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THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

STRATEGY & SUBMARINES

NEW ZEALAND'S NAVY – PRESENT AND FUTURE

THE US "PIVOT TO THE PACIFIC"

THE QUEEN ELIZABETH CLASS CVF

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THE NAVY LEAGUE OF AUSTRALIA

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20 September 2014

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INTO THE VALLEY OF DEATH WENT THE NAVAL SHIPBUILDING INDUSTRY

Much has been written about the metaphorical 'Valley of Death' for Australian naval shipbuilding - the media love the term. Unions and industry are claiming that if the new Government doesn't place big orders for naval vessels very soon that jobs will be lost, as well as the capabilities to build naval vessels in the future.

These claims are mostly true. For a start the last government failed to build or even place orders for any new naval ships over a six year period - the current shipbuilding efforts being a legacy of the Howard Government. Lead times for new naval ships are very long. So the union's and industry's claims of heading for the valley of death are inaccurate, for we are actually already there. Companies involved in naval shipbuilding have already laid people off. This will get more serious in 2015 when the LHDs CANBERRA and ADELAIDE are completed. In 2018 when the last of the Hobart class destroyers is launched this will be even worse.

The fact of the matter is that it takes years to do the design work and go through the government processes to approve the build of sophisticated high-end naval ships. Apart from industry's position, the previous government's inaction also impacted naval capability.

The replenishment vessel HMAS SUCCESS is 28 years old with no replacement in sight. The previous government delayed the project to replace her, probably due to its reducing the defence budget by $16 billion. Her replacement should have been ordered at least two years ago. The economic legacy inherited by the new government is now impacting its ability to try and remedy this sad state of affairs.

Every government of every persuasion has had to deal with the issue of Australian naval shipbuilding. None seems to have got it right. The Navy League in the past has contributed to this debate through submissions to parliamentary inquires on the matter. All to no avail. The answer is pretty easy, keep the build going and do it through very few yards or just one yard.

The greatest testimony to the failure of governments to sustain a naval shipbuilding industry would have to be Cockatoo Island dockyard in Sydney Harbour. This once southern hemisphere centre of excellence for naval shipbuilding and repair was allowed to slowly wither away and die during the late 1980s (the list of warships previously built there, let alone repaired, is impressive). No orders where forthcoming after HMAS SUCCESS was launched.

The one glimmer of hope to sustaining a national submarine building capability is the project SEA 1000 which is still aiming to produce 12 submarines. Twelve submarines will actually mean a continuous build, for as the last enters service the first could be decommissioned and the replacement project started. This would prevent the Adelaide 'Techport' site suffering the same fate as Cockatoo Island.

As for the SUCCESS replacement, this should probably be the highest priority for the new government. However, with money being so tight it may mean an overseas build to cope with the capability shortfalls before the industry sustainment issue can be addressed. This will cause much gnashing of teeth and calls of unpatriotic behaviour by the opposition party and unions. Hopefully there will be those to remind all that had the previous government cared, then the replacement would have been ordered long before the new government was elected thus avoiding the 'Valley of Death' we find ourselves in now.

NAVY UNDER ATTACK

The last few months have been very difficult for the RAN on many fronts with a very high operational tempo and several operations and exercises to perform. It has also been the target of political and media attacks, which have also given rise to social media attacks as well.

Now while one might be tempted to think this is just the result of another sex scandal and Navy should be used to it, this one isn't. It's far worse. When Navy, or the wider ADF, does wrong, of course it deserves public scrutiny. But the most recent attacks started by the national broadcaster, the ABC (and perpetuated by the Greens and ALP) have been far more malicious with undertones of a political agenda.

Several months ago the ABC published and promoted the fanciful accusations of a people smuggler (hardly an impeachable source) that our Navy personal tortured his clients on the high seas. Other news agencies investigated the issue and decided it was 'bogus' before the ABC decided to run with it, and run with it and run with it. The ABC's subsequent treatment of our navy as a proxy tool for its attacks on the government and its border protection policy have been nothing less than appalling gutter journalism.

So why has the ABC done this? Well, our navy is proving just how professional it is with its involvement in the Government's Operation Sovereign Borders campaign to stop illegal people smuggling. Our navy has been central to the Government's policy success. So much so those with an opposing political agenda are now attacking it.

So not only does the RAN now have to cope with sneaky and desperate people smugglers playing, at times, lethal games, but has had to endure being stabbed in the back by the national broadcaster - the broadcaster that uses the same source of funding as our navy, the tax payer.

If the ABC is looking for news stories that celebrate Australia and Australians then it should be reporting that fewer sailors are presenting for Post Traumatic Stress Disorder (PTSD) treatment, as they haven't had to fish the decomposing dead bodies of men, women, children and babies out of the water since Operation Sovereign Borders started. They should be rejoicing in the number of lives saved by our navy, for under the previous Government's policy one person was dying on average every two days (nearly 1,100 people in total). The ABC should be reporting how incredibly professional our navy is at this new form of border protection and how it is now leading the world in tackling the global people trafficking problem (where high death rates are also the norm).

Perhaps the previous Government's Communications Minister had a point about placing controls on the media to stop this sort of politically motivated bias. Which brings up the issue of Senator Stephen Conroy, then Communications Minister, now Shadow Minister for Defence. His recent 'lack of judgement' over accusations of a political cover up against the uniformed Joint Head of Operation Sovereign Borders, LTGEN Angus Campbell DSC AM, is further proof of just how far some will go to attack the government's policy success.

Of course the ABC of today isn't the trusted provider of impartial news it was in the past. Take for instance its incredibly arrogant and self-righteous stance on the issue of publishing Australian Top Secret documents from US traitor and criminal Edward Snowden under the fallacious and insulting claim of the public's right to know, causing a serious rift in near neighbour relations. It then had the gold plated hypocrisy to complain and launch an investigation into leaks concerning the salaries of its 'star players'. 'This was not in the public interest' were the claims from the tax payer funded ABC.

Incidentally, in case you missed it, here are those annual salaries as published by News Limited (all in the name of the taxpayer's/public's right to know of course):

- Lateline host Tony Jones $355,789.
- Juanita Phillips, weeknight presenter of ABC News in NSW and evening presenter for ABC News 24, $316,454.
- 7.30 presenter Leigh Sales $280,400 a year.
- Quentin Dempster, $291,505.
- Insiders presenter Barrie Cassidy $243,478.
- Breakfast host Virginia Trioli $235,664, co-host Michael Rowland $151,006.
- Former Media Watch presenter Jonathon Holmes, $187,380.
- Former political editor Chris Uhlmann $255,400 a year.
- Radio National's Breakfast host Fran Kelly $255,000.
- ABC's online political editor Annabel Crabb $217,426.
- Head of the ABC Mark Scott $773,787.

As a comparison the annual base salary of a junior sailor is approximately $52,000 and that of a ship's Captain approximately $147,000. I'll let you judge who is worth more to the nation.

NUSHIP SUCCESS launching from Cockatoo Island dockyard. She was the last warship to be built there. (National Archives NAA_M2669_921_001)

THE NAVY AND THE COMMUNITY

For very many years ships and establishments of the RAN have been involved in helping their communities.

In the late 1970s the Navy League decided that these considerable efforts should be appropriately recognised. The League established the Navy League Perpetual Trophy – Community Award. Since 1981 the ship or establishment judged to have made the best contribution to their community has been awarded the Perpetual Trophy.

The Trophy is not lightly awarded. The many nominations are put through a rigorous process to select the winner. The nominations are shortlisted down to three. The short listing process was previously conducted under the auspices of the Deputy Chief of Navy.

It is now carried out by the Fleet Commander and his Leadership Group. Once the shortlist is settled the final three nominations are then passed to the Federal Council of the Navy League to decide the winner. The winner for 2013 was HMAS STIRLING.

It is instructive to look at the many activities undertaken by Navy personnel at HMAS STIRLING. The list shows the range, the variety and the extent of involvement of Navy members in community activities

- "Long Table Lunch" – cooks and stewards volunteered to assist in the preparation and delivery of a silver service dining experience to 1,000 cancer sufferers and survivors to help raise funds;
- Harvey Harvest Festival - Navy Domestic Engagement Department organized weekend volunteers to exhibit a Navy display;
- Visit to Baptist Care residential aged care facility;
- Many information tours, BBQ /luncheons, personal development activities for schools, cadets, sporting groups, and charitable foundations at HMAS STIRLING;
- Many visits by personnel to schools;
- Voluntary attendance at ANZAC Day ceremonies;
- CO`s speech to Celebration of International Woman`s Day Luncheon;
- HMAS STIRLING`S female officers presented at Every Woman Expo;
- Fund raising for Legacy raised $52,000;
- Personnel acted as escorting agents at the West Australian Football League Hall of fame annual presentation night;
- Assisting Serenity Lodge treatment centre for abuse problems;
- Red Cross blood donations;
- Leukaemia Foundation;
- $900 raised for life vests for children attending rehabilitation sessions;
- $5,900 raised for Rockingham RSL Sub-Branch
- Personnel took part Long Ride 2013 for the Prostate Cancer Foundation;

It is notable that all the above community activities are in addition to the continued support for HMAS STIRLING`s official charity, the Malibu school for special needs children. The school has been the recipient of numerous activities and fundraising events.

While I have used HMAS STIRLING as the example, such work is carried out by all Navy ships and establishments of the RAN. Over the last 33 years winners of the Navy League Perpetual Trophy have ranged from large establishments and major fleet units to some of the Navy`s smallest vessels.

The community work carried out by Navy members has without doubt done a great deal of good for many individuals, groups and community organisations. This work has also enhanced the reputation of the Royal Australian Navy. To all at HMAS STIRLING, congratulations, and to all Navy personnel everywhere, very well done. Keep up the good work.

NAVY DAY

Navy Day last year was a great success. The 4th October 2013 was the best Navy Day yet - except, of course, for 4th October 1914.

There can be no doubt that the Fleet Entry, the International Fleet Review and the associated events resulted in an enhanced awareness of Navy nationwide.

The impact of last year`s events can be built upon. While it may not be possible to repeat last year (for perhaps another 25 years?) there are many things that can be done on the 4th October this year, and in succeeding years, to remind the nation of its Navy.

Suggestions so far to hand include; RAN ships visit ports around Australia; ships be dressed for the day; uniforms be worn wherever personnel are on the day; Navy bands play in Martin Place Sydney, Federation Square Melbourne and similar places elsewhere.

My own proposal is that the Australian White Ensign be flown from the top of Parliament House Canberra on Navy Day.

I would be interested to learn from The Navy`s readers what they think of the above suggestions - and what Navy Day suggestions they themselves might have.

(right to left) Federal President of the Navy League of Australia Mr Graham Harris, Commander RFD RAN (retired) presents the Commanding Officer of HMAS STIRLING Captain Angela Bond, RAN with the Navy League of Australia Perpetual Trophy in front of members of the Navy League and STIRLING personnel. (RAN)

STRATEGY & SUBMARINES

By Richard R. Fernandez

It is axiomatic that form follows function, which means insofar as navies are concerned that naval assets are acquired to fulfil a purpose. Once purpose is determined, then the correct tools can be chosen for the job. Thus, every acquisition must be viewed in the context of "what is it for". Unless the ends are defined, nothing can be said about the proposed means.

Buying naval vessels is a means to an end. The determination of ends is usually called strategy. Unfortunately, the goals of Australian naval strategy are sometimes presented as a laundry list.

1. The defence of Australia, meaning the ability to prevent an enemy from seizing its northern territories;
2. The common defence of Southeast Asia;
3. Stabilization operations in the Southwest Pacific;
4. Support to civil authorities, which generally means being able to help when disaster strikes; and last but by anystretch not the least
5. Global Coalition Operations, or what used to be called being able to defeat the "enemy fleet".

Another way to restate strategy, as a report to the Australian Parliament did, is to break it down into elements.

1. Sea denial;
2. Sea control; and
3. Power projection.

The trouble with laundry lists is you cannot tell which is most important. But common sense tells us that Task 5 (Global Coalition Operations) is the sine qua non of a navy, comprising both "Sea Denial – the prevention of the use of the sea by another force against us" – and Sea Control, the ability to impose one's will for a time on an opponent.

If the Royal Australian Navy (RAN) can perform Task 5, it can do Tasks 1 through 4. But if the RAN cannot do Task 5, Tasks 1 through 4 are out of the question. Without sea denial and sea control, power projection is not possible.

Because some of Australia's potential opponents are potentially stronger than it could ever realistically be, China being a case in point, achieving sea denial and sea control against such a foe realistically requires the assistance of an ally.

The Collins class submarines DECHAINEUX (left) and WALLER. The Collins class will need to remain in service longer than anticipated due to the complexities in designing a new submarine class to replace them and meet the shortfalls inherent in diesel electric submarines. (RAN)

Hence the stated goal of White Paper Defence 2000 – "to defend Australia from any credible attack, without relying on help from the combat forces of any other country" – automatically put the Australian Defence Forces (ADF) on the horns of a dilemma.

Professor Stephan Fruehling's fascinating discussion in Of Australian Strategy and Submarine Design lists out possible RAN missions and attempts to divine "which submarine will do them best" in the light of their individual requirements. The missions he describes are:

- Anti-surface and ASW operations in Northeast Asia, i.e. around Taiwan and in the Yellow Sea;
- A "distant blockade" of China operating in "maritime chokepoints" like the Malacca or Lombok Straits;
- Barring Chinese naval vessels and nuclear submarines from threatening Allied shipping in the Indian Ocean;
- Operations directly off the Chinese mainland to achieve operational objectives in Southeast Asia and the approaches to Australia.

While Fruehling rightly notes that each mission "has implications for the required range, endurance, combat system, sensors, weapons load, quieting etc" of the candidate submarine design, *the missions themselves* will have a different solution set depending on whether Australia decides to go it alone or act implicitly as part of the hegemon's fleet.

The strategic tension is most pronounced in the selection of the next RAN submarine because that is really at the core of the navy's sea denial capability. But the lack of a definite strategic choice has given the submarine requirements a Jekyll and Hyde character. On the one hand, the conventional Collins-class boats are the stereotypical weapon of the weaker power, the 21st century equivalent of the submarine and naval mine, combining the mobility of a World War II sub with the quietness of a hole in the ocean. On the other hand, many of the envisioned RAN missions implicitly require cooperation with the United States and hence governed by the strategy of the dominant power.

There are certainly attractions to the strategy of the weaker power. Murray Leinster, writing in the Golden Age of Science fiction back in 1942, described the apotheosis of an intelligent, mobile mine in his story "The Wabbler". The Wabbler in the end blows up the target battleship – the perfect illustration of the weaker power checkmating the stronger.

> "The Wabbler lay in its place, with its ten-foot tail coiled neatly above its lower end, and waited with a sort of deadly patience for the accomplishment of its destiny. It and all its brothers were pear-shaped, with absurdly huge and blunt-ended horns, and with small round holes where eyes might have been, and shielded vents where they might have had mouths. They looked chinless, somehow. They also looked alive, and inhuman, and filled with a sort of passionless hate. They seemed like bodiless demons out of some metallic hell. It was not possible to feel any affection for them. Even the men who handled them felt only a soft of vengeful hope in their capacities."

