

THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

**AUSTRALIAN
NAVAL BASES**

**RETURN
BRITANNIA**

**MARTIME
TERRORISM**

**WHO SANK
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Front cover: A RAN S-70B2 Seahawk helicopter carrying an Australian White Ensign, flies over HMAS PARRAMATTA and the historic vessel Lady Hopetoun in Sydney Harbour to mark the launch of the Royal Australian Navy's International Fleet Review 2013. Over 50 nations have been invited to participate in the International Fleet Review (IFR) to be held in Sydney from 3 – 11 October 2013. The IFR is being held to commemorate the centenary of the first entry of the Royal Australian Navy Fleet into Sydney which occurred on 4 October 1913. (RAN)

NUCLEAR DEBATE FINALLY SURFACES

China has recently named and commissioned her new super sized aircraft carrier and started sea trials. India is currently trialling a new aircraft carrier and taken delivery from Russia of the impressive and formidable Akula-II class nuclear powered attack submarine (SSN) INS CHAKRA. Australia on the other hand has just had \$5.5 billion ripped out of its defence budget creating a hole in our future capability planning in what many commentators are calling the lost 10 years.

However, all may not be lost. The debate over nuclear powered submarines for Australia's Navy to replace the ailing Collins class submarines has finally started. But only just.

It was reported in the Australian Financial Review in mid-November 2012 that ALP Whip and former Labor Defence Minister Joel Fitzgibbon said in an interview to the paper "I now believe it was a mistake to rule out a nuclear option and we should have a discussion about every option which might deliver the capability we need in a timely and affordable manner". The statement breaks ranks with the established Labor Party policy of deliberately ignoring the benefits of nuclear power for our most potent deterrence capability, let alone our power industry itself.

In response to Mr Fitzgibbon's remarks the opposition Shadow Minister for Defence said that while they have no policy either way on the type of submarine to be acquired under Project SEA 1000, nuclear propulsion should not have been excluded from a study of options for the submarines.

A shift to nuclear propulsion would put Australia in line with its major allies and many other navies who have either adopted SSNs or are about to.

The cry from opponents of nuclear propulsion and indeed the senior hierarchy of the RAN is that "we have no nuclear industry to support a fleet of SSNs". While this is currently true it doesn't have to be the case. SSNs cannot be introduced overnight. There could be a gap of 10 years from decision to delivery. Thus there is more than enough time to build an industry to support them (the question of support also needs to be quantified as modern nuclear submarines need 'significantly' less support than previous classes of SSNs on which many contemporary assumptions seem to be based).

In any event Australia's world class universities can provide the necessary education for a nuclear industry to get started very easily and quickly. It might surprise many Australians that our universities regularly turn out trained nuclear physicists. In fact, they have been teaching nuclear physics since the 1970s. It is an undeniable fact that Australia needs a nuclear industry, if only to take the pressure off power generation using fossil fuels.

Australia has a nuclear reactor at Lucas Heights in Sydney's South-West. Although its main function is research and medical isotope production it does provide the basis upon which to build an industry. In fact, Lucas Heights is set to become one of the world's leading producers of medical isotopes, potentially earning Australia over \$100 million a year in exports.

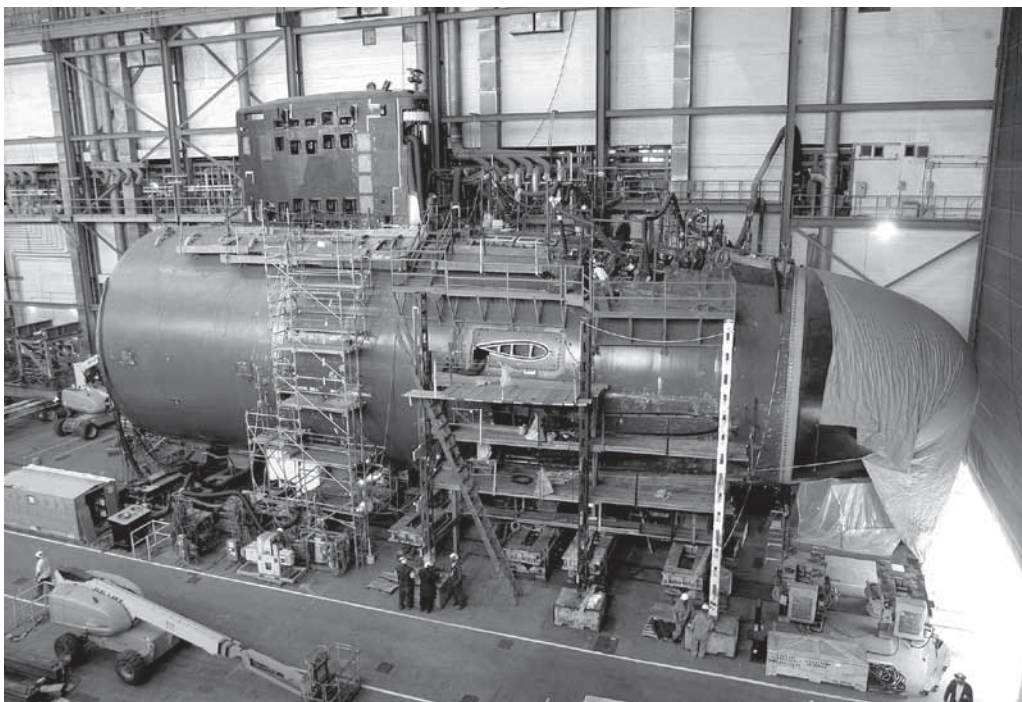
Ironically the Gillard Government, the same that said no to nuclear power generation, has recently provided over \$168 million in funds to improve the facility run by the Australian Nuclear Technology and Safety Authority (yes, there is even a fully staffed Government Department in operation dealing with nuclear issues such as regulation compliance and policy formulation to support and regulate a future nuclear industry).

A point of misguided criticism is that South Australia could lose vital jobs and skills through missing out on the SEA 1000 replacement contract to another country with nuclear technology if the nuclear option were chosen. This may only be half true. There is no reason why the front end of the new submarine cannot be made in Australia and the back end (i.e. the propulsion systems) made elsewhere and mated here in Australia. This is a similar concept that is seeing the hull and machinery of the Canberra class LHDs made in Spain and shipped out here for fitting of the island superstructure and all its important and classified electronic systems. The model of bi-lateral building exists and is currently being tested and thus refined by the Defence Material Organisation and Australian industry.

