bigger than export customers would countenance.

SUBMARINES

DG SM was the equivalent of DG Ships. Submarines saw a series of enhancements via the exceptionally quiet Porpoise and Oberon SSK. One highlight was the SSN-07 (Swiftsure) class where an established team built on previous projects, to generate a well-balanced design that was a quantum leap ahead, featuring: deeper diving depth, machinery rafts and pump-jet propulsor. This was followed by more pedestrian incremental improvements as SSN-13 (Trafalgar) class. UK submarines are generally smaller than their US contemporaries, but UK led the US in acoustic tiling, and was rather better with stealth, via quieting and the propulsor to avoid blade-rate signature.

UK led very successful development of ergonomic control panels for reactors (in advance of the US), but suffered a series of engineering problems when the US did not pass on their later experience of the S5W series reactor. Other UK highlights were evolution to PWR1 → 2 and exploitation of core A → G for longer life, plus the MODIX decontamination process.

Spearfish is a significantly better weapon than the US Mk 48 ADCAP. After a long spell in the doldrums with the extended Mk 24 development, Spearfish used the propulsion turbine from the losing Mk 48 vendor, plus it leveraged off/exploited the front end of Stingray; Otto fuel+HAP gave outstanding range and speed against deeper diving or faster Soviet SSN.

WEAPON ENGINEERING

Covers the whole plethora of weapons, sensor and C4ISR equipment; for most of the post-war period, this was managed separately for

above water, and for underwater aspects. Examples of troubled projects include:

Computer Assisted Command System (CACS). CACS 4 for the Type 23 was terminated by Controller in 1987, being replaced by DNA(1) although this meant that the first seven hulls had no command system on build, and were not deployable to frontline settings. CACS suffered from a pedestrian Milspec solution (its specification was only a half generational improvement) that nevertheless consumed a full projects worth of effort and finance, in a period of rapidly improving COTS capability.



Performance Criteria, Tugg.

Universal Modem System (UMS) for satcom. This was a US led bilateral with the UK as the junior partner. A valid demonstrator was followed by a competition, which selected the second vendor (who had not built a working prototype) on grounds of the added 'gizmos' attached to their offering; this undermined the viability of the whole programme, which collapsed.

Seawolf Mid-Life Update (SWMLU). An example of multiple problems: shortcomings in computer simulation (only overcome by firing many more development rounds than intended) and weak integration between changes to the tracker software; the result was an upgrade that was over-priced, didn't deliver the promised benefits and was de-scoped 'until it succeeded'. This was 'swept under carpet' in order that the follow-on programme was not undermined.

Many of the failures identified above were not due to weak PM, but were forces on projects by external factors.

DISCUSSION

Notionally successful projects also face a 'honeymoon period', where the initial euphoria is followed by a deep trough in the perception of the system, due to 'second eleven' maintainers and logistics, spares, support and training shortcomings.

During the bulk of the post-war period, technical development was Government led, via the combination of research scientists, procurement & development engineers, and serving RN staff embedded in the projects as Naval Applicators. This was a creative partnership, responsible for most of the major improvements; but changes that focuss on acquisition processes have watered down the 'added value' of both science and RN grades.

PROCUREMENT ORGANISATION

The UK acquisition organisation has faced continual change since 1960; initially the Procurement Executive, more recently the Defence Procurement Agency (DPA) and the parallel Defence Logistics Organisation (DLO). These were re-integrated as Defence Equipment and Support (DE&S), revoking the former 'agency' status in 2007 [1]. The more recent changes include the: Smart Procurement Initiative and, in parallel, Lord Drayson's Defence Industrial Strategy (DIS), and Defence Acquisition Reform via the DA change programme (DACP). Further upheaval followed in the wake of the Haddon-Cave and Bernard Gray reports about safety responsibility through-life, acquisition reform, and the Strategic Defence and Security Review (SDSR). DE&S are still embracing internal change as PACE (Performance, Agility, Confidence and Efficiency), launched in 2008 to implement change; this was intended to transform DE&S into "a more effective organisation, capable of achieving its mission and making its contribution to the Defence acquisition agenda".

PROJECT MANAGEMENT

In 1988 Jordan-Lee-Cawsey recommended that MoD spend more money up front, to de-risk key aspects, before committing to the major production decision. There has been more recent emphasis on whole ship procurement, in order to avoid MoD's responsibility for government furnished equipment/information, or for interfaces.

Gadeken's paper (*Through the Looking Glass*) contrasted the differing competencies of UK-US Project Manager skills, giving an interesting snapshot in the early 1990's, prior to the PE → DPA → DE&S structural changes. This may be a dated view taken at the highpoint of UK capability, but Gadeken has not been revisited since Bernard Gray joined DE&S as Chief of Defence Materiel in 2011 (his preferred GoCo scheme was abandoned in late 2013, but external



Provide commercial, technical and managerial leadership, for B&Q read Bunnings, now opening in UK. By Tugg.

advisors from Bechtel, CH2M Hill and PwC were incorporated. Gray was succeeded by Tony Douglas on 30 Nov 15).