Certainly mines can be very effective. While the public often thinks that Imperial Japan was bombed into submission by fleets of B-29s dropping incendiaries, it was probably the Army Air Corp's role in mining Japan that proved most damaging. Operation Starvation succeeded beyond anyone's wildest dreams. "In terms of damage per unit of cost, it [aerial mining] surpassed strategic bombing and the United States submarine campaign.

> "After the war, the commander of Japan's minesweeping operations noted that he thought this mining campaign could have directly led to the defeat of Japan on its own had it begun earlier. Similar conclusions were reached by American analysts who reported in July 1946 in the United States Strategic Bombing Survey that it would have been more efficient to combine the United States's effective anti-shipping submarine effort with land- and carrier-based air power to strike harder against merchant shipping and begin a more extensive aerial mining campaign earlier in the war. This would have starved Japan, forcing an earlier end to the war."

Those Wabblers sure were hell on ships. Nor have the mines and submarines become less lethal over time. Scott Truver, writing in 1972, noted that "since the end of World War II mines have seriously damaged or sunk almost four times more U.S. Navy ships than all other means of attack combined."

But though the image of the big black ball with contact spikes sticking out of it still dominates the public imagination, by far the most deadly of today's mines are conventional submarines. The resurgence of the non-nuclear submarine is largely due to the development of Air Independent Propulsion (AIP), which is inherently low in mechanical noise, the long-range wire-guided torpedo and sophisticated passive

An Israeli Dolphin class diesel electric submarine. The Israelis have huge transit distances to travel to get from the Mediterranean to the Red Sea given the need to avoid the Suez Canal (which must be transited on the surface thus giving away the submarines 'strategic location').

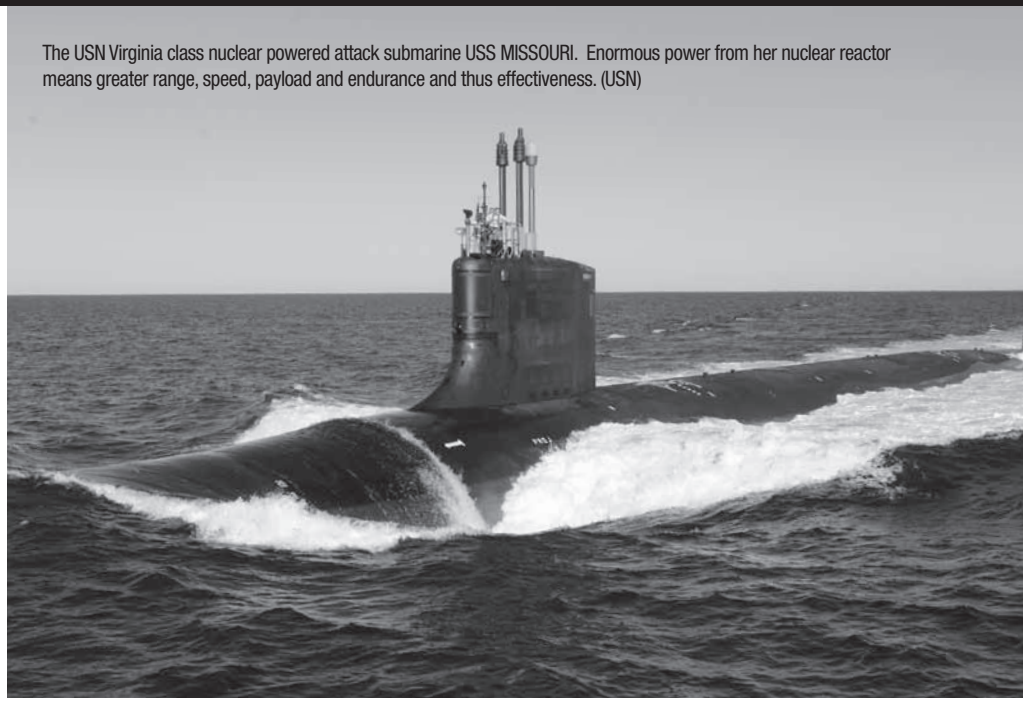
sonar. These, when combined, result in submarines like the German AIP U-212, which are tiny by American standards – 1,800 tons submerged and short-legged – but become a black hole in the water that can fire ship-killing weapons for miles in any direction. Built with special non-magnetic steel and silently propelled by an AIP engine with the ability to turn on a dime, they are designed to lurk in the shallows and strike at unsuspecting targets over a fairly large patch of ocean.

"Partly owing to the "X" arrangement of the stern planes, the Type 212 is capable of operating in as little as 17 metres of water, allowing it to come much closer to shore than most contemporary submarines." In fact, some European-style conventional subs are even described as having "bottoming gear" – landing skids that let the boat sit in the murk and, like the Wabbler of science fiction, bide their time until they can snap a warship's keel like a twig.

But the tradeoff for this lack of mechanical noise is energy poverty and poor endurance. AIP units often generate only as much power as a family sedan so that even banks of four produce 300 kw compared to the 30,000 kw of a Virginia class SSN. With that small output, the subs are limited to creeping along at about 2 or 3 knots. That may be of little consequence in European scenarios, where submarines must only transit a short way to station before turning off their diesels and activating the AIP. But slow speed and the small hull sizes of European off-the-shelf subs are a bane for countries like Australia and Israel, which must send their subs great distances in what are essentially modified European coastal submarines.

For instance, Israeli subs must be able to round the Horn of Africa from their bases in the Mediterranean to reach stations off Southern Iran (since they cannot count on free passage through the Suez in wartime) and Australian subs are no better case, having to traverse major stretches of the South Pacific to reach their areas of operation.

Those long transits must be done snorting on diesel, creating a period of vulnerability when units become essentially World War II snorkel submarines until they reach their ambush positions. At Australian operating ranges, all the limitations of small hull size and low energy are magnified beyond anything the European coastal navies are likely to encounter. These tradeoffs are discussed at length by Simon Cowan, in his monograph Future Submarine Project Should Raise Periscope for Another Look.



The USN Virginia class nuclear powered attack submarine USS MISSOURI. Enormous power from her nuclear reactor means greater range, speed, payload and endurance and thus effectiveness. (USN)

"SGs take a long time to transit to their patrol stations (as their speed while snorting is about 10 to 12 knots). An SSG travelling 3,500–4,000 nautical miles (a distance similar to that from HMAS STIRLING to the South China Sea or the Middle East) could take more than four weeks to travel there and return. An eight-week deployment would therefore mean a maximum of four weeks on station. Consequently, two submarines would have to be deployed in order to cover one eight-week period on station. Allowing time for routine maintenance and other activities pre- and post-deployment, a minimum of four submarines would be needed to have one submarine continuously on station in the South China Sea or the Middle East. If long-term maintenance schedules are added (taking three to four years out of every 11 years for the Collins Class), then at least five submarines would be needed. Six would be needed to cover for unforeseen contingencies or if the submarines have frequent equipment failures."

The saving grace of conventional submarine is comparative cheapness and stealth. For as long as stealth can be preserved, the limitations that Cowan describes might be endured. However, once deprived of invisibility, conventional subs would have few advantages over the nukes. If forced to manoeuvre or match moves with an SSN or modern surface escort that can "see" them, the energy-poor conventional boat would rapidly be exhausted and unable, with their small hulls, to outshoot the big SSNs with their plentiful and greater ranged weapons.

Countries like China and Iran have conventional sub forces precisely because they are pursuing the strategy of the weaker power against the American SSNs much in the same way that jeune ecole's torpedo boats and mines were ranged against the British dreadnoughts.

So the strategy of the weaker power has much to recommend it. But is this the right choice for Australia from the strategic perspective? The answer to this question depends in part on how the RAN thinks future trends play out. Technology is rarely static and, if the naval equation was upset by the AIP, it is being upset again by the growing role of mobile sensor grids and underwater robots in naval warfare. One popular publication went so far as to say "It has been said that unmanned vehicles will ultimately render the AIP submarine obsolete."

The mobile sensor grid concept is based on the simple idea of wiring up the oceans the way CCTV units blanket Central London, with the difference that the ocean grid, unlike the London cameras, can follow you around.

"Back in 2005, the US Navy's Office of Naval Research (ONR), along with the Defense Advanced Research Projects Agency (DARPA), began work on developing such a system. The concept behind PLUSNet (persistent littoral undersea surveillance network) is to create a semi-autonomous controlled network of fixed bottom and mobile sensors, potentially mounted on intelligent unmanned underwater vehicles (UUVs) to keep a constant eye on littoral zones."

Wiring up something as vast as the sea may seem a fool's errand but advances in robotics and network technology have made it feasible and potentially cheap. In fact, the trend is even away from fixed grids towards mobile ones.

". . . trends in naval research are leading to a technological shift in underwater surveillance, moving from fixed sensor arrays to mobile platforms mounted on UUVs. "We'll need to leverage technology and create a network of interconnected sensors with submarines as the hub of that network," said Vice Admiral Jay Donnelly, US Navy submarine force senior commander, at a Submarine League symposium in October 2010.

"We'll use unmanned undersea vehicles and distributed netted sensors to serve to expand the sphere of influence that our submarines have, and will enable persistent presence in more areas of the world," Donnelly added.

"Eventually, unmanned undersea vehicles and distributed netted sensors will likely replace our permanent fixed undersea sensor infrastructure, which in many cases is beyond its design life."

The 2013 NATO ASW exercise "Proud Manta" was a recent test of underwater robots coordinated through communications gateways like the Wave Glider – a device one part of which rides above the waves in communication with the fleet while the lower half remains submerged to gather signals from other robots.

In this concept of operations, the robotic sensor grid finds, fixes and provides targeting data while the energy-rich USN fleet units – CVNs, SSNs and surface action groups – defend the network and fire the long-range shots. They cover or protect the sensor network in the same way that machine guns cover a terrestrial minefield. In turn, the sensor network allows them to engage previously hidden targets with near impunity. If the weaker power attacks the sensor network, it will expose itself to the fire of the fleet. Just as you can't dig up the minefield until the covering machine guns are eliminated, neither can a weaker power dismantle the sensor grid without running afoul of the USN's overwatch.

It's an intriguing paradigm. Whether it works, only time will tell, but it seems the early 21st century is already shaping up as a contest of ideas: the mobile underwater combat grid protected by the Fleet versus the sophisticated AIP mobile minefield protected by land-based support.

The classic image of a destroyer captain listening with white-knuckle intensity to the sonar's active pings is not quite accurate anymore. "In early July 2012, the United States Navy (USN) responded to Iran's threats to use warships and mines to close the strategic Strait of Hormuz – through which around 40 percent of the world's energy travels – by deploying dozens of ROVs [remotely operated vehicles] to the Persian Gulf."

But even ROVs are transitional technology beside the real game changers: swarms of vehicles which can think for themselves and go where they are told. These go by the generic name of "gliders", cheap simple devices which can literally precision-navigate round the world, powered by wind and wave and animated by artificial intelligence. And as they voyage, like miniature versions of the wind-powered ships of the Age of Sail, they tirelessly scour the ocean for things – like AIP submarines. Perhaps the best known of these devices are made by Liquid Robotics.

It was just such a glider which served as communications relay in the Proud Manta 2013 exercise, a moving telephone booth through which other robots put through calls to the Fleet and in turn received instructions. The USN has been building this capability for some time. Back in 2011, Stripes wrote:

> "GRAFENWÖHR, Germany — Unmanned aircraft have been playing a major role in the wars in Iraq and Afghanistan for years. Now, the U.S. military is beginning to field unmanned submarines.
>
> In a move that could dramatically cut the cost of undersea warfare, NATO is testing three Autonomous Undersea Vehicles, or AUVs, in the Mediterranean Sea this month as part of the alliance's largest annual anti-submarine warfare exercise.
>
> The AUVs, dubbed "gliders," have much in common with their flying cousins,

The SSGN USS GEORGIA. The space onboard the Ohio class SSBN meant that it could be converted to carry over 100 non-nuclear cruise missiles as well as special forces teams with their associated equipment and command and control requirements. Behind the conning tower can be seen a shelter for special forces equipment such as a swimmer delivery vehicle. (USN).

including wings, according to Michel Rixen, a scientist at the NATO Undersea Research Center in Italy."

Some gliders are specifically designed to keep pace with an AIP submarine as it creeps along. And they are cheap enough to be ubiquitously deployed. One hundred and fifty of the experimental prototypes were purchased for US$53 million. They are likely to get cheaper still. One proposed model is frankly designed to stalk conventional subs.

"Liberdade class flying wings are autonomous underwater gliders developed by the US Navy Office of Naval Research which use a blended wing body hullform to achieve hydrodynamic efficiency. It is an experimental class whose

A 'Slocum glider ' drone. While not as fast as conventional Autonomous Underwater Vehicles, it uses buoyancy-based propulsion to provide a significant increase in range and duration compared to vehicles propelled by electric motor-driven propellers, extending ocean sampling missions from hours to weeks or months, and to thousands of kilometres of range.

models were originally intended to track quiet diesel electric submarines in littoral waters, move at 1–3 knots and remain on station for up to six months. The "Liberdade" (Portuguese for "Liberty") was the name of a ship cobbled together by Joshua Slocum prior to the one he single-handedly piloted around the world."

Technology is always disruptive and it poses unsettling strategic dilemmas for countries like Israel and Australia. If one assumes that China, Japan and Russia will eventually develop similar sensor grids (what some writers call "automated coastguards"), then an investment in conventional submarines may mean something more serious than buying the wrong hardware. It may mean being trapped in the wrong paradigm. If AIP subs become detectable, they will have none of the benefits of stealth and all of the disadvantages of small hulls and limited energy.

High energy and big hulls give the USN the ability to host modular mission packages, enabling them to act like equipment racks in a modern server farm. Warships can be "versioned" to keep them compatible with the information grid by swapping the modules in and out. Simon Cowan emphasizes the lack of "hotel" capacity to criticize the conventional submarines Australia considers purchasing. He writes:

"Given the increasing number of complex computerised systems being operated by modern submarines, another important concept is a submarine's 'hotel load.' As SSGs are limited by the power stored in their batteries (which can only be recharged by surfacing), they strictly ration power among their systems. SSNs are capable of generating and sustaining a much greater power output while submerged due to their nuclear reactor. This power output allows SSNs to carry a greater number of far more powerful sensors and systems (which increase sensor range and awareness), greatly increasing the flexibility, stealth and usefulness of SSNs.

The advantages of size and much greater power also allow SSNs to carry greater payloads and weaponry, as well as equipment such as UUVs and Special Forces team vehicles, further demonstrating the capability edge that SSNs might give to Australia in the Southeast Asian region."

Cowan argues that even the long-supposed SSN deficiency in coastal waters, estuaries and close-in work may soon be obviated by "the potential of UUVs." UUVs require space; and spacious ships require energy. Together, these requirements make a good argument for an SSN.