The Navy League saw the light long ago and has been recommending the SSN option for years. In fact when the Oberon submarine replacement project was being formulated the Navy League started the debate with a special supplement in THE NAVY outlining the case. That case is of

course an old one. SSNs are faster, can stay underwater indefinitely, carry more weapons, are less expensive to support over the years (as you do not need to keep refuelling them) and are more survivable as they can evade an enemy through speed, unlike the diesel electric submarine which tries to be silent through inactivity, even after being found.

Failing to pursue the nuclear option for Australia's power generation needs, let alone for its new submarine fleet is a no-brainer!



The (non-Nuclear) front end of a USN Virginia class SSN. There is no reason whatsoever why the front end of the new Project SEA 1000 submarine for the RAN could not be made in Adelaide and then the back end nuclear propulsion section, built overseas, brought to the build site to be mated with the Australian front end. Thus providing defence jobs in Australia and giving the RAN the best of both worlds. (USN)

2012 AGM

The Annual Meeting of the Navy League of Australia and a meeting of the Federal Council of the League were held in Canberra on 26th and 27th October 2012.

It was a very well attended meeting, much enjoyed by all involved. Brassey Hotel were once again very co-operative in meeting our needs.

As is usual on these occasions Federal Council was presented with reports from each of the State Divisions. The Divisions reported on a wide variety of activities ; attending the keel-laying for the future HMAS HOBART; Seafarer's Church services; entertaining visiting naval ships; a Navy Week Yacht Race; Trafalgar Dinners; seminars and "think-tanks"; support for Navy Cadets; and lobbying to promote Navy League Policy. It was heartening to hear that our Divisions are in good shape and all working to promote the maritime interests of Australia.

Federal Council also received a report, given by a member of the New Zealand Navy League, on activities on the eastern side of the Tasman Sea. Federal Council received a report on our history project. The League in Australia is now 112 years old. The task of establishing what material is available to be used in writing such a history is naturally taking time. But good progress is being made. If any reader of this magazine believes they have something to contribute please contact the League.

The highlight of the meeting was the three hours Chief of Navy, Vice Admiral Ray Griggs AO CSC RAN, spent with Federal Council. During our meeting with CN a wide range of topics were raised for discussion.

The League greatly appreciates the willingness of Navy and in particular the Chiefs of Navy, to participate in our annual meetings.

ESSAY COMPETITION

The Navy League Maritime Essay Competition winners were announced at our Federal Council meeting.

The Essay Competition is run in two categories. One professional and the other non- professional. Each year the judges may award up to three prizes in both the professional and the non-professional categories.

This year the winner in the professional category, and the recipient of the

First Prize of \$1,000, was Sub Lieutenant D M Greenwood for his essay "Maritime Terrorism – How Serious a Threat To Australia?".

Mr Murray Dear was awarded second prize for his essay "Perilous Times in the South Pacific". Murray is a New Zealander who is a regular participant in our annual competition. The perilous times refers to Japanese actions in the South Pacific in the first half of 1941

A third prize was awarded in the professional category. This was to CMDR Greg Swinden for his essay "On Loan - Australians with the Royal Navy 1939-1941" being the story of the RAN Officers and Ratings serving with the RN during the first two and a half years of World War II.

This year only one prize was awarded in the non-professional category. The winner was Michael Griggs for his essay "HMAS SYDNEY and the Korean War: Setting the pattern for Littoral Warfare."

100TH ANNIVERSARY

2013 is the 100th anniversary of the arrival on 4th October 1913 of the new Australian Fleet into Sydney Harbour. This event is to be commemorated in October 2013 with a Fleet Entry on the 4th October and a Fleet Review on the 5th. The Sea Power Conference, the Pacific 2013 International Maritime Conference and the Pacific Maritime Trade Show will commence on the 7th October. These latter events are normally held in January, but have been brought forward to coincide with the RAN's centenary celebrations.

The Navy League will be there too! Our annual conference for 2013 is to be held in Sydney, so that the League can give support to and participate in the events outlined above.

We expect to be back in Canberra in 2014.

CADETS NEWS

Each year the Navy League of Australia Trophy for the "Most Efficient Training Ship in Australia" is presented to the Navy Cadet Unit judged to be the best in Australia.

The winning Unit for 2012 is TS NOARLUNGA. The League congratulates all involved on a well deserved award. The Trophy was presented to the Unit by Chief of Navy on 3rd November 2012.



The Navy League AGM members with CN, VADM Ray Griggs, AO, CSC RAN during October 2013 in Canberra. (from L to R) John Redman (Vic), John Strang (Fed Advisory Council), John Jeremy (NSW), Trevor Vincent (WA), Graham Harris (Fed President), Mason Hayman (WA), VADM Ray Griggs (Chief of Navy), David Rattray (SA), Harvey Greenfield (QLD), Robert 'Otto' Albert (NSW), Bill Dobbie (NZ Navy League) RADM David Holthouse (Rtd - Fed Vice President), RADM Andrew Robertson (Rtd - NSW) and Mr Bill Gale (WA).

AUSTRALIAN NAVAL BASES

A CENTURY OF CHALLENGES AND LOST OPPORTUNITIES

By John C. Jeremy

The vexed question of naval bases has been around for as long as the Navy. As time goes on more pressures are being placed on Navy to either find new bases or fight to keep the existing assets. John Jeremy looks at the history of Australian Naval base policy.