Experience emphasises the need to do sequential projects, back-to-back, in order that the lesson learned are carried forward. The DE&S preference for competitive acquisition at all costs means that 'do nothing/do minimum' are not properly considered, and 'do something' often fails to give other Nations offerings a fair hearing. Such 'tunnel vision' can also fail to check the external environment hasn't changed, so invalidating the comparisons [2].

Specifications. The mid 1980's was marked by the move to competitive tendering against a Cardinal Point Specification (CPS), in an attempt to shorten development timelines. CPS procurement was championed by Dr Kielly (then DGSW(N)). The ethos was that industry 'knew best', and that provided MoD set the key parameters, all would be well; it was intended to avoid staff backseat driving, fiddling, or requirements creep, all leading to programme slippage.

Whilst this contained the germ of a good idea, hindsight has shown that this placed a very high premium on setting the Key User Requirements (KUR) correctly. Examples of CPS done badly, or focused on the wrong metrics were:

- UAF. Underpowered ESM set, that had to be replaced by UAT.
- 996 radar & LFA plot extractor. Contracted from separate vendors, both against loose CPS specifications, leading to early replacement of LFA by LFE. Prolonged availability & support difficulties.

CPS led to a 'winner take-all' approach that ignored any desirable enhancements that emerged after the contract award. It also gave little emphasis on the more intangible aspects like human factors, user friendliness and of being 'jackproof', that had previously been the responsibility of Naval Applicator's, but whose input was now marginalised.

In the late 1990's there were a few spectacular project failures like the Nimrod programme, roundly criticised by the National Audit Office and Major Project Reviews. These led to the Levine and Gray

reports whose authors may have overstated the problem to bolster their own positions. The whole of the defence budget 'black hole' was exaggerated; yes, MoD encouraged an optimism bias, but the 'bow wave' was a management construct to fully front-load the defence programme, and it moved right in real-time (it was never the over commitment or gross cost over-run portrayed by Politicians).

The reaction to this criticism was the classic bureaucratic measure of re-organising, and insisting on rigid top-down control, via labyrinthine procedural checklists, and a tick-box culture. This reduced the risk personally carried by those who were accountable at the top of the organisation; effectively creating a Stalinist command economy.

Caius Petronius is often used to suggest that re-organisation is a way of diverting attention from real problems. Bernard Gray didn't ask his team which processes added least value-for-money, he just sought yet more top-down, directive management.

MoD's default organisational position is narrow vertical 'cylinders of excellence' (aka stovepipes) and this makes it difficult to integrate sideways, especially over softer issues.

UK has had a relatively weak position over 'lock-in' to prime contractors. MoD should not be 'hands-off', but often fails to hold them to account, due to loss of in-house skills as Suitably Qualified & Experienced Personnel (SQEP). Apart from developing novel or innovative technologies, the other reasons to do research is to maintain a source of impartial advice that can provide consistent advice. This capability advice thread is not easy to regenerate, and MoD has to have the ability to 'push back' against a vendor's technical view; this is not negated when the emphasis shifts to Rainbow teaming with industry, e.g. the Complex Weapons construct. Innovation needs skilled people, to both a. spot the opportunities, and b. to make it happen.

Several organisational changes have removed the Naval Applicator (either user, or technical) as professional project officers; these have now morphed into Requirements Managers (to include duties rusticated from MoD MB at the last down-sizing). This makes the added value of DE&S questionable [3], since there is a process/procedural emphasis, with a short term focus on dashboard performance statistics and simple metrics, i.e. Treasury view that they could use P3M tool to micro-manage (and back-seat drive) Successor, as a series of super projects, each reporting upwards. This checklist/ box ticking doesn't give the added value that you get from real experience of solving engineering project problems.

Research. The Defence Research Agency (DRA) was formed on 1 April 91 as an executive agency of the MoD under the 'next steps' initiative. Though initially vote-funded, the aim was to move to a trading fund, where those commissioning research had control over the timescale and priority of the work. Dstl was formed in 2001 but the most recent change (1 April 17) removes Trading Fund status; whilst it will still remain an Executive Agency (though with reduced freedom).

Reductions in CSA's science budget and the directive to outsource R&D to the maximum extent are bound to affect MoD's overall performance, since Dstl enjoyed relatively long tenure (acting as the corporate memory) during periods when both Main Building & Front Line Commands were down-sized and badly affected by rapid staff turn-over ('churn').

BOTTOM LINE

The overall concern would be that both acquisition and research, MoD are following the Navy's trajectory, making the fundamental error of assuming that people don't matter, and that organisational change and strong top-down process control are the way to assure output. The result is that individuals are not valued, merely treated as being an overhead; and that flexible working would make them fully interchangeable 'cogs'. The evidence from the RN engineering melt-down is how key (but volatile) the people part of the capability are, and that once trust is lost, it can require herculean efforts to restore.

THE FLOORPLATE VIEW

The other pre-occupation is with 'assurance' as a compliance & box-ticking exercise; this should be differentiated from scrutiny. Assurance is 'covering your back' as a defensive measure (i.e. all processes were completed, M'lud); it doesn't add-value. In contrast scrutiny tests that the requirement & solution are still appropriate, and have evidence to underpin their assertions of value-for-money; its' questions are much more open-ended, and have real rigour.