"Using relatively inexpensive UUVs for surveillance and intelligence-gathering makes more sense than using multibillion-dollar submarines to scout estuaries. While UUV technology (like unmanned aerial vehicle (UAV) technology) is still in its infancy, it has enormous potential. It is quite possible that UUVs will follow the increasing use of drones in aerial surveillance, not to mention the potential weaponisation of UUV platforms.

Yet Australia remains torn. It has no nuclear industrial base to support SSNs and is home to anti-nuclear political parties which are likely to take a dim view of anything with a reactor. Australia is stuck in the identity crisis of a middle power. By contrast, the USN has the luxury of following its chosen paradigm to its logical conclusion. It operates from the strategic clarity of being king of the hill. This endows them with a simplicity of purpose that RAN can only envy.

An RUSI monograph describes the USN pursuit of capacity – what Cowan calls "hotel space" – to host UUVs that loom so importantly in its plans. It has converted huge ballistic missile submarines precisely because they are big.

"As a guided missile submarine, the primary vision for the new Ohio-class SSGNs is that of a submarine capable of carrying a large number of Tomahawk cruise missiles. With the ability to carry up to 154 Tomahawks, the new ships meet the primary vision superbly – but they do much more than just support cruise missile strikes. Storage space and berthing have been added to enable the sustainment of up to 66 embarked Special Operations Forces (SOF) personnel. Every SSGN of the new class has been upgraded to include a Battle Management Center – a large open space where mission planning for either submarine or Special Operating Forces (SOF) missions may be conducted.

They are also capable of mounting up to two Dry-Deck Shelters (DDS) or one DDS and one Advanced SEAL Delivery System (ASDS). These can deploy SEALs or SOF equipment, either wet or dry, while the submarine stays submerged. Given all this, it's easy to see that this new breed of submarine will change how people think about submarines and submarine missions, and make it a quintessential IW platform."

The USN can pursue a single strategic concept to the limit because it is not saddled with the same strategic ambiguity that Australia is heir to. The USN is unabashedly pursuing its natural strategy, while Australia is left pacing the floor muttering "to be or not to be". That is indeed the question: whether or not Australia pursues either the strategy of the weaker or stronger power, or whether it compromises and sub-optimally splits the difference.

There are benefits to adopting any of these

courses. But there are no benefits to not doing so consciously. Deliberately adopting the strategy of the weaker power means Australia will have some naval warfighting capacity even if it must act without the US. Deliberately choosing the strategy of the stronger power means that Australia can leverage the latest and the greatest – as long as it fights alongside the USN. Sub-optimally splitting the difference may work better than either for so long as peace prevails and the fleet is never tested in the crucible of a major war.

Strategic choice will cast a shadow on everything, not simply the choice of naval platforms. The non-obvious implication of adopting the USN shift to networks is it makes information the principal weapon of the fleet. If Australia joins this game, it must be fully cognisant of the upstream and downstream requirements necessary to support the information battle. Fighting an information war is natural for the United States, given its legacy, its tech and aerospace industries. It is the quintessential American 21st century way of war.

It may be less natural for Australia, which will have no choice but to follow suit once it goes down that road. The USN will become enormously powerful in any alliance in which information is the principal determinant of naval strength. Any country which wants to fight the American-style naval battle must accept that the USA will hold most of the cards. That is the price of fighting within their paradigm.

But Australia can become a niche player if it decides to go that route, akin to the way it participates in satellite surveillance and signals intelligence, a world that is dominated by the United States. While it may be impossible for Australia to duplicate American resources across the board, it may hope to become the world leader in selected niches of the dominant paradigm by specialisation.

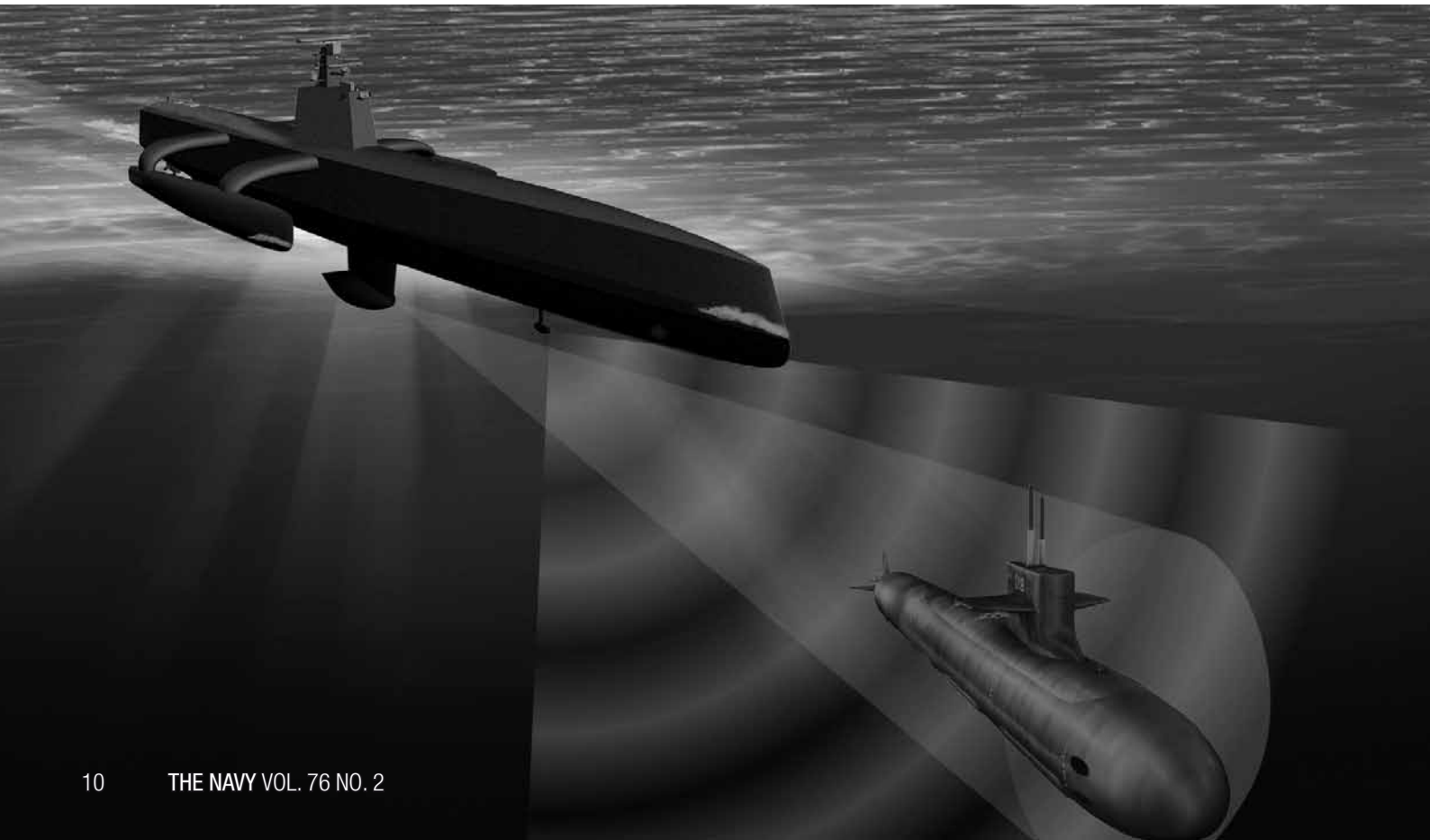
Yet all this is premature. Before all else, Australia must decide what naval paradigm to bet the farm on. To be or not to be, that is the question. And then all the hardware decisions will follow. A return to Leinster's Wabbler story may illustrate the point.

"Sounds in the air did not reach the Wabbler. Sounds under water did. It heard the grinding rumble of stream winches, and it heard the screeching sound as the drydock gates swung open. They were huge gates, and they made a considerable eddy of their own. The Wabbler swam to the very center of that eddy and hung there, waiting. Now, for the first time, it seemed excited. It seemed to quiver a little. Once when it seemed that the eddy might bring it to the surface, it bubbled patiently from the vent which appeared to be a mouth. And its brain went tick-tick-tick-tick within it, and inside its brainpan it measured variations in the vertical component of terrestrial magnetism, and among such measurements it noted the effect of small tugs which came near but did not enter the drydock. They only sent lines within, so they could haul the warship out. But the tugs were not the Wabbler's destiny either….

The steel prow of the battleship drew nearer, and then the bow plates were overhead, and something made a tiny click inside the Wabbler. Destiny was certain now. It waited, quivering. The mass of steel within the range of its senses grew greater and greater. The strain of restraint grew more intense. The tick-tick-ticking of the Wabbler's brain seemed to accelerate to a frantic and intolerable pace. And then the Wabbler achieved its destiny."

The humble Wabbler, the weapon of the weaker power, destroyed the battleship. But it succeeded mostly because its purposes were clear. It chose and lucked out. Nothing is as unforgiving as indecision. ■

Below: The ASW Continuous Trail Unmanned Vessel (ACTUV) is a US funded project launched in early 2010 to develop an unmanned drone ship for Anti-Submarine warfare (ASW). The vessel is optimised to overtly track and trail target submarines. A suite of sensors capable of tracking quiet, modern diesel electric submarines will be implemented into this completely unmanned vessel. (DARPA)



NEW ZEALAND'S NAVY – PRESENT AND FUTURE

By Murray Dear

With updates to its two Anzac class frigates and a new replenishment ship in the not too distant future the RNZN isn't doing too badly. NZ correspondent Murray Dear takes a snap shot of the RNZN present and future.

New Zealand sits atop a submerged continent which has small outcrops to the north (Kermadec Islands), the east (Chatham Islands) and the south (Bounty, Antipodes, Campbell and Auckland Islands). This quirk of geography has resulted in New Zealand having the world's fourth largest Exclusive Economic Zone (EEZ). The Ross Dependency in Antarctica and the Tokelau Islands just south of the Equator are New Zealand territories plus there are defence commitments to Niue, Samoa and the Cook Islands. In summary, the Royal New Zealand Navy (RNZN) has responsibility for protecting the nation's maritime interests over a huge area in the South Pacific.

In November 2010 New Zealand Prime Minister John Key launched the *Defence White Paper 2010* which set the Government's plan for a modern Defence Force that would meet defence and security needs over the next 25 years. This was followed in 2011 by the release of the New Zealand Government's *Defence Capability Plan*. A key goal of the plan was to establish a Joint Amphibious Task Force by 2015 with a primary focus on responding to security challenges and defence tasks in New Zealand and its environs, security challenges to New Zealand's interests in the South Pacific and challenges to New Zealand and Australia's common interests.

The plan includes Capability Priorities between 2011 and 2020 of which the two most relevant to this report are *Credible Combat Capabilities* and *Strategic Protection and Logistics*. To examine the impact the impact of these Capability Priorities on the RNZN it is relevant to consider the assets currently operated, which include:

- Two ANZAC class frigates,
- An amphibious sealift ship,
- Two OTAGO class offshore patrol vessels,
- Four LAKE class inshore patrol vessels,
- A replenishment tanker,
- A diving support ship,
- Two Mine Counter Measure/Rapid Environment Assessment boats,
- Five SH-2G (NZ) Seasprite helicopters.

The RNZN Naval Combat Force comprises the frigates TE KAHA and TE MANA, commissioned in 1997 and 1999 respectively. These ships have served the RNZN well and have operated throughout the Pacific with occasional deployments to the Indian Ocean. Exercises are frequently conducted with the Royal Australian Navy (RAN) and other friendly navies. During 2013 TE MANA participated in Five Power Defence Arrangements exercises followed by port visits to Vietnam, China, Republic of Korea, Japan and Guam. Since November 2013, TE MANA has been operating in the Indian Ocean, Gulf of Aden

(from left to right) HMNZ Ships WELLINGTON, OTAGO, TE MANA and CANTERBURY in Cook Strait. (RNZN)

and Gulf of Oman on international anti-piracy patrols. TE KAHA is currently alongside at Devonport Naval Base undergoing scheduled maintenance and Phase Two of the Platform Systems Upgrade which includes installation of the Integrated Management Platform System and new air conditioning plants.

The *Defence White Paper 2010* proposed that naval combat capabilities be upgraded and an ANZAC Frigate Systems Upgrade (FSU) is included under *Credible Combat Capabilities*. The FSU project is projected for implementation during 2016-2017 and will replace the hardware and software of the combat management system, modernize radars and sensors and replace the RIM-7P Sea Sparrow point defence missile system. It was recently announced that the naval MBDA Sea Ceptor air defence missile has been selected to meet the Local Area Air Defence (LAAD) system requirements (see *THE NAVY* Vol 75. No.3 pp17-18). On completion of the FSU project, TE KAHA and TE MANA will have the capability to remain in service until around 2030.

HMNZS TE KAHA in Jervis Bay, NSW. The RNZN will be upgrading their Anzac class frigates' air defence capability with the European Sea Ceptor missile and not the ESSM as used by the RAN. (RAN)

The amphibious sealift ship CANTERBURY and the replenishment tanker ENDEAVOUR comprise the Navy Logistic Support Force. CANTERBURY was the lead ship of the Project Protector fleet which also includes the offshore patrol vessels (OPVs) OTAGO and WELLINGTON plus the inshore patrol vessels (IPVs) HAWEA, PUKAKI, ROTOITI and TAUPO.

Built to commercial standards, CANTERBURY's design is based on the Isle of Man RO-RO ferry *Ben-My-Chree*. The ship is capable of transferring cargo and personnel ashore by helicopter or by two Landing Craft Medium (LCM), when port facilities are not available. Since commissioning in 2007, CANTERBURY has undertaken a range of operations including the sealift of Australian and New Zealand military vehicles to East Timor, humanitarian and disaster relief operations in the South Pacific and sea training for RAN junior officers. A reinforced company of 296 troops can be carried along with up to four RNZAF NH90 medium utility helicopters. A Seasprite helicopter can be embarked and the flight deck is able to operate a Chinook sized helicopter. CANTERBURY was fortuitously berthed at Lyttleton when the February 2011 Christchurch earthquake struck and the ship's company played an integral disaster relief role in support of the local community.

CANTERBURY was rushed into service and the ship has developed a number of defects which require remediation. Under *Strategic Protection and Logistics* this remedial work is to be completed by December 2015. The *Defence White Paper 2010* confirmed that the ship will be replaced with a similar capability at the end of its life.

The replenishment tanker ENDEAVOUR has now been in service for 25 years and usually operates in support of the Naval Combat Force. ENDEAVOUR provided essential support to HMS NOTTINGHAM when the RN destroyer struck a rock off Lord Howe Island in 2002. The ship can carry 5,500 tonnes of fuel and four containers can also be carried to allow storage of ships' stores or for shore support missions.

(front to back) The replenishment ship HMNZS ENDEAVOUR with Anzac class frigate HMNZS TE MANA. The RNZN will be replacing ENDEAVOUR with another replenishment ship in the near future. (RNZN)

The Offshore Patrol Vessel HMNZS WELLINGTON. The RNZN has two of this class of patrol boat which regrettably have been plagued with some reliability and manning issues. (RNZN)

With some tanks now sealed, ENDEAVOUR now effectively has a partly double sided hull. The ship's flight deck was originally designed to operate a Westland Wasp helicopter and while it is too light for Seasprite operations, in-flight refueling can be undertaken.

