

THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

DEFENCE
WHITE PAPER
2016 ISSUE



**ASIA'S RESTLESS
GIANTS**

**BEFORE YOU STRIKE
HARD AND FAST...**

**F-35S FOR THE
CANBERRA CLASS LHDS**

**THE SILVER PHANTOM
HMS AURORA**

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06 ASIA'S RESTLESS GIANTS: THE CHALLENGES TO ASIA'S MARITIME COMMONS

By Michael Wesley

11 F-35s FOR THE CANBERRA CLASS LHDs: CHOOSING AN LHD DESIGN

By Kelvin Curnow

21 BEFORE YOU STRIKE HARD AND FAST: FIRST CLUTCH THE ENGINES

By Robert Cuthbert Blake and Nicholas Bellamy

25 THE SILVER PHANTOM HMS AURORA (X) IN THE MEDITERRANEAN 1941-43

By Nigel Beake

REGULAR FEATURES

- 02 From the Crow's Nest
- 03 Letters
- 05 The President's Page
- 15 Flash Traffic
- 32 League Policy Statement

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Front cover: USS HARRY S. TRUMAN navigates the Gulf of Oman 26 December 2015 (Mass Communication Specialist 3rd Class J M Tolbert US Navy via AP MANDATORY CREDIT 2.0).

NEW SYNTHESIS: ENDURING VALUES

Securing Futures

This edition continues assessing the strategic context of the 2016 Defence White Paper and the emerging Force Structure. These themes are further developed in the The Navy League of Australia Essay Competition 2016, see page 31, regarding 21st Century Naval Warfare; Australian Naval History and Australian Industrial Maritime Strategy (AIMS). Paper 1 addresses 'Asia's Restless Giants' and provides a thought-provoking analysis; arguing for Australia to develop its own (asymmetric) critical strategic thinking capacity – necessary to 'best offset risk and uncertainty in the present and foreseeable future'. Paper 2 builds on this thinking, with an analysis of F-35B Lightning II aircraft – how they influenced the LHD Design and will, possibly as early as 2017, be deploying from the decks of HMA Ships CANBERRA and ADELAIDE. Paper 3 represents something of a departure for *THE NAVY* – examining a successful engineering application of propulsion clutch design systems used by the majority of Western Warships. The skills sets and business model applied by the Company provide, potentially, a template for Australian maritime industrial applications and exploiting our engineering and design skills. The final paper considers the exploits of HMS AURORA, the Silver Phantom, considered by Vincent P. O'Hara [1] as 'possibly the best shooting ship in the Royal Navy'.

On 7 May 1959, C.P. Snow delivered the BBC Rede Lecture in which he identified the growing division and breakdown in communication between The Two Cultures – the sciences and the humanities [social sciences]. He asked his audience 'whether they could describe the Second Law of Thermodynamics' – similar to asking a classicist 'have you read Shakespeare?' Reducing the question still further, he asked his audience to 'describe mass, or acceleration – the scientific equivalent of saying, "can you read?" Not more than one in ten of [those present]...felt that [he] was speaking the same language'. Snow's fundamental critique was of English education; cultural snobbery, and its class system 'that pushed students towards "traditional culture" [i.e., the classics] and the professions (law), rather than science and industry'. He compared Britain to Venice:

'Like us...they knew that the current of history had begun to flow against them. [But change] meant breaking the pattern into which they had crystallised...they never found the will to break it'.

In 1962, the literary critic arch-classicist and neo-elitist, F.R. Leavis, led a devastating, traducing personalised attack on Snow [2], in which he described Snow as being:

'Intellectually as undistinguished as it is possible to be...exhibiting an utter lack of intellectual distinction and an embarrassing vulgarity of style'.

To his lasting credit, Snow allowed Leavis' vituperation to stand – believing that this would allow the debate to continue. Stephen Fry [3] later commented:

'[Leavis was] a sanctimonious p***k of only parochial significance [with] an intense suspicious propensity to explode in wrath and anathematize anyone who dared disagree with him'.

Whether it is Australia's refusal to take authority seriously (our greatest strength and weakness) or Britain's English class system, the division between the two cultures has continued to grow. It is now almost to the point of 'thematic apartheid' within universities, state and private schools in Australia, the U.K., and the U.S. In some Australian universities, 90% of PhD cyber and nanotechnology research students come from South East Asia; the Sub Continent and the Middle East. This is not a criticism of these able international students – but it does reflect a situation where Australia's education system appears increasingly unable to nurture its own. Meanwhile, attempts to make science and maths attractive – e.g., the artificial conflation of STEM – have, in the words of David Perks,



Entrance to the Venice Arsenal.

a physics teacher writing for the Institute of Ideas and Civitas:

'Treated science as a branch of media studies, rather than as a group of discrete bodies of knowledge to be transmitted to the student; it assumed that children can relate only to what they know, and that they should not be challenged by new concepts; it gave too much weight to what children say they enjoy, rather than stretching them to develop their capacity for abstract thought; and it replaced the controlled laboratory experiment – "the backbone of modern scientific enquiry" – with field studies'.

Why is Ed. concerned? – Because empiricism, the sea, science, technology, critical and strategic thinking have always gone together – discretely synthesising the sciences and humanities to provide economy and benign co-adaptation. It was this that underwrote and underpinned Britain's Industrial Revolution:

Just as knowledge is social – so too is science, technology, engineering, mathematics, the humanities and social sciences.

In the 17th century, The Doge would take VIPs to an empty dock at Venice's Nuovo Arsenal (built in 1320). Twenty-four hours later – through effective and efficient production techniques – a completed galley would stand. The subliminal deterrence message to visitors was clear: 'in 24 hours we can build a galley; in a month a fleet – with a maritime tradition established (in ABC's terms) over 300 years to fight and win – what can you do, Matey?' Deterrence is contained as much in Navy's industrial designs, classes, systems, build and maintenance (its techné); as in sustaining the Fleet (its epistémé); as in reflectively, peaceably and responsively, projecting Australian *influence* (its phronesis). The complex and uncertain – potentially unstable – future we face today may not be deterred through more control:

'Only variety can *influence* complexity: complexity cannot be controlled.' [4]

Variety is achieved by connecting discrete bodies of knowledge – so enabling specialisation and new professions, jobs, skills and knowledge to emerge. Complex variety is not the same as managed



HMAS SYDNEY III in the Captain Cook Dock at Garden Island.

Garden Island from Pinchgut
November 2015.



diversity – no matter diversity's undoubted goods. Considering the emergence of a political class in the U.S., the U.K., and Australia. Fifty years ago, MPs came from a variety of different professional and thematic backgrounds – including agriculture, white and blue collar, academe, industry, science, law, engineering, the unions, medicine, the Defence Forces and Public Sector. Today, while there is significantly improved diversity, ethnic representation and gender balance – there is, arguably, less thematic variety. Many MPs come through a graduate, politico-legal, non-scientific background (the current and previous PMs attended Oxford as Rhodes scholars), via an accountancy consultancy company (ACC), law, the media, as political advisers, and / or the unions – with minimal leadership experience. Complex problems are solved by synthesising a variety of skills within a common philosophy – the very basis of Commonwealth. Diversity without variety leads to hyper-competition, failure and unhappiness. They need not, though, be antithetical – provided a common understanding is maintained:

'At the heart of a Liberal [democratic] education is the notion that human beings are capable of moving from barbarism to civilisation

by using their intellectual and moral capacities – and that is [The] Idea which ought to unite scientists and literary intellectuals alike'. [5]

For Navy, this is particularly important for two reasons:

First, rather than command determined by branch exclusivity, variety dictates 'generalism (all of one company), before specialism'.

Secondly, to enable leadership and variety, Navy might consider postgraduate level general-systems courses for all specialisations, educational backgrounds and followerships – from Leading Hand through to Commander.

Such a postgraduate programme would be highly attractive to infrastructure industries and might be formed in partnership with local industry, academe, research and university providers. It could pay for itself; while providing a unique, Australian 21st Century Knowledge Arsenale, with our people's techné; epistémé and phronesis at its core. Like the Nuovo Arsenale, it would be our greatest strategic asset - providing both Influence and Deterrence in uncertain times. ■

1. *Passage Perilous: Malta and the Convoy Battles of June 1942*. 2012, Indiana University Press.

2. *The Spectator*, 9 March 1962.

3. *The Fry Chronicles*. 2010. Penguin Books.

4. After Ashby, R. *An Introduction to Cybernetics*. 1957. London: Chapman and Hall.

5. Whelan, R. *Fifty years on, CP Snow's 'Two Cultures' are united in desperation*. UK Daily Telegraph, 5 May 2009.

LETTERS

OPERATION NEPTUNE

Dear President,

Regarding The NAVY LEAGUE OF AUSTRALIA'S interest in the 75th anniversary of the RNZN, we are planning for a busy 2016. Planning includes a history conference in October (which we will sponsor in conjunction with the Maritime Friends of Wellington) including eight presenters covering (a) an overview, (b) the loss of HMS NEPTUNE, (c) HMNZS LEANDER at Kolombangara and the subsequent NBCD issues, (d) WRNZNS, the RNZN & the Korean War, the Hydrographic Service, the Otago/Leander Class Frigate era and a presentation by the Maritime Friends. The planned strategy conference has the theme, "looking to the future; lessons of the past" and will include New Zealand maritime strategy, ANZUS, NZ Foreign Policy, the RNZN's place in the world, the interest in the 1980's in submarines, Project Protector and a forward view to perhaps 2030. There may be some interchange of presentation between the two conferences. Captain Andrew Watts ONZM RNZN is leading Operation Neptune from Auckland; including the International Fleet Review in Auckland 17 – 22 Nov. It was as a result of a meeting with him that we responded to his suggestion for a Strategy Conference.

We hope to be able to provide an article for the October 2016 issue of *THE NAVY* Magazine of Australia.

Kind regards

Bob McKillop

The Navy League of New Zealand, Wellington Branch Inc.

75

1941 – 2016





WOOLLOOMOOLOO PHOTO • PAGE 36

The NAVY Vol. 78 No. 1 – Jan. 2016



Dear Editor,

The carrier from which the photograph was taken is definitely *INDOMITABLE*, note that the nearest octuple pom-pom is on a higher deck than the forward one and the raised tops to the two visible 4.5" gun turrets which obtrude above flight deck level. The battleship is definitely *KING GEORGE V*, flagship of VA Second-in-Command BPF, Vice Admiral Sir Bernard Rawlings, and the cruiser to its left is definitely *SWIFTSURE*, flagship of the 4th Cruiser Squadron, Rear Admiral E J P Brind. The two destroyers to the right are frustratingly difficult to identify but the one against the jetty on the furthest right has a searchlight on the 'bandstand' aft of the funnel which makes it a 'U' or 'W' class.

WESSEX is carrying out a 'cold-move', note the cover over the forecable showing that her boilers are not flashed up. She formed part of the 27 Destroyer Flotilla and arrived in Sydney with the rest of Task Force 118 from the BPF on 10/11 February 1945. She has a cable party on the forecable but no jack hoisted so there are no lines ashore and there is a fender party visible on the iron deck, outboard of the anti-aircraft gun 'bandstand'. The bow of the tug moving *WESSEX* is just visible on the extreme right of the picture, outboard of the 'bandstand'.

Of interest, I found another photograph in V E Tarrant's book 'King George V Class Battleships', Arms & Armour Press, 1991, that appears to have been taken a few minutes later showing the tug by *WESSEX* starboard quarter. The dockyard craft outboard of the two destroyers on the right, with number N07?, ought to be identifiable from dockyard records. Perhaps the Naval Historical Society could track it down.

On the 75th Anniversary of the Battle of the Coral Sea, 2017 (ABC75), there is the obvious comment that it was the first major battle between aircraft carrier task forces where the fighting was done principally by aircraft and the surface ships never came within sight of each other. Its strategic setting was also a major factor. Mulling it over, it also occurred to me that it is one of only a few battles named after a 'blue water' patch of ocean. Most are named after the nearest point of land e.g., Trafalgar, Tsushima, Jutland, Matapan, Falklands, Coronel, Dogger Bank etc. Perhaps this ties in with its long-range, strategic nature?

David Hobbs



HMS *INDOMITABLE* (92) Entering Captain Cook Dry Dock, Garden Island, Sydney after suffering Kamikaze attack, May 1945.



HMS *KING GEORGE V* (41) enters Apra Harbour Guam 1945.



HMS *SWIFTSURE* (08).



HMS *WESSEX* (R78).

Erratum, Vol. 78 No.1, Jan-Mar 2016:

p.2: Admiral Sir Andrew Cunningham (ABC).

p.25 Photo: NUSHIP ADELAIDE (L01) and HMAS CANBERRA (L02) Garden Island Sydney July 2015.

Photo by Paul Sadler.

p.36 Photo: David Hobbs writes: The photograph was taken from the bridge of HMS *INDOMITABLE*. The destroyer HMS *WESSEX* coming along side has not yet had her BPF pennant number (D32) applied and still has the earlier RN pennant number (R78) in place. The cruiser may be HMS *SWIFTSURE*. The Battleship's full name is HMS *KING GEORGE V*.

I first wrote my page for this edition back in January. Magazines can have long lead times and early deadlines. And it is always best to keep one's editor happy. In January it was thought that the launch of the 2016 Defence White Paper would be at a date after the publication of this edition of The Navy. In the event the launch was sooner than expected. Hence, on the day the White Paper was launched [1] our editor contacted me to advise that the magazine was about to go off to the printers. He asked would I like to do a quick update on the White Paper. Naturally, I said yes.

The White Paper has been two years in the making. On a necessarily quick, preliminary view it appears to have been well worth the wait. Readers will recall that it was in April 2014 that the then Prime Minister and Defence Minister announced that Defence was to prepare a White Paper which was to be completed by 2015. The White Paper process as announced involved a thorough examination of the many matters relevant to Australia's defence. The themes that individuals or organisations were asked to consider when putting in submissions to the White Paper were extensive. The themes were listed in the October 2014 edition of The Navy. In October 2014 the League forwarded its submission. This was published in the April 2015 edition of The Navy. Our submission can also be found on the League website www.navyleague.org.au An Expert Panel was appointed to conduct community consultations. The Panel also met with public policy think tanks and defence industry. The Report of the Panel—Guarding against uncertainty: Australian attitudes to defence—was released in July 2015.

Among other steps in the preparation of the White Paper the Government had commissioned the Rand Corporation to examine naval shipbuilding in Australia. The Report of the Rand Corporation recommended a continuous build programme for Australian naval shipbuilding. In August 2015 the government announced, following the Rand Report, that there was to be a continuous build programme. The Government announced that it would bring forward the Future Frigate Programme with a continuous onshore build programme to commence in 2020. The Government further announced that it was bringing forward construction of the Offshore Patrol Vessels by two years, with a continuous onshore build commencing in 2020. Adelaide was hereafter to be the principal naval shipbuilding centre for Australia. The 2015 White paper was expected to be released in October 2015. As readers will know, in September, following the change of Prime Minister, Senator Marise Payne was appointed Defence Minister. Any new Minister will quite naturally wish to review what she has inherited. The new Minister has had a long-term interest in defence and no doubt wished to make her own input. As a consequence the release of the Paper was postponed.

The outcome of all this work is now revealed in the now 2016 White Paper. There is a great deal in the Paper that we in the League can welcome.

There is much in the Paper which supports Australia's maritime strategy. The Paper confirms the Australia is to acquire 12 "regionally superior" submarines. The decision as to whether the new boat will be French, German or Japanese is yet to be announced. So too is the matter of where they will be built. Before Christmas Senator Payne, in a speech in Adelaide, said that the new submarines would be built onshore, offshore or as a hybrid build. It is probably a safe assumption that one way or another a good deal of the work will be carried out in Adelaide. The use of the phrase "regionally superior" is interesting. By the time the new boats are in the water there will be at least 4 nations in the Indo-Pacific region operating nuclear submarines.

The RAN is to get 9 new anti-submarine frigates and 12 new offshore patrol vessels. The amount of new construction these vessels represent will certainly permit the continuous build programme previously announced and confirmed in the White Paper. The League has, in The Navy and in our White Paper submission, argued for a continuous build

programme. The Navy is to get new maritime tactical unmanned aircraft. UAVs are becoming a common feature in naval operations. It is intended that the UAVs will operate from both the new frigates and the OPVs. The RAN is also promised modernized mine countermeasures.

It is pleasing to note that the RAAF is to receive an additional 7 Poseidon LRMP aircraft. Additional aircraft is something the League proposed in its White Paper submission. The White Paper states that the ADF is to acquire a new deployable land-based anti-ship missile capability. This is a new capability. Apparently it is contemplated that these missile systems would be used to protect offshore oil and gas installations. On my quick read of the Paper I am unable to find any performance details, range etc.,. Presumably the missiles would be an Army responsibility.

Other announcements affecting Navy include the upgrade of the logistic support ship HMAS CHOULES and the acquisition of two new replenishment ships by 2026 with the option of a third replenishment or additional logistic ship in the late 2020s. The White Paper also proposes the acquisition of a large hulled multi-purpose patrol vessel for the Navy to support border protection and maritime resource security related tasks. It is proposed to establish a riverine patrol capability with a new fleet of lightly armed boats for operations in a wide range of estuarine environments.

There is a great deal in the 2016 White Paper. The plans outlined in it will have to be carried out over many years. A number of earlier White Papers have had but a short life. It is to be hoped that this Paper will last much longer. Which brings me to the subject of money. Money is the hurdle at which many a White Paper has stumbled. In the White Paper documents appears the following statement "this force will be achieved through the Government's funding plan, which raises Defence funding to 2% of gross Domestic Production by 2020-21. The Defence budget will rise from \$32.4 billion in 2016-17 to \$58.7 billion in 2025-26, with approximately \$195 billion to be invested in Defence capability over this period."

The League welcomes the 2016 White Paper. We look forward to the timely implementation of the proposals set out therein.



1. See <http://www.defence.gov.au/whitepaper/Docs/2016-Defence-White-Paper.pdf>, accessed 25 Mar 2016.

ASIA'S RESTLESS GIANTS: THE CHALLENGES TO ASIA'S MARITIME COMMONS

By Michael Wesley

Every generation believes it is living through the most dangerous and turbulent decades in history. Variations on that phrase occur with striking regularity in the defence planning documents of Australia and many other countries, stretching back to before the Second World War. In what has become a process of inter-generational gloom rivalry, competing eras conceptions of risk and turbulence are compared, debated over – and ultimately left unresolved. The whole process, it strikes me, is rather pointless. All eras are beset by turbulence, uncertainty and risk. Whether one era is more uncertain, turbulent or risky than another is largely irrelevant – in each era it is the job of defence planners to assess risks and uncertainty as best they can, and assign responses and resources as best they can to addressing those. In the absence of an ability to apportion defence resources through time, each generation is obliged to use what resources it has to best offset risk and uncertainty in the present and foreseeable future.

A more useful form of temporal comparison between the past and today should be to ask:

- What is distinctive about the era we are entering?
- What are the new drivers of turbulence, uncertainty and change?
- How do these new factors challenge our strategic environment; and
- How best can we use our defence resources to respond to these?