There is a pervasive emphasis on Corporate 'Spin'. There are too many 'initiatives', however internal change programmes are frequently un-costed or resourced; there is no Plan B or considerations of 'how to return to a safe and stable state' if things go wrong. Change programmes are very modish, and usually fail to consider Do Nothing or Do Minimum. Staff churn re-inforces outsourcing, to the detriment of SQEP, few now have experience (or inclination) to challenge their prime contractor, especially over value-for-money issues. Staff have largely lost a hard engineering edge, about how to make things



Specifications, Tugg.

happen, by developing, installing or repairing equipment; they no longer have hands-on workshop, dockyard, manufacturing or sea trials experience.

There is no substitute for the added value of experienced staff able to intuitively balance a mixture of soft issues and risks. Safe decision making for simpler decisions, should leave the anguishing for more complex problems and difficult cases. The sense is that in times past, there whilst there were one or two PE Project Managers who were 'turkeys', the rest were adequate or better. However, it now takes a team of 'all-stars' to make a project 'fly'.

Staff now face a plethora of top-down directives, and down-the-

line cascade of 'manure'. Topics that are not central to the delivery of capability are given top billing: diversity, green issues (despite the fact that the outsourced facilities management prefer water saving to properly flushing toilets), and by asking staff to work different hours, or to run their computers on internal battery between 1600-1800, in order to save electricity.

Staff feel undervalued; they see little or no reward, whilst expenditure on annual reporting dwarfs the pay awards actually made to staff. Pressure on car parking and 'green' travel to work, hot desking, outsourcing (with TUPE (union negotiated outsourcing), plus continual re-organisation, and pressure not to book to legitimate overheads are all seen as an attack on staff terms & conditions,

contributing to reducing morale. The result is usually more 'have-your-say' surveys; it is not a concerted move to reduce the gap between the perceptions held by the board, and their workers (shades of BREXIT).

Project management has developed a reputation for being something of a black art – a skill which can only be practised by professionals who are well-versed in all sorts of odd-sounding disciplines and techniques.

There is no reason why this should be so. Project management is the application of good practices in a structured manner and in choosing appropriate automated tools which can help you. The skill lies in identifying when the circumstances in which these practices should be applied, and the best way to do so." (Brown, 2007, p4).

A VIEW FROM SOUTH OF THE BELTWAY (M25-M4 CORRIDOR)

MoD's very poor Knowledge Management (paper archives at TNT Swadlincote) practically guarantees that the Department will continue to repeat past mistakes & failures. Staff are dissuaded from holding paper, but digital record archiving is subject to very arbitrary change and server/space allocations. The result is that there is no culture of consulting 'lessons learned' on previous projects (in the medium to long-term). DE&S once had a Project Referral Unit (PRU) for projects 'in special measures'; the core knowledge is still there, but is now hidden behind a management dashboard.

MoD's recent emphasis is on absolute 'top-down' control, and on input costs. There is very much less effort applied to capability output (which is not quantifiable in cash terms). Senior staffs acquiesce to continual Treasury demands for efficiency savings in the short



There will be no reminiscing of how it was, Tugg.

term, without considering the longer-term impact on a sustainable in-house skill set. One concludes that 'spreadsheet Phil' (now moved from Defence to Chancellor) knows 'the cost of everything, and the value of nothing.'

This paper offers several cautionary tales: MoD's lack of experience about design issues, combined with a 'hands-off' contractual approach; it poses the question of whether there ever was a golden-age for MoD project management? The overall view is that if there was a golden-age for UK Naval equipment projects, it probably ran through the 1980's and then tapered off in the early 1990's. Since then, it appears that the 'Mojo' of UK major project success, has shifted from defence, across to large civil projects like Crossrail.

This view could be subject to rose-tinting; I therefore usually ask two test questions:

- Am I a silly old **** or what ? (the answer so far is 'or what').
- Secondly, I ask visiting Very Senior Officers, 'when did you last say No to a proposal, on the grounds that it was bad for your people ?'. I don't usually get an answer.

The system tends to reject advice from older members of staff, despite the fact that they are largely the corporate memory of what went before (and therefore why it might fail to succeed in the future). ■

Thunderer is a former RN Engineer Officer, with a several sea-going appointments including a Head of Department tour in a frigate, and in a destroyer during the Falklands conflict. He had a range of other jobs ashore, including: research, procurement, and latterly in a 4* headquarters. He is a Chartered Engineer who is domiciled outside UK, and had most recently been working on offshore energy projects.

ACKNOWLEDGEMENTS

To the Editor of the Review of Naval Engineering for permission to re-use Tugg's timeless cartoons. JNE articles are available via <http://www.jneweb.com>.

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ENDNOTES

1. Understood to have had much to do with DPA's refusal to 'do NEC for free'. Agency status gave its then Head this degree of autonomy from MoD Main Building to refuse to tackle wholly unfunded initiatives.
2. Example is Soothsayer that took so long, that a cold-war requirement based on BAOR had been invalidated by more recent experience in Iraq and Afghanistan.
3. Some outsiders now view DE&S as merely being technical clerks !!