ENDEAVOUR is reaching the end of its life and under *Strategic Protection and Logistics*, a Maritime Protection and Sustainment Capability project is under development. Among the options being considered is a more versatile vessel which will incorporate a supplementary sealift capability. It is proposed that such a vessel would be capable of refueling and sustaining the Joint Amphibious Task Force and also offer options in terms of protection and sustainment of ground forces as well as the provision of humanitarian assistance and disaster relief operations. This new capability is scheduled to be in service by 2019.

The two OPVs and the four IPVs comprise the Naval Patrol Force which operates in support other government agencies including Customs, Police, Conservation and Fisheries. The Australian built OPVs had a long gestation as delivery was much delayed while defects were corrected. Both ships are now in service and are capable of conducting maritime patrol, surveillance, search and rescue, humanitarian assistance, disaster relief, peacekeeping support and sea training roles. The OPVs are ice capable and fisheries patrols have been conducted as far south as the Ross Sea. While the OPVs can operate a Seasprite helicopter, in practice this has rarely happened due to aircraft availability.

The locally built IPVs are designed for maritime security missions around the New Zealand coast and into the South Pacific. They undertake border patrols, surveillance, response and boarding operations and search and rescue. The ships work in conjunction with other government agencies around New Zealand's 15,000 kilometres of coastline within the EEZ. The IPVs are comparable in size and performance with the RAN's ARMIDALE class patrol craft.

The diving support ship MANAWANUI, which has been in service since 1988, supports diving and mine counter measures operations. The ship accordingly has a close association with the Operational Diving Team (ODT) and the Mine Counter Measures Team (MCMT). Late last year MANAWANUI, the ODT and the MCMT were all involved in the location and recovery of a crashed light aircraft and its two deceased occupants from the seabed off the west coast of the North Island.

A primary task of MANAWANUI is to provide littoral warfare support. Under *Strategic Protection and Logistics* a Littoral Warfare Support Capability (LWSC) project is currently under development. This project will replace MANAWANUI and the hydrographic & oceanographic survey ship RESOLUTION (decommissioned in 2012) with a single capacity. The new capability will be able to quickly establish shipping lanes and landing points making it a key enabler for the delivery of land forces from the sea. The capability will be a central element of the 2020 force that will have utility in both warfare and disaster relief. It is expected that the new LWSC will be delivered in 2018.

The Inshore Patrol Vessel HMNZS HAWEA. The RNZN has four of this class of patrol boat. (RNZN)

Two new mine counter measure/rapid environment assessment (MCM/REA) boats TAKAPU and TARAPUNGA have just entered service. These purpose-built boats represent an enhanced capability enabling the Littoral Warfare Support Force (LWSF) to operative more effectively in New Zealand waters and in the South Pacific. The boats will serve as an operational platform for all LWSF requirements including diving, Autonomous Underwater Vehicle operations, rapid environment assessments and survey tasks. Each 9.2 metre long boat has a range of 150 nautical miles at a continuous transit speed of 24 knots with endurance up to 18 hours (six hours at 24 knots and twelve hours at six knots). The boats and their trailers can rapidly be deployed by land, sea and air. Two ex Army Unimog trucks can tow the boats for local deployment and recovery. The boats can be deployed onboard CANTERBURY, OTAGO and WELLINGTON plus they can also be transported by RNZAF C-130 Hercules aircraft. Each boat on its trailer is a tight fit for a Hercules and for this reason they have a removable canopy. When this capability becomes fully operational, there will be a capacity to provide a rapid response for disaster relief operations in the South Pacific.

The five SH-2G (NZ) Seasprite helicopters are on the strength of 6 Squadron RNZAF. The Seasprites are manned by naval aircrew with RNZAF ground and ship support. Only two Seasprites are regularly available for service onboard TE KAHA, TE MANA and CANTERBURY. The Seasprites can carry depth charges, homing torpedoes and AGM-65 Maverick air to surface missiles, a legacy weapon from the long departed RNZAF A-4K Skyhawks. The Seasprites are now 15 years old and due for replacement.

Under *Credible Combat Capabilities* there is a Naval Helicopter Capability Project that would consider options and deliver the capability during 2012-2016. The Government recently announced that it will purchase eight ex RAN SH-2G (I) Seasprites for NZ$242 million. The deal includes two spare airframes, a training simulator, Penguin air to surface missiles and additional components. The helicopters were originally built for the Australian Defence Force but the contract was cancelled in 2009 after a cost blowout and questions about their suitability. An independent study conducted by Marinvent Corporation of Canada advised that the helicopters would be a very capable purchase, meet all requirements and could be introduced into service. Not surprisingly, the Opposition defence spokesman has criticized the purchase on the basis that the new Seasprites will be an "orphan" model. Time will tell whether or not this has been an astute purchase.

While the RNZN has a fleet of new ships with replacement capabilities for some older vessels identified, the manpower situation is not so rosy. Long standing grievances over pay came to a head when the New Zealand Defence Force (NZDF) implemented an ill considered "civilianization" project. This was in response to a Government request to reduce costs across all three services and was mainly aimed at "back office" administrative posts. The net result was that in 2011/2012 the turnover in naval personnel rose from a manageable 11.25% at the start of the financial year to an unsustainable 22.96% at year's end. The situation was not helped by the Australian mining industry actively recruiting Navy personnel with heavy engineering skills.

With many core skills strip mined from the RNZN, the net result has been a major reduction in operational performance. In terms of the RNZN's statement of intent on delivery of the Project Projector ships in 2010, the OPVs and IPVs were to undertake 840 sea days each year (an average of 140 days for each ship) of non military patrols within the EEZ. The actual sea days for 2011/2012 were 219 days for the OPVs and 397 days for the IPVs. Due to manpower shortages the WELLINGTON and two IPVs were laid up for several months. Many ex Royal Navy sailors have since been recruited and there are reciprocal exchange arrangements with Australia and Canada. WELLINGTON recently returned to sea with a "foreign legion" of Kiwi, British and Canadian officers while ENDEAVOUR was recently home to eleven RAN personnel while HMAS SUCCESS underwent maintenance.

Over time, manning issues will be resolved with recruitment and training. Any significant downturn in the Australian mining industry might be of benefit to the RNZN as some people with engineering and technical skills may return to the service. Women now comprise a third of the naval workforce with the shore establishment PHILOMEL and ENDEAVOUR currently commanded by female officers. It is quite probable that the first female Chief of Navy may be appointed in the not too distant future.

With 80% of its 2020 fleet currently in service, the RNZN is in a similar position to the US Navy. While the RNZN currently lacks a supplementary sealift capability, the Government owned Interislander Service operates three large RO-RO passenger/vehicle ferries which could possibly be requisitioned should the need ever arise. The key objective over the coming years will be the formation of the Joint Amphibious Task Force which will be able to operate independently and also in conjunction with RAN as and when required. Depending on the circumstances, all the RNZN fleet will have a role to play within the Joint Amphibious Task Force in an integrated and effective response to New Zealand's security needs. ■

The amphibious warfare ship HMNZS CANTERBURY with Super Seasprite helicopter passing port side. Capable of transporting 296 troops and their equipment and vehicles she can also embark up to four NH-90 helicopters and two landing craft. (RNZN)

01 P8 FOR RAAF

The RAAF is set to receive eight new Boeing P-8A Poseidon maritime surveillance aircraft, with an option for a further four aircraft subject to the outcomes of the upcoming Defence White Paper review.

Prime Minister Tony Abbott made the announcement at Defence Establishment Fairbairn on February 21, while inspecting a new visiting US Navy P-8A that had flown in for joint exercises with Air Force and Navy.

The state-of-the-art aircraft is expected dramatically boost Australia's ability to monitor its maritime approaches and patrol over 2.5 million square kilometres of our marine jurisdiction - an area that equates to nearly 4 per cent of the world's oceans.

The first aircraft is scheduled to be delivered in 2017, with all eight aircraft fully operational by 2021. The USN has so far ordered 53 with a total order expected to reach 117.

The P-8 will replace the P-3 Orion which has served Australia well for many decades. The USN has started the decommissioning of its P-3 Orion fleet with most retiring P-3s being relegated to desert storage.

The Boeing P-8 Poseidon (formerly the Multimission Maritime Aircraft or MMA) is modified from the Boeing 737-800ERX. Boeing assembles the P-8A aircraft in the same facility where it builds all its 737 aircraft, modifying the planes while they are still in production, instead of taking a completed airliner and tearing it apart to make the military modifications. Boeing officials say that strategy has helped them reduce cost.

The P-8 is intended to conduct anti-submarine warfare (ASW), anti-surface warfare (ASUW), and shipping interdiction, along with an electronic intelligence (ELINT) role. This involves employing torpedoes, depth charges and Harpoon anti-ship missiles. It will use sonobuoys and has a sophisticated surface search radar, electro-optic and radar and signals detection systems. It is designed to operate in conjunction with the Northrop Grumman MQ-4C Triton Broad Area Maritime Surveillance unmanned aerial vehicle, which Australia is keen to purchase. The P-8 has also been ordered by the Indian Navy as the P-8I Neptune.

02 25 AW101 MERLINS FOR RN

The UK Ministry of Defence (MoD) has awarded a contract worth £330 million (AUD$580 million) to AgustaWestland to convert Royal Air Force (RAF) AgustaWestland AW101 Merlin HC.3/3A helicopters for maritime use with the RN.

As part of the Merlin Life Sustainment Programme (MLSP), AgustaWestland will convert 25 AW101 HC.3/3A aircraft to HC.4/4A standard. Once conversion is completed the aircraft will be transferred from the RAF to the RN, to replace the RN's current fleet of Sea King HC.4 helicopters that are to be retired in 2016.

Under Phase 1 of the MLSP, to begin immediately, seven Merlins will be converted to an interim standard for maritime operations. The interim conversion includes a powered folding main rotor head; the addition of lashing points to secure the aircraft to the deck of a vessel; strengthening and modification of the aircraft's undercarriage; and the addition of new communications equipment.

The interim standard is required in order to provide the RN with converted Merlins from 2015 onwards, to allow for an initial operating capability (IOC) around the time of the Sea King's withdrawal from service in 2016.

The seven interim aircraft will be followed by the remaining 18 Merlins, which will undergo Phase 2 modification, fully optimising them for maritime operations. On top of the modifications included on the interim aircraft, Phase 2 will include a folding tail and a cockpit modification to match that of the RN's current AW101 Merlin HM.2 helicopters. Deliveries of Phase 2 aircraft are planned to run from 2017 to 2020, with IOC planned for mid-2018. Once deliveries of the Phase 2 aircraft begin, those that received the interim Phase 1 modification will be converted in turn to the full Phase 2 standard.

RN STILL INFLICTING DAMAGE ON THE FRENCH

In 2005, precisely two centuries after the battle of Trafalgar, the French government took the first of a series of decisions that led accidentally to the French taxpayer subsidising the RN's two new Queen Elizabeth class aircraft carriers.

During February this year the French government's public spending watchdog protested that a defence co-operation agreement signed by Jacques Chirac and Tony Blair in 2006 led to "a French contribution pure and simple to the financing of [two] British aircraft carriers in their early development phase".

The transfer of funds was buried in the small print of the 2013 French defence estimates but discovered by the Cour des comptes, or court of auditors, in its annual report a week later.

The saga began in 2005 when. President Chirac's government decided to co-operate with Britain in building a new generation of aircraft

01 A USN P-8 with a P-3 Orion in the background. The RAAF have ordered eight P-8 with another four as an option to replace its ageing P-3 Orion maritime patrol aircraft fleet. (USN)

02 An RAF AW101 Merlin helicopter. 25 of these three engined transport helicopters will replace the RN's Sea King Commando helicopters. (RAF)

carriers. France was to build one ship, to take the operational pressure off its solitary, nuclear-powered aircraft carrier CHARLES DE GAULLE. The British were to build two vessels.

It was clear from the beginning, as the court of auditors points out, that the two countries were sailing in diverging directions. Britain wanted conventionally powered ships for vertical-take-off aircraft. France wanted a nuclear-powered ship which would possess a long deck and catapult equipment for take-off and landing by conventional warplanes.

Nonetheless, the French government signed a "memorandum of understanding" with Britain in 2006. France handed over €102m for the right to consult "off the shelf" development work already undertaken by Britain. It contributed another €112m over the next two years for further studies. In 2008, under President Nicolas Sarkozy, Paris dropped its plans for the new aircraft carrier which would have cost around €3bn.

"Between 2006 and 2007, France spent €214 m – €102m handed over to London as an entry ticket and €112m in industrial contracts – whose results are now useless to us," said the Cour des comptes.

Despite this experience, France and Britain are pushing ahead with ambitious plans for defence co-operation in other areas. David Cameron and President François Hollande signed another memorandum in March to develop a Franco-British UAV.

The Emperor Napoleon would be spinning in his tomb. So might be Admiral Pierre-Charles-Jean-Baptiste-Silvestre de Villeneuve, the man who lost the Battle of Trafalgar.

COLLINS TO BE IN-SERVICE LONGER

Defence Minister David Johnston has confirmed that a lengthy extension to the in-service life of the Collins-class submarines is necessary to avoid a submarine capability gap.

The Minister said that the planned withdrawal dates of the six Collins-class fleet would need to be extended "for as long as we safely and reliably can to ensure we maintain our submarine capability as we work through the complex issues involved in introducing the Future Submarine without inducing schedule risks".

"This is more important than ever as we are witnessing a significant proliferation of modern submarine capabilities across the Asia-Pacific region," he added.

The implications of the Minister's statement would indicate that work on SEA 1000, the project to replace the Collins, is proceeding at a much slower rate than would have been hoped for.

03 RAN ACCEPTS FIRST TWO MH-60R SEAHAWK ROMEOS

The RAN has taken delivery of the first two of 24 MH-60R Seahawk Romeo maritime helicopters at a ceremony on 24 January at US Naval Air Station Jacksonville, Florida, as part of its Project AIR 9000 Phase 8, designed to replace its exsisting 16 S-70B-2 Seahawks. According to a statement by Defence issued on 25 January, the initial aircraft are expected to be followed by an additional five over the course of 2014.

Commander David Frost, commanding officer of NUSQN 725, described the MH-60R Seahawk Romeo as a "big step forward" from the Seahawks that are being replaced.

"The MH-60R is a potent maritime combat helicopter that will primarily be used in the ASW role. The aircraft will also contribute to navy's ASuW role by providing an air-to-surface missile capability," Cdr Frost added.

In October 2013 the RAN revealed that its personnel with NUSQN 725 at Jacksonville had received training with both the Mk-54 torpedo and the AGM-114 Hellfire missile.

The two helicopters and crew are expected to remain in Florida until late 2014 for further training before commencing operations at Naval Air Station Nowra, New South Wales, Australia.