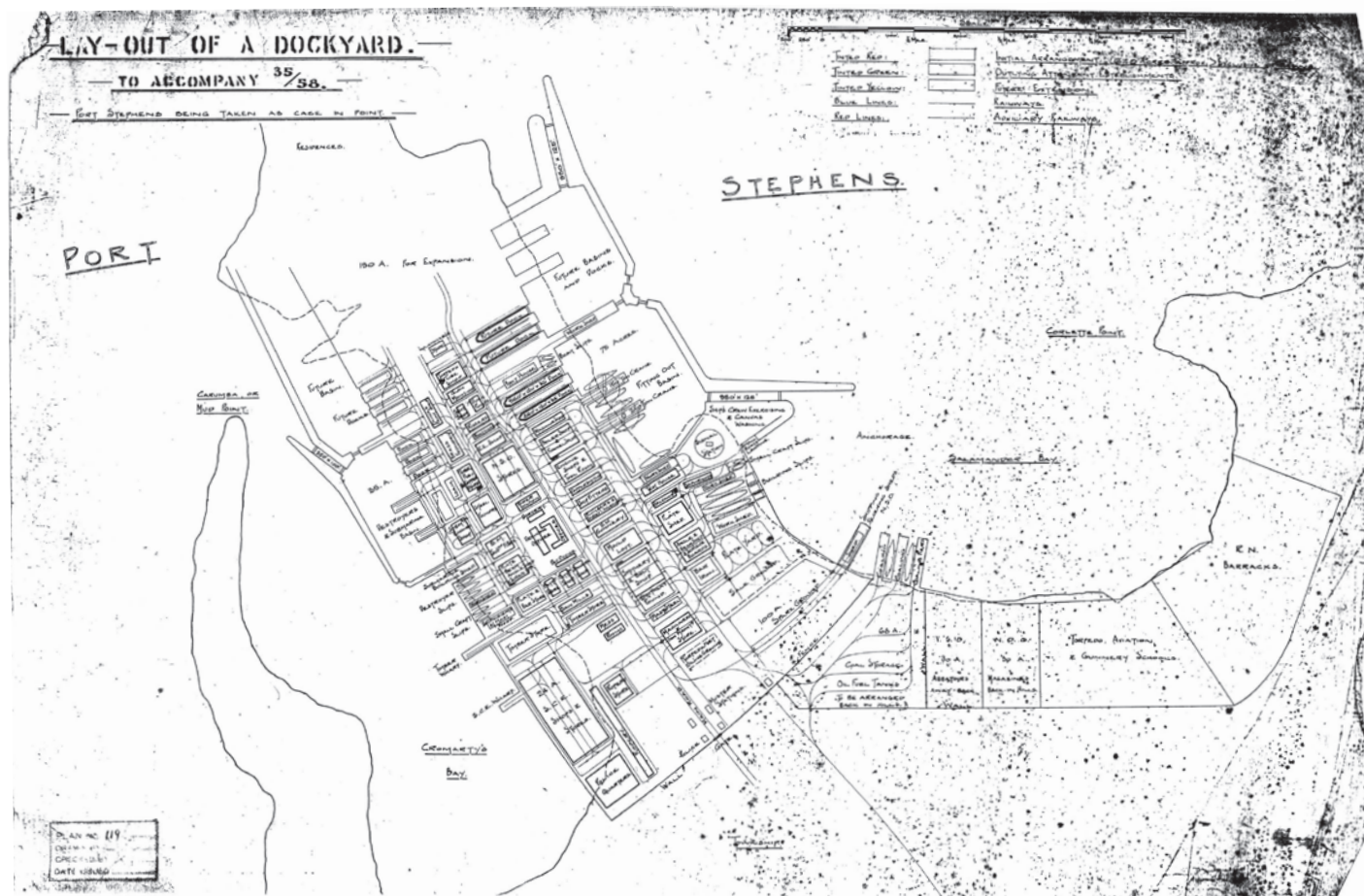
On 1 January 1901 the Australian Colonies joined together to form a new nation, the Commonwealth of Australia. The Australian Constitution gave the Commonwealth the power to make laws for the defence of the nation and on 1 March 1901 the states transferred all their naval forces to the Federal government.

The new Commonwealth Naval Forces comprised a strange mix of old and unsuitable ships manned by a small force of only 239 officers and men.

At the time, the main responsibility for the maritime defence of Australia lay with the Royal Navy, which maintained a squadron of ships on the Australia Station, based in Sydney. For many years the Navy used areas at Fort Macquarie, now the site of the Opera House, for the repair of boats and maintenance of ships' gear. It took a long

while before a more permanent base was established in Sydney and it was not until the last decade of the nineteenth century that substantial facilities were constructed on Garden Island in Sydney. The Admiralty had been reluctant to commit to Garden Island, preferring a mainland base but Garden Island already had a naval presence and it was to become the main depot supporting the Squadron, with dockings and other major work need for the ships undertaken by the NSW Government Dockyard on Cockatoo Island.

With the agreement of the Admiralty 1902 to maintain a squadron based in Australia for ten years, there was some time (but not much) for the new Commonwealth to develop its own navy. The form of the future RAN began to take shape during these years and by 1909 the concept of a fleet unit had developed. Orders had been placed for



This plan for a naval base in Port Stephens, dated 1916, shows a layout for a large base typical of British naval dockyards of the time.

several ships and at the Imperial Conference of 1909 the shape of the future RAN emerged. The fleet unit was to comprise one armoured cruiser, three protected cruisers, six torpedo-boat destroyers and three submarines (only two submarines were subsequently built) with one of the cruisers and four of the destroyers to be built by the NSW Government at Cockatoo Island in Sydney.

The Fleet Unit, led by the battlecruiser HMAS AUSTRALIA, arrived in Sydney on 4 October 1913 to an enthusiastic welcome, the Flag of the last British Commander in Chief of the Australia Station, Admiral Sir George King Hall, was hauled down and the naval facilities in Sydney were handed over to the Commonwealth free of charge.

In June 1910, the Commonwealth Government had invited Admiral of the Fleet, Lord Fisher, to advise on future Australian naval defence. Fisher was unable to accept the invitation and proposed recently-retired Admiral Sir Reginald Henderson in his place. Henderson accepted the redirected invitation and arrived in Western Australia in August 1910 to begin his task. Admiral Henderson's report was submitted on 1 March 1911, when the construction of the Australian Fleet unit was well underway. However, there was much more to be done to establish the new navy and Henderson's recommendations were intended to set the course for the future Royal Australian Navy.