HMS PRINCE OF WALES COMMAND OF THE SEA: PIVOTAL MOMENTS IN HISTORY

By Andrew Ng

In December 1941 a combination of ill fortune and short sightedness resulted in the loss of two capital ships of the British Empire followed shortly thereafter by the impregnable 'Gibraltar of the East'. Having directed all of its defences towards the sea Prime Minister Winston Churchill would subsequently describe the fall of Singapore as "the worst disaster and largest capitulation in British history". Our Prime Minister John Curtin predicted that "the battle for Australia" would soon follow and pivoted our nation towards the United States of America including placing Australian forces under the command of US General Douglas MacArthur [1].

FIRST ENCOUNTER

Battle of the Denmark Strait

It was a bleak and dreary night when HMS PRINCE OF WALES was called into action. This was no drill even though she had only been completed two months prior and was still suffering from main battery breakdowns at the recent exercises at Scapa Flow. Vice-Admiral Lancelot Holland was en route to the Hvalfjörður in Iceland on 23 May 1941 with the capital HM Ships HOOD and PRINCE OF WALES but was ordered instead to steer to a position of 62 degrees North with the hope of intercepting the pride of Hitler's Kriegsmarine, the indomitable BISMARCK. Crucial information had arrived from the Swedish cruiser GOTLAND at Kattegat followed by an American long-range Glenn Martin Maryland bomber pilot from No. 771 Squadron who had braved the inclement weather over Bergen. Prime Minister Winston Churchill excitedly cabled President Franklin Roosevelt: "We have reason to believe a formidable Atlantic raid is intended. Should we fail to catch them...mark them down for us...and we will finish the job." [2]

Admiral Günther Lütjens had recently broken into the Atlantic in February via the Denmark Strait with battleships GNEISENAU and SCHARNHORST, and was planning the same with the BISMARCK and PRINZEUGEN under Operation Rheinübung. It was a calculated gamble especially because he would need to forgo time-consuming (yet invaluable) refuelling from the WEISSENBURG in order to take advantage of the fog and snow showers currently enveloping the Denmark Strait. He wrote in his diary: "The weather seems to have been made for the breakthrough." [3]

The ensuing Battle of the Denmark Strait was a disaster for the Royal Navy (RN). HOOD was hit by a 15 inch shell from the BISMARCK which penetrated the flagship's light deck armour and exploded the aft magazine. This caused her to split in two and sink within three minutes. The German ships then concentrated fire on PRINCE OF WALES and landed many hits, including a heavy blow below her waterline. The RN's latest and largest battleship suffered repeated battery breakdowns which limited her return fire. Fortunately the Vickers Armstrong technicians had remained on-board and enabled PRINCE OF WALES

to score two crucial hits on the BISMARCK. The resultant loss of boiler room power, precious fuel and a 9 degree port listing would prove pivotal in Lütjens' decision to disengage, abandon the breakout mission and attempt the safe French port of Saint-Nazaire, which would eventually spell the end of the BISMARCK.

BACKGROUND

Although it was the golden age of the battleship, encounters between battleships were, however, uncommon. To understand this and the climate within which PRINCE OF WALES was born it is necessary to recognise how command of the sea has helped to shape history.

BATTLESHIP DOMINANCE

'Rule Britannia!'

Britain had projected power at sea for centuries, most notably demonstrated by the blockade of France during the Napoleonic Wars, the United States during the war of 1812 and of Germany during World War 1. Eminent military strategists such as Mahan (The Influence of Sea Power upon History [4]), Corbett [5] and Churchill himself [6] had clearly documented its contribution to national might and strength of diplomacy.

The pivotal naval battle of Tsushima in 1905 confirmed the importance



HMS PRINCE OF WALES (53) A King George V battleship ordered during the Second London Naval Conference which limited naval guns to 14 inch. Motto- Ich diene (I serve) Moored at Singapore.



Sink the BISMAR! HMS PRINCE OF WALES landed two decisive hits which proved critical in the BISMAR!s decision to disengage and run for home.

of the modern battleship and the need for speed and big guns, which significantly influenced future battleship design, especially of HMS DREADNOUGHT a year later. This further inflamed the world's unhealthy obsession with larger and faster capital ships in the hope of achieving naval dominance via deterrence ("the supreme art of war is to subdue the enemy without fighting" [7]). Exactly the opposite occurred, however, after a series of hapless events and alliances sparked the Great War. Both Britain and Germany were acutely aware of the devastating consequences of a naval defeat equivalent to Tsushima. This led Churchill to describe Admiral Jellicoe (Commander of the British Grand Fleet at the Battle of Jutland in May 1916) as "the only man...who could lose the war in an afternoon" [8]. Britain needed its battle fleet to protect its empire, its trade routes and war supply. Germany also understood its importance for disrupting supply convoys and for diplomatic prestige.

BIRTH OF PRINCE OF WALES

After World War 1 another frenzied global arms race took off. Battleship building was re-ignited and the Naval Treaties of the 1920s and 1930s tempered this only temporarily. It was in this provocative atmosphere that HMS PRINCE OF WALES (53) was born. Limited to 14 inch guns, she was the newest King George V class battleship and the pride of the fleet with a displacement of 43,786 tons, 14.7 inch thick armour, overall length of 745 feet and top speed of 28 knots. Her illustrious pedigree dated back to 1765 with many preceding ships having served as the flagship of her time. However, she was dogged by ill fortune from even before she was laid down and quickly gained the nickname 'unlucky ship'. Originally called KING EDWARD VIII she was promptly changed to PRINCE OF WALES upon the King's abdication. Another setback occurred during construction when the German Luftwaffe dropped a bomb which exploded below her bilge keel, causing severe flooding and pushing her completion date back to 31 March 1941.