04 BAE SYSTEMS PULLS OUT OF INDIAN NAVY GUN CONTEST

BAE Systems has decided to not to offer its Mk 45 Mod 4 127 mm/62-calibre Naval Gun System for the Indian Navy's INR15 billion (US$243.5 million) tender for 13 guns after claiming that it is commercially and technologically unviable. This leaves Italy's Oto Melara as the sole bidder with its 127 mm/64-calibre lightweight naval gun.

"The company concluded that key aspects outlined in the RfP present the bidder with a disproportionate level of risk," BAE Systems wrote in a letter to the Indian Ministry of Defence (MoD) in late 2013, ahead of the March 2014 deadline to submit proposals.

Industry sources interpret "disproportionate risk" to include BAE Systems assuming production and quality control guarantees and delivery schedules for India's state-owned Bharat Heavy Electricals Limited (BHEL), which will build 10 of the 13 guns via a transfer of technology. Under the arrangement BAE Systems would have no functional control over BHEL, but it would be

03 The first of 24 MH-60R Seahawk Romeo maritime helicopters for the RAN's NUSQN 725. (RAN)

04 An Oto Melara 127 mm/64-calibre lightweight naval. Its superior performance to the USN Mk-45 Mod 4 may mean BAE's pulling out of the tender could be a blessing in disguise for the Indian Navy. (Oto Melara)

penalised for the latter's non performance.
Oto Melara is offering its 127 mm/64-calibre lightweight naval gun, with the precision-guided Vulcano round that recently entered service with the Italian Navy.
However, the IN could still obtain the Mk-45 Mod 4 from BAE through a FMS (Foreign Military Sales) deal with the USN, which would see USN production line guns earmarked for India.
The IN is being forced to import 127 mm guns as the government-run Defence Research and Development Organisation has been unable to develop them. The systems will arm seven Shivalik-class frigates and six Delhi-class destroyers that are at various stages of construction at local shipyards.

USN PROCURES RAPID SOFT-KILL UPGRADE

The US Navy has ordered the prioritised introduction of new decoy and jamming equipment for at least two DDG-51 Arleigh Burke-class guided missile destroyers to improve the soft-kill countermeasures capability. It is understood DDG-61 USS RAMAGE was the first to be equipped.
The rapid move to a single-source provider was revealed on 6 January in a Justification and Approval (J&A) statement released by US Naval Sea Systems Command (NAVSEA) and acknowledged the installation of the Mk-59 Mod 0 Decoy Launching System (DLS) and the Transportable Electronic Warfare Module - Speed to Fleet (TEWM-S2F) active electronic countermeasures (ECM) system on two ships.
In the J&A statement, NAVSEA said that Chief of Naval Operations (CNO) Admiral Jonathan Greenert had, in October 2013, directed the installation of Mk-59 DLS and the TEWM-S2F on two DDG-51s. NAVSEA added that initial systems installation had been reprioritised to meet the directive from the CNO.
The two new systems are being introduced are said to meet an urgent operational need. The Mk-59 DLS is the US designation for Airborne Systems' Outfit DLF-3B floating RF decoy system, procured by NAVSEA in 2013 to address a Rapid Response Effort to provide the fleet with a near-term, off-the-shelf decoy capability. The TEWM-S2F is a compact ECM system evolved from the TEWM demonstrator previously developed by the Naval Research Laboratory.
In mid-December 2013, the USN announced that a 'fly-away' team from Norfolk Naval Shipyard (NNSY) had completed the Mk-59 DLS retrofit package on board RAMAGE earlier that month during a maintenance period at Souda Bay, Crete. The destroyer is on a scheduled deployment supporting US Sixth Fleet maritime security and theatre security co-operation tasks. Pictures of RAMAGE show two twin launcher sets fitted on either beam.
No mention was made by the USN of the TEWM-S2F backfit. However, NAVSEA's J&A suggests that this installation was to be performed concurrently.

05 VIKRAMADITYA ARRIVES

Following a five-year delay and an almost three-fold escalation in its refurbishment costs, the Indian Navy (IN) has finally commissioned INS VIKRAMADITYA, a former modified Soviet Kiev class aircraft carrier.
Indian Defence Minister A.K.Antony said at a ceremony at the Sevmash shipyard in Severodvinsk, northern Russia "The induction of VIKRAMADITYA, with its integral MiG-29KuB fighters and Kamov Ka-31 helicopters, will add a new dimension to the IN's capabilities".
"The VIKRAMADITYA -MiG-29K combination can be expected to confront any shore-based air force and prevail as it will exercise sea control over a three-dimensional bubble spread over a 400-450 nms radius," he added.
The IN has acquired 45 Russian MiG-29Ks, which will constitute the Indian Fleet Air Arm for the two carriers air arms of VIKRAMADITYA and VIKRANT , a 40,000-tonne carrier under construction at Cochin Shipyard Limited in southern India that is likely to be commissioned in 2018.
The carrier is currently not equipped with close-in weapon systems (CIWS). The IN plans to equip VIKRAMADITYA with a locally designed CIWS and the long-range Barak 8 air-defence missile system that is under joint development with Rafael-Israel Aerospace Industries by 2017. VIKRAMADITYA will join INS VIRAAT (ex-HMS HERMES), a 54-year-old Centaur-class carrier, that recently underwent its fifth refit to keep it operational until VIKRANT enters service in 2018.

C-27JS TRANSFERRED TO U.S. COAST GUARD

The United States Coast Guard (USCG) will acquire 14 Alenia Aermacchi C-27Js as part of an intra-service transfer from the United States Air Force (USAF). The transfer was approved on December 19 through the Congressional passage of the 2014 National Defense Authorization Act and formally signed into law by President Obama on December 26.

05 INS VIKRAMADITYA and INS VIRAAT (ex-HMS HERMES) at sea together for the first time. (IN)

The law allows 14 of the current USAF C-27Js to be promptly transferred to the USCG with initial flight operations commencing within 6-12 months. The aircraft will be used for medium range surveillance USCG missions such as maritime patrol, drug and migrant interdiction, disaster response, and search and rescue.

The company also anticipates the USCG will immediately begin the process for expanding the C-27J's capabilities with tailored mission kits to include surface-search radars, electro-optical sensors and mission suites installed on all 14 planes.

The aircraft represent a highly efficient, cost-effective solution to the USCG's Deepwater recapitalisation programme and reinforce the C-27J's proven adaptability, manoeuvrability, and speed for maritime and search and rescue missions.

The C-27J will provide the USCG with greater range, endurance, speed and payload capacity than other twin turboprops in its inventory, and the capability to perform both medium and long-range missions, said Benjamin Stone, president and chief executive officer of Alenia Aermacchi's North American business unit.

The C-27J is the perfect fixed wing multi-role airlift aircraft for today's complex operating environments. Extremely manoeuvrable and versatile, the rugged C-27J boasts the highest power-to-weight ratio in its class, and the ability to perform fighter aircraft-like 3.0g force manoeuvres — enabling it to make tight turns, and to climb and descend quickly. It can fly farther, faster and higher than any other twin engine military transport aircraft in its class. Its low operating cost makes it an ideal platform in today's fiscally constrained environment. The Spartan has been ordered by the air forces of Australia Italy, Greece, Bulgaria, Lithuania, Romania, Morocco, Mexico, United States, Peru, and an undisclosed African country for a total of 76 aircraft.

06 CH-53K TESTS BEGIN

Helicopter maker Sikorsky has powered up the engines and spun the rotor head on the first prototype CH-53K heavy lift helicopter — designated the Ground Test Vehicle (GTV) for the USMC. The January 24 event continues the "Bare Head Light Off" phase of testing — so named because it was conducted without rotor blades — that began under auxiliary power in December with safety-of-flight test pilots at the aircraft's controls.

"GTV main engines powered 'on' is a significant step for the CH-53K helicopter program," said Mike Torok, Sikorsky's CH-53K Program Vice President. "Having independently tested the aircraft's many components and subsystems, including electrical and avionics, hydraulics and flight controls, landing gear, propulsion, transmissions and rotors, now we have begun testing these critical functions as an entire system powered by the GTV aircraft's three GE 7,500 shaft horsepower class engines."

Sikorsky delivered the GTV into the test programme at the company's West Palm Beach, Fla.-based Development Flight Centre in late 2012. Now anchored to the ground at its remote outdoor test site, the 44,000-pound GTV aircraft is outfitted at more than 1,300 points with sensors that will measure and verify the ability to operate safely under its own power. The GTV will undergo ground testing for approximately two years with both Sikorsky and USMC test pilots at the controls.

Once Bare Head testing is completed, Sikorsky will mount seven main rotor blades and four tail rotor blades onto the GTV. During this second test phase, Sikorsky will conduct extensive aircraft system checks leading to a formal Pre-Flight Acceptance Test required to clear the first flight aircraft for flight testing.

Four additional test aircraft are being prepared for flight test, commencing in late 2014. During the three-year flight test program, Sikorsky will continue to evaluate the GTV for long-term endurance of the engines and dynamic components, survivability, and maintenance practices.

"We have entered a much anticipated phase in this developmental program," said Col. Robert Pridgen, U.S. Marine Corps Programme Manager for Heavy Lift Helicopters. "We have experienced significant learning at the sub-system and component level, which continues to build our confidence in the capabilities of the 53K. We look forward to the initial validation and discovery at a full system level."

Sikorsky leads an industry team developing the CH-53K heavy lift helicopter for the U.S. Marine Corps. The aircraft's 88,000-pound (39,916 kg) maximum gross weight is designed to triple the external load carrying capacity of the CH-53E Super Stallion aircraft to more than 27,000 pounds over a mission radius of 110 nautical miles under "high hot" ambient conditions.

The U.S. Department of Defense's Programme of Record remains at 200 CH-53K aircraft with a U.S. Marine Corps Initial Operational Capability in 2019.

07 RN BUYS BACK ARK ROYAL SCRAP PARTS TO FIX ILLUSTRIOUS

It has been revealed in the UK that scrap yard parts from a nearly dismantled ARK ROYAL have

06 Sikorsky's CH-53K heavy lift helicopter Ground Test Vehicle (GTV) undergoing testing. (Sikorsky)

07 The former Invincible class aircraft carrier HMS ARK ROYAL being pulled apart for scrap at a Turkish scrap yard.

been hurriedly acquired and used to rebuild bits of in-service sister ship HMS ILLUSTRIOUS to save money.

The sale of the ARK ROYAL in 2011 saw public outrage as Britain was then left without any carriers for fixed-wing planes.

When ILLUSTRIOUS, which can only employ helicopters, suffered a fire, the UK MoD realised they had no replacement parts for the ship. Cash-strapped MoD officials were forced to make a desperate plea to the Turkish scrap yard's owners to return vital parts of the sister ship ARK ROYAL.

ILLUSTRIOUS had been on patrol around Somalia in August when the fire broke out in a radio switchboard.

A Ministry of Defence spokesman said: "While the part was not one that would routinely need replacing, a small fire meant we had to get hold of another one, which we did, paying £57,000 less than we would have done if buying new."

Britain decommissioned and sold the ageing ARK ROYAL for £2.9 million to a Turkish scrap yard two years ago to boost defence spending.

A former head of the Royal Navy, Admiral Lord West, said: "We should have held on to the ARK for just this sort of situation.

"Selling her off for scrap was a huge risk. With her sister ship ILLUSTRIOUS remaining in service, she would have been very useful."

KEEL LAID FOR THE SECOND AIR WARFARE DESTROYER IN ADELAIDE

On 8 Feb another milestone was reached for the Air Warfare Destroyer (AWD) project when the keel of the Royal Australian Navy's (RAN) second destroyer, NUSHIP BRISBANE was laid in Adelaide.

In keeping with tradition, the Chief of Navy, Vice Admiral (VADM) Ray Griggs AO CSC RAN placed a newly minted silver coin under the keel of BRISBANE. He was assisted by two of the youngest apprentices at the shipyard, Jayden Cairns and Courtney Bird. The coin is believed to protect builders and sailors from misfortune and danger.

VADM Griggs said "The DDG brings a significant step up in the air warfare capability of the RAN. It will be the fighting heart of the Fleet, along with the upgraded Anzac class frigates, and will mean that we have probably the most sophisticated and powerful surface Fleet that the RAN has ever had."

The Hobart class destroyers represent a major leap in capability for the RAN. Their role is to protect ADF personnel by providing area defence for accompanying ships as well as land forces and infrastructure in coastal regions.

Defence Minister The Hon. David Johnston attended the ceremony and said "These vessels will take us to a new generation and dimension for the Navy. I look forward to having them at sea defending Australia's interests".

08 UNIT CITATION FOR YARRA

On 4 March the proud descendants of the Ship's Company of HMAS YARRA (II) looked on as Chief of Navy, Vice Admiral Ray Griggs, AO, CSC, RAN proudly accepted a Unit Citation for Gallantry awarded to the crew of HMAS YARRA (II) for acts of extraordinary gallantry in action in 1942.

Presented by the Governor General, Her Excellency the Honourable Quentin Bryce AC, CVO, the citation details a series of events that commenced on the 5th of February 1942, when a convoy about to enter Singapore harbour was attacked by Japanese aircraft and the troop transport *Empress of Asia* was everely damaged.

Despite the threat from continuing air attacks and the explosions in the *Empress of Asia*, HMAS YARRA's Commanding Officer, Commander Wilfred Hastings Harrington, RAN, manoeuvred the ship alongside the stern of the sinking transport, enabling 1334 men to be directly transferred across to YARRA. YARRA then proceeded to rescue a further 470 men from life rafts and floats.

On the 4th of March 1942, YARRA and her convoy of three merchant vessels were proceeding to Fremantle. In the early hours of the morning, YARRA's lookouts sighted a Japanese surface action group. Each individual Japanese warship was greatly superior to YARRA in fighting strength and speed. Despite this, YARRA's newly appointed Commanding Officer, who assumed command on 11 February 1942, Lieutenant Commander Robert William Rankin, RAN, immediately manoeuvred the ship between the enemy and the convoy, made smoke to screen the convoy and closed to engage.

At the ceremony, the Chief of Navy spoke of their bravery.

"Collective gallantry is the most prized achievement in Navy. The crew of YARRA served the nation; they did so with extraordinary gallantry, skill and conspicuous devotion to duty; they did so as one company, even to death," Vice Admiral Griggs said.

When it was obvious the ship was about to sink, the order to abandon ship was given. Despite this order the last remaining gun crew continued to engage the enemy until silenced by direct fire. Of 151 crew members, only 13 survived. ■

08 Part of the ceremony in Melbourne for the award of a Unit Citation for HMAS YARRA. (RAN)

2ND PLACE

THE US "PIVOT TO THE PACIFIC:"
IS IT REAL, OR IS IT MEMOREX?

By Capt George Galdorisi USN (Ret)

Capt George Galdorisi USN (Rtd) writes about the topical US Military pivot to the Pacific region in his second place Navy League of Australia 2013 Essay Competition entry.

PERSPECTIVE

"Our new focus on this region reflects a fundamental truth – the United States has been, and always will be, a Pacific nation … Here, we see the future. With most of the world's nuclear power and some half of humanity, Asia will largely define whether the century ahead will be marked by conflict or cooperation, needless suffering or human progress."