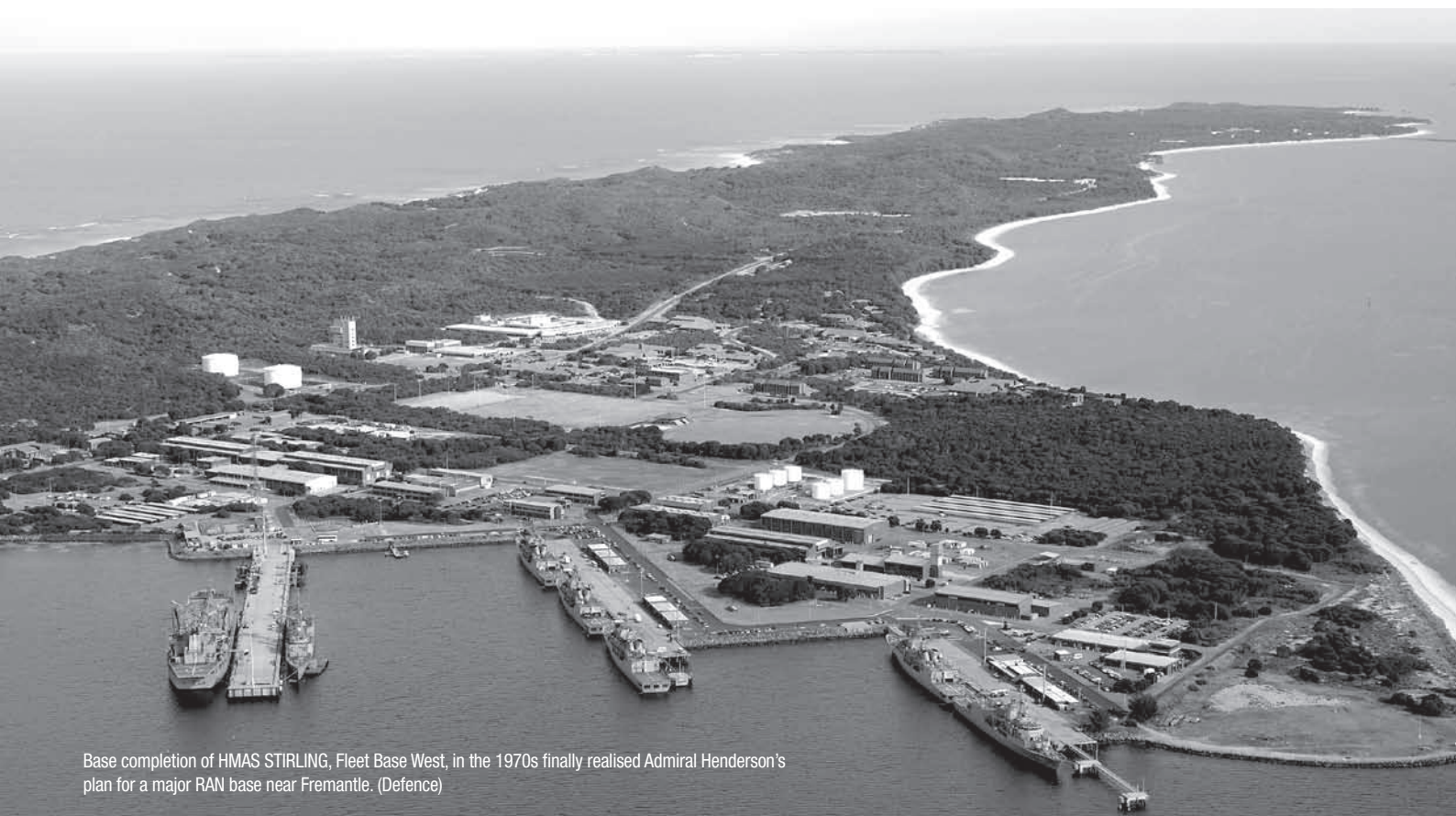
In 1910 Britain was the dominant world power, Australia was a nation within a nation as a Dominion within the British Empire and Henderson's plans for the Australian navy were developed within the concept of Empire sea power. His recommendations for the Australian fleet were ambitious. In addition to the main bases in Sydney and Fremantle, he proposed secondary bases in Darwin, Thursday Island, Townsville, Brisbane, Port Stephens (NSW), Western Port (Victoria), Hobart, Port Lincoln, Albany and King Sound (Western Australia). Despite the grandiose nature of his proposals the recommendations were largely adopted, particularly in regard to the structure and organisation of the Navy.

The acquisition of a permanent base in Sydney was urgent and Rear Admiral Sir William Creswell, First Naval Member of the Australian Commonwealth Naval Board, was keen to see use made of Cockatoo Island in Sydney to save time and money.

Despite objections from the Third Naval Member, Engineer Captain William Clarkson, Creswell prevailed and Cockatoo Island was acquired in January 1913, becoming the Commonwealth Naval Dockyard. With considerable development, particularly during the First World War, the dockyard made a major contribution to the RAN and the nation until it was finally closed in 1992.

Negotiations for the transfer of Garden Island from the Admiralty were pressed forward and construction commenced at the Flinders Naval Base in Victoria, although Clarkson greatly reduced the scope of the base and changed its location. Work was also begun for the Henderson Naval Base on Cockburn Sound and at Port Stephens in NSW. Land was acquired at Port Lincoln, Albany, Brisbane and Hobart. In 1913, the Navy appointed civil engineer Sir Maurice Fitzmaurice, senior partner of the London firm Coode, Son and Matthews and chief engineer to the London City Council to advise on the design of the new bases. His report on the Henderson Naval Base was completed on 21 October 1914 and on 2 February 1915 the Naval Board decided to recommend to the Minister that dredging work, the construction of the destroyers and submarine basin, the first stage of the main basin and the permanent slipway be taken in hand immediately. Early plans for the base were very ambitious, but by 1917 the scope of work had been substantially reduced to save money.

Meanwhile, in May 1915 the Naval Board generally agreed that Port Stephens was suitable for a primary fleet base on the east coast and recommended that £25,000 be provided in the 1915–1916 estimates for the construction of a base there. A large area of land on southern shore of Port Stephens was acquired later that year. In March 1916 the Naval Board examined a plan for the Port and recommended that work on road access and foreshore work be commenced.



Base completion of HMAS STIRLING, Fleet Base West, in the 1970s finally realised Admiral Henderson's plan for a major RAN base near Fremantle. (Defence)

A plan of the base in the National Archives, whilst clearly conceptual, shows the base spread over a large area of Soldiers Point and the shore of Salamander Bay with shipbuilding facilities and berths for submarines, destroyers, cruisers and capital ships and even two graving docks, the largest of which at 950 feet long by 120 feet wide would have rivalled the size of the WWII-built Captain Cook Dock in Sydney.

The end of the First World War prompted a further review of Australia's strategic situation, the composition of the fleet, naval base requirements and the organisation of the RAN. The Commonwealth asked Lord Jellicoe (of Jutland fame) to conduct the review and he arrived in Sydney in June 1919. He remained in Australia until August that year. The Government had hoped that he would recommend the abandonment of the Henderson plan but it was not to be so. Identifying Japan as the most likely threat in the Pacific, Jellicoe recommended a considerable expansion of the RAN, including the acquisition of an aircraft carrier and two battlecruisers, a contribution equal to about 20% of that he estimated to be required to meet the Japanese threat.

As to bases and dockyards, Jellicoe confirmed the need for two main naval bases, one on the east coast and one on the west. He recommended that the Henderson Naval Base be continued, but at reduced scale. As to the east coast, he said that Garden Island and Cockatoo Island had reached the limit of expansion and recommended that the major east coast base be built in Port Stephens.

After the end of the war, work had slowed down at the Henderson Naval Base until decisions on its future were made. Despite Jellicoe's recommendations, all work was suspended on 5 October 1921 and in due course stores and plant associated with the project were disposed of.

Progress at Port Stephens was very slow, and little work was done apart from the acquisition of land, construction of a road and wharf and the project was also abandoned in 1921. The provision of a dry dock suitable for modern capital ships would have to wait.