EARLY WAR SERVICE

Following the Battle of the Denmark Strait, PRINCE OF WALES was repaired at Rosyth. She was then chosen to transport Winston Churchill across the Atlantic for a secret conference with Franklin Roosevelt off Newfoundland. The resultant Atlantic Charter of 14 August was a pivotal policy statement which set goals for the post-war world and eventually became the basis for the modern United Nations. The General Agreement on Tariffs and Trade, post-war

global economic cooperation and freedom of the seas were also derived from the Charter.

A month later, PRINCE OF WALES received her penultimate posting. She was assigned to Force H in the Mediterranean which provided an escort for Operation Halberd, a supply convoy from Gibraltar to Malta. On 27 September the convoy was attacked by Italian aircraft with PRINCE OF WALES playing her part by shooting down several with her modern dual purpose 5.25 inch guns. Later that day she was dispatched to intercept the Regia Marina. However, the enemy did not materialise and the convoy arrived in Malta without further incident.

FINAL VOYAGE

Tensions in the Pacific had been rising ever since the Japanese occupied French Indochina in July 1940. Proximity to British possessions in the Far East including Australia, and the failing Japanese-American diplomacy led Churchill to believe war was inevitable. He repeatedly pressured the Admiralty to send three modern battleships to Malaya to deter the Japanese or at least buy enough time for other British capital ships to sail half-way around the world should war in the Pacific occur. Singapore after all was expected to be able to hold out for at least one hundred days.

Unfortunately Britain was already over-stretched through protecting convoys which supplied Britain and keeping the Kriegsmarine and Regia Marina at bay. The Admiralty delayed and even ignored written pleas from their Prime Minister, believing it a flag waving exercise, until a heated meeting on 20 October 1941 led to the compromise of two capital ships. The commander would be Admiral Tom Phillips who last commanded during World War 1. He believed emphatically that Japanese aircraft posed no threat to a modern well-captained battleship possessing adequate anti-aircraft armament, based on the fact that no battleship in open water had yet been sunk by aircraft alone.

MORE BAD LUCK

Therefore on 25 October 1941, PRINCE OF WALES (chosen because Churchill had enjoyed the warmth of her crew during his recent Atlantic crossing) and her destroyer escort left home waters bound for Singapore, there to rendezvous with veteran battlecruiser REPULSE and aircraft carrier INDOMITABLE. However, in a further stroke of



Winston Churchill on board HMS PRINCE OF WALES en route to his secret Atlantic Charter meeting with Franklin Roosevelt.



HMS PRINCE OF WALES (left, front) and REPULSE (left, behind) under attack - the first capital ships to be sunk solely by air power.

ill fortune INDOMITABLE ran aground off Jamaica, damaged her hull and was unable to proceed. Unfortunately a substitute carrier was not considered, even though PRINCE OF WALES subsequently berthed at Cape Town on 16 November, barely 30 miles from aircraft carrier HMS HERMES which was in Simon's Town Naval Yards for a refit. HERMES had just completed an Indian Ocean tour of duty, carried 15 aircraft, was performing no vital duty and could have easily accompanied Force Z to Singapore where she could then have been refitted. Regrettably, such short sightedness and ill fortune would continue to plague PRINCE OF WALES during her final fateful voyage.

On 2 December 1941 Force Z steamed up the Johore Strait to the great naval base at Singapore. Local papers hailed their arrival but by order of the Admiralty referred to REPULSE as "a large warship". This would keep the Japanese guessing and disguise how vulnerable and weak the fleet actually was, contrary to popular belief that these two warships were invincible, coming from a most distinguished lineage that reverberated Britain's long-established rule of the sea.

LOOKING FOR TROUBLE

Events then changed dramatically when the Japanese struck Pearl Harbor on 7 December 1941. The next day seventeen Mitsubishi Nell bombers flew from Indochina to raid Singapore. Despite negligible damage, Phillips wanted to prevent his ships from being caught dockside as had transpired in Pearl Harbor. The Japanese were landing at multiple points along the Malaysian coast and Phillips wanted to wreak havoc upon the thinly armoured Japanese transports by catching them unawares.

That night under cover of darkness Force Z steamed towards Kota Bharu "to look for trouble" [9]. Entering the Gulf of Siam placed the fleet under threat from Japanese air forces in French Indochina. Strangely though, Phillips believed that no aircraft had sufficient range nor carried torpedoes, despite the air raid which had occurred only hours before. Extremely heavy cloud cover on 9 December hid the British ships but luck would shortly desert them. The Japanese were expecting the two British capital ships and had increased aerial and submarine reconnaissance. The farthest most submarine to the north of the base managed a glimpse of the two ships to the east, reported the sighting and soon 126 aircraft were armed with torpedoes and bombs. Transports lying off Kota Bharu were moved eastward out of danger whilst every Japanese ship and aircraft eagerly searched for them.