President Barack Obama
Remarks to the Australian Parliament November 17, 2011.

The much ballyhooed United States "Pivot to the Pacific" is being watched carefully by the nations of the Asia-Pacific region - and it should be. Major powers have sometimes been long on rhetoric and short on action. The challenge for nations in the region is to assess where this pivot is going. In other words, is it real - or something else?

Over four decades ago a popular television commercial featured American jazz vocalist Ella Fitzgerald. The singer sang a note that shattered glass while being recorded to a Memorex audio cassette - only to have the tape played back and the recording also break the glass as the announcer intoned, "Is it live, or is it Memorex?" Today, many in the region want to know whether the United States "Pivot to the Pacific" is real and live, or just a "strategy de jour" that will pass - just as audio cassette tapes have passed into the technological dustbin.

While it may be impossible to assess - at this juncture - whether the announced United States "Pivot to the Pacific" (or Rebalance to the Asia-Pacific Region as it is officially called) is genuine, there are indicators to watch that can help us determine if it will, indeed, have traction moving forward. Knowing what indicators to watch can help us, as the Duke of Wellington famously said, "Endeavour to find out what you don't know by what you do; that's what I call guessing what's on the other side of the hill."

The LCS USS FREEDOM. The USN is basing four of its new LCS out of Singapore as part of its pivot to the Pacific. (USN)

WHAT IS THE UNITED STATES OFFICIAL POSITION?

In the fall of 2011, the Obama Administration issued a series of announcements indicating the United States would be expanding and intensifying its already significant role in the Asia- Pacific, particularly in the southern part of the region. The fundamental goal underpinning the shift was to devote more effort to influencing the development of the Asia-Pacific's norms and rules, particularly as China emerges as an ever-more influential regional power. A primary purpose of the "pivot" or "rebalancing" toward the Asia-Pacific was to deepen US credibility in the region at a time of fiscal constraint. Much of the "pivot" to the Asia-Pacific is a continuation and expansion of policies already undertaken by previous US administrations, as well as earlier in President Obama's term.

The administration's policy regarding this "pivot" or "rebalancing" was emphasized in an October 2011 article in Foreign Policy by then-Secretary of State Hilary Clinton. In this commentary, she noted:

Dictators like Kim Jong-un (seen here) make a greater focus on the Western Pacific by the US Military more legitimate in order to counter his regular acts of aggression.

> One of the most important tasks of American statecraft over the next decade will therefore be to lock in a substantially increased investment -- diplomatic, economic, strategic, and otherwise -- in the Asia-Pacific region…At a time when the region is building a more mature security and economic architecture to promote stability and prosperity, US commitment there is essential…Beyond our borders, people are also wondering about America's intentions -- our willingness to remain engaged and to lead. In Asia, they ask whether we are really there to stay, whether we are likely to be distracted again by events elsewhere, whether we can make -- and keep -- credible economic and strategic commitments, and whether we can back those commitments with action.
>
> The answer is: We can, and we will…Just as Asia is critical to America's future, an engaged America is vital to Asia's future… President Obama has led a multifaceted and persistent effort to embrace fully our irreplaceable role in the Pacific…By virtue of our unique geography, the United States is both an Atlantic and a Pacific power. We are proud of our European partnerships and all that they deliver. Our challenge now is to build a web of partnerships and institutions across the Pacific that is as durable and as consistent with American interests and values as the web we have built across the Atlantic.

While the US Rebalance to Asia-Pacific encompasses many aspects, one of the most closely-watched is what is occurring in the military realm. This is critical, because the region has not been peaceful. For example, there have disputes between China and Southeast Asian nations in the South China Sea; disputes between China and Japan over the Senkaku Islands in the East China Sea; North Korea's sinking of the South Korean warship CHEONAN; as well as other areas of conflict; to say nothing of ongoing illicit trafficking in people, weapons, drugs, and WMDs. Often, the degree of commitment to deal with these issues is measured in terms of military forces available.

The official US Department of Defense policy regarding the Rebalance to the Asia-Pacific was articulated in a memo by Deputy Secretary of Defense Ashton Carter. In his August 2012 memo, Secretary Carter noted:

> The President's Strategic Guidance of January 2012 directs several important changes to the Department's priorities, including a rebalance of emphasis towards the Asia-Pacific region. Rebalancing must encompass: the principles that guide our efforts to reinforce security in the region; our posture, presence and force structure; alliances and security partnerships; investment in new capabilities and technology; operational concepts and tactics, techniques and procedures; and our approach to operational plans.
>
> Over the past year, the United States has moved to "operationalize" this new strategy, from reaffirming treaty obligations with Asia-Pacific nations; to speeches and articles in international media by Obama administration officials; to more robust US participation in Asia-Pacific fora such as the East Asia Summit; to issuing its Air-Sea Battle Strategy to address anti-access and area denial challenges in the region. All of these initiatives are important, but what has garnered perhaps the most attention have been the concrete military steps that are underway in the region.

WHAT HAS THE UNITED STATES ***DONE*** TO REBALANCE TO THE ASIA-PACIFIC?

While speeches, promises, pronouncements and the like are important, for many, seeing tangible evidence of something as important to a sea change in United States policy is vastly more important to most observers. Here, there is a great deal happening that provides evidence the United States does, indeed, intend to make this rebalance "real."

As those living in the region know, while Europe is a landscape, the Asia-Pacific region is a seascape. Therefore, the most significant US force posture changes in the region are likely to be in naval force structure. As the US Chief of Naval Operations has noted, "The Navy will build on its longstanding Asia-Pacific focus in four ways:"

- Deploying more forces to the Asia-Pacific.
- Basing more ships and aircraft in the region.
- Fielding new capabilities focused on Asia-Pacific challenges.
- Developing partnerships and intellectual capital across the region.

This rebalance of US Navy - and other - military assets to the Asia-Pacific region is already being manifested in a number of important ways:

- Allocating 60 percent of total Navy assets to the Pacific Fleet rather than the 50 percent commonly devoted previously.
- Basing four of the Navy's new Littoral Combat Ships in Singapore.
- Adding three more attack submarines to be home-ported in Guam.
- Shifting more Aegis Ballistic Missile Defence capable ships to the Asia-Pacific region.
- Rotating up to 2,500 Marines at a time through Darwin, Australia, on training and presence missions.
- Initially fielding advanced capabilities in the Asia-Pacific including the fifth generation Joint Strike Fighter and the Triton Unmanned Aerial Vehicle.
- Adding 14 long-range missile defence interceptors to bases in Alaska (oriented toward the North Korea threat) and a THAAD missile-defence battery to Guam.

Clearly, the United States government, the US military, and the US Navy in particular have begun a "real" rebalance to the Asia-Pacific region, much of it manifested in terms of military capabilities dedicated to the region. But this represents only an initial step. Of greater interest is whether this shift will continue in a self-sustaining manner, or whether the current momentum will be lost. What will the future portend?

LIFTING THE FOG OF WAR REGARDING THE UNITED STATES REBALANCE TO THE ASIA-PACIFIC

If any of the above leaves the reader wanting in an effort to solve the "Is it live, or is it Memorex?" puzzle regarding the United States rebalance to the Asia-Pacific, we believe we can - at least partially - lift the "fog of war" on this issue. The forces working on an airplane - thrust, lift, drag and weight - can provide a convenient metaphor in examining the United States Pivot to the Pacific. Figure 1 and the accompanying text box describe these forces in sufficient detail so that we might bin them below. Examining each of these forces, in turn, can help us determine the odds of the US rebalance to the Asia-Pacific region remaining "real."

Thrust:

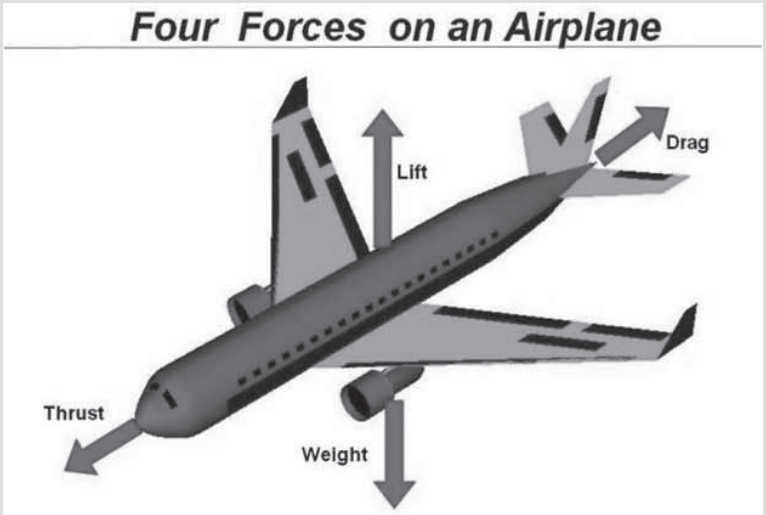
Underlying the Rebalance to the Asia-Pacific is the simple fact that the centre of gravity for US foreign policy, national security, and economic interests is shifting towards Asia, and that US strategy and priorities need to be adjusted accordingly. Thus, this "trust" represents forces external to the United States DoD that are driving the mandate for the United States to "Pivot to the Pacific." These are forces well-known to those living in the region. Over 50% of the world's population (3.4 billion people) lives in the Asia-Pacific. The region includes the most populous nation (China), the largest democracy (India) and the largest Muslim-majority nation (Indonesia). The region is home to seven of the ten largest standing militaries (China, the United States, Russia, India, North Korea, South Korea, and Vietnam).

Readers of *The Navy* don't need a tutorial regarding the economic dynamism of the Asia-Pacific region. The "Asia-Pacific Century" is all about economics. The region is home to the three largest economies (China, Japan and the United States), the economically dynamic ASEAN nations, and growing economic power-houses such as Australia and Canada. Over $5 trillion in trade passes through the South China Sea every year while a quarter of the world's oil passes through the Strait of Malacca each year. The region is marked by stunning economic growth, breathtaking innovation, and economic dynamism unknown anywhere else in the world.

From the United States perspective, the economic realities could not be clearer. Since 2000, Asia has become the United States' largest source of imports and second-largest export market after the North America region. As the world's fastest growing economic zone, Asia is expected to become even more vital for the US economy in the future—an expectation that has led the Obama Administration to pursue the Trans-Pacific Partnership and to make Asian nations central to its National Export Initiative. Greater trade flows through the Asia-Pacific have also reinforced greater US security interests in the region.

Lift:

While the economic factors causing the United States to rebalance towards the Asia-Pacific are important in their own right, what is driving or "lifting" the United States to accelerate this Pivot to the Pacific are the growing security concerns in the region. Some of these were mentioned



The forces working on an airplane - thrust, lift, drag and weight - can provide a convenient metaphor in examining the United States Pivot to the Pacific.

Thrust: This force is external to the United States DoD and directly opposes drag. It is the set of national and international factors that are driving the mandate for the U.S. DoD to "Pivot to the Pacific." It can be seen as the energy fueling the "plane."

Lift: This force is internal to the United States DoD and directly opposes weight. It is the set of actions being taken to operationalize the "Pivot to the Pacific."

Drag: This force is external to the United States DoD and directly opposes thrust. It is the set of national and international factors that are competing with DoD's focus on the Pacific, and which may hinder or slow the Pivot.

Weight: This force is internal to the United States DoD and directly opposes lift. It is the set of pressures or factors intrinsic to the US military force that might limit or inhibit the rebalance, including the inertia of current force structure and budgetary decisions being made now that will have repercussions for decades to come.

earlier, and without putting too fine a point on it, China's increasing military power, coupled with its growing willingness to use that power in disputes with its neighbours, is causing the United States to take a more visible and proactive military stance in the region.

The Chinese actions over the past several years that either explicitly or implicitly threaten her neighbours are well known to those in the region. And what is significant is the fact that these assertive moves have occurred only recently. Ten years ago, no oracle could have predicted the aggressive Chinese territorial claims over the Diaoyu/Senkaku Islands in the East China Sea and the totality of its claims over the area the size of India, the South China Sea. Chinese fishing boats, maritime surveillance vessels, naval vessels and military surveillance aircraft have backed up those bold assertions with forceful maritime and aerial encroachment in areas that have traditionally been judged non-contested. And perhaps most troubling, China has made it increasingly clear that it does not intend to compromise with its neighbours in order to settle these disputes. If anything, the Chinese position continues to harden over time.

Undergirding China's moves in the region has been the dramatic increase in its military spending. China alone accounts for 30 percent of Asian defence spending and China's official military expenditure in 2011 was more than two-and-a-half times the 2001 level, growing by an average of approximately 11 percent per year in real terms over the period, even faster than the economy as a whole. Most observers predict China's defence budget will double over the next five years, reaching over $238B in 2015, and outstripping the combined spending of all other nations in the Asia-Pacific region.

Simply put, as China continues to grow economically and use these funds to bolster more aggressive military moves in the region, we can expect this to "lift" the United States into committing more military forces to the region. But this does not happen in a vacuum. While the United States may have the intent to continue - or even accelerate - this rebalance, other factors are at work that could well slow it down.

Drag:

Like the force acting on an airplane, drag represents those national and international factors external to the United States DoD that are competing with DoD's Pivot to the Pacific and which may hinder or slow the Pivot. Chief among these is the fact that the United States is a global power and simply can't walk away from its commitments in other regions, from Europe, to Africa, to South and Central America, to the Middle East and South Asia.

All these regions are important to the United States and the US commitment must include military assets. For example, the United States is committed to NATO and especially to the defence of Europe from the threat of ballistic missile attack - witness the substantial commitment of US military assets to the European Phased Adaptive Approach for missile defence, including the permanent stationing of four modern US Navy destroyers in Rota Spain. Latin America too commands a substantial US military presence, especially in the areas of the trafficking of illegal drugs or people. And more recently, crises in North Africa have commanded added US military presence.

However, it is the Middle East and South Asia where the United States is having a particularly difficult time extricating itself from its responsibilities - including substantial military presence. High-ranking US military officials have cautioned against pulling all US troops out of Afghanistan any time soon. Piracy in the Gulf of Oman - as well as in the Horn of Africa - still

(from L to R) The Chinese Sovremennyy class destroyer HANG ZHOU, the Jiangkai II class frigate ZHOUSHAN and the Sovremennyy class destroyer TAIZHOU. These new Chinese naval vessels are based closer to the South China Sea and thus the Pacific.

Two USN MQ-4C Triton long range unmanned aerial vehicles. Tritons will be based in the Pacific for the long range persistent intelligence, surveillance and reconnaissance role. (USN)

demands a US naval presence. And more recently, the crises in Syria has caused the US Navy to surge substantial numbers of ships to the Eastern Mediterranean. The sum total of these worldwide commitments are - and will likely continue to - impose a significant "drag" on the United States DoD's Rebalance to Asia.