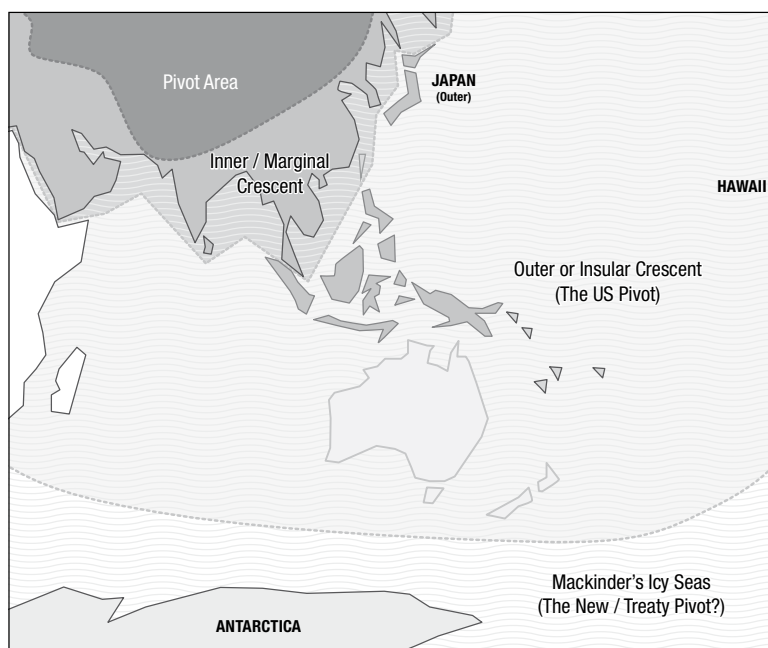
Of course, these questions give rise to different debates, over how new the changes actually are, and how challenging to the established order. But even these debates can generate productive avenues of thought and discussion for defence planning.

I contend that in the current period, the first quarter of the twenty-first century, is being shaped by two vectors of turbulence: the rapid enrichment and empowerment of Asia's largest societies; and the rapid advance and spread of communications technologies. The future of both of these vectors is attended by significant uncertainties: in trajectory, dynamics and consequences. But there is mounting evidence that each of these is generating new upside and downside risks for defence planners. While there are undoubtedly connections between both vectors, I will focus on the first and its impact on maritime strategy.

WEALTH, POWER AND TURBULENCE

There are two predominant and opposed narratives concerning the rapid enrichment and empowerment of Asia's largest societies. One is that all will be well, and that by mid-century, Asia will be a prosperous and peaceful continent; the other is that wealth and power will lead to competition and war, both hot and cold [1]. But there are strong signs that the actual consequences of rapid empowerment and enrichment is Asia will be much more complex. There are three compelling reasons why I believe that wealth and power changes in Asia will cause turbulence, but not necessarily lead to sustained conflict.

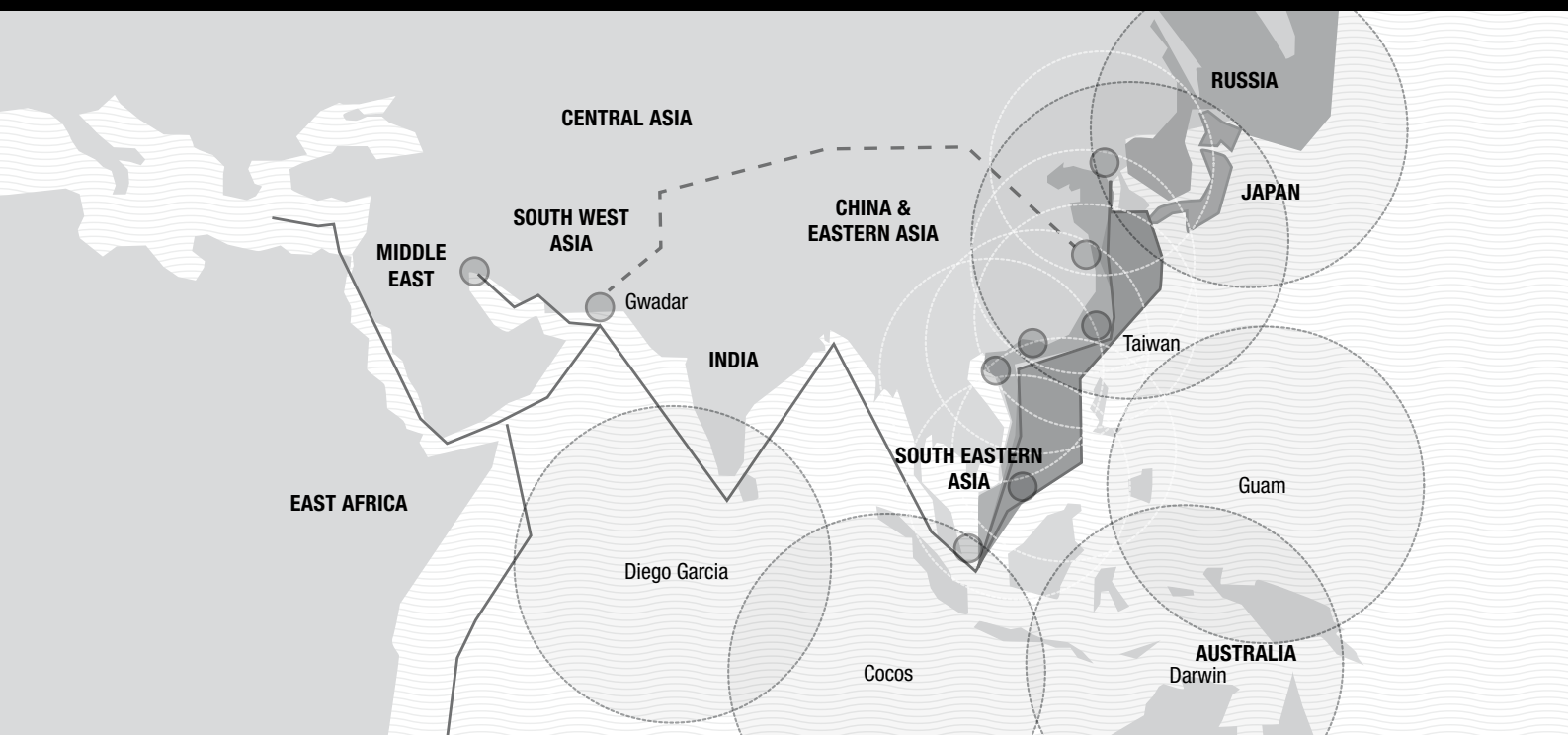
First, the overwhelming weight of history shows that economic growth is not secular, meaning that it can occur without affecting perceptions and



Mackinder's Panglossian Heartland Theory Applied to the Indian and Pacific Oceans (RCB).

beliefs. Wealth and power are two fundamental locators of a state's roles and rights in international relations; those with more wealth and power invariably have a more expansive sense of their rights and prerogatives – and often of the moral rectitude of their actions – than those with less. Hence sudden shifts in wealth or power cannot but alter societies' self-perceptions, expectations and beliefs. Asian societies' recent histories of colonialism and domination, along with the deeply hierarchic logics of their social relations and worldviews, means that relatively sudden adjustments in wealth and power will acquire great significance in terms of rights, prerogatives and perceptions of justice.

Second, Asia's economic growth has brought a rapid expansion in the external dependence and vulnerabilities of its societies. Industrialisation and urbanization have created massive demand for energy, raw materials and consumer markets for rapidly growing economies. Between 1990 and 2007, China's oil consumption tripled and India's increased by over two-and-a-quarter times. The International Energy Agency estimates



The Chinese Motte, Keep, Bailey, Great Sand Wall and Dragon's Spear Strategy. See *The NAVY Magazine Flash Traffic*, Vol. 78 No.1, Jan-Mar 2016, (RCB).

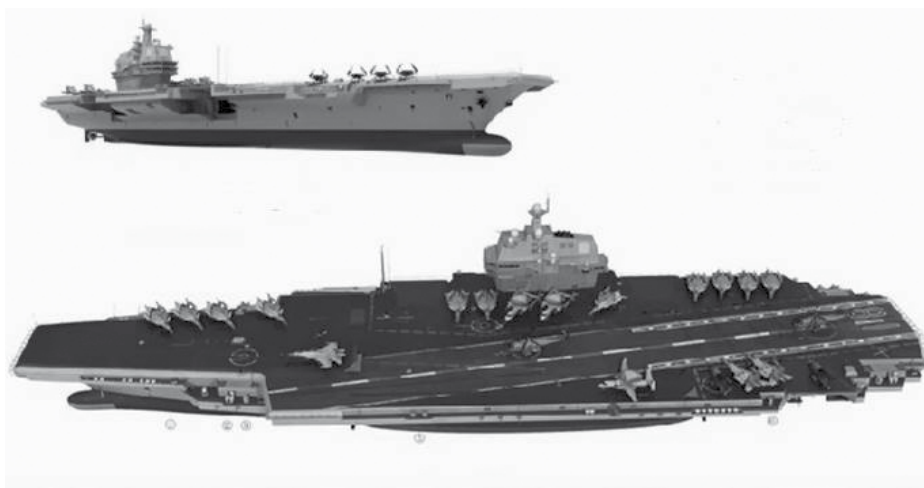
that by 2030, China's energy thirst will have doubled again and India's will have grown by two-and-a-half times. A second form of economic interdependence overlays the first, flowing from Asia's enthusiastic participation in an increasingly sophisticated system of distributed manufacturing, or global production sharing. Research shows that in no other region has global production sharing advanced so far as in East Asia – to the extent that between 70% and 80% of the growth in manufacturing in East and Southeast Asia have come from global production sharing. This makes the manufacturing sector in East and Southeast Asia – the rapidly expanding heart of these economies – highly vulnerable to disruptions to the supply chain in other countries. One recent study found that the March 2011 Fukushima disaster in Japan, which cut Japanese automobile production by 47.7% and electrical component production by 8.25%, also caused a 19.7% drop in Thai auto manufacturing, a 24% drop in Philippines' auto manufacturing, and a 6% drop in Indonesian auto manufacturing; while affecting the electrical sectors on the Philippines by 17.5% and Malaysia by 8.4% [2].

Third, rapid wealth and power increases in Asia's largest societies has raised the prospect that one or more of them can now contemplate regional dominance. Previously, during the second half of the last century, no Asian power was large or wealthy enough to realistically dominate all others or to challenge American power in the Pacific. Now China appears increasingly able to do both, a prospect that has stimulated a number of different reactions among its neighbours. In addition to this, the neat set of reinforcing trade, investment and security dynamics around the Pacific rim has been superseded by a growing bifurcation between states' security interests and their economic connectivities. Most of China's significant neighbours have been establishing strategic connections with each other and with the United States as a way of hedging against China's growing power, while at the same time deepening their economic linkages with the Chinese economy.

The result is an escalating rivalry between the interdependent states of the Indo-Pacific. And this condition seems to be self-accelerating: interdependence leads to growing wealth, which leads to expanding expectations, which leads to growing rivalry. The stakes involved in such deep and complex interdependence mean that the rivalry cannot be brought to a head in a physical contest of arms that could jeopardise economic enrichment. At the same time, the rivalry and lack of trust among regional countries means that economic interdependence cannot drive the sort of political integration that has led to the creation of what Robert Cooper called "post-modern states" in Europe [3].

THE PSYCHOLOGY OF INTER-DEPENDENCE

In purely structural terms these three changes have resulted in two developments in Asia's economic geography. The first is the pronounced geographic separation between Asia's centres of consumption and Asia's centres of production – particularly in minerals and energy. Asia's industrializing and urbanizing giants represents the greatest growth trajectory for demand for energy and minerals in the world, both today and into the foreseeable future. It is a demand growth that is both insatiable and structural – meaning that if the demand is not met with dependable



PLAN domestic aircraft carrier the Type 001A Launched Dec 26 2015.

supplies at sustainable cost it will threaten social, economic and political cohesion in Asia's rapidly industrializing societies. Particularly in energy, there is only one source of sustainable supply in the world that can hope to meet the demand: West Asia's hydrocarbon reserves. For many West Asian producers the demand security provided by East and South Asia's energy thirst is as structurally compelling: without continued robust demand for energy and reliable flows of export dollars, the stability of their own mostly autocratic societies would also be threatened.

The second development in Asia's economic geography is the development of a region-wide manufacturing system, and the rapid end to the prospects of autarchic industrialisation – where all or most elements of manufacturing and consumption occur within a single national economy. With regional and global manufacturing becoming ever more footloose, this has made considerations of comparative advantage among countries and companies more fleeting and more fraught. China and several Southeast Asian countries have become increasingly worried about being caught in the “middle income trap”, where their cost of labour rises but the local manufacturing sector is unable to innovate up the value chain [4].

While both processes have undoubtedly led to rapid increases in power and wealth and modernization of Asian economies, they have also been disconcerting for some. Particularly for countries with histories of self-sufficiency, import-substitution, and autarkic policy settings, the sudden and irreversible expansion of their economic dependence on the outside world has led to increasing anxiety, particularly as the global economy seems to be gripped by periodic instability with increasing frequency. The combination of a sense of increasing vulnerability to flows and supplies located outside the country's borders, with the growing strategic rivalries and competition touched off by China's ascent, have led to a growing sense of strategic claustrophobia, particularly among Asia's larger powers. This strategic claustrophobia manifests itself in the growing anxiety that rivals will play out their strategic designs by manipulating vulnerabilities and dependencies; and that the only way to counter this is to position one's own country to be able to manipulate the vulnerabilities of its rivals.

CLAUSTROPHOBIA AND RIVALRY

The arrival of an era of rivalrous interdependence has led to some distinct changes in the Indo-Pacific's strategic dynamics. The first can be termed the “normalization” of Asian security. On gaining independence, most inherited colonial boundaries that included a great deal of diversity and rivalry, and many soon acquired communist insurgencies also. The result was ethnic and political instability, and a consequent preoccupation with domestic security in a way that crowded out serious external security preparation or competition.

Security spending in the Indo-Pacific has shifted decisively in favour of external security over the past decade. While few of those countries that in the past have been preoccupied with internal security would admit that their domestic concerns have completely resolved, the shift in favour of external security reflects intensified strategic competition in the region. Thus despite its internal security budget being larger than its military budget, China's arms spending continues to grow strongly.

The growing strategic rivalry across the Indo-Pacific can be read from basic arms acquisition statistics. In 2012 SIPRI reported that the period from 2007-2011 saw a 200 per cent higher

volume of arms transfers into Southeast Asia than there had been between 2002 and 2006. This volume of imports was the highest since the end of the Vietnam War. Naval weapons formed the bulk of these purchases, with Ships and maritime weapons accounting for 52 per cent of the total, and another 37 per cent accounting for weapons with a possible maritime role. SIPRI reports that a similar level and profile is evident in weapons acquisition intentions also [5].

As a result, Asian countries on the whole are becoming more able to prosecute their own external security interests – and as ability grows, willingness follows closely. The Indo-Pacific is becoming a more militarized realm, with a greater number of consequential security actors. The options for both rivalries and coalitions have expanded, as have the chances of conflict occurring among militaries whose capabilities exceed their doctrine or maturity.

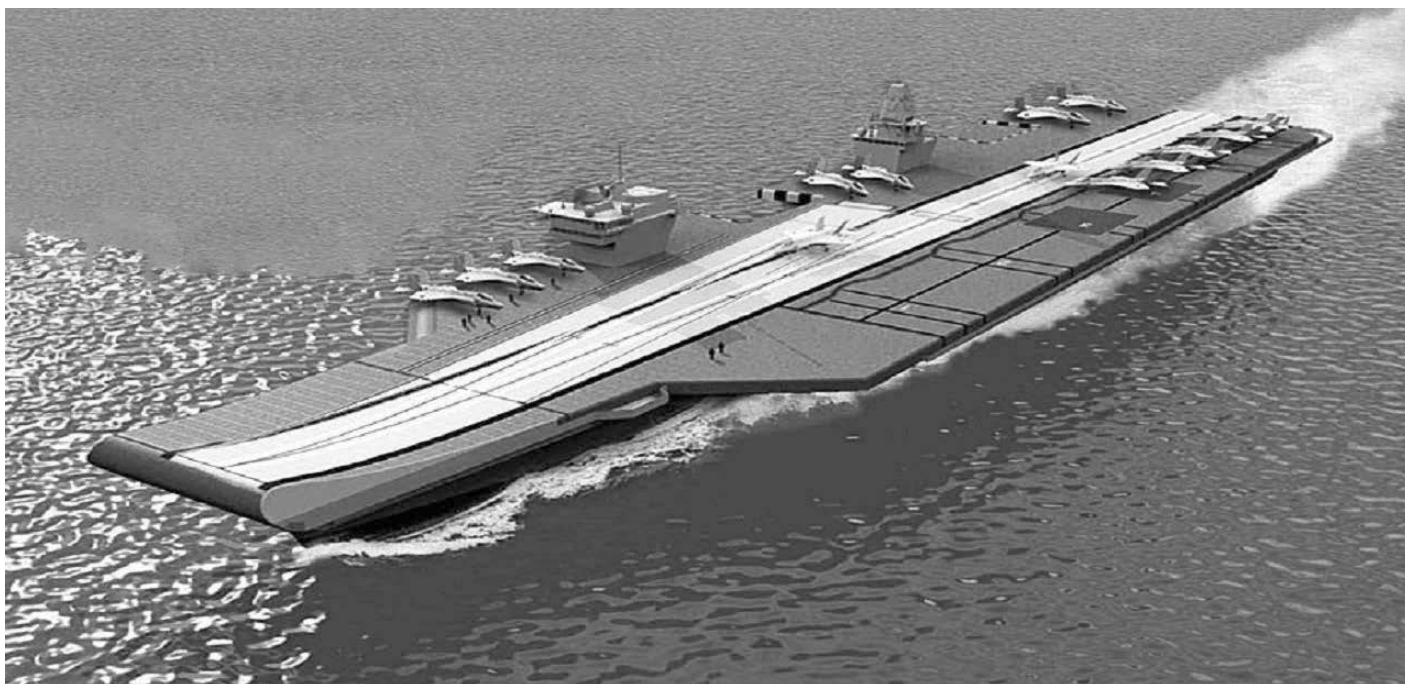
Another change appears to be developing in strategic doctrine. The growing rivalries and capabilities in the region has coincided with a wariness about direct confrontation and escalation, particularly of the sort that could disrupt the lucrative interdependences of the region. A result of this reluctance has been a growing awareness of the options for “horizontal escalation” – that is responding to confrontation in one location by threatening to exploit a rival's vulnerabilities in another location. So, for example, a United States unwilling to risk a direct naval confrontation with China in the Taiwan Strait, could threaten to shut down the Strait of Hormuz to China-bound oil tankers. Or China, in order to build pressure on Japan over the Diaoyus/Senkakus, could start harassing Japanese ships in the South China Sea. Or India, under pressure from China on their mutual land border, could threaten to squeeze off access through the Andaman Sea to Chinese ships. Looked at from this perspective, the sudden flaring up of maritime territorial disputes looks much less like being driven by localised demands and rivalries, and much more about strategic positioning for the evolving rivalries across the Indo-Pacific.

GEOGRAPHY AND STRATEGY

In the context of an increasingly contested maritime domain, the particular geographic features of Asia's southern tier begin to take on particular strategic significance. At the heart of manipulable dependence lies Asia's east-west energy trade: the disruption of no other commodity or supply could wreak such widespread damage as that of hydrocarbons. The physical properties of these energy commodities means the bulk of them must be transported along a concentrated and non-redundant sea route, from the Gulf, through the Indian Ocean, the Straits of Malacca, the South and East China Seas.



ROKS DOKDO (LPH 6111) and USS GEORGE WASHINGTON (CVN 73) transit the Sea of Japan Nov 2015.