NEAR MISS

Force Z falsely believed they maintained the element of surprise and pressed on, unknowingly on a collision course with Vice Admiral Ozawa's force of six cruisers who was racing to intercept them. The rapidly approaching night made conditions precarious and was highlighted by a pivotal event. Reconnaissance pilot Lieutenant H Takeda had spotted two large ships and signalled 53 bombers to his position. Takeda then illuminated the target by dropping a flare which was seen by Ozawa aboard the cruiser CHOKAI who was also surprised to see his own Japanese planes lining up to attack him. Frantically he signalled Saigon and a friendly-fire catastrophe was narrowly averted.

By 10:55pm the two fleets were within 5 miles or ten minutes of each other. Had they met, the superior firepower of the British capital ships would have blown the Japanese fleet out of the water and changed the course of the war in the Pacific. However, Phillips also saw Takeda's flare, realised that he had been spotted and changed course back to Singapore. The next morning, destroyer HMS TENEDOS (H04)—which had been dispatched earlier to Singapore—was attacked which signalled that the Japanese were zeroing in on him. However, Phillips refused to break radio silence, which meant that everyone knew of his whereabouts except the British.

RISE OF AIR SUPREMACY

Beginnings of the capitulation

At 10:45am on 10 December a formation of 94 Japanese aircraft converged on Force Z. After a 500 kg bomb exploded inside the aircraft hangar of REPULSE, Phillips turned his ships in unison. This antiquated line of battle manoeuvre halved the effectiveness of all of the anti-aircraft guns and the error was quickly rectified. Next, two torpedo-carrying bomber squadrons approached and began to drop height. Upon seeing this, torpedo specialist LCDR Harland warned Phillips, only to be told "No, they're not, there are no torpedo aircraft about" [10].



Admiral Sir Thomas Spencer Vaughan Tom Phillips GBE, KCB, DSO RN nicknamed Tom Thumb due to his short stature.

PRINCE OF WALES's sophisticated 5.25 inch guns put up a curtain of steel but jammed continually. One Japanese Nell crashed but eight launched their torpedoes with one hitting amidships. The ship vibrated and leapt into the air, immediately taking on 2,400 tons of water, a 13 degree list and losing half of her electrical power and speed.

An eerie quiet descended the scene as the Japanese planes departed but still Phillips maintained radio silence. Instead, Captain Tennant took the initiative and signalled to Singapore that they were under attack. Immediately a squadron of 11 Buffalo fighters under Flt-Lt Tim Vigors took off from Sembawang airfield 150 miles away but costly minutes had been squandered. The next wave of Japanese aircraft arrived first, bypassed the crippled PRINCE OF WALES and overwhelmed REPULSE which gallantly fired her outmoded 4 inch guns. Captain Tennant manoeuvred superbly until a synchronised Japanese pincer attack resulted in critical hits and the order to 'abandon ship'.

At 12:41pm a further eight Nell bombers arrived and finished off the incapacitated PRINCE OF WALES. Destroyers HMS ELECTRA and HMAS VAMPIRE courageously came in to save survivors from REPULSE. HMS EXPRESS heroically went right up to the listing PRINCE OF WALES and executed a mass exodus of sailors. Flt-Lt Vigors arrived at the scene just as the last of the Japanese Mitsubishi's (which possessed no fighter cover) departed. The Buffalos would have wreaked havoc had the word come earlier.

CONCLUSION

Churchill at first refused to believe the news. Never before had Britain lost two battleships in a single day. He would write in his memoirs "In all the war I never received a more direct shock. Over all this vast expanse of waters Japan was supreme, and we were everywhere weak and naked." [10]. The Japanese had learnt from the Battle of Taranto where the British had launched a similar attack on the anchored battle fleet of the Regia Marina. The death knell for Singapore had been sounded. In less than two hours the centuries-old reign of the battleship had come to an end. Military thinking had changed forever and Britain would never again lose a battleship at war. Aerial warfare was supreme and would be pivotal in the forthcoming decisive battles in the Pacific.

The life of PRINCE OF WALES was brief but full, having been born during the reign of the battleship only to succumb at the hands of its successor (i.e. air power). She served faithfully to the end and during pivotal moments in history. On 10 December 2016 we marked her 75th anniversary and remember the valiant 840 British sailors and 4 Japanese pilot crews. We reflect also on past mistakes and, as the next generation PRINCE OF WALES (R09) prepares to launch, we hope not to repeat them.



HRH PRINCE OF WALES (21) visiting HMS PRINCE OF WALES (R09).

Predicting the future and the optimal military strategy can be fraught with danger. Throughout history many pivotal technological advancements have shaped military science, from rifle firepower during the US Civil War to the machine-gun in the Great War. However, not predicting the future can be even more devastating. For example, air power dominance had been heralded as far back as Giulio Douhet (1869-1930) and Billy Mitchell (1879-1936), but it took the loss of Britain's pride of the fleet PRINCE OF WALES for it to finally sink in.