Construction of the Flinders Naval Base fared better and today it is the home of HMAS CERBERUS.

With the abandonment of the Henderson and Jellicoe plans, it was not until 1938 that the need for a modern capital ship dock was addressed with the decision to build the Captain Cook Dock in Sydney. Built between Garden Island and the mainland, it resulted in a considerable enlargement of the dockyard. The dock was completed in 1945 and it remains the largest dock in Australia and today it is a major national strategic asset. Located adjacent to the now-reduced dockyard area is the RAN's Fleet Base East. Very constrained by residential development the base is crowded even before the largest ships ever built for the RAN, the LHDs CANBERRA and ADELAIDE, are completed and based there with the three Hobart-class destroyers after 2014.

Admiral Henderson's plans for a major fleet base in the west had to wait a few more decades. Work began on Fleet Base West on Garden Island at the southern end of Cockburn Sound around 1970. Today, after the completion of HMAS STIRLING, about half the ships of the RAN, including all the submarines, are based there and with the development of shipbuilding and ship repair facilities at Henderson, south of Woodman Point, Admiral Henderson's plan for a major fleet base in Western Australia has finally been achieved. Considerable investment by the Western Australian Government, in particular, has provided excellent facilities at the Common User Facilities at Henderson and, although the recently-completed floating dock is not big enough to dock the LHDs, there is provision for future expansion.

An amphibious warfare training base, HMAS ASSAULT, was established in Port Stephens during World War II, but today the Port is devoted to more peaceful pursuits. Not only would any revival of naval plans for Port Stephens be immensely expensive, there would likely be substantial environmental road blocks.

The decision to base half the fleet in Western Australia prompted another review of the RAN's dockyard needs in the early 1980s. This resulted in the closure of Cockatoo Dockyard in Sydney, the

The Cunard liner *Queen Mary 2* berthing at Fleet Base East in February 2011. The Captain Cook Dock at Garden Island is a major national asset and will be needed to support the navy for many decades. (Defence)



privatisation of the operation of the Garden Island Naval Dockyard and the sale of the Williamstown Naval Dockyard in Victoria which had been acquired by the RAN during World War II.

By the early 1980s environmental pressures demanded the relocation of Navy munitions storage and supply facilities away from Sydney. It was clear also that the space available for Fleet Base East was limited and it was likely to come under pressure from residential growth. Plans were developed for a new armament depot and fleet base in Jervis Bay on the NSW south coast. Jervis Bay was already used regularly by the Navy and it was reasonably close to the industrial centre of Sydney and the dockyard at Garden Island. Three locations were considered — one on the north shore of the bay and two on the south, one of which was adjacent to the existing facilities at HMAS CRESWELL. The cost, in 1986 dollars, was estimated at something over \$1 billion.

Not surprisingly, the Jervis Bay proposals met powerful environmental opposition and the plans for Jervis Bay were dropped in 1989 before they had even got off the drawing board. The bay is now mostly a marine park and locked away from future development. The armament depot ended up at Eden, even further away from the Fleet Base.

For the next two decades little happened to advance major new bases for the navy, while commercial and residential development continued to consume available options.

When considering where new naval bases might be located it is worth keeping in mind essential requirements for such a facility. A major fleet base needs to be located where people want to live. Partners need to be able to find suitable and satisfying employment and there must be educational facilities for families, including universities. The port in which the base is located needs to have defendable, all-weather deep-water access with a manageable tide range. The base would need a sizeable area of land within the port for the necessary facilities and cyclone-proof berths for the ships. The base should be close to other naval assets such as exercise areas, firing ranges and other specialised facilities. In addition to having the usual services required by a major fleet base, access to comprehensive industrial infrastructure would be essential. It does not take long to discover that, despite Australia's size, options satisfying all these requirements are now very limited.

Recently developments in the Port of Sydney have refocused attention on Fleet Base East and its long-term future. Whilst the development of Port Botany and, to a lesser extent, Port Kembla has taken most of the cargo traffic away from Sydney Harbour, the rapid growth of the cruise industry has highlighted the lack of available berths for modern passenger ships. Many of the newer ships cannot pass under the Bridge leaving only one passenger berth east of the



A drawing of Option 3 for the redevelopment of HMAS CRESWELL as the new Fleet Base East.

bridge, the Overseas Passenger Terminal at Circular Quay. Until recent improvements were completed in Circular Quay, the only option for the Cunard liner *Queen Mary 2* was to anchor in the harbour or berth at Fleet Base East. Such access on a regular basis has been demanded by the cruise industry as the number of cruise ship visits to Sydney is expected to grow from 116 ship visits in 2010 to between 300 and 450 ship visits by 2020. Moreover, it is possible that over half of those ships will be unable to pass under the bridge.

In June 2011 the Minister for Defence commissioned an independent review into enhanced access by cruise ships to Fleet Base East. The review, conducted by the experienced public administrator and diplomat Allan Hawke, was completed in February 2012 and found that enhanced access by cruise ships was possible but at considerable cost and inconvenience to the Navy and inconvenience to local residents. The report emphasised the need for the Navy to have priority for the use of the facilities at Garden Island and for any costs to be borne by the State Government or the cruise industry.

The berths at FBE to which the cruise industry seeks access are on the eastern shore of Woolloomooloo Bay, located largely south of the Garden Island dockyard and on a narrow strip of land between the water and Cowper Wharf Road. As a fleet base, the location is not ideal — it is even less ideal for a major passenger terminal with little room and difficult road access.

The Hawke review concluded that access by cruise ships to Garden Island was not compatible with the Navy's requirements but identified five longer-term options for enhanced cruise ship berths, all of which would involve significant investment:

- disperse cruise-ship support between the current Overseas Passenger Terminal, dolphins in Athol Bay and Port Botany (this option is estimated to cost about \$74 million). Mosman residents would surely be up in arms over the Athol Bay proposal and the industry does not like the prospect of using Botany Bay;
- lease Fleet Base berths 1–5 to the Sydney Ports Corporation for cruise ship use and develop a replacement wharf for the Navy on the eastern side of Garden Island. This option is estimated to cost at least \$342 million and the new wharf would be unlikely to be available before 2025;

- lease Fleet Base berths 1–5 to the cruise ship industry and develop berths at Glebe Island for the Navy. The cost of this option is estimated to be a minimum of \$143 million. Whilst all RAN ships are likely to be able to get under the bridge this option presents operational difficulties for the Navy with more dispersed facilities. Moreover, the NSW Government has other plans for Glebe Island;
- share Fleet Base berths 2–3 with the cruise industry with Glebe Island and White Bay berths being made available to the Navy; and
- transfer Fleet Base berths 1–5 to the Sydney Ports Corporation with the Navy to transfer to new facilities outside of Sydney.