NS VISHAL IAC II India's Nuclear Powered Aircraft Carrier.

As the weapons acquisition statistics in Southeast Asia attest, the sea along this singular corridor has become a symbol of vulnerability and opportunity for Asia's jostling powers. As C. E. Calwell notes, the coast always exists as a potential frontier between belligerent states, with the scale and timing of the threat rarely being able to be anticipated or planned for [6]. Calwell particularly notes the strategic advantages and disadvantages presented to maritime powers by two particular geographic features: peninsulas and bays. Peninsulas, he argues, by definition lack strategic depth; they are the very opposite of a land-based salient into enemy territory:

The salient land frontier does not necessarily place troops within the salient at a strategical disadvantage; because they may be in a position to strike; and there are two different directions in which they can strike. But an army in a salient girt by the sea cannot from the nature of the case strike if the enemy has command of the sea. ...[7]

Bays, on the other hand, offer a completely different set of advantages:

As, in time of war, the frontier of that nation which enjoys the maritime control is the coast line of the enemy, it follows that when the coast line takes the shape of a giant gulf or bay, the army of the power dominating the sea can strike either to the left hand or to the right, while the adversary is compelled to divide his forces [8].

With these observations in mind, it is necessary to suggest another way of thinking about Asia's maritime geography than control of sea lines of communication or choke points. The threat to close a particular choke point has two disadvantages: it offers at best a short term strategic advantage; and it is likely to be indiscriminating, inconveniencing rivals and allies at the same time. One must also keep in mind Sir Julian Corbett's observation that "the most common situation in naval war is that neither side has the command [of the sea]; that the normal position is not a commanded sea, but an uncommanded one" [9]. Particularly in a situation with several rising rivalrous naval powers, it is more likely that they will try to strive for enduring political and strategic preponderance over key geographic features of maritime

Asia, and to forestall the preponderance of their rivals.

From this perspective, there are six alluring possibilities for preponderance that offer themselves to Asia's jostling powers. Conveniently, these divide into three bays and three peninsulas. The three Bays are the Arabian Sea, the Bay of Bengal, and the South China Sea. The geography of Bays interacts with power and the strategic imagination of rising powers in peculiar ways. Bays are enclosed bodies of water that engage the territorial imagination – one can imagine "owning" a bay much more easily than one can imagine "owning" a sea or an ocean. Maritime Asia's three Bays are historical trade hubs with abundant historical – and therefore contemporary civilizational – overlays. Before European conquest, Asia's maritime trade route was neatly divided into three "circuits", each with a different pattern of monsoonal trade winds. The South China Sea circuit was dominated by Chinese traders, the Bay of Bengal by Indian traders, and the Arabian Sea by Arabs. It is not hard to see why these bodies of water might so engage the romantic and strategic imagination of these peoples. Each of these Bays is subject to territorial disputes and expansive great power sovereignty claims. Each is bordered by one big and several



JS IZUMO (DDH-183) Image Operating F-35.

smaller claimants; with the United States as the anxious guarantor of the maritime commons in the background. Each Bay is attended by complex politics and strategy around its egress and ingress points: does control of a Bay confer or negate control of a chokepoint? Does control of a chokepoint confer or negate control of a Bay?

The three peninsulas are the South Asian Peninsula, the Indo-Pacific Peninsula, and the West Pacific Peninsula. Peninsular geography also interacts with power and the strategic imagination in peculiar ways: it constrains, concentrates, funnels and bundles power. Strategic shifts in one part of a peninsula are likely to cascade through to its other parts. Peninsulas tend to be strategically stable if dominated by a single set of strategic interests; but once a contrary strategic interest gains hold, they become extremely unstable. Two of the Indo-Pacific's peninsulas – the South Asian and West Pacific peninsulas – hold the key to India's and China's strategic claustrophobia. Each are held in full or part by rival entities; each contain parts of India's and China's historic sense of wholeness; each are sites of strategic footholds by major rivals. For China to gain control of the West Pacific Peninsula; or for India to become supreme on the South Asian Peninsula, would represent major advances in their regional and global power capabilities. The Indo-Pacific Peninsula, running from northern Thailand through the Malay Peninsula and the Indonesian archipelago to northern Australia, is just as crucial: as the land divide between the Indian and Pacific Oceans, it is a vital frontier between American power and Indian and Chinese ambitions. Any one or combination of powers that gained supremacy over the Indo-Pacific Peninsula would hold the key to the broader Indo-Pacific.

CONCLUSIONS

Three Peninsulas, three Bays. To find a Mackinderian formula, the Peninsulas hold the key to the Bays; the Bays hold the keys to the Peninsulas. So, for example, the further expansion of Chinese influence down the Indo-Pacific Peninsula will further split ASEAN solidarity, allowing the continuing advance of Beijing's claims in the South China Sea. Creeping Chinese control over the South China Sea brings it closer to its goals in the West Pacific Peninsula – what Chinese strategists call the First Island Chain – including by ramping up the pressure on territorial disputes with Japan in the East China Sea. If India is able to draw Pakistan, Bangladesh and Sri Lanka into its own growth dynamic, and thereby neutralize them as strategic concerns, it can build influence in the Arabian Sea and Bay of Bengal. India's growing presence in the Bay of Bengal and into the Malacca Straits can act as a counter to Chinese control over the Indo-Pacific Peninsula – and even into the South China Sea. China's ability to establish a permanent presence in the Arabian Sea – perhaps at Gwadar – will decisively counter India's position in the South Asian Peninsula and the Arabian Sea.

Arguably, this geopolitical perspective on Asia's future raises more questions than it answers. Many of these developments are nascent. Big unknowns abound. To what extent will the United States be able to maintain maritime supremacy against the naval build-ups of so many southern tier states? What are China's and India's abilities to build geopolitical influence on the Peninsulas, while establishing supremacy over the Bays? To what extent will peninsular and littoral states forge a strategic common



Sir Halford John Mackinder.

purpose or be divided and dominated by their giant neighbours?

For Australia, there are some clear implications. First and foremost, we must get used to the fact that we are an integral part of the Indo-Pacific Peninsula, and cannot escape the escalating competition for it. Second, we must stop thinking tactically and start thinking strategically about the region. Instead of priority relationships as the foundation of our foreign and defence policies, we need to think in terms of three bays and three peninsulas. The outcome in each will have profound implications for us, and we need to think hard about all possible permutations. Third, neither multilateralism nor bilateralism will provide a way forward. The great powers will – and already are – using the region's institutions as instruments in their rivalry. Staking our future on Asia's institutions being able to mitigate this scale of rivalry will be a mistake. Neither will cultivating good bilateral relations with the major powers be enough. A small player like Australia risks being ignored and played off by the bigger powers. Instead, we need to find a flexible, plurilateral approach to the region, in which we place an equal or even greater emphasis on building common cause and understanding with countries closer to our own size. Be it in the Bays or the Peninsulas, it is the choices of medium sized and small states that will hold the key. These are our natural caucus group – and we should pour resources into a deepening continuing engagement with them over the fates and dynamics of the peninsulas and bays. In particular, we need to build our strategic relations with the peninsular swing states, Japan and Indonesia, helping shape and bolster their strategic visions for the peninsulas and bays. One thing is for certain: the Asian Century will almost certainly not be benign for Australia if we continue to be strategically naïve about how rapid economic growth affects security dynamics. But by thinking geopolitically about Asia as a whole – its northern and its southern tiers; its bays and peninsulas – we can survive and prosper in the Asian century. ■

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8. *ibid.*, pp. 266-7

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F-35s FOR THE CANBERRA CLASS LHDs: CHOOSING AN LHD DESIGN

By Kelvin Curnow

This paper considers planning to replace HMAS TOBRUK and the Kanimbla class with what became the LHDs (Landing Helicopter Dock); commencing in 2000 with the objective announced in the Defence 2000 'Our Future Defence Force' White Paper. A 2003 Defence Capability Review stated that two LHDs of at least 20,000 tonnes displacement and capable of launching five to six helicopters simultaneously were required. In 2004 a Request For Information (RFI) and invitation for tenders was sent to two European shipbuilders, the French company Direction des Constructions Navales (DCN) and Spanish company Navantia. DCN submitted a proposal based on the Mistral class amphibious assault ship. The Navantia design was based on the Buque de Proyección Estratégica (BPE - Strategic Projection Ship).

In September 2010 a vessel with an LHD design was commissioned into Armada Española (Spanish Navy) service as the SNS JUAN CARLOS I. On 20 June 2007, the then Minister for Defence Brendan Nelson announced that a AUD\$3 billion contract to build two ships to the BPE design had been awarded to the Spanish firm and its local partner Tenix. Construction of the ships, to be named Canberra and Adelaide, commenced in 2009 and 2011 respectively. Canberra (LDH 02) was commissioned on 28 November 2014 while Adelaide (LDH 01) will be completed and enter service in 2016 and was commissioned into Navy, December 2015.

THE CANBERRA CLASS LHD

The vessels measure 230.82 metres (757.3 ft.) in length, have a maximum beam of 32 metres (105 ft.), a maximum draught of 7.08 metres (23.2 ft.) and at full load will displace 27,500 tonnes. Each ship also has substantial aviation facilities, having a flight deck measuring 202.3 metres by 32 metres (664 ft. by 105 ft.) with six spots permitting simultaneous operations for helicopters up to NHI MRH-90 Taipan size. Eight medium-size helicopters can be accommodated on the hangar deck and an additional ten can be carried on the light vehicle deck if required. Other types which will operate from the ships include the Boeing CH-47F Chinook, Sikorsky MH-60R anti-submarine and Airbus Tiger attack helicopters. However, unlike the Spanish Navy no fixed-wing aircraft will operate from the Australian ships. The BPE was designed with a 12 degree ski-jump specifically to enable the operation of Short Take-Off and

Vertical Landing (STOVL) Boeing AV-8B+ Harrier II fighter aircraft. This feature was retained on the Australian ships, the cost of redesigning them was considered to be too prohibitive.

According to reports, unlike the JUAN CARLOS I the Australian ships were not constructed with dedicated fuel lines or ammunition lifts to sustain fixed-wing operations. This was not only to save cost, but it was considered that the LHDs would be only used for humanitarian relief. In situations where there was a necessity for ship-based airpower this would be adequately met by the Tiger attack helicopter. At no time was it considered that the ships would be used in an opposed landing operation. However, this rather defeats the rationale behind the BPE design which is specifically for 'power projection' as its Spanish name implies.

The Canberra class are designed to carry a maximum of 1,600 troops (in overload), 110 vehicles or 46 tanks. This is hardly a ship intended for humanitarian relief or to provide an Australian response to low-level conflict in the Pacific. These operations could be supported by a much smaller less capable vessel, HMAS CHOULES being an example. Given the dimensions of the Canberra class, Australia has either overspent on an unnecessarily large design, or underspent so that the ships cannot offer the full range of capabilities in any future high order conflict.

THE POSSIBILITY OF AN F-35B PURCHASE

In May 2014 reports began to emerge that the then Prime Minister, Tony Abbott, had requested the Department of Defence (DOD) to examine the possibility of operating Lockheed Martin F-35B Lightning II (also known as the Joint Strike Fighter – JSF) STOVL fighters from the LHDs. Mr Abbott had asked the DOD to examine the merit of buying F-35Bs in the Defence White Paper and accompanying Force Structure Review to be published in late 2015.

One year later, on 7 July 2015, The Australian Financial Review reported that the idea had been abandoned because the LHDs would require extensive modifications to permit operation of the F-35. These would include adding a landing approach radar, heat-resistant coating for the flight deck, an increase in jet fuel storage capacity, new fuel lines and specially equipped hangars.



RN Pilot Tests F-35B on board USS WASP 2015.



Osprey and AV-8B Harriers Operating from the Deck of Arima Ship JUAN CARLOS 1 2014.

The estimated cost of the modifications, according to News publications, was put at AUD\$500 million. In addition an expenditure of AUD\$12 billion (acquisition plus through-life costs) would be required for twelve F-35Bs. The cost of modifications, together with the perceived lack of effectiveness and inherent inefficiencies in operating a small number of F-35Bs from the LHDs effectively meant that the proposal was dismissed.

THE CASE AGAINST USING AN LHD AS A FIXED-WING CARRIER

An insightful paper written by Dr. Richard Brabin-Smith and Dr. Benjamin Schreer, published by the Australian Strategic Policy Institute and titled *Jump Jets for the ADF* [1], presented a comprehensive range of arguments against fixed-wing operations from the Canberra class. The authors considered three main contentions:

- First, the F-35B is a risky and expensive option. It is true that of all the F-35 variants the STOVL 'B' version has proven the most troublesome and required a large number of modifications to the design which have in turn compromised its capabilities.

The authors rightly identify that the F-35B has a radius-of-action 140nm less than that of the land based F-35A and 150nm less than that of the F-35C launched by catapult from a conventional aircraft carrier. Moreover, the F-35B has a smaller weapons bay than that of the other two variants.

- The second argument submitted is that the LHD would require an additional Hobart class AWD to be built to protect it from air attack, acting as 'goalkeeper' against enemy missiles and strike aircraft.
- Lastly, Brabin-Smith and Schreer canvassed the wide range of scenarios in which an LHD with a small air wing might operate effectively. These included operating as part of an integrated force defending Australia through to assisting the USN in expeditionary actions against active threats, either from recognised nations, or from ad hoc identities such as ISIS.

The authors concluded that:

'in none of the scenarios examined an Australian contribution with a small number of STOVL aircraft would be of little or any use'.

In further evidence against the effectiveness of the

F-35B, the fighter demonstrated a less than satisfactory 50% availability rate during Operational Test 1 (OT-1) carried out on the USS WASP in the period 18-26 May 2015. However, this unacceptably low figure must be viewed in the light of the fact that the F-35 is an aircraft which is far more sophisticated than any other naval aircraft and is still in development. This is despite the declaration on 31 May 2015 by the USMC that it had achieved Initial Operational Capability (IOC).

THE CASE FOR FIXED-WING LHD OPERATIONS

The JUAN CARLOS 1 regularly operates with a combined maximum of twenty-two Harriers and helicopters, the mix dependent on the mission requirements. A maximum of twelve Harriers is carried at any one time. These are used to provide air support to the *Infantería de Marina* (Naval Infantry) as well as fleet air defence. While apparently small in number, the Harriers provide a formidable capability because the size of a carrier air wing has become less important since the advent of VSTOL aircraft which, not requiring catapults or arresting gear, can be used to generate a very high mission rate. The RN's Sea Harriers (SHARs) during the 1982 Falklands War were able to generate an exceptional mission rate. A total of 1,335 combat sorties were flown during the 45 days of air combat operations beginning 1 May 1982. This is an average of 1.41 sorties per SHAR per day. Together with an availability rate of over 90% the SHARs were able to provide a capability well above the scant numbers embarked.

During the conflict twenty-eight SHARs attained air superiority over the combined forces of the *Fuerza Aérea Argentina* (Argentine Air Force) and *Comando de Aviación Naval Argentina* (COAN - Argentine Naval Aviation) totalling some 240 aircraft. Outnumbered ten to one the SHARs shot down twenty-one Argentine aircraft for no loss. Without their presence many more personnel and ships would have been lost.

In Operation Unified Protector, the 2011 operation against the Libyan regime of Muammar Gaddafi, eight *Marina Militare* (MM - Italian Navy) AV-8Bs flying from the carrier ITS GIUSEPPE GARIBALDI dropped a total of 160 guided bombs, and flew a total of 1,221 hours. The same factors which proved so decisive in the Falklands conflict were reinforced in Italian operations over Libya. A small force operating close to the conflict zone,



F-35Bs Lightning II Embarked Upon USS WASP for Successful Flight Trials 2015.

Image of F-35B Landing on HMAS CANBERRA (L02).



the Italian GRUPPO AERomobili (GRUPAER - Embarked Aircraft Group) flew 33 per cent of Italy's total sorties, and 53 per cent of the attack missions with little tanker support. This disproportionate contribution again highlighted the contribution that even a small aircraft carrier embarking a few Harriers can make.

OPTIONS FOR FIXED-WING OPERATIONS

Despite claims to the contrary, the Canberra class can be modified for operation of the F-35B. These immensely flexible vessels are adaptable to many more roles than any other surface ship. As an example, the light vehicle deck could be used to accommodate containers pre-packed with aircraft spare parts. This would obviate the need for specially equipped workshops. Indeed, the perception that the design of the LHD prevents effective fixed-wing operations is patently not so.

Fixed-wing fighter operations from a carrier have proven to be far more effective than that offered by their land-based counterparts. To provide sufficient support to the RAN in any shooting war, the RAAF would have to be expanded considerably beyond its current force structure, requiring far greater expenditure than that needed to modify the LHDs and purchase an adequate number of F-35Bs. The costs of re-design and modification can be offset by the fact that the Spanish Navy has from the outset had plans to modify the JUAN CARLOS I for F-35B operations. Following the Spanish lead, most if not all potential obstacles would have already been addressed. One further factor advances the case for a modified LHD. In December 2013 the Turkish navy ordered a ship based on a modified BPE design which is specifically intended to operate the F-35B. A model of the ship was exhibited at the International Defence Industry Fair (IDEF) held in Turkey in May 2015. This model was shown with five F-35s arranged on the deck and incorporated a higher level of equipment than its Australian counterparts. The equipment included the sophisticated SMART 3D radar, a landing approach radar and two Phalanx CIWS (Close-In Weapons Systems). With three navies and the original design authority/constructor involved in modifying the BPE for F-35B operations both cost and risk are considerably reduced.

When the proposals were advanced for the purchase of an LHD design it was suggested that three ships, be bought. An idea currently being discussed, should the government push ahead with the suggestion for shipborne fixed-wing airpower, is to buy the third LHD to a modified configuration, specifically to operate F-35B aircraft. This could be built to

the same design which has been adopted by Turkey. It would mean that Australia's amphibious forces would remain at their current strength and the two LHDs currently in service would be used as back-up when the purpose designed ship either was unavailable or in refit.

At the time Navantia was named the preferred bidder one multi-role LHD design was apparently not considered, yet with foresight would have been a far better choice. This is the Italian Navy's ITS CAVOUR. This 30,000 tonne ship is as capable of filling the same roles as the Canberra class, but has the added advantage of being designed from the outset to operate F-35B fighters. The CAVOUR, much like its American and Spanish counterparts, will need the heat resistant coating applied to its flight deck but little other modification. It is equipped with the Selex European Multifunction Phased Array Radar (EMPAR) 3D radar and for self-defence four 8-cell A-43 Sylver launchers carrying the MBDA Aster 15 Surface-to-Air Missile (SAM) and two Oto Melara 76mm Super Rapido guns. This vessel is truly multi-role, being able to operate as either a light carrier or an LHD, with a more sophisticated fit-out than any of the three BPE variants.

THE CARRIER AIR GROUP, ITS AIRCRAFT AND ROLES

As few as eight F-35 aircraft can afford significant capabilities to a naval task group, providing disproportionate capability relative to the size of the carrier air group. To provide an adequate level of air defence to the fleet would normally require four F-35s, each carrying four Advanced Medium Range Air-to-Air Missiles (AMRAAMs). The AIM-120D AMRAAM has a range of 180km and hence provides considerable reach for the fighters defending a naval task group. This is the situation as it currently exists, the future offers considerably more by way of capability.