Weight:

But beyond the international considerations causing "drag" on the US Pivot to the Pacific, there is a substantial "weight" that is impeding this rebalance. In the wake of the most severe economic downturn in the United States in over three-quarters of a century, the US DoD budget is being cut - and cut dramatically. And most predict this budgetary strain will have repercussions for decades to come. The numbers speak for themselves. Total US defence spending, including both base funding and war costs, will drop by about 22% from its peak in 2010 to its new steady-state in 2017. And the current US gridlock with possible budget sequestration could well put additional stress on the US defence budget. The 2011 US Budget Control Act mandated a reduction in the Defense Department future expenditures by approximately $487 billion over the next decade or $259 billion over the next five years. As one Pentagon spokesman put it, "The budget constraints of sequestration may require a change in the pace and scope of some of the Department of Defense's activities in the Asia Pacific." Most observers agree this greatly understates the impact of current and future DoD budget cuts. Or as Ian Storey, a senior fellow at the Institute for Southeast Asian Studies in Singapore put it, "There were always concerns that America's daunting financial problems would derail the whole 'project' of rebalancing to Asia, and latest cuts only add to those fears."

A PRISM ON THE FUTURE

"Trying to predict the future is like trying to drive down a country road at night with no lights while looking out the back window."

Peter Drucker

As this quote suggests, there are manifest perils in attempting to predict the future - especially when the issue is one as complex as the United States Rebalance to Asia. However, using our aircraft metaphor, we can use the forces represented by thrust, lift, drag and weight as a prism to examine whether this Pivot to the Pacific has traction and will continue.

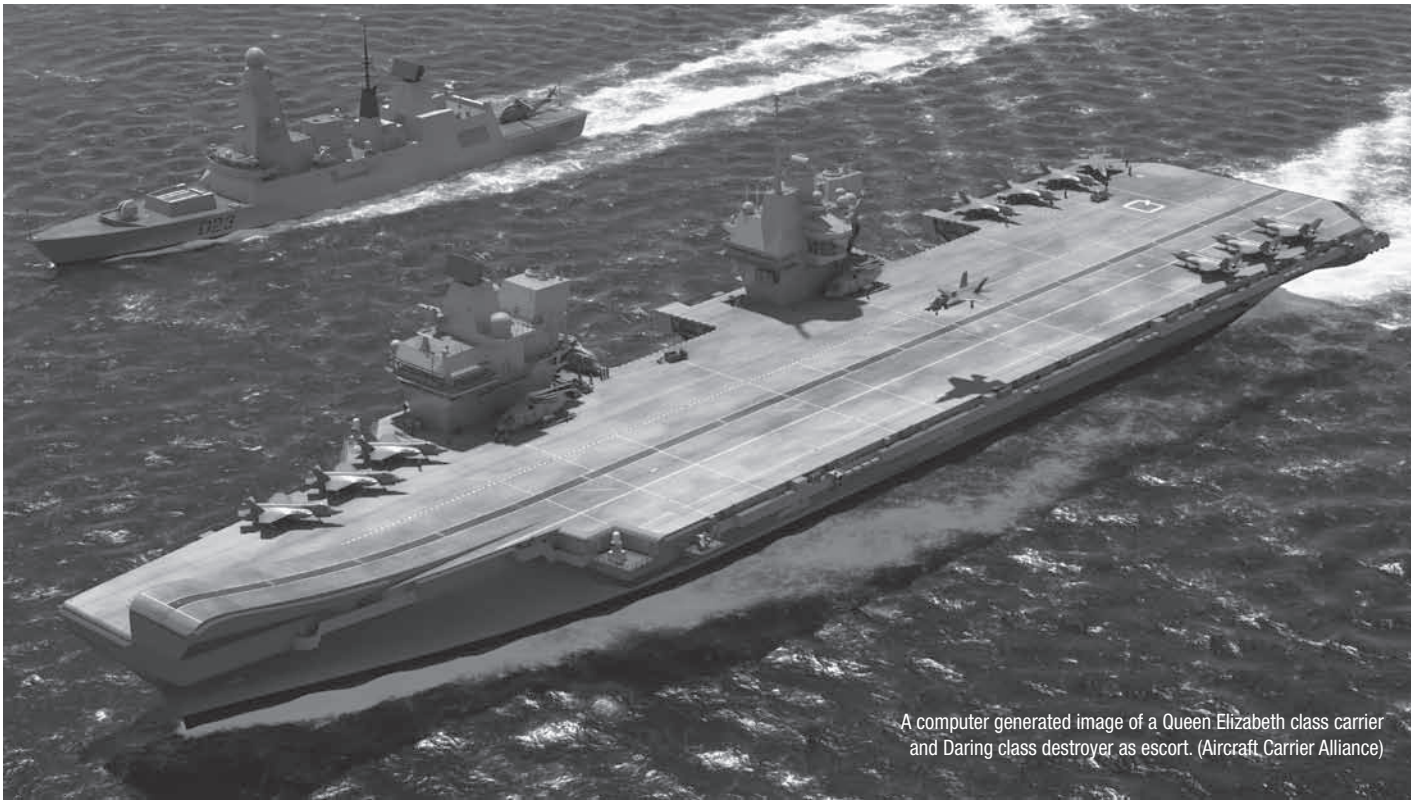
And this is more than an academic exercise. Governments of the Asia-Pacific region have a vital interest in knowing how "real" the US Pivot is. Regional militaries are acutely invested in understanding what US military force posture in the region will entail. Defence industry leaders in the region need to know whether the platforms, systems, sensors and weapons they produce for their respective militaries - especially for those nations allied with the United States - will be working beside, or without, US military forces. While the jury is still out on these questions - the prism is available now. Knowledgeable observers will watch the thrust, lift, drag and weight vectors and draw their own informed conclusions. ■

2ND PLACE

THE QUEEN ELIZABETH CLASS CVF
AN EXCELLENT DESIGN POORLY EXECUTED

By Brendan Alderman

Kelvin Curnow's 2013 Navy League Essay Competition second place entry (non-professional) explains the history and mistakes the UK has made along the way to making what could be one of the best conventional aircraft designs ever.



A computer generated image of a Queen Elizabeth class carrier and Daring class destroyer as escort. (Aircraft Carrier Alliance)

The Queen Elizabeth class aircraft carrier had its origins in the UK Strategic Defence Review (SDR) launched in May 1997 by the newly elected Labour government led by Prime Minister Tony Blair. To the surprise of almost all observers in defence matters the SDR set out an ambitious agenda for the renewal and re-equipment of Britain's armed forces based on an annual increase in defence spending. For the Royal Navy the news was particularly promising. Based on the axiom that 'air is free and steel is cheap', several classes of vessel were to be replaced by larger, more capable ships. Notable among these were the Type 45 air-defence destroyer, the Astute class hunter-killer nuclear powered attack submarine (SSN) and the CVF aircraft carrier. The CVF was to be at least twice the size of the Invincible class of carrier capable of carrying aircraft of a more advanced design than the Sea Harrier fighter.

The SDR was heavily influenced by the First Gulf War when the British commanders could only look on in astonishment at the firepower launched by the Americans against Saddam Hussein's forces. Britain's armed forces were geared towards helping protect the UK and her NATO allies against their Cold War foe, the Soviet Union. The collapse of the Soviet Union and the ending of the Warsaw Pact meant there was now no clear threat to the UK or Western Europe. Britain now had to look to the future and attempt to predict the type of future war she would fight. Her most recent experiences, that of the 1991 Gulf War and the Falklands War of 1982 suggested that the conflict would be of an expeditionary nature fought far from home. Bearing in mind the lessons of the Falklands conflict, the new aircraft carrier would be able to carry least twice the number of aircraft of the Invincible class and initially would be of a Short Take-Off and Vertical Landing (STOVL) design.

The only opposed beachhead landing since the Second World War occurred at San Carlos Water, West Falkland, on 21st May 1982 which exposed numerous weaknesses in the Royal Navy. Among these were the inadequate radar and missile systems which, designed as they were to engage Soviet long-range bombers over the sea, proved unsatisfactory for littoral warfare and against fast low-flying fighter aircraft over land. The only fighter aircraft available to protect the Falklands task force was the BAe Sea Harrier FRS.1 armed with the latest version of the American Sidewinder air-to-air missile, the AIM-9L. She was a formidable opponent to the Argentine air force and navy strike aircraft despite being hampered by a radar which had poor performance over land, subsonic performance and relatively short range. Nevertheless, with only 20 fighters available, the Sea Harrier force notched up some impressive statistics - not the least being that, along with the Boeing F-15 Eagle, it remains the only Western fighter aircraft with no aerial victories credited

A USMC F-35B STOVL JSF landing aboard USS WASP during first of class sea trials last year. The UK's CVFs were designed to take the F-35B STOVL version of the JSF, then F-35C catapult and arrester version then changed back again to the B model JSF, at great cost. (USN)

against it, the score being 22-0. Alongside these remarkable numbers the Sea Harrier was perceived to have several advantages over contemporary naval aircraft.

The sea states in the South Atlantic were such that aircraft operation from conventional catapult equipped carriers would have been difficult, if not impossible at times. Moreover, in emergencies the Sea Harriers could be readily diverted to other landing platforms. On one occasion Sea Harriers were diverted to land on the LPD HMS FEARLESS, whilst in other instances they used 'Sid's Strip', a landing strip constructed from aluminium planking at San Carlos.

Opinions varied about how useful the RN's last conventional aircraft carrier, HMS ARK ROYAL(V), would have been had she not been decommissioned four years previously. There was wide debate. On one hand, the mere presence of a large carrier equipped with supersonic Phantom fighters and long-range Buccaneer strike aircraft was perceived by many to be a game-changer in such a conflict. It was considered especially so because the ARK ROYAL carried Gannet Airborne Early Warning (AEW) aircraft, the component considered most lacking in the Falklands task force's protection against air attacks by the Argentines. Those who argued against the ARK ROYAL's usefulness said that the serviceability rates of the Phantom and Buccaneer aircraft were low (with the Sea Harriers it was nearly 100%) whilst there was always the question of catapulting and recovering the aircraft in the poor sea states which existed.

After the Falklands conflict the RN set about addressing some of the shortcomings of the Sea Harrier. The number of missile rounds was doubled, whilst larger external drop tanks were the answer to the inadequate range of the fighter.

The AEW problem was addressed by modifying several Sea King helicopters to carry a Searchwater radar suspended in an inflatable bag under and off to the side of the aircraft. Both these aircraft were then further developed - especially the Sea Harrier which in its FA.2 variant employed the extremely capable Blue Vixen radar and the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM). The successful development of these systems was to further influence the design of the RN's next carrier, the CVF.

Through necessity the UK had developed the Sea Harrier, an aircraft which had proven successful beyond the dreams of even the most optimistic. Now, by choice, the RN was to go ahead and develop a carrier which defied the norms. Instead of planning a large ship with catapults and arrestor gear, the early preference was for a STOVL ship.

Experience and overwhelming success with the Sea Harrier and the ski-jump equipped Invincible class pushed the UK in the direction of a super-sized STOVL carrier capable of carrying at least twice the number of aircraft as the earlier class. Indeed, there was an opinion among naval aviators that it was '...better to stop then land, than land then stop.' It is easy to comprehend why the UK would accept the STOVL carrier as the best way to go however, taking into account the wider picture the decision appeared deeply flawed.

Initially sketches of the replacement for the Invincible class of carriers indicated it was to be a 40,000 ton ship of a 'through-deck' design, a ski jump and with no provision for an angled deck. This was to all intents a 'super Invincible class' rectifying some mistakes of the earlier design by eliminating the area-defence anti-air missile system and reducing the size of the island, thereby increasing flight deck area. However, it

was considered that by increasing the design weight to 60,000+ tons the usefulness of the carrier would increase considerably without a commensurate increase in cost. This conclusion was reached after the initial assessment phase began on 25 January 1999 involving six companies, Boeing, British Aerospace (later BAE Systems), Lockheed Martin, Marconi Electronic Systems, Raytheon and Thomson-CSF (later Thales Group). This assessment phase concluded on 23 November 1999 on which date the Ministry of Defence (MOD) awarded contracts to two consortiums, one led by BAE Systems the other led by the Thales Group to undertake detailed design studies.

The years 2001-2 were to prove watershed years in the CVF project. On 17 January 2001, the UK signed a Memorandum of Understanding (MoU) with the United States Department of Defense (DoD) for full participation in the Joint Strike Fighter (JSF) programme, becoming the only Tier 1 partner in the project, a fact which gave her input rights into the design. The Lockheed-Martin design was chosen on 26 October 2001 as the winner in a fly-off with a Boeing design. Lockheed Martin and BAE Systems were now to productionise the design which would later receive the official designation Lockheed Martin F-35 Lightning II.

The fighter was to be produced in three variants for the US Air Force (F-35A), US Navy (F-35C) and US Marines (F-35B). It was the latter design which particularly interested Britain, for the F-35B was a STOVL aircraft, perceived by both the Marines and the RN to be a direct successor to their Harrier aircraft. However, the JSF was also to be operated by the RAF a fact which in itself almost predetermined any decision by the RN regarding the configuration of the CVF.

The RAF wanted the STOVL F-35B as a direct replacement for its Harriers and there was little possibility that the British government or MOD would permit two different fighter types to be ordered by the two services, even if they were different variants of the one design. In announcement made by the MOD on 30 September 2002 it was clear that the F-35B was to be the variant ordered, though the RN long hankered to catapult aircraft from its fleet carriers.

The choice of the STOVL F-35B did not completely determine the CVF design however, for a decision had been made almost at the outset that the carrier be 'future-proofed' in that it would be equipped for, but not with catapults and arrestor gear. The CVF was to be in service for 50 years, hence it made immense sense to design and build a carrier capable of operating CATOBAR (catapult assisted takeoff but arrested recovery) aircraft.

In an innovative decision made on 30 January 2003, the UK 's (then) Defence Secretary, Geoff Hoon, announced that the Thales Group design had won the CVF design competition however, BAE Systems would operate as the prime contractor.

The Thales design was innovative in that it had two islands, the forward island for navigating the ship, the aft island for controlling flying operations. Two deck-edge lifts were placed at the rear of each island. A plan view of the design immediately made evident its adaptability to CATOBAR operations, the design being not dissimilar to that of modern American super carriers. The starboard sponson both in its size and shape would easily accommodate angled deck operations. Indeed, in comparison with the Nimitz class carriers, the distance from the stern of the CVF to the culmination of the sponson demonstrates that there is little difference in length between the British and American designs.

The CVF is shorter than the Nimitz class, 920ft in comparison to 1,092ft, this difference is in the deck area forward of the sponsons. Whilst considerably larger than the French Navy's CHARLES DE GAULLE, the CVF is 81ft shorter than Russia's ADMIRAL KUZNETZOV, or the Chinese Navy's LIAONING, albeit both these vessels are 10,000tons lighter at full load.

Despite the differences in size, tonnage and configuration these vessels are all designed to carry around 40 aircraft, considerably fewer than the American carriers. The CVF is lightly defended, with only three Phalanx systems providing any form of noteworthy defence against missile attack. In comparison the FNS CHARLES DE GAULLE carries the Aster missile system, the same as that carried by the Type 45 destroyers. In retrospect it may have been wise to have included such a system for the CVF class, this would have provided a substantial measure of self-defence and also release a destroyer or frigate for other duties.