In assessing this last option the review commissioned a scope and costing study using transfer of only the Navy's amphibious and support ships to a new base in the Port of Newcastle as an example. Newcastle was used for this purpose on the basis that existing port facilities could be acquired and developed for permanent Navy use as a less-costly option than development of a "green field" site. This option was considered to apply equally to any other Australian port considered strategically sound including, for example, Brisbane, Gladstone or Townsville.

The review noted that in existing port locations there are no readily available sites which could accommodate a new naval base without major expansion of port facilities currently fully committed to commercial shipping activity. Creation of "green field" port facilities would involve added development costs and greater environmental challenges. Excluding the cost of acquiring the necessary land and numerous indirect costs such as additional Defence housing, personnel relocation costs or additional operational costs that might be borne by Defence due to separation from other shore-based technical-training and operational-support facilities located in the Sydney basin area and the industrial base, or any industry relocation costs and implications, this option was considered to cost at least \$1003 million. It would be unlikely to be available before 2025 and the review noted that Newcastle is not, in any case, available as an option.

It is hard to imagine how this conundrum might be resolved. The Government's only solution so far is to permit up to three cruise ship visits per year to FBE for the next couple of years and the matter lies under the carpet for the moment.

The cruise ships *Millennium* and *Aurora* at anchor in Sydney Harbour in 2009. This is likely to be a common sight in coming years as the number of cruise ship visits to Sydney increase. (Author)



Meanwhile, another review completed in March 2012 has added to the debate. Conducted by Allan Hawke and former Defence Department Secretary Ric Smith, the Australian Defence Force Posture Review was a timely examination of the location of ADF facilities around Australia in light of the development of the country's north and the distance of many of the present facilities from operational areas.

As we might expect, the review concluded that maritime capabilities are significantly influencing Australia's future force posture. Joint amphibious capability was identified as having a transformational effect on the Navy, Army and the ADF generally, driving force posture considerations.

The review recommended that:

- Defence should develop a more comprehensive long-term master plan for meeting Navy's Force 2030 basing requirements, which also addresses the implications of increased US activities and presence in Australia.
- Defence should commence planning now on long-term options for establishing a supplementary east-coast fleet base at Brisbane for the future submarine and large amphibious ships. A supplementary base could be developed at a new reclaimed-land site extending further into Moreton Bay from the current port facilities and linked to the Port of Brisbane by a causeway. This work would complement the development of options for embarking forces on amphibious ships at Brisbane in the shorter term.
- Defence should proceed with its plans to homeport the Hobart-class destroyers and LHDs at Fleet Base East in the short term but also develop additional options involving Brisbane and Fleet Base West, noting that the latter is operationally unsuitable for the LHDs.
- Defence should develop options to expand wharf capacity and support facilities at Fleet Base West to accommodate the future frigate class and the forward deployment of at least one Hobart-class destroyer. FBW should also be enhanced to accommodate increased visits by US Navy ships and submarines. It should continue to be the primary base for RAN submarines.

- Defence should plan to upgrade or expand bases to accommodate the offshore combatant vessel (OCV) and replacement LCH, noting that scale and cost of work will depend on the final size of the OCV and LCH, including:

- upgrades or expansion of bases at Darwin and Cairns;
- upgrades at HMAS WATERHEN in Sydney; and
- upgrades at Fleet Base West to support OCV mine countermeasures operations

The review examined possible basing options in the north and north-west of Australia and the possibility of arrangements which would enhance access to commercial ports but considered that permanent Navy bases in the North West are not operationally necessary.

Apart from the proposal to eventually develop a supplementary fleet base in Brisbane, none of these recommendations ease the short-term pressure on Fleet Base East. Moreover, the probable very high cost of the long-term supplementary east-coast base in Brisbane is likely to push it out well into the future. The next development in this story is likely to be the new White Paper due next year and it is notable that the Government has commissioned Allan Hawke, Ric Smith and businessman Paul Rizzo as an expert panel to provide advice during its preparation.

Throughout the last century development of bases for the RAN has been sporadic and the lack of a firm direction has resulted in greatly reduced options for the future as commercial and residential development has removed potential sites from consideration. Now some positive action towards at least securing future options would seem to be essential before they are also lost. Meanwhile, it is likely that we will see even more cruise ships at buoys around Sydney Harbour each summer as a consequence of decades of inadequate planning of port facilities. ■

Expansion of the RAN base in Darwin, HMAS COONAWARRA, will be needed to accommodate future RAN ships. (Defence)