Lockheed Martin are developing the CUDA missile which will offer similar capabilities to AMRAAM, however being dimensionally smaller will allow the carriage of triple the number of missiles. Effectively, this means forty-eight missiles will be aloft, providing the same capability as a Hobart class AWD. As an alternative, the aircraft could be equipped with the 300km range European MBDA Meteor missile, the most sophisticated and longest ranging Air-to-Air Missile (AAM) extant. With fighters on station 200-300km from the carrier, taking advantage of Cooperative Engagement Capability (CEC) and the Link 16 data link, adversary aircraft could be engaged and 'splashed' up to 600km from the carrier.

The F-35 is continuing to undergo considerable development even as it tentatively enters service. To address range deficiencies Israeli Aircraft Industries (IAI) are developing conformal fuel tanks for the aircraft to be delivered to the Israeli Zroa HaAvir VeHahalal (Air and Space Arm). Taking a different path the USMC has conducted successful series of air-to-air refuelling trials of the F-35B from Bell-Boeing MV-22 Osprey tiltrotor aircraft. Either or both solutions could be adopted by the RAN.

The F-35B has been criticised for its internal capacity for air-to-ground weapons which currently stands at either two 500lb or 1000lb class guided bombs. The American solution will be to use the 250lb Raytheon GBU-53/B Small Diameter Bomb II (SDB), eight of which will be carried internally. In contrast the British have decided to adopt the more high-tech MBDA SPEAR (Selective Precision Effects At Range) missile, powered by a Hamilton Sundstrand TJ-150 turbojet which affords it with a range of 100km. This highly effective weapon can be employed in the air-to-surface, anti-ship and Suppression of Enemy Air Defences (SEAD) roles. Eight missiles will be carried internally.

The primary Achilles heel which has always pervaded the operation of

2000 radar system to equip its AugustaWestland HM.2 maritime helicopters. This is a modular system which can be fitted and removed as required and provides an efficient cost-effective means of providing a shipborne AWACS platform. The radar has a range of 85+nm (160+km). The most likely candidate to host such a system in Australian service would be the MRH-90 helicopter. Employing Joint Tactical Information Distribution System (JTIDS), Link 16 and CEC the AWACS helicopter is both a force enabler and capability multiplier. Carrying two or three AWACS helicopters, ASW helicopters and twelve F-35s an LHD air group affords the navy a capability well beyond the relative size of the numbers carried.

COST

All modern weapons systems cost enormous amounts of money and naval vessels are amongst those which cost the most. However, the real cost of sending naval vessels into the middle of a shooting war without essential air cover is answered by not what must be paid up-front, but the cost in lives and equipment without essential integral shipborne air support. The tragic lesson of not providing adequate carrier-borne air-cover is found in the souls and vessels which lie at the bottom of San Carlos Water and the South Atlantic Ocean which surrounds the Falkland Islands.

CONCLUSION

As a result of the Defence White Paper, 2016, Australia is soon to commence on a major shipbuilding programme for new frigates, submarines, offshore patrol vessels and replenishment ships.. ■



Forward Island of NUSHIP QUEEN ELIZABETH II
with F-35B on the Ski Ramp.

STOVL aircraft is that of operating in high ambient temperatures. STOVL aircraft are inherently disadvantaged in comparison to their Catapult Assisted Take-Off But Arrested Recovery (CATOBAR) counterparts because they require a very high thrust to weight ratio. The British have adopted a novel solution to this problem in the form of a deck landing system which provides visual guidance to the pilot flying his or her F-35B from the flight deck of a Queen Elizabeth class carrier. This is the Bedford Array, a lighting system that has a series of LEDs arranged 12-18 ft. (3.7-5.5 m) apart running down the centreline of the ship. These are stabilized for the vessel's heave and pitch and provide visual glide path information to the pilot via a helmet-mounted display. Using the Array the pilot will guide the aircraft to a Short Rolling Vertical Landing (SRVL) which entails using lift from the fan and vectored thrust main engine to hover while it is still moving fast enough to also generate wing lift. The aircraft's brakes are used to bring it to a stop. SRVL permits a significantly reduced approach speed and landing distance. It has the added benefit of lessening the 'super heating' of the flight-deck.

No carrier group can put to sea without an Airborne Warning And Control System (AWACS) capability.

In May 2015 the RN selected the Thales Searchwater



Successful F35 Ski Ramp Trials 2015.



PLUNGING INTO THE RIA OF DEATH

As warned of by *The NAVY* magazine and noted in this issue's President's Page, delays in establishing a continuous ship-building programme and release of the 2016 Defence White Paper, impacted further by the deferral of the submarine build programme, have all contributed to the so called shipbuilding valley of death.

The keel for the third and final air warfare destroyer of the Hobart-class was laid down on November 19, AWD Alliance reports. The third destroyer, HMAS SYDNEY, is the last of three ships currently being built for the Royal Australian Navy under the direction of the Alliance — the project coordinator responsible for managing the works of shipbuilder ASC, mission systems integrator Raytheon Australia, and the Australian Department of Defence.

The 7,000-ton Hobart-class are the first vessels of the Royal Australian Navy built around the USN's Aegis Combat System. Originally considered to comprise a class of six, an additional three AWDs could provide shipbuilding continuity between 2016 and the SEA 5000 future frigate programme coming on stream in 2020, or so. Six AWDs are also important in providing 'continuous at sea' air defence cover necessary to deploy forward Australia's Amphibious Readiness Group.

01 HMAS MELBOURNE (F05) SEIZES \$50AUD MILLION OF HEROIN

HMAS MELBOURNE seized 151 kilograms of heroin, worth an estimated \$50AUD million, from a dhow off the east coast of Africa.

The drug haul is the second for HMAS Melbourne's current deployment to the Middle East region, bringing the total weight of heroin seized to more 578 kilograms in two months.

Commander Joint Operations Command, Vice Admiral David Johnston, said the haul raised the Royal Australian Navy's 2015 drug seizures in the region to almost \$600 million. Melbourne is operating with Combined Task Force 150 and is on her eighth deployment to the Middle East as part of Operation MANITOU. She is the 61st rotation of a Royal Australian Navy vessel in the region since the first Gulf War in 1991.

GENERATION SHIFT: 35 YEAR OLD HMAS DARWIN (F04) HEADS FOR MIDDLE EAST

Having escorted world-wide deploying PLAN ships, comprising the Luyang-Class destroyer JINAN, (DDG152), the Jiangkai-Class frigate YIYANG (FFG548), and the Fuchi-Class replenishment ship QINDAOHU (AOR886) — all built between 2003 and 2011 — into Brisbane, see back cover, the 35 year old HMAS DARWIN (launched in 1982) sailed for the Middle East on the 62nd Operation MANITOU rotation. Previously she had been farewelled by the Prime Minister and Chief of Navy, Vice Admiral Tim Barrett and friends and family at Garden Island.

EUREKA 'PICKET BOAT' — HMAS BALLARAT (F155)

HMAS BALLARAT reconnected with their ship's motto—defend the flag—on the 161st

anniversary of the Eureka Stockade.

The rebellion took place in Ballarat in 1854, when local gold miners objected to unfair licensing laws, corruption and a lack of representation in government. The objection culminated in the miners burning their mining licenses and forming a makeshift stockade.

The first Australian flag, the Eureka flag, is taken by some to signify the birth of Australian democracy. The flag remains an important part of BALLARAT'S identity and is reflected in the ship's patch, worn on every sailor's shoulder opposite the RAN White Ensign. BALLARAT is progressing her CEAFAIR anti-ship missile defence upgrade.

AUSTRALIA CRITICAL TO U.S. PACIFIC PIVOT

An independent report by the influential Centre for Strategic and International Studies (CSIS) into U.S. Policy in Asia (commissioned by the Pentagon) and reflected in DWP 2016, confirmed Australia as being:

- Critical to U.S. military strategy in Asia;
- playing an increasingly important role across the Indo-Pacific region;
- vital both for its Maritime Military Capabilities, and;
- Able to forward base U.S. forces in northern Australia, with secure access to the region and the South China Sea.

distant enough from most conflict zones to protect US assets, but still close enough to allow rapid deployments to critical theatres'.

The report, while reflecting on Australia's unique contribution as a Five Eyes Ally (including in Vietnam and currently in the Middle East), emphasises two critical strategic contributions made by Australia:

- Maritime Assets (Submarines and the Amphibious Readiness Group including its Tailored Air Group and Embarked Military Forces), and;
- Diversification of US posture — meaning that Australia can act co-dependently of the U.S. and so create alternative means of influence, engagement and coalitions in the region.

In his January discussions in Washington (including at CSIS) it is clear that, while asking Europeans to do more in the Middle East against ISIS (inferring the U.K.), the PM did not rule out additional Australian forces, but rather he was looking for U.S. regional engagement and direction. The CSIS report is supportive on both questions — it reaffirms that, the U.S. would wish to see Australia expanding further its regional Maritime capabilities (and certain key enablers such as Cyber) at the expense (if necessary) of more boots and bombs on the ground in the Middle East.

Malcolm Turnbull had a successful trip to



01 HMAS MELBOURNE's Boarding Party approach a Suspected Vessel off East Africa.

The report chimes almost exactly with papers in *THE NAVY* Magazine over the past decade — as reflected on page 32. In this respect, CSIS emphasis upon Australia's maritime posture and emerging Amphibious / Littoral Capability — both in defence of the homeland and for projecting influence in the region — is significant. It reinforces many of the conclusions reached in the 2009 Defence White Paper and underlines much of the strategic context outlined in the 2016 Defence White Paper. The report notes that the Obama administration has consistently failed to provide either leadership or coherent policy in the region and that this has led to further uncertainty and instability. Notably in the South China Sea, where the vacuum created is being filled by an un-deterred China. The report states:

'at the current rate of US capability development, the balance of military power in the region is shifting against the US'.

In a sign of growing pessimism in Washington — perhaps infected by English declinism — the report also prepares for a worst-case WWII type scenario, with Australia 'serving as sanctuary for US forces in the event of conflict, one that is

Washington at a difficult time both for President Obama and the Office of the President. With the demise of the U.K. on the international stage, the U.S. increasingly has to depend on reliable regional allies. This extends also to another 'front' opened by the P.M. on Cyber Security (the 1.5 track dialogue (involving officials and independent analysts)) — which, as noted by *THE NAVY* Magazine, is fundamentally a maritime capability. Three imperatives emerge: the first is the importance of the 2016 Defence White Paper and its strong emphasis on Maritime; secondly, to resolving the unseemly funding issues for the Joint / USMC Northern Bases; and thirdly, the development of a coherent and funded Australian Cyber Command. All three are likely to be a test for Australia; its political, military, economic, academic and research leaders. All the more reason, therefore, for commemorating the 75th Anniversary of the Battle of the Coral Sea, alongside Talisman Saber 2017.

ANAO: ACQUISITION FAILING

The Australian National Audit Office (ANAO) released a report in December into Defence Test



and Evaluation (T&E) that makes for grim reading. ANAO audited Defence's T&E in 2001–2002. Since then, NAO have found that there has been little or only late progress on most of their areas of concern. That's despite the concerns being reiterated in a Defence T&E Roadmap in 2008 and in the Senate Inquiry into Defence Procurement (especially Chapters 2 and 12) in 2012. In this same period US Defense has entrenched independent T&E into Congressional laws, under Title 10 funding, which provides mandatory independent annual reporting of all T&E measures to Congress.

Not one of the 12 Australian Defence organisations dedicated to T&E does developmental testing of ships or submarines: the Navy only has a dedicated operational T&E agency. The implications of this maritime approach may be seen in ANAO coverage of CANBERRA and ADELAIDE's T&E. This approach also places significant risk on the adequacy of preview testing for the future submarine project options and is at odds with the long-term decision by this government to invest in continuous ship building.

Little is known of the post first principles DOD structure other than it aims to 'reduce acquisition bureaucracy' and create a 'strong strategic centre'. Experience suggests this ends in the worst of both worlds – overly optimised (efficient; not effective) and centralised. Indications suggest that efficiencies may already have been taken to the further cost of Research (DSTG) and Defence T&E.

02 NEW PLAN REPLENISHMENT SHIP EMERGES

The first PLAN Type 901 vessel may be being built in south China's Guangdong province. Details are vague but the ship's estimated dimensions suggest 45,000–55,000 tonnes, a length of 350 metres and a beam of 32 m. Photographs show a ship not dissimilar in forward profile to an enlarged version of HMAS CHOULES (L100) – which is 16,000 tonnes, 176 metres long, and 24 metres wide. Such a Landing Ship Dock (LSD) – capable of carrying troops, tanks, light trucks, landing craft and operating helicopters – would be a significant enhancement to China's amphibious capabilities and ambitions, notably in the SCS. The ship is at an advanced state of construction and a launch in early 2016 seems likely; a second vessel may already be under construction.

02 PLAN Type 901 replenishment vessel in build in Southern China.



FUTURE SUBMARINE COMPETITIVE EVALUATION

Evaluation of Australia's delayed Future Submarine program commenced with three potential international partners submitting their proposals. Minister for Defence Senator the Hon Marise Payne announced.

'The Government's Competitive Evaluation Process remains on schedule with Defence receiving submissions from DCNS of France, TKMS of Germany, and the Government of Japan by the 30 November 2015 closing deadline'.

Payne continued: 'submarines are Defence's most complex, sensitive, and expensive capability, so it is important that the evaluation process is thorough and robust'.

The evaluation process will be overseen by the 'new' Expert Advisory Panel, with advice to be provided to Government in 2016. Noting the recent DWP 2016, this may be coincident with the delivery of the Force Structure Review (FSR) and the announcement of the next Federal election, no later than October.

U.S. UNLIKELY TO APPROVE COMBAT SYSTEM FOR FRENCH OR GERMAN BUILT SUBMARINES

The Front versus Back End issue, regarding the building of Australia's Future Submarine, took an additional twist in January – following the P.M.'s visit to the U.S. – when it was revealed that the U.S. was unlikely to release its Combat System for fitting in German or French boats. In the Front versus Back End debate, Australia largely fits out and weaponises the Front-End using indigenous / U.S. designed and classified systems – that can talk to the U.S. The Back-End is largely about propulsion – where the COLLINS Class initially failed – and is where the French and German designs currently outweigh the Japanese Soryu class. However, this is arguably the least sensitive and hi-tech in terms of Australian research / industry competitive advantage. The U.S. is also known to favour the 'Japanese' solution since it further enhances the Triple Alliance (U.S.; AS and Japan); and the Soryu is considered to offer the best interoperability with the U.S. – including the potential for upgrading the last six (of twelve?) boats for nuclear propulsion.

The counter argument, articulated in *THE NAVY*

Magazine, is with respect to creating an overly symmetric and antagonistic response to China – by Australia going Japanese. It is also noted that Japan has never fully atoned for the atrocities carried out against Chinese, Hong Kong, British, Australians, Malaysians, U.S., Burmese and Singaporean peoples in WWII.

DELAYS IN DWP 2016 EXACERBATE DARWIN PORT INCOHERENCY

Darwin's port has sold a 99-year lease for \$506 million to a Chinese company. The port was described as a 'strategic defence port' in the annual report of the body that runs it. This rather contradicted the PM's pre-sale comments describing it 'as a commercial port, not a military port'. The Darwin Port Corporation chief executive officer Terry O'Connor noted that: 'the Port of Darwin plays an important role in Australia's Defence strategy and in 2014/15 was host to over 100 Navy vessels;...it increased Harbour activity for *Talisman Sabre 15*;...and signed access agreement with the Australian Defence Force for its refuelling requirements'.

Australia's response to China needs to show a degree of co-adaptive coherency, with the U.S. and other regional allies, if vital infrastructure loop-holes such as these are not to be mercilessly exploited.

F35: USAF MAY BUY NEW F-15 OR F-16 FIGHTERS

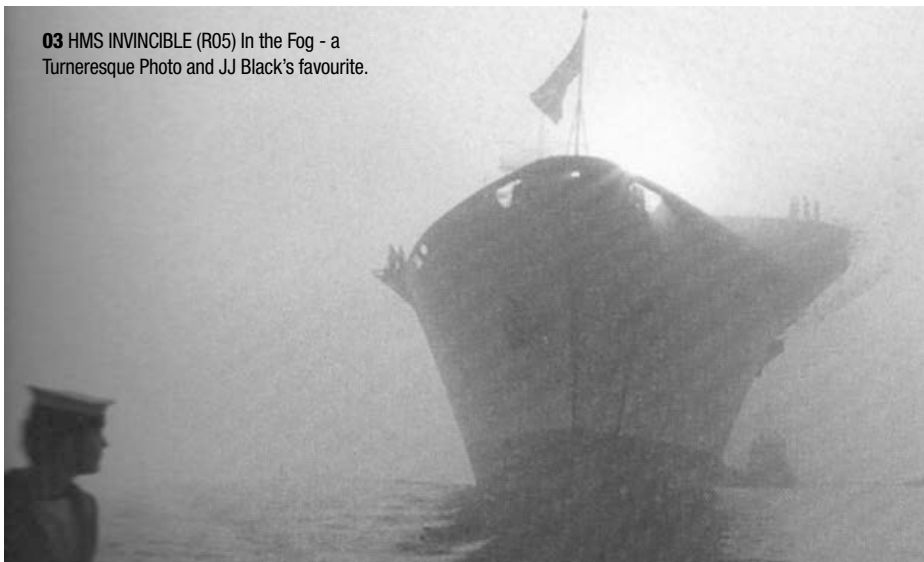
Whereas USN (with USMC) deploys the majority of US Fighter Aircraft – USAF decision to re-consider its order for F-35 is likely to have wider impact; including on RAAF. The F-35 Lightning II may not be produced in sufficient numbers to maintain the U.S. Air Force's current operational capabilities due to budget cuts. USAF is considering filling the capabilities gap with F-15s, F-16's, or F/A-18E/F Super Hornets. An option that remains viable for RAAF.

The Pentagon procurement plan is for 2,500 aircraft by 2040 at a cost of almost \$600AUD. The Lightning II is being produced in three variants: The F-35A conventional takeoff and landing for the U.S. Air Force; the F-35B short takeoff and vertical landing variant for the U.S. Marine Corps, and the F-35C carrier-suitable variant for the U.S. Navy.

FRENCH AND US CARRIER STRIKE GROUPS COMBINE AGAINST ISIS

USS HARRY S TRUMAN (CVN 75) strike aircraft from Carrier Air Wing 7, France's nuclear-powered aircraft carrier FS CHARLES DE GAULLE (R 91) (Combined Task Force 50) undertook combat operations in Iraq and Syria in late 2015. They led carrier-based naval strike operations for Operation Inherent Resolve - against Islamic ISIS. The Truman carrier strike group consists of USS ANZIO (CG 68) USS BULKELEY (DDG 84), USS GONZALEZ (DDG 66), USS RAMAGE (DDG 61), and USS GRAVELY (DDG 107).

03 HMS INVINCIBLE (R05) In the Fog - a
Turneresque Photo and JJ Black's favourite.



03 LAST OF THE BOLD

Admiral Sir Jeremy Black, who died aged 83, was one of the RN's most highly decorated and popular post-WWII admirals, who took his ship HMS INVINCIBLE to war in the Falklands with the adage 'there and back with JJ Black'. The citation for his DSO read that 'throughout the war [he] displayed outstanding qualities of professionalism, leadership and stamina in his command... to keep men and machinery operating at the peak of their performance for such an extended period so far away from home base has required exceptional powers of concentration, man management and perseverance and HMS INVINCIBLE'S success owes much to these qualities so abundantly held by her commanding officer'.