Another notable feature of the CVF is the employment of faceting on the two islands, thus, for the first time ever stealth features were included in a design of such size.

In 2010 Britain's new Conservative/Liberal Democrat coalition government launched its Strategic Defence and Security Review (SDSR) which was announced to the public on 19 October of that year. The cuts were

The CVF QUEEN ELIZABETH taking shape. (Aircraft Carrier Alliance)

Nearly all to the RAF's GR-9 Harriers were sold to the USMC for spares. Seen here are the remains of the stripped out aircraft now stored in the US desert storage facility at Davis-Monthan Air Force Base Arizona. Keeping the Harriers would have enabled uninterrupted training and experience on STOVL fast jet operations for the CVF's introduction to service. (USAF)

swingeing, particularly for the RN which lost the carrier, HMS ARK ROYAL (V) along with four Type 22 frigates. The RAF was also savaged, it lost its entire Harrier GR.9/9A fleet, sold to the US for spare parts for a fraction of their value. The consequence of this however, was also to effect the RN, for since the retirement of the Sea Harrier in 2006, the Invincible class only put to sea with RAF owned, but jointly crewed, Harriers. Now, with these aircraft removed from the inventory, carrier strike was no longer an option available to the British government and would not be available for at least another 8-10 years when the first of class HMS QUEEN ELIZABETH CVF would enter service.

However, she would not remain in service for more than two years acting only as a training carrier, the plan was to then put her in extended reserve. The second of class, HMS PRINCE OF WALES was to be completed as a conventional carrier equipped CATOBAR operations.

The F-35C carrier variant would be purchased in lieu of the F-35B, this variant having a longer range, a greater payload capacity and moreover it was considered cheaper to purchase and operate. With this decision, it appeared that the UK had finally decided to not go down the lonely path of STOVL, but return to the notion of a true fleet carrier capable of carrying all the Western naval aircraft.

Just as importantly, a decision to use CATOBAR ensured that the RN would be able to operate the world's most capable ship borne AEW&C (Airborne Early Warning & Control) aircraft, the Northrop Grumman E-2D Hawkeye, a type used by both the US and French Navies. Gone would be the days of relying on radar carrying helicopters, which because of their range, speed and height limitations were, at best, a compromise solution to the problem of providing airborne early warning.

The story however, did not end there, for despite criticising the previous Labour government's decision to buy the 'inferior' F-35B the coalition government performed a volte-face and on 10 May 2012 it was announced that the UK would indeed go ahead with the purchase of the STOVL variant of the CVF. Reasons cited for this reversal included the difficulty in converting the CVFs to CATOBAR operation and the cost, estimated to be in the order of US$2Bn. This figure was later disputed by the US, which stated that the cost of equipping PRINCE OF WALES with two EMALS catapults and an advanced arrestor gear system would be in the order of US$800m. By completing the CVFs in ski jump configuration, the UK Defence Secretary Philip Hammond noted that both the QUEEN ELIZABETH and PRINCE OF WALES could be operated simultaneously, whereas the probability of converting both CVFs to CATOBAR operation was extremely low, mainly because of cost, thus leaving the UK with only one operational carrier. The limitations of such a notion were immediately evident by looking across the English Channel and observing the problems faced by the French Navy with only one carrier. However, even with one CATOBAR equipped carrier the French Navy has demonstrated interoperability with the USN, with cross-decking exercises commonplace. The 2011 Operation Unified Protector by NATO against the Gaddafi regime in Libya demonstrated the immense bonuses of having even one

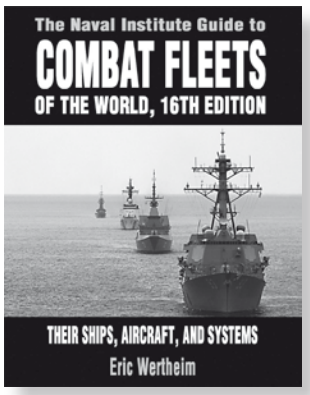
A computer generated image of the unique two island superstructure of the CVFs as well as showing how much room there is on the light deck. (Aircraft Carrier Alliance)

conventional carrier at a nation's disposal. The CHARLES DE GAULLE launched strikes against Libya using both Rafale M and Super Etendard Modernisé fighters and employed her Hawkeye aircraft to immense effect, occupying as they did one of the AEW&C tracks over the Mediterranean opposite Libya. Even in high ambient temperatures the Rafales were notably able to return with unspent ordnance, always considered to be a factor of immense value, especially financial.

In all the recent conflicts involving fleet carriers the use of a STOVL design, such as the CVF would be found wanting. The F-35B is short on range, it has a radius of action some 200miles less than the USN's F-35C. Moreover, the possibility of extending the STOVL version's range with integral refuelling support, as with the USN's use of the Super Hornet and with the French Navy's employment of their Rafales as air-to-air tankers, is not possible. The USMC intend to use the Osprey tilt rotor as aerial refuellers, however their load out is negligible, the only effective way to ensure that enough fuel load is available to naval fighter is to catapult the refueller off the carrier. Unlike the Rafales during the Libyan conflict, the F-35B will be unable to return to the carrier with unspent ordnance, such is the marginal vertical landing performance of the aircraft.

The UK has proposed as a solution to this problem that the aircraft return to the carrier using a Short Rolling Vertical Landing (SRVL). This is an unproven concept, moreover because the fighter is actually 'rolling' as it lands, it may require the CVF to be configured with an angled deck as well as a mirror landing system. The latter certainly is a counter argument to the claim that a STOVL carrier is much simpler from which to operate aircraft, the need to practice 'flying the ball' alone increases training costs because F-35B pilots will be required to be current in deck landing techniques. The days of the few trips in a Harrier to be current in carrier operations are well and truly over.

Perhaps the biggest shortcoming of the CVF programme is that instead of it being categorized for what it is, the RN's desire to have proper fleet carriers, it has had to be redefined as a programme which provides four acres of a go anywhere national asset just for the project to survive. The RN remembers only too well the RAF's successful campaigns to destroy its previous attempts to maintain large carriers at the core of its fleet. By redefining the Queen Elizabeth class as national assets the RN has attempted, so far successfully, to save a programme which was always open to cancellation through rising costs and non-committed politicians. Being 'national' rather than navy assets makes the programme harder to come under inter-service criticism, thus the carrier will operate air force owned fighters and navy as well as army helicopters. However, whilst this shows the intrinsic adaptability of the carrier, it also demonstrates that compromise makes plain its inherent weaknesses. No longer a proper strike carrier, the compromised design exposes the weaknesses of a vessel which, if equipped with catapults and arrestor gear, would be one of the greatest aircraft carrier designs put into operation. ■



The Naval Institute Guide to Combat Fleets of the World, 16th Edition: Their Ships, Aircraft, and Systems

Hardcover: 1,152 pages, B&W
Naval Institute Press; 16th edition (August 15, 2013)
ISBN-10: 1591149541
ISBN-13: 978-1591149545
By Eric Wetheim

Combat Fleets of the World is internationally acknowledged as one of the best one-volume reference books to the world's naval and paranaval forces. Updated regularly since 1976, it has come to be relied on for all-inclusive, accurate, and up-to-date data on the ships, navies, coast guards, and naval aviation arms of more than 170 countries and territories, *THE NAVY* magazine being one of those that rely on this book.

Large fleets and small maritime forces get equally thorough treatment. Comprehensive indexes make the book easy to use and allow for quick comparisons between ships and fleets.

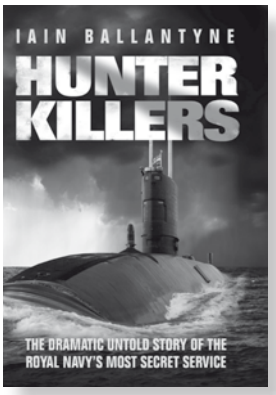
This new edition, the first in five years, presents timely information on major and even minor developments that could impact the world scene. More than four thousand illustrations and multi-view drawings present the user with the most detailed views available for identification and comparison purposes. Additional aids for the user include a section on how to use the book, lists of terms and abbreviations, an informative ship-name index, and more. An expanded chapter on the Chinese navy provides major updates on the status of their new aircraft carrier and the latest Chinese submarines, surface ships and naval missiles.

Dozens of detailed line drawings depict exactly where weapons and sensors are located on the world's combatants such as the Iranian Ghadir-class submarines, the French Forbin-class destroyers, and the USN's Littoral Combat Ships.

The ship data section for each country provides full coverage of all ships, from the largest aircraft carriers to the smallest training and auxiliary craft. The vessels of the world's coast guards and customs services are given thorough treatment as well. But the book is much more than a ship encyclopaedia. It includes information on the personnel strengths of each country's naval forces, major base locations, and details on maritime radar, sonar, naval aircraft, and weapon systems currently in service.

The author, Eric Wertheim, is a defence consultant, columnist, and author specialising in naval and maritime affairs. Frequently interviewed by the news media, he has served as a speechwriter for US Pentagon officials and a consultant to private industry and the U.S. government. He has been a columnist for Proceedings magazine since 1994 and lives in the Washington D.C. area.

This book is a must for all naval enthusiasts.



Hunter Killers

The Dramatic Untold Story of the Cold War Beneath the Waves

By Iain Ballantyne
Hardcover: 400 pages
Publisher: Orion (September 12, 2013)
Review by Cem Devrim Yaylali, Istanbul

Shortly after reading 'Hunter Killers' by Iain Ballantyne (Orion, hardback) I was offered an opportunity to join a group visiting the Turkish submarine TCG CANAKKALE.

Our guide was the Executive Officer (XO) of the submarine and I asked him how deep his vessel could dive. According to open source information available on the Internet (and elsewhere) the diving depth is 250 metres for that class of submarine. The XO gazed hard at me for a few seconds before answering. He would only confirm that the diving depth of his boat is in excess of 200 metres.

I realised long ago that, regardless of their nationality, language, religion and other discriminating features, all submariners around the world are secretive people. They don't like to talk about their trade in public. Therefore, it is a remarkable achievement for Iain Ballantyne to persuade British submariners to talk in depth about their activities during the Cold War years.

'Hunter Killers' covers a period of nearly four decades, from the late 1950s to the 1990s. When a book tackles such a broad period it is important for the writer to find the balance between the stories of individuals and presenting the time line of global events.

In my view, Ballantyne has mastered this challenge triumphantly.

Submarines and their respective secret, silent services have always fascinated me, so I was very much impressed with the stories revealed within.

'Hunter Killers' is based around first-hand accounts of operations conducted in high secrecy, under very hazardous conditions. Ballantyne reveals some potentially deadly bumps between nuclear-powered submarines and takes the reader on nerve-wracking voyages by diesel electric submarines, some of them under ice. He also looks at how submarine captains are created, not least via the intense, ruthless process known as 'the Perisher'.

These are just some of the stories told in detail. An epilogue looks at the evolving submarine rivalries of today, with Ballantyne suggesting that if there is to be a new 'battleground' it will be in the South China and East China seas. It is in this context that he presents a few details on the exploits of Australian submarines during the Cold War and beyond.

The underlying message is that if we want a hint of what the future may hold in Asia-Pacific, and elsewhere in the 21st Century, we should dive into the past exploits of the RN's submarines in the Atlantic and points North.

Although it is a work of non-fiction, 'Hunter Killers' is a compelling read and the tempo of the narrative seldom drops. In a few chapters there are references to books or movies published or released at a particular period of time, sometimes in parallel with similar true-life incidents. If you do not know those works of art, the cultural context may be lost on you, but this is a very minor gripe.

Overall Ballantyne has written an excellent book, presenting many exciting and never before told stories from a select band of British submariners - some ratings in addition to officers - who served during the Cold War. The exploits of those featured serve to illustrate the experiences of the broader brotherhood, ensuring the story remains accessible and tightly focussed.

It was the daring adventures of these men that helped the West to win the Cold War. We should consider ourselves lucky that their stories are presented to us in such a fine book. It is surely the most enthralling of Cold War submarine thrillers, but better than any novel because it is for real.

'Hunter Killers' (482 pages) is available in Australia as a hardback from Dymocks and other bookshops. It is also available as an e-book.

Seaforth World Naval Review: 2014

By Conrad Waters (Editor)

Series: Seaforth World Naval Review

Hardcover: 192 pages

Publisher: Naval Institute Press (October 15, 2013)

Since its launch in 2009 this annual has rapidly established a reputation as an authoritative but affordable summary of all that has happened in the naval world in the previous twelve months. It combines the standing features of regional surveys with one-off major articles on noteworthy new ships and other important developments. Besides the latest warship projects, it also looks at wider issues of importance to navies, such as aviation and electronics, and calls on expertise from around the globe to give a balanced picture of what is going on and to interpret its significance.

Special features for this year include a survey of current and future torpedo developments, a look at how the Royal Navy is coping after the Strategic Defence and Security Review, plus analyses of significant new warship classes: the Japanese Hyuga class DHH concept, the USNS *Spearhead* Joint High-Speed Vessels, Danish Iver Huitfeldt class frigates, and German AIP technology as demonstrated in the recent Type 212A submarines. All very fascinating topics.

For anyone with an interest in contemporary naval affairs, whether an enthusiast or a defence professional, this annual has become required reading.

The Editor, Conrad Waters, a barrister by training and a banker by profession, has had a lifelong interest in modern navies about which he has written many articles. He also compiled the annual review of navies for the journal Warship and was the founding editor of Seaforth World Naval Review.

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 some 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.

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.
- Believes that the level of both the offensive and defensive capabilities of the RAN should be increased and is concerned to see that the substantial surface and sub-surface capability enhancements contained in the 2009 Defence White Paper should survive the forthcoming 2014 review of Defence capability; in particular a substantially strengthened submarine force, 3 Air Warfare Destroyers (AWDs), 2 landing ships (LHDs), 8 new frigates (Anzac class replacements), 20 offshore combatant ships, 6 heavy landing craft and substantial numbers of naval combatant and ASW helicopters.
- Strongly supports the acquisition of large, long range and endurance, fast submarines and, noting the deterrent value, reliability and huge operational advantages of nuclear powered submarines and their value in training our anti-submarine forces, urges the consideration of nuclear power as an option for those vessels.
- Notes the potential combat effectiveness of the STOVL version of the JSF and supports further examination of its application within the ADF.
- In order to mitigate any industry capability gap following the completion of the AWD program, recommends bringing forward the start date of the planned future frigate (Anzac replacement) program, recognising the much enhanced capability projected for these ships.
- 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 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.

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.

NUSHIP ADELAIDE, the second of Australia's two Canberra class LHDs, arriving in Melbourne for the first time carried by the ship lift vessel Blue Marlin. (Defence)

The Arleigh Burke Flight IIA class destroyer USS TRUXTON passing through the strait of Gibraltar on her way to the Black Sea as part of the GEORGE H.W BUSH carrier battle group. (USN)

The mighty LHD NUSHIP CANBERRA on sea trials off the NSW coast. (RAN)