RETURN BRITANNIA

GIANT CARRIER SET TO REVERSE NAVAL FORTUNES

By Phil Radford

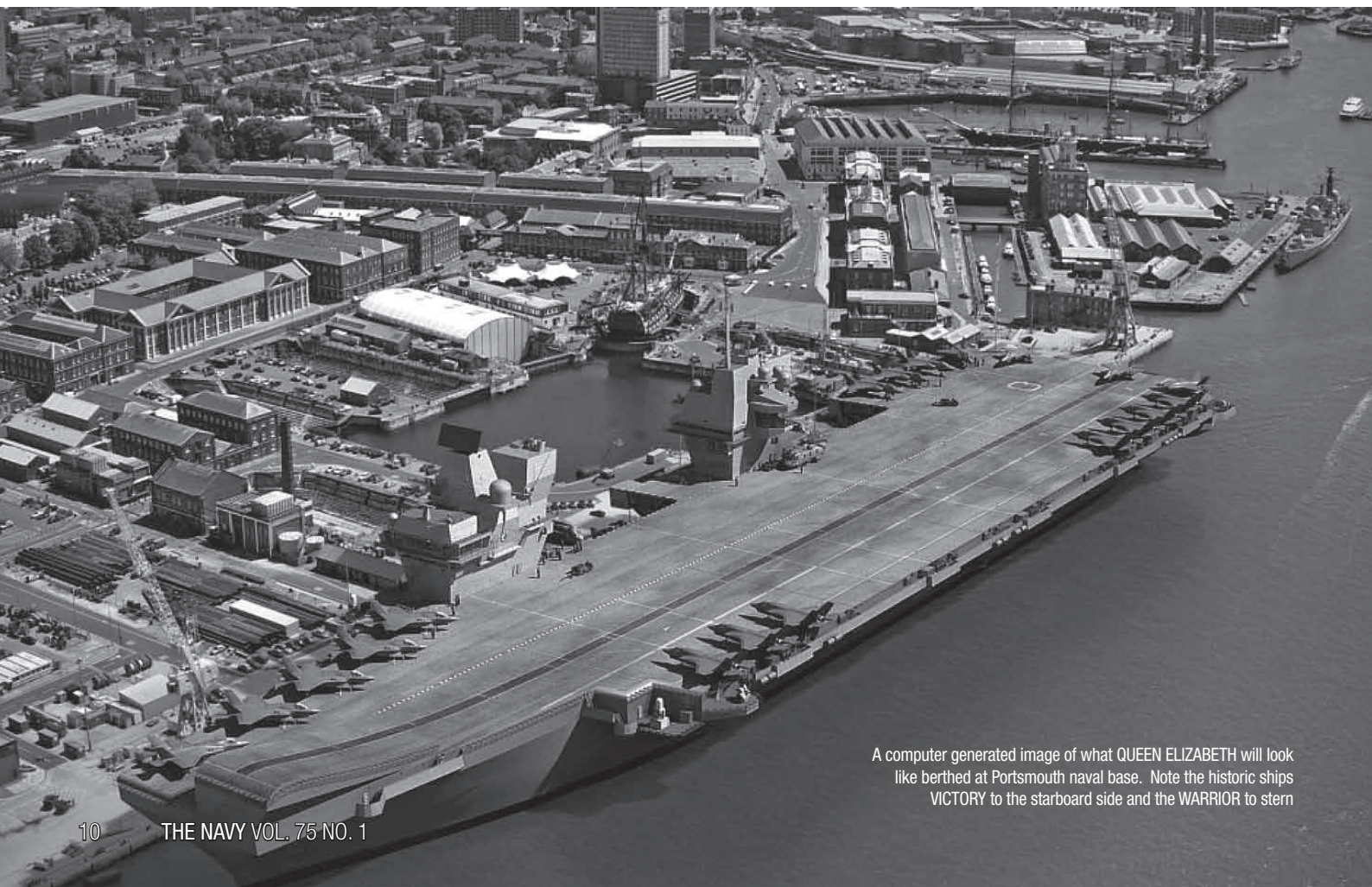
At the Rosyth Royal Dockyard in Scotland – where Beatty's perforated battlecruisers repaired after their shoot-out at Jutland – a dramatic revival of Royal Navy fortunes is underway. Inside the gigantic, 300-metre No.1 dry dock, the UK's new flagship, HMS QUEEN ELIZABETH, has just passed the half-way point in her construction. She represents quite an about turn in Royal Navy fortunes. At 65,000 tonnes, she will be the largest warship ever commissioned in UK and relaunch a global expeditionary capability surrendered 33 years ago when the navy's last fleet carrier, HMS ARK ROYAL, headed north for recycling.

QUEEN ELIZABETH's decade-long passage from design board to dockyard has not been easy. Early attempts at cross-channel collaboration proved politically messy, with the Labour government forcing French contractor Thales to share its winning design with other UK firms. Naturally, the RAF blew hot and cold on the carriers, unsure if mobile airfields were more of a threat than an opportunity. And just as the first steel was cut in 2010, the financial crisis almost torpedoed the project for good: only the revelation that HMS QUEEN ELIZABETH would cost more to cancel than complete prised the new government's fingers off the fatal lanyard.

The carrier's greatest vulnerability was always – and always will be – her sheer size. Frustrated after three decades of nudging Harriers around cramped hangers and narrow flight-decks, their lordships at the Admiralty gambled big. "Steel is cheap, and air is free," proclaimed Britain's then Chief of Defence Staff, Admiral Stanhope, as he brandished the colossal design in public, and brazened it through treacherous Treasury waters. For now, at least, the gambit has paid off. In mid-October, the British Prime Minister lined himself up in front of the hull and proclaimed the ship, a 'success story' for the UK.

Certainly, the scale of the ship makes a daunting impression. The 100 metres of flight deck now in place sit 30 metres above the keel – considerably higher than most frigates' masts. Huge sponsons attached to the upper hull dramatically overhang the lip of the dry dock in which the lower hull rests. Adding 17 metres to the ship's width on each side, these sponsons will enable QUEEN ELIZABETH to sport a flight deck almost twice as wide as the ship's waterline beam.

Forward, in the bowels of the dock, a zeppelin-sized wave-piercing bow is the start point for an elegant forward-thrusting shear that rises above eye-level with the promise of fine lines. Moving aft, the 180 metres of red-painted hull now in place terminates abruptly in a



A computer generated image of what QUEEN ELIZABETH will look like berthed at Portsmouth naval base. Note the historic ships VICTORY to the starboard side and the WARRIOR to stern

vertiginous, 10-story cross section – as if the entire ship has been suddenly guillotined. Beyond is 100 meters of empty, expectant dock, with just a few hard-hatted workmen dwarfed by the cavernous void in which they stand. In fact the last giant stern section has just arrived from Glasgow and now floats high in the non-tidal basin, beyond the caisson gates.

“This is the biggest and most demanding engineering programme anywhere in the UK,” says David Goodfellow, shipbuild director for the Uk Aircraft Carrier Alliance – the consortium of naval and systems contractors assembling the ships. “The scale is unlike anything ever undertaken in the UK before. Just building QUEEN ELIZABETH and sister ship, HMS PRINCE OF WALES, requires companies that are more used to competing, coming together and working in an effective alliance. Right now, about 10,000 people are working on these ships: half of them at six separate shipyards across the country.”

Using the same build approach as the RAN’s new Hobart destroyers – and the Airbus A380 – contractors are assembling the hull from prefabricated blocks, which are internally close to completion. “Each block is 70-80% fitted out by the time it arrives at Rosyth,” says Goodfellow. “This means we can build most parts of the ship simultaneously. It also gives us the flexibility to test and commission onboard systems before they are installed in the hull, which makes for a more efficient build programme. In fact, the project is so big and complex, we simply couldn’t complete it any other way.”

This ‘complete-first, assemble later’ technique accounts for some astounding feats of engineering on display at Rosyth. A towering, rail-mounted Goliath crane straddles the hull, and deftly lowers a 1,000-tonne sponson into position beside the flight deck. Confirming the shipyard director’s point, the near side is open, exposing the ships complete vital innards. The arteries of plumbing and ventilation that have cluttered ships’ passageways ever since navies took to steel, protrude evenly, each cleanly severed.