As an acting sub-lieutenant in the destroyer CONCORD, during the Korean War, the ship was straddled by enemy artillery which killed three men. His first command (and last Court Martial) was one of the last wooden-hulled Ton-class minesweepers, HMS FISKERTON, then based in Singapore. There he was appointed MBE and awarded a Setia Negaar Brunei for the 'Limbang Raid', when he carried Royal Marine commandos up river to release the district officer (DO) and other hostages captured by communist guerrillas. He succeeded despite heavy machine gunfire and afterwards recalled the DO's wife kissing the deck and crying: 'Thank God for the Royal Navy!'

USN GREAT GREEN FLEET TO DEPLOY ON BIO-FUELS

Given all its other constraints and challenges and the reducing costs of oil on the world market – noting the ongoing Oil [Trade] Wars between the U.S. and Saudi-Arabia; Saudi-Arabia and Iran and the U.S. / EU / NATO and ISIS – it is unclear whether the USN going green is a military initiative or a political sop?

Navy Secretary Ray Mabus' described his vision of a more fuel-efficient navy as the Great Green Fleet. He also announced a carrier strike group will set sail powered by a mix of biofuels and fossil fuels, to showcase the Navy's goal to cut petroleum use by 2020. It is presumed that the strike group will also include Nuclear energy – actually amongst the greenest of fuels available? - since the USS

JOHN C. STENNIS (CVN-74) – the seventh Nimitz class nuclear powered supercarrier, is expected to lead the Great Green flotilla when it deploys early in 2016 from Bremerton.

At some point – if Westerns politicians are serious about green energy and fuels – it will be necessary to reintroduce Nuclear to their vocabulary.

THAILAND TO REPLACE COASTAL GUNS WITH LONG-RANGE MISSILES

Continuing its tilt towards China, the Royal Thai Navy (RTN's) Coastal Defence Command is replacing a number its coastal gun batteries with long-range missiles and is currently reviewing several options, potentially including Chinese built weapon systems.

MALAYSIA CALLS FOR EXPANDED USE OF DE-CONFLICTION CODES IN SCS

Chief of the Royal Malaysian Navy (RMN), Admiral Kamarulzaman Ahmad Badaruddin, called for wider use of naval protocols ratified in 2014 for application in the South China Seas (SCS). The protocol, known as the Code for Unplanned Encounters at Sea (CUES), consists of standardised phrases for naval ships and aircraft to use in unexpected encounters, especially in contested maritime regions and when exercising Rights of Freedom of Navigation (RFON).

VIETNAM PROTESTS CHINESE SCS GREAT SAND WALL TESTS

China rejected a protest by Vietnam over flight tests conducted on a new man-made airstrip in the South China Sea – declaring it is part of its territory. Vietnam Foreign Ministry spokesman Le Hai Binh said the test flight violated Vietnam's sovereignty, breached mutual understanding and hurt bilateral relations. Chinese Foreign Ministry spokeswoman Hua Chunying said: 'relevant activity falls completely within China's sovereignty – [China] will not accept the unfounded accusations from Vietnam'. The U.S. and Australia have expressed concern that China's 'unlawful' claims are aggravating international tensions. China's airstrip on Fiery Cross Reef is long enough for bombers capable of launching cruise missiles.

04 USS MILWAUKEE (LCS-5) REPAIRS EXTENDED TO FEBRUARY

Repairs to Littoral Combat Ship USS Milwaukee (LCS-5) are estimated to extend into early February following a catastrophic propulsion failure centred on the ship's combining gear, the complex gearing system that merges the output from the ship's Rolls Royce MT-30 gas turbines and Colt-Pielstick diesel engines to the ship's water jets. Subsequent inspections confirmed that the clutch slip led to the propulsion casualty. It is understood that this is not a class-wide issue and different clutch assemblies have been fitted to other LCSs.

T45: WILL SOMEONE PUT THE LIGHTS ON

The much vaunted, 'most capable destroyer of its kind', the British Navy's Type 45 is effectively being withdrawn from service in order to 'upgrade the ships' diesel generators to add greater resilience to the power and the propulsion system'. In other words, developing a system that will keep the lights on and prevent frequent total electric failures. The cost of repairs, in addition to removing ships from front line duties, is expected to be in the region of \$AUD 4B – adding a third to the original build costs of \$AUD 2B per ship. With only six ships in the class, the RN can, at the best of times, only sustain one T45 on operations – 1 in refit; 1 in maintenance; 1 in work-up; 1 deploying and 1 returning from deployment.

04 USS MILWAUKEE (LCS-5) - Lockheed Martin.





This presumes having a reliable ship deploying, returning and on station – which the Type 45 patently is not. Rear Admiral Chris Parry 'retired' from the RN for speaking truth to power, noted: 'it's rather like buying a high-priced television to watch your favourite football team but because you don't have secure power supplies, the power goes off about every 10 minutes. You can't have that in combat, you can't even have that in normal operations - it is not safe'. Even if a T45 gets on station (and does not have to be towed there and back) they are at risk of failure – catastrophically endangering ship and crew in the event of actual combat. Which rather begs the question of their purpose, in the first instance?

The Type 45 is an anachronistic last gasp in English shipbuilding. The British Navy would be far better off cutting its losses and redesigning / building a new class of versatile modular type ships, of which it may afford at least 15, today! – the actual number of destroyers needed by UK.

HOLLOW PROMISES, UK SDSR 2015: HMS OCEAN (L12) DECOMMISSIONED

Continuing the decline of the British Navy identified by *The NAVY* League Magazine and exacerbated by the results of the UK's Strategic Defence and Security Review 2015, the flagship of the Royal Navy, HMS OCEAN, is to be decommissioned in 2018, just after a multi-million pound refit. HMS ARK ROYAL was similarly de-commissioned just after a major refit and SDSR 2010.

The RAF is the main beneficiary of SDSR 2016, with a \$24AUD billion increase in the ten-year equipment budget. Most of that will go on accelerating the acquisition of 24 stealthy F-35B Lightning II fighter jets, to ensure that each of two new aircraft carriers will have at least a squadron of F-35s. The two aircraft-carriers are due to be fully operational by 2023 – however considerable doubts remain – due to shortage of pilots and skill sets necessary for the British Navy to operate fixed wing aircraft. The demise of the Fleet Air Arm – long sought by the RAF – has come at pyrrhic cost to both RN and RAF.

Recognising the U.K.'s inability to provide for 2nd strike for its ageing Nuclear Deterrence – due to lack of ASW Frigates and Maritime Patrol Aircraft (MPA) – a £2-billion programme for nine Boeing P8 MPA has been placed. The Trident nuclear deterrent is to be renewed, at a cost of around \$65AUD billion – falling against the Navy's budget for the first time. So representing a further cut in the Navy's procurement vote. The British navy and the army have both lost. The navy will have to sail on without the additional 4,000 sailors necessary simply to sustain the current 'fleet'.

Speaking in Washington, the politically marginalised and ineffectual British Defence Secretary Michael Fallon, commented:

- The UK is bringing the 'full force' of the RAF to bear against ISIS [= more ageing and increasingly unreliable Tornado aircraft].
- Over the next decade [UK] plan to spend more than \$350AUD billion [= no new money] on new equipment.
- To respond to increasing demands in future UK will have a potent expeditionary force of up to 50,000 [= 60% of projected future Army and

Royal Marine strength of 'about 80,000', down from 150,000 in 2010].

- At sea... a maritime taskforce of new frigates [= 8 T26s] and destroyers [= 6 T45s] alongside, in the 2020s, the world's second most capable carrier force [= 2, discounting presumably the French Carrier Force of 4+?].
- UK enhancing its relationship with Japan, while;
- Working with China more closely [to] bind them into the rules based international order.

Note: The U.K.'s tilt toward China on nuclear power and propulsions (see *The NAVY* Magazine Flash Traffic Jan-Mar 2016) and away from U.S., E.U. (noting the forthcoming referendum on membership) and its traditional Commonwealth regional alliances (including with Australia, New Zealand, Singapore and Malaysia) may create a destabilising regional influence. The U.K.'s motives are increasingly unclear, even perfidious – and its growing affiliation with China may act to embolden; not pacify.

As a result of SDSR 2015, the British Royal Navy has been forced to cut its order for the new Type 26 frigate from thirteen to eight. Further delays in ordering and numbers, means the UK will advance even more rapidly into its own shipbuilding valley of death, than will Australia – as the clapped-out T23s and T45s struggle on. A result of further delays and reduction in orders means the Type 26 looks increasingly unlikely to be a contender for the RAN SEA 5000 frigate program.

05 WHO COMMANDS AND CONTROLS CHINA?

In an aside during his Australian book-launch, Peter Stringer the co-author of *Ghost Fleet* (with August Cole), noted that a previous visit by Chinese President Xi Jinping to the U.S. failed to connect. The Chinese President seemingly wanted to learn how a democracy kept command and control of its military – and to learn from the U.S. The U.S. wanted only to tackle Cyber-crime and Cyber-espionage emanating from China. The two are linked: President Xi was attempting to tackle strategic causes; whereas the U.S. was lost in tactical symptoms.

The issue is very serious in confirming the inability of the U.S. currently to operate or think at the strategic level – so giving contenders such as Putin a free hand. There is no coherent vision



05 Chinese president Xi Jinping.

or alternative – and, given the lack of attractive forces, allies are pulling apart. The clear example being the U.K. with the U.S. and the E.U.

President Xi Jinping needs help. On his return from his state visit to the U.K. he apparently faced bitter infighting (notably amongst his Generals), following an abortive conspiracy in March 2015 to stage a coup d'etat against him – leading to the postponement of his visit to Pakistan. His problems are further exacerbated by the dramatic decline in the value of China's currency; its economy and foreign earnings, after China's stock market crashed in mid-2015, and again at the beginning of 2016. At the same time as the economy slowed, Xi launched an anti-corruption campaign against senior Army officers. This would not matter in Western countries – but in China (like Soviet era Russia), over 70% of the economy is owned and controlled by senior PLA Officers. The official PLA Daily newspaper acknowledged dissent in the ranks by denouncing 'resistance blocking the reforms of military command appointments'. Talk of the coup came after President Xi purged two top generals, Xu Caihou and Guo Boxiong, for corruption. A retired general, in an interview with the Hong Kong political magazine *Qianshao*, later commented:

Mr Xi could not sleep soundly at night in the leadership compound at Zhongnanhai, in the old centre of Beijing. What does he worry about? First, about the military power on which his life depends.

Chinese politics is not the post-Communist monolith outsiders take it to be. It is deeply factional; not dissimilar to Byzantine-like Iranian political factions, except with the Chinese Communist Party at its centre. Consequently, an unprecedented public vow of loyalty to Mr Xi by 15 Top generals was 'a sign of weakness as much as strength', according to Roderick MacFarquhar of Harvard University.

A majority of China's generals were promoted by his two predecessors; whereas President Xi relies on the factions led by the sons and daughters of the leaders of the 1949 revolution – known as the 'princelings'. Simultaneously, President Xi Jinping appears to be opening up multiple fronts at a time of economic existential and interstitial weakness, including:

- Taking forward an anti-corruption campaign under General Liu, the political commissar of the PLA general logistics department and another princeling;
- Thereby confronting entrenched PLA private capital factions;
- Promoting generals such as Zhang Youxia (a fellow princeling) to lead the Central Military Commission on PLA transformation and get rid of the 'old wood';
- Creating a Joint PLA Command Structures similar to the U.S.; consolidating its seven military command regions into four;
- Turning the PLA into a proper modern Army [Navy and Air Force].
- Ending the PLA Multinational Business Enterprises and its for-profit activities – including as property developers and speculators.
- Ordering the Chiefs of Staff to follow his instructions (following a visit to India when the PLA escalated a border dispute with India).

Lack of effective Command and Control; a deeply factional Politburo; competing private companies, ministries and armies, in addition to a divided and competing PLA may be exacerbating issues, such as in the South China Sea. As an example, China's aircraft carrier PLAN LIAONING was bought and fitted out largely through private funding – not initially authorised through the Politburo.

It is increasingly unclear if a local incident in the SCS, incorrectly handled, might not lead to catastrophic escalation and, even, general war – with echoes of 1914. This in addition to the so called 'peace disease', which has Chinese senior officers anxious to prove themselves and their Army in combat – not unlike the pre-WWI Prussian General Staff.

Australia's Hedley Bull recognised in his political research, the need to develop – after the English School – a principled handle on methodology and process. Unlike the Gramscian-Marxists – who sought to seek power by seizing the levers of control – Bull et al., advocated seizing the methodological controls behind the levers. This served two purposes: it prevented (through bureaucracy) the seizure of single or multiple levers (including by / of the Armed Forces); and it acted to prevent change. The U.N., NATO, and the E.U. are all examples of English Scholasticism. In preventing general war, it has been highly successful. However, in attempting to control failure and complexity, Methodologists also prevented adaptation and change. As seen in the sclerotic U.S., U.K., and E.U. political responses to the GFC and Syria.

President Xi Jinping is one of the most powerful of China's leaders, with strong connections to the PLA. He served as an aide-de-camp to a senior General - and is an ally of the Chief of General Staff, General Fang Fenghui. Perhaps one of the most important things Australia – with the U.S. and [possibly] the U.K – could do, is to invest in a new style Marshall Plan with the intent being to discretely assist and educate senior Chinese civil-Government on network-methodologies for commanding and controlling its factionalised pol-mil economic enterprises. Significantly, in her strategic context setting to the Centre for a New American Security in Washington, Foreign Minister Ms Julie Bishop stressed Australia's military co-operation with China, arguing that it adds to the Asia-Pacific region's security. In parallel, with a firm military posture, this may be much more asymmetric, peaceable and cost-effective than any amount of rulings in the Hague or by the UN. For the moment, President Xi Jinping may be in command but not control of the PLA/PLAN. A network faction seeking to challenge Xi could create an existential crisis through the seizing of / firing on an Allied ship in the SCS. A twin-track approach working with President Xi Jinping to prevent / pre-empt just such an incident appears entirely sensible. (Analysis by R.C. Blake.)

06 CHINA'S NEW AIRCRAFT CARRIERS

China is building an entirely indigenous-build second aircraft carrier, The 50,000-ton vessel is being built in the northern port of Dalian and will be conventionally, powered. Designs for China's third aircraft carrier indicate that it may



06 PLAN aircraft carrier LIAONING (16).

be nuclear powered. The 2nd PLAN carrier will carry J-15 fighter-bombers (based on the Russian Sukhoi Su-33) and be fitted with a ski ramp jump mode for launching fixed-wing aircraft. The second carrier will be about the same size as the LIAONING and about half the size of a U.S. Nimitz-class carrier.

07 U.S. FACING SEVERE CARRIER SHORTAGE IN THE PACIFIC

A delay in orders – including un-productive U.S. ship building compared to China or even U.K. QE2 Class carriers - is threatening a shortage of aircraft carriers in the contested South China Seas and the Middle East in 2016. Adm. John Harvey USN rtd. commented: 'there is no easy way to take a ten-carrier force and operate it like you have sixteen – at some point the wheels will come off the cart'. The USN is required to operate eleven carriers by law, but Congress granted the Navy's request for a waiver in 2013 when USS ENTERPRISE (CVN-65) was deactivated after fifty years of service. The exemption was supposed to last until GERALD R. FORD (CVN-78) is commissioned, which would bring the fleet back up to eleven ships. In 2007, the USN still operated 12 carriers, until USS JOHN F. KENNEDY (CV-67) was retired in 2007. USN Pentagon planners have continued to argue that the U.S. Navy has too few carriers to

meet its global commitments and that it needs about sixteen carriers to sustain current / future operational loading on ships and crews.

USN RUNNING ON EMPTY

Growing evidence suggests that the U.S. Navy's build programme is in crisis. Existing ships are overly complicated and expensive to build in un-modernised yards; lacking also the strategic design thinking in re-setting the post Iraq / Afghanistan Force. The result is that the USN and USMC are up against the Pugh-Augustine Defence Cost Power Curve – a Fleet will halve in size every 20-30 years unless designs are regularly refreshed / re-set. Continuing this theme, Captain Jerry Hendrix USN rtd, Center for a New American Security, noted:

- The Ford-class aircraft carrier and the F-35C fighter take the USN in the wrong direction
- Doubling-down on a strategic mistake made 20 years ago to short-change range
- Only investing in new, unmanned aircraft with longer range — ideally launched off smaller, cheaper carriers — can restore the carrier's relevance in the face of Russian and Chinese ship-killing missiles.
- 'The GERALD R. FORD (CVN-78) is too damn expensive. I still think we can do aircraft carriers more cheaply'.



07 USS GERALD R. FORD (CVN-78) under construction in Newport News.



08 Island Navigator is a Rolls-Royce type UT 737 CD design built by Kawasaki in Japan for the Norwegians.

- The problem is the carrier's ability to generate sorties matters most at short ranges. That requires a major change in mindset for the Navy.
- If the Navy cancelled F-35C altogether, 'it could afford to purchase two squadrons of 12 Super Hornets [per carrier] (in addition to the two Super Hornet squadrons already present) to replace the two squadrons of 10 F-35Cs and purchase six squadrons of [drones] with 16 aircraft apiece (12 strikers and four tankers) and still be able to return money to the taxpayers'.

Meanwhile, Virginia shipyard informed 738 workers that they will be laid off in Feb 16. The yard is the only builder of Navy aircraft carriers and one of two providers of submarines to the service. Coincidentally, Huntington Ingalls Industries (the owners of the yard), received a \$200 million to order long-lead time material and perform design work on LPD 28, a yet-to-be-named (unplanned by USN) 12th ship in the LPD 17 San Antonio class. Invoking a swap-back agreement, dating back to 2002, General Dynamics will receive another order for a DDG 51 Arleigh Burke-class destroyer. After the LPD program was cut from 12 to 10 (then to 11 and back to 12), Northrop got out of the shipbuilding business and a new entity — HII — was formed, including Ingalls and the now-closed Avondale shipyards. The DDG 51 program was also scheduled to end at DDG 112, but was subsequently restarted by the Navy, awarding contracts to both Ingalls and BW. As of now, all destroyer contracts through DDG 126 in fiscal 2017 have been awarded,; divided between Ingalls and Bath.

Questions also continue to be raised about the advanced destroyer ZUMWALT (DDG 1000). Specifically, concerns exist as to the ship's stability and its ability to sustain underwater and upper-deck damage in combat. Ken Brower a Naval Architect previously commented: "the trouble is that as a ship pitches and heaves at sea, if you have tumblehome instead of flare, you have no righting energy to make the ship come back up". Norman Friedman, naval consultant and author noted '[The ZUMWALT] has a very good potential for causing a lot of problems. If all the

critics are right, this thing is dangerous'.

The critical issue identified by Admiral Scott H. Swift USN, Commander, U.S. Pacific Fleet speaking during Pacific 2015 was the need to 'reset the force' — to re-structure U.S. Armed Forces, post Afghanistan and Iraq. It is not in the interests of China or Russia or any of the West's contenders to give the U.S. the time to re-set its force and allow its economies to recover. The GFC looks like extending to 2018 before GDP recovery to 2007/8 levels in most countries. The question is 'how does the GFC end?' — like the Great Depression in 1939, in General War? And, if that is the case, 'how does the West start designing and thinking with less of a peacetime mentality?'