Britain is hoping to secure its trade routes and its future with the completion of its second supercarrier, a warship so expensive that it was temporarily mothballed. All around us nations are following suit. Australia has acquired two new Landing Helicopter Docks and embarked upon a \$50 billion next generation submarine program, all of which has merit. However, in our climate of rising nationalism and the pivot to the Pacific, does such a build-up of armaments actually project power? Will it "subdue the enemy without fighting"? Or will it just increase the friction already apparent in the South China Sea? Is the focus on bigger and more expensive the optimal strategy in such pivotal times where advanced ship-killing missiles, devastating cyber-attacks (à la Ukraine), stealth and drone technology are set to dominate? Or are we just repeating the arms race of the last century?

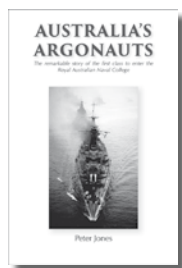
No one knows the answers to these questions in such pivotal and rapidly changing times. However, there is one thing of which we can be assured:

Whoever commands the sea, commands the trade; whosoever commands the trade of the world commands the riches of the world, and consequently the world itself.

Sir Walter Raleigh (1554-1618) [11]. ■

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Australia's Argonauts

The Remarkable Story of the first class to enter the Royal Australian Naval College
Vice Admiral Peter Jones AO, DSC RAN (Rtd.)

Echo Books (Nov 2016)

Hardcover ISBN: 9780994624604

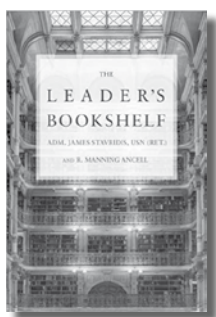
Softcover ISBN: 9780995414716

eBook as a PDF ISBN: 9780994624611

Hardcover: \$59.95 Paperback: \$49.95 eBook: \$14.95

This is a gracious book, as befits an elegant and gracious Admiral and teacher, who led his crews at sea and ashore with quiet confidence and conviction. An 'Admiral-by-accident' for, if things had worked out differently, Peter would have been an Architect! A great loss for Navy if he had done so. Jones' passion for design and thinking, and his compassion for Navy nevertheless comes out in his (and Tony Grazebrook's) story of the First Argonauts and of Australia in the 20th Century. It says much of Jones that he also contributed to this story and to Navy in his own times. For the spirit lives on and nowhere is this more important than today as we redesign and reshape Navy for the 21st and 22nd Centuries. 'The sands were running out for the Pioneer class...and their remarkable wives and the support they rendered their husbands throughout their lives', Jones eloquently writes. I wonder though, for it seems to me those sands were used to build the very foundations upon which Navy stands today, brick-by-brick, where they may they never run out. A Navy now distinct and in a class of its own, thanks to these men and women of the Pioneering Class. Our Argonauts did not come home, for they did not need to – they built

their own. Perceptively identified is the role of Naval Intelligence and Commander Rupert Long OBE RAN, in particular. British naval intelligence officers regarded Long as 'one of the ablest of them all', and Eric Feldt considered that, in a war when 'too little was done too late', Long 'did enough and he did it in time'. Naval Intelligence was never the oxymoron of MI. As Navy reshapes for the future, these skills (a new branch?) are needed again – in Cyber and elsewhere. Some say that "the Pioneer Class were not only the first, but the greatest class to graduate from the Naval College". I beg to differ. There will be other great entries and classes. They may indeed be greater but there greatness will always rest humbly on the achievements of the Argonauts. Admiral Colvin wrote of The Argonauts in 1942 'that they were never mere copyists' but 'blended something peculiar to themselves', and the 'result was unmistakable and unmistakably good'. As the Baton passes to the next generations, we can have confidence it will be blending the goods of the old with the goods of today. A great read, thank you Peter.



The Leader's Bookshelf

Admiral James G. Stavridis USN (Ret.)
Lieutenant Commander R. Manning Ancell USNR (Ret.)

Naval Institute Press (15 March, 2017)

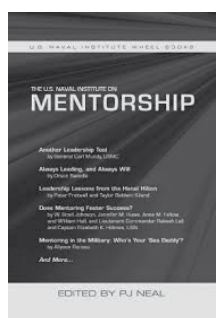
Hardcover ISBN-10: 1682471799

Softcover ISBN-13: 9781682471791

Hardcover: \$US29.95; \$AS40.00

Admiral Stavridis used to strike fear and consternation into senior Allied Officers (and his own) – particularly the largely unread Brits, it is sad to say – when he would ask 'what they were reading'. As an intelligence gathering exercise it was profound – since he could rapidly identify the critical thinkers, from the lumpen. No doubt he also indirectly contributed to many Staff Officer's education too! Like all great leaders and many Americans, there is humbleness to Stavridis and his willingness to learn and to listen. It was not that he wanted to 'shock and awe', what he wanted was critical engagement, understanding and sharing of new knowledge. Sadly he was probably often disappointed. The Leaders Bookshelf is therefore something of a continuation of Stavridis' (and Ancell's) quest for critical thinkers and new knowledge. But it is more so, for it provides useful signposts and direction – as much for reading the past, as understanding the present, and scoping our futures. For prediction we leave to quacks and soothsayers. Anything that cannot be prioritised beyond five is probably a complex system. So a reading list of 50+ is implicitly complex and the question becomes 'is the matter dealt with in terms of simplicity (a form of parsimony and therefore complexity) or complicatedly, as in KISS?' Probably the former, although lists are always problematic – ask any PhD candidate submitting their thesis! Nonetheless it largely works. While there are the usual suspects: Grant, Eisenhower, Churchill (x2); Sun Tzu, Keegan (x2), Moore, Huntingdon, O'Brien, Rommel; there are also the unexpected: Harper Lee, Asimov (The