THREE NEW VESSELS FOR PLAN SCS FLEET

PLAN has commissioned three new vessels, including a Dongdiao-class (Type 815G) auxiliary general intelligence (AGI) ship, NEPTUNE (852), a Type 904B supply ship, the LUGUHU (962), and a Type 636A survey vessel, the QIAN XUESEN (873) into its South Sea Fleet.

08 OCEAN DILEMMA OR OPPORTUNITY?

In a unique arrangement Australian Border Force Cutter (ABFC) OCEAN PROTECTOR (aka Ocean Shield) is to be officered by Australian Border Force, with a civilian crew and serve under the White Ensign. A single RAN Liaison Officer (Lieutenant / Chief Petty Officer) will be on board. This raises a number of questions including under the Laws of War; warships serving under the White Ensign and commissioned Naval officers. It also, potentially, opens the door to creating an Australian Fleet Auxiliary, serving under the Blue Ensign, as per the British Royal Fleet Auxiliary. This would appear to be the sensible solution that maintains legal distinction, customary law and rights of commission.

However, it also opens up other opportunities. Following the recent decline in oil prices and turmoil on the world's stock markets, there has been a collapse in the global Offshore Survey Vessel (OSV) market, including ships like OCEAN

PROTECTOR. Consider the ISLAND NAVIGATOR being built by Kawasaki to a Rolls-Royce type UT 737 CD design, for handing over to the Norwegian offshore service provider Island Offshore in 2017. The \$AUD50M ice-class vessel is 168.8m long, with a 28m moulded beam and 11.7m moulded depth to main deck, capable of accommodating up to 91 people. With relatively minor modifications and treating the ship as a platform for versatile systems modularisation (VMS), the ship could be rapidly brought into Navy as a frigate or destroyer. Painted grey and with scuttles removed — it already looks like a modern warship not dissimilar to the ZUMWALT.

If Navy is to expand and scale / compose a sustainable and affordable Fleet it needs increasingly to think and do as if it were at war. The OSV market opens up not just possibilities for a less expensive Blue Ensign but for a White Ensign Fleet also, with interchangeability of Flag, crews and purpose between platforms.

PREPARE FOR WORLD WAR III WITHIN A FEW YEARS.

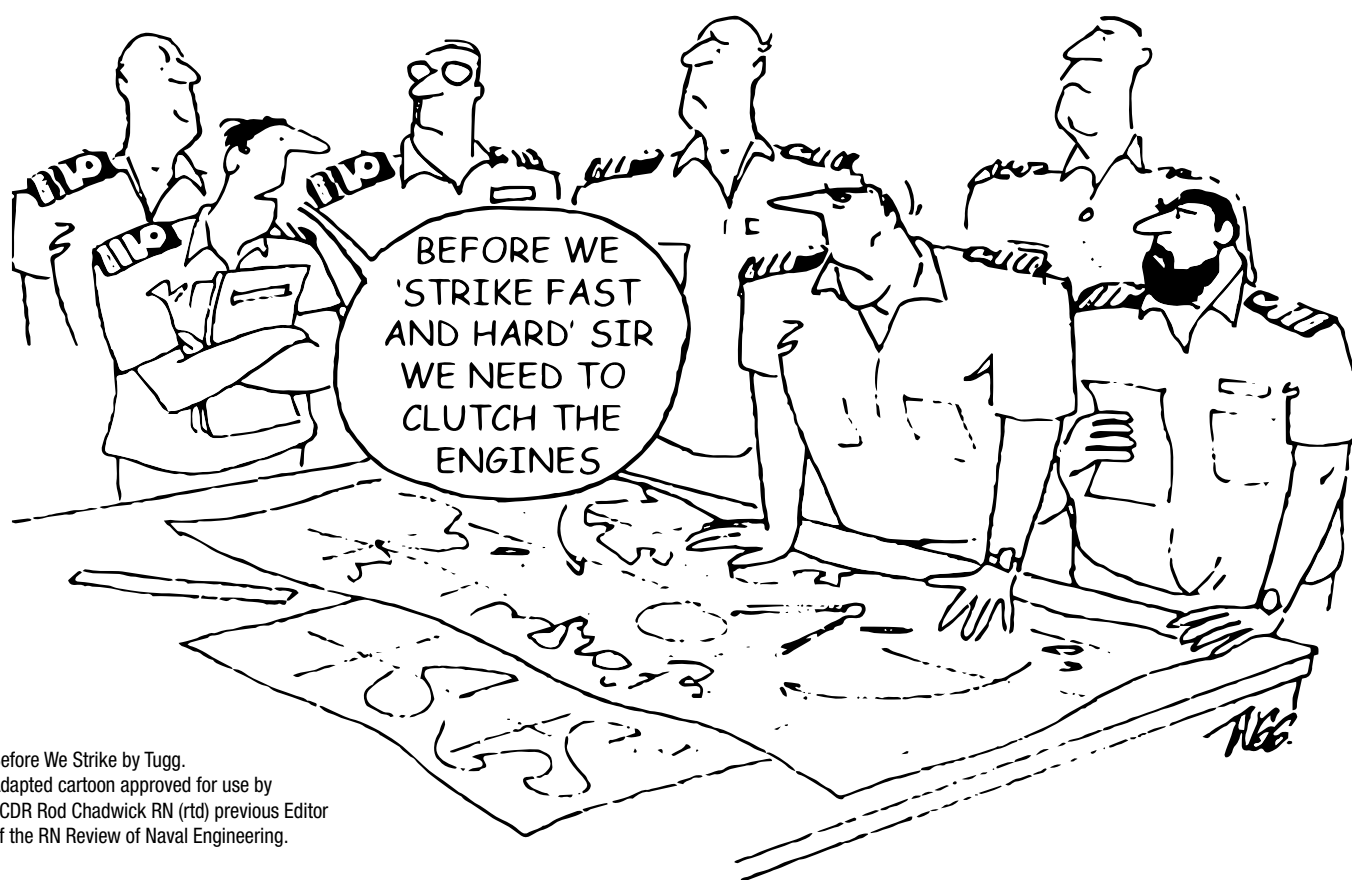
Sweden's Major General Anders Brännström commenting in a brochure distributed to an armed forces conference assesses: 'the global situation we are experiencing and which is also made clear by [recent] strategic decisions leads to the conclusion that we could be at war within a few years'.

Providing similar analysis, Lieutenant Colonel Frank G. Hoffman, U.S. Marine Corps Reserve (Retired), and Ryan Neuhaard in 'No Wake for Ares' (Dec 2015), commented: 'the end of war has been prematurely announced. A spate of articles and analyses have misread or misrepresented empirical conflict data, failed to frame that data in a meaningful context, and seriously miscast the policy implications of the debate. We believe that there will be no wake for war, and that tomorrow's security conditions pose numerous challenges to preserving what passes today for peace'.

BEFORE YOU STRIKE HARD AND FAST: FIRST CLUTCH THE ENGINES

By Robert Cuthbert Blake and Nicholas Bellamy

There is a remarkable technical story that actually lies behind the effective operations of the majority of Western designed and built warships over the last 60 years. It is also a British success story; combining a genius for engineering with a resilient business model that has allowed SSS Gears to design, fit and compete in some of the toughest and most demanding markets of the world – and survive booms and busts. After 60 years of production, the Company has supplied over 30,000 clutches for marine propulsion, electrical power generation, process machinery (fans, compressors and pumps) and auxiliary drives (turning gears, starting drives). The story told for the first time in *The NAVY Magazine* is of historical and Australian Industrial Maritime Strategic (AIMS) importance - highly relevant to DWP 2016; to future propulsion and all electric designs, as Navy powers up for the 21st Century..



Before We Strike by Tugg.
Adapted cartoon approved for use by
LCDR Rod Chadwick RN (rtd) previous Editor
of the RN Review of Naval Engineering.

A desire to push boundaries, develop new designs and remain focused on one product and attention to detail gave the company, *SSS Gears*, a strong foundation on which to diversify the role of its clutch into many applications. Synchro Self Shifting or (SSS) Clutches were originally conceived as a freewheel for use within automotive transmissions by Mr Norton Legge [1]. The original prototype was exhibited at the London Motor Show in the late 1930's, where it was spotted by Mr Harold Sinclair, a highly respected mechanical engineer and founder / director of Fluidrive Engineering Company. At that time, Fluidrive produced fluid couplings and Mr Sinclair saw broader markets for such clutches. Fluidrive Engineering, under Mr Sinclair's direction, eventually purchased the Synchro Self Shifting Clutch design and its patents.

To further develop clutch designs, Mr Sinclair enlisted the help of Mr H. A. Clements, a brilliant young engineer, who already had experience within

the gearing industry. Mr Clements and Mr Sinclair formed a formidable design team, originally operating from the Fluidrive Engineering Company. After becoming disillusioned with the large corporate model of business, Mr Sinclair left FECO and, with Mr Clements, set up *SSS Gears* to concentrate on clutches, with a policy of 'remaining small and focussed on engineering'. In the early 1950's, the clutch business became an independent, privately owned company: *SSS Gears Limited* (subsequently referred to as the *Company* or *Company*).

Initial clutch designs transmitted powers around 250 kW for industrial drives (fans, pumps, compressors etc.) and within the 'SSS Powerflow Gearboxes' used within many different diesel power shunting locomotives. Some of these clutches are still operating today within the heritage locomotives restored and operated by railway enthusiast groups.

NAVAL BEGINNINGS

In the late 1950s clutch development took a major step forward, when the company was approached to develop a clutch for combined steam turbine (COSOS) and later combined gas and steam turbine (COSAG) driven marine propulsion gearboxes. At that time, the British, US and Canadian Navies were experimenting with separate steam turbine drives for *cruise* and *boost* speed for their destroyers and frigates. The British Navy had experienced significant problems with friction plate type clutches supplied with their Y100 COSOS propulsion plant and asked *The Company* to design clutches suitable for the arduous conditions associated with marine propulsion.

Design and development work on Y100 were an eventual success, although these original COSOS gearing arrangements were superseded almost as soon as they were completed. The UK Admiralty had been secretly developing the gas turbine for marine propulsion – with the long term goal for the Y100 to be redesigned for use with gas turbine propulsion.

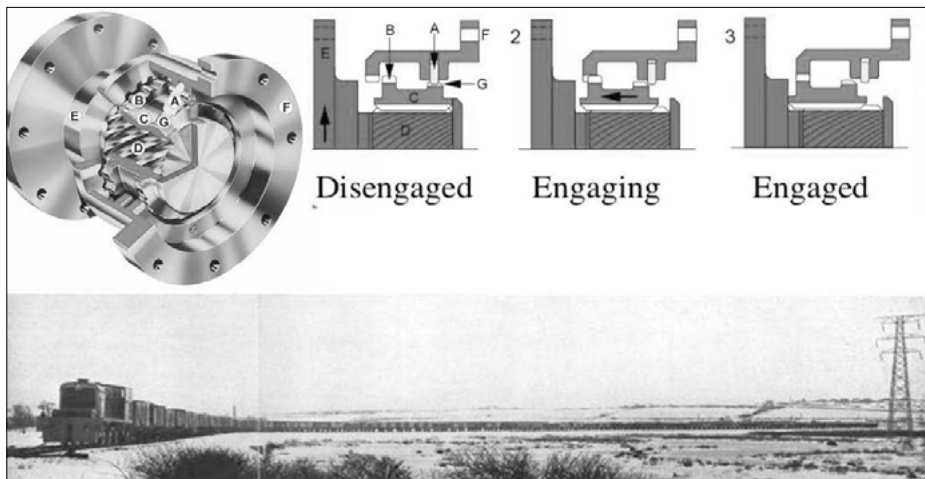
With Y100 proved its worth and clutches were later specified for Y102 and Y105 gearboxes in COSAG and later COGOG propulsion. The early 1960s saw these clutches being specified for Tribal and County Class Destroyers. Further development of COGOG based gas turbine performance saw clutches being specified for Type 21 frigates and Type 42 destroyers, both utilising Rolls Royce Olympus / Tyne configurations.

The US Navy suffered friction clutch failure in the DD-963 guided missile destroyer, with DD-963 (USS SPRUANCE) at one point becoming a 'sitting duck' when all four friction clutches failed at the same time. The failure of nearly all Y100 and DD-963 friction clutches was best summarised by David Bowie's Haze Gray publication: 'Cruising Turbines of the Y100 Naval Propulsion Machinery', chronicling the Y100, Y102 and Y105:

- A clutch relying solely on friction was unsuited for the powers and high rotational speeds associated with naval steam turbine plant.
- The effects of main shaft speed deceleration in a seaway at the moment of clutch engagement can be significantly magnified by the gear trains and can result in excessive differential accelerations of the opposing clutch members when the clutch is mounted in a high speed gear line.
- That without a suitable 'locking-in' arrangement a marine clutch for main engines, which have large inertias, can "shuttle" during the moment of engagement, with consequent damage to the rotating mating elements.

Following the DD-963 friction clutch failures, *Company Clutches* were fitted to the subsequent FFG program and proved highly reliable. FFG success meant specification for DDG-51 and retrofitting to other Spruance class ships. Similar problems in the US Coast Guard meant clutches were specified from CGC-47 (Tampa Class) onwards and retrofitted into many other USCG vessels. Friction clutch failures led to a redesign moving away from frictional properties of wear plates, to include:

- Transmit torque through a gear tooth mesh, allowing a positive 'lock-up'.
- The geared mesh is engaged automatically by a pawl and ratchet mechanism.
- Disengagement, is also automatic, and the reverse of engagement.

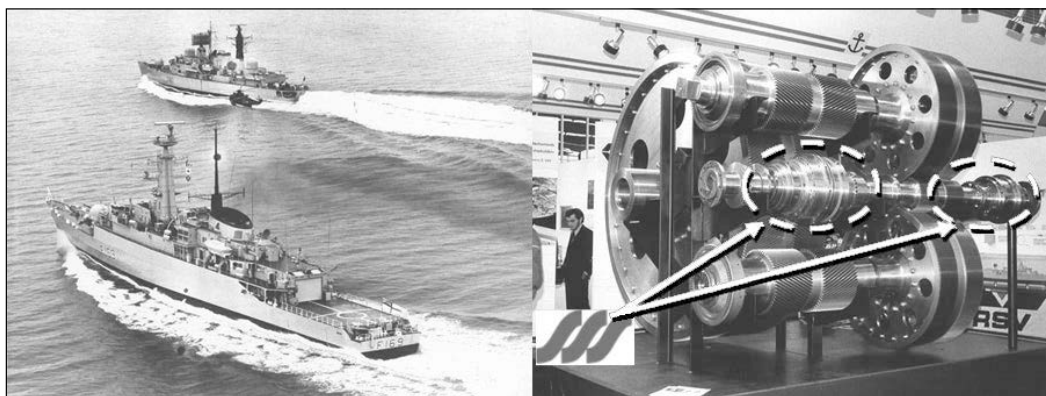


SS Clutch Operating Principle and Hudswell Clarke Enterprise Diesel Shunting Locomotive early 1950s.

- Engagement / disengagement cushioned by a dashpot mechanism.

Such clutches do not require a sophisticated control system and high pressure engagement oil (or air). The automatic engage / disengage principle removes the need for the complicated control and monitoring systems associated with friction clutches, which makes the overall cost comparable. These clutches are also 'fit and forget' type products which require little or no servicing, spares or overhaul regimes (see Type 23 experience below), their total cost of ownership can be shown to be lower than friction clutches.

Company Clutches now feature within the main propulsion drives of 45 different world navies. 1,000+ have been supplied to the US Navy and US Coast Guard alone and have been independently verified by the US Navy to have an MTBF rating of at least 250,000 hours across all designs studied, with zero design / material defect failures attributable (see ASME Turbo publication GT2008-51338).



Type 42 Destroyer HMS SHEFFIELD (D90), Type 21 HMS AMAZON (F169) and RNLN KORTENAER S Class all used SSS Clutches.

Over two hundred and fifty Clutches have been supplied to the Royal Navy, who have advised that they regard SSS Clutches as a 'fit and forget' product, after several hundred thousand combined operating hours experience on Type 23 Frigates. The Type 23 'fit and forget' system was a particular success – applying magnetic inspection plugs with 'removable halves' designed to facilitate regular inspection. Ultimately, the RN concluded that Clutch inspection



HMAS SYDNEY (FFG03) and HMAS HOBART III (D39) fitted with COGAG and CODOG SSS Clutches.

posed more of a risk than the possibility of clutch failure and regular inspections were ceased.

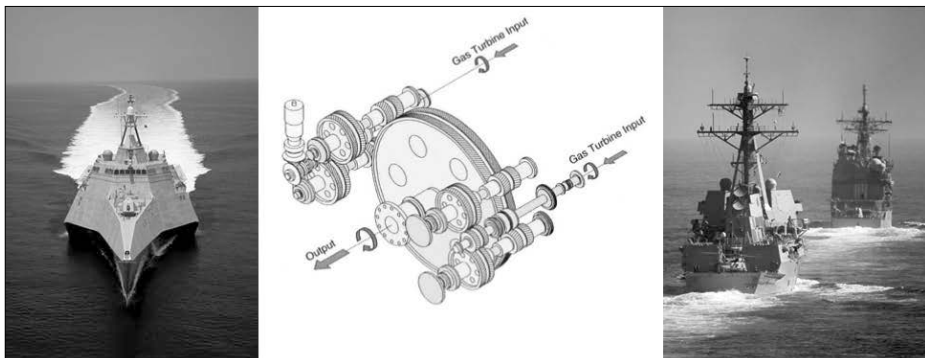
A new clutch design was recently supplied for a contemporary frigate program for an Asia-Pacific Navy, despite strong competition from friction plate clutch alternatives. These automatic clutches require no external control system, which unlike friction clutch arrangements, means that mishaps with the high pressure control oil or its logic system does not result in possible complete drive failure. Furthermore, the automatic clutch design removes the need for regular service replacement spares (e.g. friction plates). Consequently, their operation, total cost of ownership and MTBF are optimised when compared to friction clutch alternatives. These factors represent an increasingly important contributing factor to Defence and Navy decision making processes.

POWER GENERATION DEVELOPMENT

Synchronous Condensing: In the early 1960's, clutch designs were developed for the UK Central Electrical Generation Board (CEGB) for clutching / de-clutching gas turbine power for synchronous condensing operation (MVARs supply). Initial designs transmitted powers up to 30 MW, then 70 MW and later 90 MW (50 Hz - 3,000 rpm).

Since then, some 580+ clutches for synchronous condensing, covering powers up to 176 MW @ 3,000 rpm and covering 40+ different gas turbine designs:

Combined Heat and Power (CHP) Generation: The early 1970's saw clutches designed for turbine manufacturers suitable for clutching / declutching steam turbines within single shaft combined heat and power (CHP) plants. Initially, Company Clutches were supplied for around 20 MW @ 3,000 rpm, although development has seen more recent clutches transmit 160 MW at 3,000 rpm at the Huaneng Plant near Beijing, China.



USS INDEPENDENCE (LCS2) CODAG Gearing CODAG Gearing with 2 SSS Clutches per gear box with USS TICONDEROGA (CG 54) with USS ARLEIGH BURKE (DDG 100) all geared with SSS Clutches.

Single Shaft Combined Cycle Gas Turbine (SS-CCGT) Generation : The CHP machine arrangement (ST - SSS - GEN - GT) was applied to SS-CCGT applications and to date, *the Company* has produced 290+ clutches for this application, rated up to 220 MW at 3,000 rpm. *Company* Clutches are specified by Siemens, Alstom, MHI and Ansaldo within their SS-CCGT reference plant designs.

PETROCHEMICAL AND PROCESS DEVELOPMENT

The first Clutches were developed for industrial type applications, since which the range of process applications has grown significantly:

Fan Drives: 230+ clutches have been supplied for powers up to 3,600 kW @ 1,500 rpm. In some cases, clutches have been successfully retrofitted in place of faulty / failed cam / sprag type clutches (see fig.17 below).

Pump Drives: 570+ clutches have been supplied for powers up to 1,300 kW @ 1,490 rpm. In most cases, the clutch is fitted between a hydraulic recovery turbine and electric motor driven pump to improve energy efficiency. More petrochemical engineering companies are beginning to specify *Company* Clutches for their pump drives, as they recognize the advantages, particularly longevity, that a more robust overrunning clutch design offers.

Compressor Drives: 90+ clutches have been supplied by *the Company* for compressor drive projects. The most powerful clutch supplied to date transmits 320 MW @ 3,000 rpm. This clutch was fitted to the Compressed Air Energy Storage (CAES) at Huntorf in Germany in 1979. It has been engaged / disengaged almost twice daily since commissioning without failure and has never required major overhaul. In 2015 it was still operating.

AUXILIARY DRIVE DEVELOPMENTS

A range of standardized clutches has been developed for slow speed barring / turning gear drive and more than 5,000 clutches have been supplied. *Company* Pinion Clutches have been designed for TG drive, which operate through a pinion meshed with a gearwheel installed on the turbine shaft. A Pinion Clutch which was supplied for the worlds largest (at that point) nuclear powered steam turbine. These clutches are also standardised within the starting drives of many different gas turbine designs, for example GE MS5001 / MS6001 machines and several different Solar, MHI and Siemens gas turbines.

CLUTCH QUO VADIS

Whether a propulsion system is specified to be CODAG, CODELOG or CODELAG, then automated propulsion systems with Synchro Self Shifting clutches are available. *The Company* intends publishing a paper at the ASME Turbo Expo 2016 in Seoul, Korea, outlining how these systems function in detail, with references to existing and future examples for application in modern naval systems with dual-use application in civil power generation systems. Of particular interest will be arrangements of a CODAG two-speed gear

solution which entirely removes the need for multiple friction clutches to change gear ratios between diesel and combined diesel and gas mode. Also, by the time this article reaches print, the all new Company Clutch based CODELOG, Rolls Royce MT30 powered gearboxes should have been completed within the new frigates of an, as yet unspecified Asia-Pacific Navy.

Otto von Bismarck remarked: 'Only a fool learns from his own mistakes. The wise man learns from the mistakes of others'. Regrettably, many of the lessons outlined above regarding friction clutch failures on Y100, DD-963 and USCG vessels may be forgotten as subsequent generations of propulsion engineers are pushed into reducing CAPEX and might be lured by the apparent simplicity of friction clutch concepts. Whilst it is true that a friction clutch CAPEX is slightly less than an Synchro Self Shifting Clutch, the required complicated control systems which induce higher inefficiencies (disengaged friction clutch drag and power loss are higher) flip the overall cost back in favour of SSS Clutches. As *the Company* Clutch design remains mostly unchanged, the basic design is already proven, so end-to-end logistics and commonality of supply already exists.

Factoring in total cost of ownership issues as (for example, friction plates slip and are expensive to replace!), pushes the swing further towards the automated SSS-based system. The 2011 Rizzo [2] report was fairly condemning of equipment which suited a short term goal without considering total cost of ownership. With the recent Defence White Paper announcing the RAN is to invest >\$AUD30 billion over the next 10 years on 9 new frigates [3] – a sitting duck, caused by slipping friction plates, would not be a good look in a political climate already hostile to costly procurement overruns, featurism and inadequate defence procurement engineering designs.

A FUTURE NETWORK BUSINESS MODEL?

SSS Gears HQ is in Sunbury-on-Thames, UK where all design and development work occurs alongside clutch assembly and testing. The company has always tried to remain small and efficient in size, and as such have always remained less than 45 persons in size. In addition to main company offices, an affiliate company was set up in 1978 to handle business from North and South America. SSS Clutch Co. Inc. is situated in New Castle, Delaware, USA to handle business in various states around the USA and South American countries.

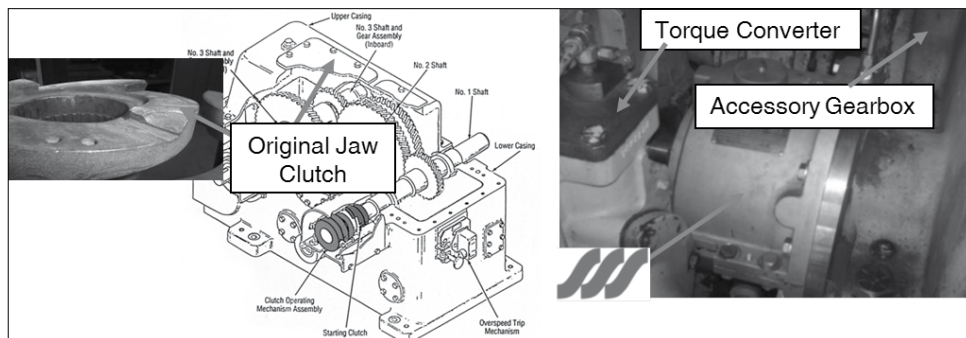
At time of writing in 2015, SSS Gears is represented by companies in each of the following geographic areas:

- Germany, Switzerland, Austria, Russia and Czech Republic.
- Japan
- Italy.
- Korea
- United Kingdom
- China
- France.

The Company maintain strong controls over subcontracted production methods and quality and own the majority of the machine tools on which this work is carried out – in some cases owning subcontracted premises. This approach guarantees long term logistical supply, whilst also controlling and developing production quality.

To achieve the goal of remaining small and efficient, the company designs, develops, assembles and tests all clutches, whereas individual component machining is sub-contracted. Despite subcontract machining, the company remains 100% responsible for their subcontractor's quality and workmanship.

All *Company* premises and machine tools are owned by cash purchase, thus remaining independent from external investment or loan / credit agreements. The largest shareholder is the Harold Sinclair Trust, the shares from which were generously donated by Mr Sinclair after his death. This trust was set up to ensure the long term independent ownership of *the Company* and the well-being of company staff. ■



SSS Clutches are now standard equipment within the starting drives of General Electric MS5001 MS6001 Gas Turbine gensets replacing the original jaw clutches.



Encased SSS Clutch for Expander Compressor drive at PTA Plant and Size 68T SSS Encased Clutch for Kill-Gas Expander during final assembly.

1. See also <https://www.youtube.com/watch?v=r0T40-lwzu8> "SSS Clutch", accessed Nov 2015.
 2. See also Rizzo report as reported:
<http://www.lowyinterpreter.org/post/2011/07/19/Navy-sunk-by-own-report.aspx>, accessed Jan 2016.
 3. For SEA 5000 costings, see: Australian Government Defence investment statement regarding the white paper: <http://thediplomat.com/2015/08/australia-to-build-entire-new-surface-warfare-fleet/>, accessed Feb 2016.

All photo credits SSS Gears Limited except:
 Figs. 2 – "The Oil Engine and Gas Turbine", June 1956.
 Fig. 3 – De Schelde "Whispered Gears"
 Fig. 4 – Commonwealth of Australia, Defence Department
 Fig. 5 – US Navy - Photo courtesy Mass Comm Spec 3rd Class Paul Kelly, Dennis Griggs General Dynamics and GE Marine, Lynn MA, USA and Mass Comm Spec 1st Class Denny Cantrell



THE SILVER PHANTOM HMS AURORA (X) IN THE MEDITERRANEAN 1941-43

By Nigel Beake

On the clear moonlit night of 9 November 1941, the Regia Marina destroyer GRECALE ploughed through a moderate Mediterranean swell. GRECALE was part of the close escort for the impressive Beta convoy of six merchantmen carrying tens of thousands of tons of cargo, fuel, vehicles and ammunition to Rommel's forces in North Africa. The Africa Corps need for supplies outweighed the disturbing intelligence that Royal Navy surface ships had returned to Fortress Malta. To protect the valuable convoy the Italian Naval command had assembled a strong escort – surely much stronger than any force the Royal Navy would hazard on a night action.

As well as GRECALE stationed at the stern of the lumbering 9 knot convoy there were five other destroyers in the close escort. And, unseen but reassuringly known to be just 3 to 5 miles astern, was the covering force of two heavy cruisers – each more powerful than any RN cruiser in the Mediterranean – with an escort of an additional four destroyers.

It is not known if, just after midnight, a lookout on GRECALE noticed the ripple of gunflashes on the starboard flank – if he had time to shout a sighting report, for the flight of shells from the unseen assailant was less than seven seconds, and then the broadside fell and all was devastation. Exploding shells cut down men standing to their action posts and penetrated the ship's thin plating to start raging fires. And in the next minute two more broadsides hammered GRECALE, leaving her a flaming, drifting wreck, unable to defend herself, with the stunned survivors of the crew desperately starting to fight the fires that threatened to engulf her.

It is unlikely that anyone on GRECALE glimpsed the silver-grey shadows of the four ships of the RN's Force K as HMS AURORA (X - the tenth RN ship to bare the name) – for that was who the assailant was – led the line on a run along the starboard side of the convoy. Her next broadside had already been poured into the merchantman Rino Corrado – as the ships of Force K systemically set ablaze close escort destroyers and merchants alike. It was the commencement of the total destruction of the Beta convoy with the powerful covering force left floundering and confused in Force K's wake.

This was the first of several spectacular victories for Force K. The repeated, unexpected appearance of the light grey cruiser with the deadly aim was quickly to earn her the nickname of The Silver Phantom.

THE SHIP

The Royal Navy Arethusa-class light cruiser AURORA achieved in World War 2 a combat record that the historian Vincent O'Hara has described as 'the envy of any warship, at any time, in any service'. However, her history tends to be overlooked in favour of those RN and RAN cruisers involved in the iconic actions of WW2 – HM Ships AJAX, ACHILLES (largely crewed by the New Zealand Division of the Royal Navy) and EXETER at River Plate, HMAS SYDNEY at Cape Spada, HMS SHEFFIELD in the BISMARCK chase as examples. This is the story of the cruiser whose gunnery was described by one enemy as 'astonishingly precise', and earned the menacing nickname amongst foes as The Silver Phantom.

The four ship Arethusa class of light cruiser, completed in 1935, was the smallest warship that could fulfil the roles of Fleet and Trade Protection cruiser. HMS AURORA was 506' long overall, had a standard displacement of 5,419 tons and a maximum speed of 32 knots, with boiler gases

Regina Marina GRECALE In her WWII Camouflage.



exhausting through two vertical funnels.

Main armament was 6 X 6" guns, in three turrets, two forward and one aft. In appearance she could be described as three quarters of a RAN Perth-class cruiser – forward she could be mistaken for one of the Australian cruisers; aft the single turret and short quarterdeck gave her an unbalanced, truncated appearance.

EARLY WAR SERVICE

At the outbreak of war AURORA was in home waters. She had an eventful early war – there was of course the tedium of continual patrolling, but she saw action against shore targets off both Norway and France. At sea she participated in the ill-fated Norwegian campaign, helped sink the German escort vessel BREMSE, intercepted a German supply ship, and was deployed in the pursuit of the BISMARCK.

In October 1940 a new Captain was appointed - William Gladstone Agnew, and in November of the following year she was transferred to the Mediterranean.

FORCE K

After the destruction of the Beta convoy, Force K intercepted the Maritza convoy on the afternoon of 24th November, 1941. In this operation the small convoy of two merchantman was destroyed by HMS PENELOPE after she had driven off the escorts, whilst Captain Agnew kept AURORA in reserve.

AURORA's next action was the night interception of the Italian auxiliary Adriatico. In bright moonlight AURORA scored a hit on her second salvo. Captain Agnew then ceased fire to give the crew time to abandon ship. However, the hopelessly outgunned Adriatico attempted to fight back,

HMS AURORA (12).



forcing Captain Agnew to re-engage and quickly reduce the Italian to a sinking wreck.

Then, on the evening of 1st December, 1941, Force K intercepted the damaged tanker Mantovani escorted by the destroyer DA MOSTO. This time PENELOPE stood clear whilst AURORA engaged the escorting destroyer, who cleverly used smoke screens to torment and threaten AURORA. However, her good luck was not to last, a hit in the aft magazine blew DA MOSTO's stern to pieces, and then the tanker was summarily dispatched.

DISASTER BEFALLS FORCE K

On the 18th December an Italian convoy bound for Tripoli anchored off the harbour whilst the entrance was cleared of mines.

Force K, now consisting of the larger cruiser NEPTUNE (largely crewed by the New Zealand Division of the Royal Navy), as well as AURORA and her sister PENELOPE and four destroyers, was ordered to intercept and destroy this convoy.

At first the operation proceeded as per the well-rehearsed and successful formula of recent convoy interceptions. At 0300 on the 19th Force K, with NEPTUNE in the lead, was only 23 miles from Tripoli and just crossing the 100 fathom depth line in an area believed to be free of mines and too deep for those weapons to be anchored. The cruisers were running paravanes – mine sweeping gear – and it one of the paravanes of NEPTUNE that triggered the first mine. Captain Agnew, seeing the explosion turned AURORA to starboard believing it to be a torpedo attack. Less than a minute later a mine exploded against AURORA's port side and the ship was grievously damaged. A 20' X40' hole was blown in the ship's hull abreast of 'B' turret and hundreds of tonnes of seawater flooded in quickly putting the ship down by the bows and with an 11 degree list to port. Fortunately the watertight bulkhead forward of the machinery spaces held, otherwise the ship would have quickly foundered. As a crew member wrote in his diary: 'My God, what a night....what hell and destruction.....we all thought we were finished.'

Captain Agnew was in a very difficult position. He was only 20 miles off a hostile coast, with dawn a few hours away and heavy air attacks likely in daylight. AURORA had 'tip-toed'

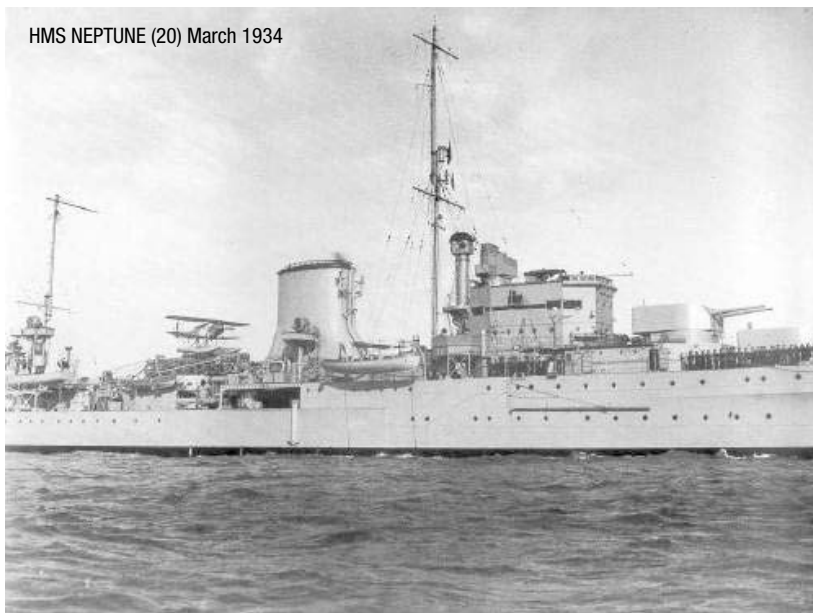
out of the minefield, but the crippled ship could safely only manage half speed and AURORA was in no condition to assist the crippled NEPTUNE which had hit three further mines and was shortly to sink. With a heavy heart Captain Agnew turned his crippled ship towards Malta.

Fortunately AURORA reached Malta without further incident, but Force K had suffered heavy losses, with the cruiser NEPTUNE and destroyer KANDAHAR both eventually lost to mines. However, AURORA's ordeal was not yet over, for she had to be taken in hand by HM Dockyard Malta for temporary repairs to enable a dash to be made for England. This was the time of continuous air assaults on Malta by the Axis powers, and AURORA was a "sitting duck" in dry dock. For the next two months she was targeted numerous times and was lucky to escape catastrophic damage, finally departing for England in February 1942, where she was out of service for another four months undergoing detailed repair work.

THE VICHY FRENCH MEET AURORA

As part of operation 'Torch' –the Allied landings in Vichy – French held North Africa in November 1942, hastily devised plans were made to capture the ports of Oran and Algiers intact. Although 'Torch' was

HMS NEPTUNE (20) March 1934



HMS AURORA (12) 1941.



ultimately a very successful operation, the subsidiary raids at Oran and Algiers failed due to inadequate reconnaissance, planning, training and vigorous Vichy French resistance. However, engagements at sea gave AURORA an opportunity to demonstrate to another Navy her extraordinary gunnery skills.

The raid to capture the port of Oran was executed in the early hours of 8 November 1942, and was quickly repulsed with heavy loss of life amongst the shore raiding party.

Vichy French naval command ordered the destroyers TRAMONTANE, TYPHON and TORNADE to sortie against ships observed off shore. Due to battle smoke deepening the pre-dawn gloom the destroyers left harbour as disorganised individual units.

TRAMONTANE was the first to clear harbour and at 0542 – not yet dawn – she signalled a challenge to an unidentified ship at a range of 6000 yards. What happened next has a certain inevitability. The unidentified ship was AURORA, and her reply to the challenge was a salvo from the main battery, followed by the fall of shot with, as usual, hits on the first salvo.

The already damaged TRAMONTANE responded as quickly as she could, but as #1 gun opened fire its crew was cut down by hits from the next salvo, with the bridge being raked by splinters disabling the command team. Further hits disabled #2 and #3 guns and with all offensive ability snuffed out TRAMONTANE drifted a ground onto rocks.

AURORA then turned her attention to the second destroyer, the TORNADE. AURORA was unlucky not to hit again as the first salvo was a straddle – some shells short, some over, which meant Aurora's gunnery was correct for range and deflection. There was no mistake with the second salvo, which scored three hits on TORNADE, including in the engine room. The systematic destruction of the French destroyer continued until she too was forced aground.

The third destroyer, TYPHON, had rescued survivors from the TRAMONTANE, but unwisely commenced offensive operations against AURORA at 0712. TYPHON soon found herself running for the cover of Oran harbour pursued by AURORA's accurate salvos, which scored one hit before the destroyer found sanctuary.

The next day, Vichy French naval command, aware of the immense build-up of allied naval forces off shore, instructed TYPHON and another destroyer EPERVIER to attempt to escape from Oran and flee northwards to France.

However, shortly after exiting harbour on the 9th November, the two destroyers were spotted by the light cruisers AURORA and JAMAICA.