Foundation series), Farago (on Patton), Mark Twain, Kipling, Fall (on Dien Bien Phu), and "H.R." McMasters (now NSA), on dereliction of duty. All tell a story and, as one who has served with "H.R." and other great U.S. Generals, one respects them all hugely as soldiers, scholars, and practitioners. Very few Allied Senior Officers come anywhere near close – which is becoming a problem, and possibly also to the USN, as opposed to the USMC? Lists always beg the question as to those left out. Two authors that would make my list would be Kimberley Kagan (The Eye of Command), and Eliot Cohen (Supreme Command: Soldiers, Statesmen, and Leadership in Wartime). Kimberley (with Fred) served for over 18 months almost continuously in Iraq and Afghanistan. A remarkable old-School, young American Lady. One of Eliot's sons had two Iraq tours and is still in the Reserves, and one of his daughters is serving in the USN. I say this, for it is different as a parent – and begs the question of retired leaders 'what are [we] doing to bring on the next generation?' The challenge Cohen implicitly exposes is that so few contemporary politicians appear even able to read (literally!) – that such lists would pass them by. What therefore are we also doing to educate the political professional elites (the 25%)? For it would appear that only Royals (like Philip (WWII), Harry (Afghanistan) and Andrew (Falklands)) and Les Deplorables (the 75%) serve today. Admiral Stavridis, Sir, you now need to write your book! In the meantime, this is a great start and a good stepping stone.



The USNI on Mentorship

Edited by P.J. Neal

Naval Institute Press (April 15, 2017)

Hardcover ISBN-10: 168247061X

Softcover ISBN-13: 9781682470619

Softcover: \$US21.95; \$AS30.00

The U.S. and Commonwealth countries, such as Australia and Canada, have never assumed or presumed a common / binding ethical or moral understanding of their recruits. It is why our countries invest so much more in developing and mentoring leadership-ethics – through example, scenarios, and 'what ifs' – in our people. This has been less the case in countries such as France and Britain, that assumed such values – but are now coming to realise that *sûreté* and indeed *laïcité* are vested in such commonly held values and cannot be assumed. This book is therefore one of a number produced by the USNI over the years – but one that goes beyond self-help, to engage and to challenge. As illustrative, Small writing on leadership and its affects on morale examines the 'why of orders' – their need. He does so empirically and kindly but in this day of instability and uncertainty, he also rightly raises the 'why'. For as norms become values, and values themselves become norms; can norms form directly into rights, orders, rules and controls – or must they be values first? And if the norms part company with common values then can their connected rights

and rules be reformed? Or do they remain rigid, unbending and unchanging – so adding to the chaos and ultimate revolution when a critical juncture occurs? I admire Stockdale, who is mentioned along with the Stockdale Paradox that enables survival in the harshest of conditions – moving beyond resilience to mental toughness: that ability to keep on going, despite being tortured, gainsaid, ridiculed, and ignored. As Gandhi opined: 'first they ignore you; then they laugh at you; then they fight you; and then you win'. This is the attitude we need, particularly today – which is beyond complacency and safe, risk-averse notions of resilience. It is also where good mentors – for they are also our greatest leaders – get going. The Naval service is an apprenticeship profession, the author states. Maybe, but I beg to disagree. It should be an aspirant profession, perhaps borrowing from the French and Canadian Navy's term for a Midshipman (or Ensign) as an 'Aspirant de Marine'. For we should never stop aspiring or mentoring, and this readable book allows us perhaps to set such a course and do both. Thanks 'P.J.'.

STATEMENT OF POLICY

For the maintenance of the Maritime wellbeing of the nation.

CURRENT AS AT 1 JULY 2017

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 in East Asia, 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.
- replacement frigates and Offshore Patrol Vessels, noting the 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.
- 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 the increasing tensions and major changes now taking place in international relationships.
- 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

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.

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AND EFFICIENCY**

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Finding what you really need is only possible when you have the best marine offering on earth to choose from. Wärtsilä is the market leader in improving efficiency, electrical and automation solutions for your Navies. Our references for over 150 navies and coast guards prove that we can meet the most stringent Naval requirements for safety, noise reduction, shock resistance and environmental compliance. Our global service network offers support when and where you need it.



Read more at www.wartsila.com/navy



HATCH: INS VIKRANT (R11) in her final stages of build in Cochin Shipyard - she has a strong Italian look to her.



MATCH: Multirole Aviation Training Vessel (MATV) SYCAMORE built at Damen's Vietnam shipyard preparing for her maiden voyage to Sydney at the end of May.



DISPATCH: RFA GOLD ROVER (A271) provides fuel for HMS PORTLAND (F79) off the West Coast of Africa - the very last RAS before she decommissioned in April 2017.