What followed was a clear demonstration of AURORA's gunnery

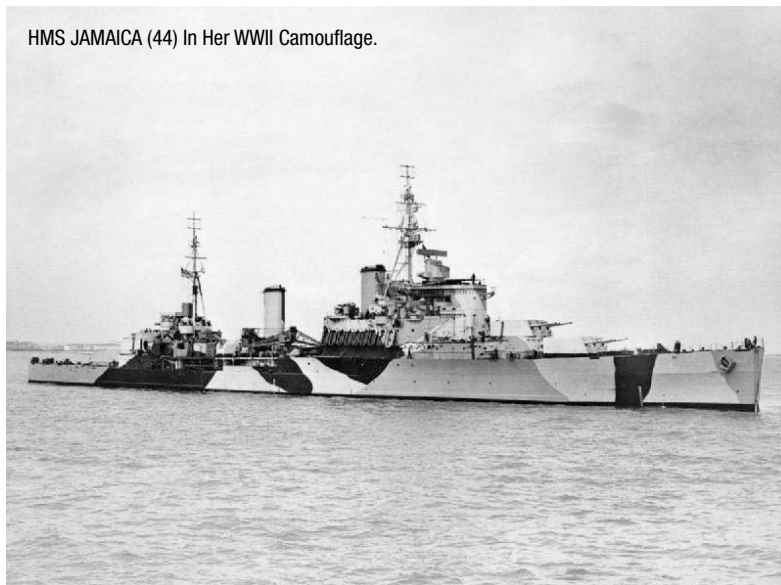
proress. The JAMAICA was a ship twice the size – thus a steadier gun platform - and with twice the armament of AURORA, yet it was AURORA that quickly destroyed EPERVIER. TYPHON, making smoke and twisting and turning desperately, found herself once again fleeing from AURORA, her upperworks drenched from near misses and splinters rattling against her hull. TYPHON found sanctuary under the protection guns of a shore battery with her captain later to write that AURORA was 'shooting with astonishing precision'.

AURORA's performance was not unnoticed by high command, with Admiral Andrew Cunningham (ABC) acidly comparing the larger JAMAICA's expenditure of 501 rounds for minimal return with AURORA's now routine rapid demolition of any opposition.

LATE WAR SERVICE

AURORA continued her war service mostly in the Mediterranean and Aegean. She was present at the Battle of Skerki Bank on 2 December 1942 where she flew the flag of Admiral Harcourt of Force Q. In an action reminiscent of the Beta Convoy battle of a year earlier, a nighttime interception of a convoy of four merchantman escorted by five destroyers and torpedo boats was a disaster for the Italians. All the merchantman were sunk, along with one of the escorts, whilst Force Q was undamaged. The action was notable for AURORA pouring a broadside into the ammunition ship KT1 at only 1,800 yards range – point blank – causing KT1 to vanish in a spectacular explosion.

HMS JAMAICA (44) In Her WWII Camouflage.



ADDENDUM: AURORA – FIRST PLAN SHIP CHUNGKING

Wreck of French Vichy Navy Ship TRAMONTANE 1942.



Admiral Sir Andrew Browne Cunningham (ABC).

AURORA was present at the invasion of Southern France and Italy, and in the Aegean received her second incident of heavy damage, with 47 of her crew killed when a 500kg bomb struck near the aft funnel. This damage was to keep her out of action for another six months. AURORA was still in the Mediterranean when the war ended.

EPILOGUE

AURORA was to have a long, but bittersweet life after retirement from the Royal Navy. In 1948, with Great Britain's economy stretched after the protracted war, and many newer cruisers in the fleet, the war – worn AURORA was sold to the Nationalist Chinese to become the flagship of their navy. However, within a few months the ship and its crew defected to the Communists, but was shortly thereafter sunk by Nationalist aircraft in harbour. Salvaged with Russian assistance, the wreck became an accommodation and stores hulk, with the hull in existence until final scrapping in the 1990's.

ANALYSIS

Why was AURORA, as Vincent O'Hara describes her, "possibly the best shooting ship in the Royal Navy"? There are many facets to the origins of her accuracy, and some of this can be attributed to good design,

maintenance and technical aspects of RN gunnery. Even consistent manufacture of shell propellant can have an effect on the spread of shot in a salvo and consequently the likelihood of a hit. Other factors include the quality of optics, the gunnery "table" or computer, evenness of barrel wear, and the alignment of each barrel with the main battery director. AURORA was assisted in many of her actions with early developments of gunnery radar – which leads to another aspect influencing her performance – the quality, training and dedication of her crew, led through most of her famous victories by Captain Agnew. He conveyed to the crew his own philosophy of night actions – hit hard, hit early, because if you are caught at a disadvantage in a night action you will rarely get a chance to recover the initiative. Captain Agnew certainly proved his own tactics sound. Good equipment requires a steady hand and eye to get the best from it, and AURORA seemed blessed in this regard. For example, early radar was difficult to interpret and electronically temperamental – good men were required to interpret outputs and keep the primitive electronics from "crashing".

Aurora was also assisted by superior intelligence – from the top secret "Ultra" intercepts, general code breaking, and air reconnaissance. The night interceptions did not happen by accident.

However, when it came to a "shoot off" with JAMAICA that second day at Oran, the larger cruiser enjoyed the same advantages as Aurora, but was shamed by the smaller ship – the quality of the crew came to the fore. ■

EDITOR'S ADDENDUM: AURORA – FIRST PLAN SHIP CHUNGKING

In the book, 'The Eighth Voyage of the Dragon, A History of China's Quest for Sea Power', USNI, 1983, Bruce Swanson follows up the history of HMS AURORA. For a more detailed account see Doug Hallet, 'Chinese Light Cruiser Chong Qing', at

<http://www.modelshipgallery.com/gallery/cl/roc/chongqing-300-dh/dh-index.html>, visited January 2016. The ROC CHONG QING (or CHUNGKING), as AURORA was renamed, played a significant role in the founding of the modern PLAN. Indeed, in its present quest for sea power the world might be seeing the 'Dragon's Ninth Voyage' – its eight being the rise of the Chinese Merchant Fleet, between the 1970s and 1990s.

Towards the end of the Second World War, the Chinese [nationalist], Republic of China (ROC) government approached the British about forming a Navy that could support the war against Japan. A provisional

understanding was reached to transfer AURORA and seven other ships to the ROC Navy. With the end of the Pacific war in 1945 – much to the annoyance of the ROC government – the British cancelled the agreement. Intense negotiations followed and final agreement was announced in November 1945, under which the U.K. agreed to transfer HMS AURORA (CHONG QING), HMS MENDIP (L60 a Hunt-class destroyer, renamed ROCS LINGFU / LIN FU) and some harbour vessels on a leasing arrangement.

DRAGON'S BE HERE

Six hundred ROC crewmen were recruited and sent to the U.K. for training in December 1945. One of the crew members was an 18-year old named Bi-Yuan, a member of the Chinese Communist Party

since 1943, and who had been ordered to infiltrate the crew and bring it over to the People's Liberation Army (PLA). The ships engineering departments were recruited directly from Chinese merchant seamen based in Liverpool, Swansea and London, with a promise that they would receive 'better pay than those recruited from China'. This was to be a cause of significant resentment to those directly recruited into the ROC Navy. During training (1945-47), Bi-Yuan and a fellow infiltrator, Wang Yi-ching, were able to create a 'Bolshevik Cell'; consisting of a dozen sailors and officers from the standby crew. ROC Ships CHONG QING and LINGFU were commissioned on 19 May 1948, on the transfer of a much needed \$AUD200 million (in 2016 prices) to the bankrupt UK exchequer – to refurbish the ships and train the crews. The crew consisted of 631 officers and men under Captain Deng Zhaoxiang, ROCN. Captain Deng was a member of the

demanding that he either 'get the ship under way for a PLA-controlled port', or 'look on as they scuttled the ship'. Captain Deng finally agreed to their demands and the ship, with its crew of 547 officers and ratings, sailed from Shanghai at approx. 0300, 25 Feb. 1949

A NEW RED STAR

CHONG QING arrived at Yantai on the Shandong Peninsula, 26 February, flying a specially made red star flag to announce its new allegiance. On 27 Feb., word came directly from Mao Zedong that 'the transfer was acceptable to the PLA', and that 'local commanders should work with Captain Deng' as a 'full ally'. Subsequently, on 2 March, a ROC reconnaissance plane located the renamed CHUNGKING and the ROC Air Force B-24 bombers began high altitude bombing runs against her. Although the initial attacks were unsuccessful, the event further unsettled the crew and ROC loyalists threatened to take over the ship and put to sea, if the Captain did not do so himself. In the meantime, the CHUNGKING Communist faction negotiated support from PLA troops (should it be needed) and Captain Deng agreed to sail for the PLA-occupied port of Huludao in North China – so averting a second mutiny. On arrival, after her one and only commission under PLA (N) command, CHUNGKING was secured by two PLA Brigades. All her crew members were ordered to remain on board for reorganisation and 're-education' by PLA Kommisars. On 15 March 1949, CHUNGKING was officially commissioned into the PLA Navy (PLAN) as its first warship. HMS AURORA, ROC CHONG QING and PLAN CHUNGKING has the unique distinction of being the first PLAN warship and amongst the first of the ROC Navy.

A few weeks later, the ROC air force again located the CHUNGKING and resumed its bombing on 19 March. Out of fuel and unable to respond to high-altitude attacks – due in large part to its seizure by PLA officials ignorant of naval warfare – her options were increasingly limited. In order to reduce casualties and in anticipation of further attacks – her crew was further paired to a hundred 're-educated' sailors.



The battered HMS AMETHYST (F116) after her escape from the PLA.

'Fuzhian clique' of professional naval officers – largely opposed to the Army officers belonging to the 'Whampoa clique'. The Whampoa clique occupied senior ROC Navy posts, and owed personal loyalty to Chiang Kai-shek. Deng joined the, then, Chinese Navy aged 11 and was a graduate of the Chinese Whampoa and Fujian Naval Academies. Additionally, he spent over five years attached to the RN and attended the [now sold off as a shopping mall] Torpedo and Anti-Submarine (TAS) School, HMS VERNON.

DRAGON'S RETURN

CHONG QING sailed on 26 May 1948; arriving in Hong Kong on 29 July – where, immediately, more than 20 members of her crew, including many from the engineering departments, jumped ship. She continued on to the ROC capital of Nanjing, with a combined two-watch emergency marine engineering department. Arriving on 14 August, she was visited there by Chiang Kai-shek and CinC ROC Navy, Admiral Gui. CHONG QING was earmarked for the Bay of Bohai, to intercept PLA junk-based troop re-supply missions. However, the deteriorating military situation along the Shandong Peninsula and North China coast meant that she was immediately thrown into supporting retreating ROC land forces. From August to October, she provided naval gun support (NGS) to the ROC Army – nonetheless, relationships between Captain Deng and ROC Navy Command remained poor.

In November 1948, CHONG QING was back in Shanghai as the Yangtze River guard ship. After the fall of Mukden, Nov 1948 and the defeat of ROC forces in Northern China, more than two hundred of her crew deserted. They were replaced by soldiers and dockyard mateys from the Jiangnan Shipyard. Bi-Yuan and Wang Yi-ching and other conspirators then formed a Liberation Committee. Subsequently, they armed themselves and seized Captain Deng at gunpoint, before

RUNNING THE GAUNTLET

On 21 March 1949, a bomb hit the stern; killing six and injuring ten crew members. The rest of the crew then abandoned ship, and the PLA concluded that it was not possible to prevent her destruction while the civil war continued. The order was given to scuttle the ship – equipment was removed; machinery greased; and, sea cocks opened. The CHUNGKING sunk at the jetty, eventually capsizing to starboard in 5 fathoms of water. Her loss advertently and significantly impacted the outcome of the civil war. When the PLA spring offensive began, 20 April 1949, the remaining ROC naval forces were ordered to attack the PLA crossing the Yangtze. It was during this final campaign that the RN Frigate HMS AMETHYST (F116) was badly damaged and took heavy casualties during her epic run past gun positions; following her refusal to surrender to the PLA. Rather than run the same gauntlet and without the CHONG QING to support the withdrawal and engage the gun positions, the remaining ROC Shanghai flotilla (comprising one destroyer, three destroyer escorts, one gunboat, five landing ships and eight auxiliaries) defected to the PLA Navy on 23 April; leading later to the surrender of Nanjing and Shanghai to the PLA.



IBRAHIM-EL-AWAL being towed to the port of Haifa after being captured by the Israeli Navy.

Note 1: HMS MENDIP (L60) was leased to the ROC Navy, together with HMS AURORA, and renamed LINGFU / LIN FU, after Major General Zhang Ling Fu, commander of the ROC 74th Division, killed during the Chinese Civil War. After CHONG QING defected to the PLA in Feb 1949, LIN FU was 'cut out' by the Royal Navy and re-commissioned in June 1949, using the crew of HMS CONSORT (R76).

Note 2: In November 1949, HMS MENDIP was sold to the Egyptian Navy, and re-named MOHAMED ALI-EL-KEBIR on 15 November and in 1951, she was renamed IBRAHIM-EL-AWAL. In 1956, she took part in naval operations during the Suez crisis, and on 30 October was despatched to Haifa to shell the city's oil installations. On 31 October she began bombarding Haifa with her four, 4 inch guns. The French destroyer KERSAINT deployed in Haifa harbour to guard the port as part of 'Operation Musketeer', opened fire but scored no hits.

Note 3: Israeli warships (their crews often ex-RN) immediately engaged IBRAHIM-EL-AWAL and the Egyptian warship rapidly withdrew. The IDF Navy then gave chase and, together with the Israeli Air Force, succeeded in damaging the vessel's power generators and rudder. Without power and unable to steer, IBRAHIM-EL-AWAL surrendered to the Israeli Navy. She was subsequently incorporated into the Israeli Navy and renamed HAIFA. She served with the Israeli Navy until the late 1960s, when she was decommissioned.

1951, and dry-docked. There, after a detailed inspection, the Russian technical advisory group concluded that the estimated cost to bring the, now, obsolescent ship back into service was about \$AUD100 Million (in 2016 prices). This was too much for war-devastated China, then also in the midst of conflict with United Nation forces led by the U.S. and Commonwealth Armies, in Korea. Further issues included the inability of the Russians to support British-designed weapons and sensors; growing divisions between Moscow and Beijing; and that the ship would have been ill suited to face continuing naval skirmishes between PLAN and ROC forces (supported by the U.S.) in the South China Sea. The PLAN reluctantly concurred, and the military career of HMS AURORA / PLAN CHUNGKING ended. The ship was cannibalised and weapons and equipment given to the Harbin Military Engineering Institute and the School of Dalian as teaching aids. The engines were removed and set up in a local factory. Some specialist equipment (radios, radars and sonars) were transferred to the Russians for 'evaluation'. The hull was then towed to Shanghai in November 1959 and renamed Huanghe. In 1964 she was given to the Tianjin Bohai civilian shipping firm as shore quarters for workers on coastal projects and renamed Beijing. The hulk was later abandoned and broken up in Qingdao, in the 1990s. Metal plates with the ship's name in Chinese characters, were discovered at the foundry and donated to the Military Museum of the Chinese People's Revolution in Beijing. They remain on display to this day.

Note 4: Rear Admiral Deng Zhaoxiang PLAN (b. 1902; d., 6 August 1998) went on to greater things. He was Deputy Commander of PLAN from 1982-83; Deputy Commander of the North China Sea Fleet in 1962 and, from 1978-81, Deputy chief of staff of Qingdao Naval Base; and, President of the Andong Naval Academy 1949-55. He is recorded in 'The Chinese Navy's Political Work and Personnel' by Srikanth Kondapalli, Research Fellow, IDSA, as having defected in 1949 to the PLA during the civil war, along with the renamed warship CHONGQING; he studied at the naval school of the 'Northern Warlords', Whampoa Military Academy, Yantai Naval Academy, and Nanjing Torpedo School.



1951 HMS AURORA as PLAN CHUNGKING being raised

AURORA FADES AWAY

In 1950, with the end of hostilities on the Chinese mainland, efforts began to salvage and raise the CHUNGKING. In April 1951, a Russian technical advisory group was despatched by Moscow to assist the Qingdao PLA Navy engineering battalion. Efforts were hampered by the bow of the CHUNGKING being only 50 feet (13 metres) from the pier, and she had to be dragged further away before being righted. On righting, the hull, integrity was found to be sound, and the ship was raised on 13 June 1951, ahead of both schedule and budget. CHUNGKING was then towed to the shipyard at Dalian on 18 June



THE NAVY LEAGUE OF AUSTRALIA TENTH ANNUAL MARITIME AFFAIRS ESSAY COMPETITION 2016

The Navy League of Australia is holding the eighth maritime essay competition and invites entries on either of the following topics:

TOPICS

- 21st Century Naval Warfare
- Australian Naval History
- Australian Industrial Maritime Strategy (AIMS)

CATEGORIES

A first, second and third prize will be awarded in each of two categories:

Professional, which covers Journalists, Defence Officials, Academics, Naval Personnel and previous contributors to *THE NAVY*; and

Non-Professional for those not falling into the Professional category.

Essays should be 2,500-3,000 words in length and will be judged on accuracy, content and structure.

PRIZES

- \$1,000, \$500 and \$250 (Professional category)
- \$500, \$200 and \$150 (Non-Professional category)

DEADLINE

Saturday 27 August 2016

Prize-winners announced in the January-March 2016 issue of *THE NAVY*.

Essays should be submitted either in Microsoft Word format on disk and posted to:

Navy League Essay Competition
Box 1719 GPO, SYDNEY NSW 2001

or emailed to editorthenavy@hotmail.com

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

THE NAVY reserves the right to reprint all essays in the magazine, together with the right to edit them as considered appropriate for publication.



STATEMENT OF POLICY

For the maintenance of the Maritime wellbeing of the nation.

CURRENT AS AT 1 JANUARY 2016

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 less certain. The League believes that Australia should pursue 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 and particularly New Zealand, PNG and the island States of the South Pacific.
- Advocates the acquisition of the most capable modern armaments, surveillance systems and sensors to ensure that the ADF maintains technological advantage over forces in our general area.
- Advocates a significant deterrent element in ADF capability 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, recognising that this means in conjunction with allies and economic partners.
- Endorses the control of coastal surveillance by the ADF, and the development of the capability for the patrol and surveillance of all of Australia's ocean areas, its island territories and the Southern Ocean.
- Welcomes Government initiatives concerning the recovery of an Australian commercial fleet capable of supporting the ADF and the carriage of essential cargoes to and from Australia in times of conflict.
- Strongly supports the 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.
- 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.
- In order to mitigate any industry capability gap following the completion of the Air Warfare Destroyer program, recommends bringing forward the start date of the planned future frigate program.
- Urges that decisions to enhance the strength and capabilities of the Army and Air Force, and to greatly improve the weaponry, and the intelligence, surveillance, reconnaissance, cyberspace and electronic warfare capabilities of the ADF, be implemented.
- 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 recognises the fundamental importance of a stable and continuous shipbuilding program for the retention of design and building skills and the avoidance of costly start up overheads.
- Supports the efforts by Navy to rebuild the engineering capability to ensure the effective maintenance and sustainability of the fleet.
- Advocates the retention in preservation (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 the 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.
- Welcomes the announced increase in Defence expenditure to 2% of GDP over the next 10 years.
- Considers that the level of both the offensive and defensive capabilities of the RAN should be strengthened, in particular with an increased number of new frigates to replace the Anzac Class, noting that these vessels will be our main escort forces in the middle of this century in a very different world.

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.



HATCH: Governor General Sir Peter Cosgrove receives a Royal Salute from the band and Commissioning Guard during HMAS ADELAIDE's (L01) commissioning ceremony.



DISPATCH: HMAS SYDNEY (FFG05) Decommissioning Ceremony, 7 November 2015.



While transiting to the port of Brisbane, the Chinese task force PLAN YIWANG (FFG-548) and PLAN JINAN (DDG-152) was escorted by HMAS DARWIN (FFG-04). Photo by ABIS Sarah Edsworth.