The massive, lower-hull blocks weigh in at up to 11,000 tonnes each, which is about the size of a WWII cruiser and too heavy for any crane. On arrival at Rosyth, they are conjoined in a delicate berthing procedure unlike anything previously witnessed in warship construction. First the newly arrived block is floated off its semi-submersible transport barge in the outer basin, which is an anxious moment in itself. By tradition, the only time water-tight bulkheads have to prove themselves is when a warship’s other defences haven’t. Not so HMS QUEEN ELIZABETH, who can quite clearly float in three pieces.

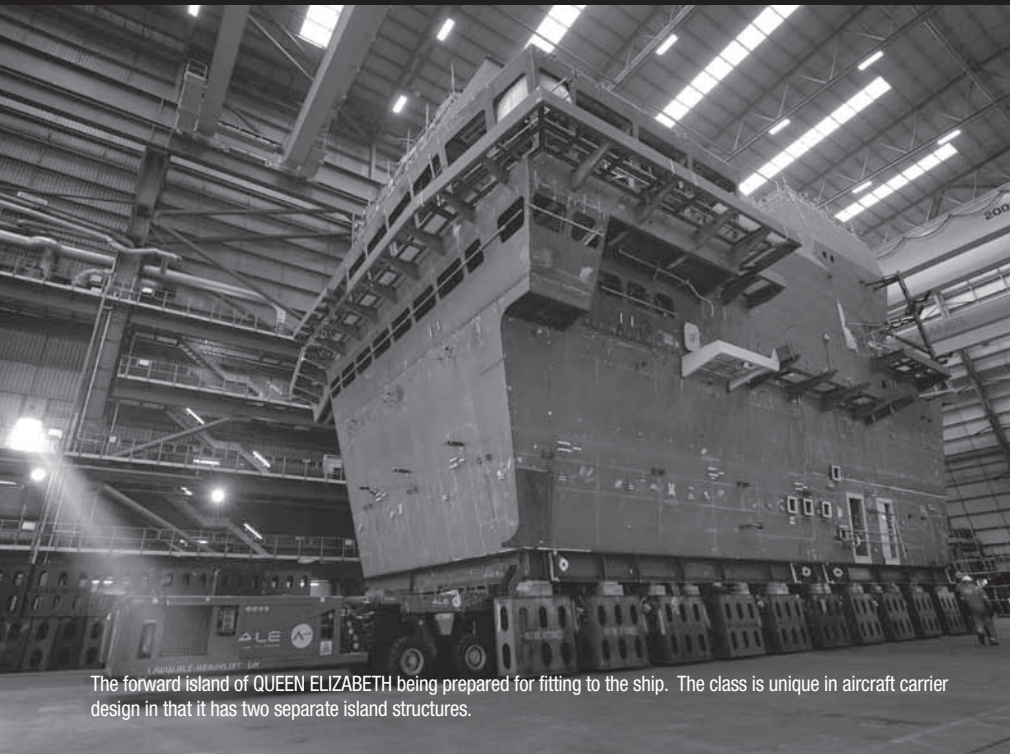
Next, the sluices are opened, and 120,000 cubic metres of Firth of Forth gush into the huge (deserted) void. Then the gates are opened, the new block is coaxed in, the gates are closed, the pumps turned on, and the Firth of Forth refilled. Once the block is lined up, it is hydraulically skidded into position directly behind the existing hull. Shipyard staff weld powerful ‘push-pull’ pneumatic jacks across adjoining deck plates and bulkheads, and each section of each block is then strained into exact alignment. Finally it’s the turn of crisply-smart arc welders to fuse the hull together, inch by pain-staking inch.

Clambering about QUEEN ELIZABETH’s completed lower decks, it’s immediately clear the “steel is cheap” mantra will pay handsome dividends for the carrier’s complement. Ratings will reside in comfortable eight-man cabins, already fully fitted-out and gleaming. Meanwhile, the ship’s expeditionary capability has been handsomely catered for, with additional cabins sufficient to transport over 1,000 marines.

Improved accommodation was made possible by dramatically reducing the number of crew required to man HMS QUEEN ELIZABETH, as compared to other carriers. With a projected crew of 650 (minus air group), she requires 400 fewer souls than her much-smaller, Invincible-class predecessors, and a fraction of the 2,000-odd that keep her US Navy counterparts moving. According to Goodfellow, the savings are the result of increased automation – especially in

The stern section LB04 of QUEEN ELIZABETH being floated into position for mating with the rest of the ship.





The forward island of QUEEN ELIZABETH being prepared for fitting to the ship. The class is unique in aircraft carrier design in that it has two separate island structures.

weapons handling. In a moment of genuine lateral thinking, the Aircraft Carrier Alliance invited the company that designed Europe's most complex airport baggage handling system (at Heathrow, Terminal 5) to come on board and fully automate the movement of shipboard munitions – ultimately enabling aircraft to sustain high sortie rates.

Moving into the heart of the ship, the vast hangar provides that space the Admirals dreamed of, sufficient to house half the carrier's 40-strong air group. To each side, and filling those deck-edge sponsons are the workshops that will house aircraft maintenance staff. Unlike their Harrier predecessor, though, the F-35 fighters slated for QUEEN ELIZABETH's deck run on 13 million lines of code – managing everything from in-flight trimming to maintenance. So the engineers beaver in these workshops won't be the grimy mechanics beloved of Harrier pilots, but neat software specialists and tidy programmers.

Cut into one side of the hangar is the void where one of QUEEN ELIZABETH's mighty 70 tonne-capacity aircraft lifts will sit – big enough to raise two fighters at a time. And emerging up onto the flight deck, it's immediately clear why the Royal Navy fought so hard to keep the carriers on their procurement programme, and why successive governments have relented. At 16,000 square metres, this wide, long airfield will provide the UK with movable sovereign acreage not much smaller than the giant US carriers, and over three times the space of UK's old flat-tops.

In fact this lofty flight deck is already the veteran of several battles. It was originally conceived with a ski-jump for the Short Take Off – Vertical Landing (STOVL) version of the US-led F-35 fighter. In 2010, however, the UK's new coalition government ordered a redesign with catapults and arrestor gear, to enable the carriers to launch a longer-range, higher payload conventional version of the F-35. After some careful number crunching it emerged that embedding those catapults into the flight deck would have cost over £2 billion. Reluctant ministers rang 'Full Reverse' in April 2011, and HMS ELIZABETH will get her ski-jump after all.

This about turn didn't just raise eyebrows in England. Operating F-35s from the Australian navy's new amphibious ships seems a taboo subject for government, but when HMAS CANBERRA arrived at BAE Systems' Williamstown facility on 16th October for fitting out, she sported a prominent ski-jump bow that leaves little doubt about the contingencies she's designed for. With the Royal Navy settled on STOVL jets, QUEEN ELIZABETH will be the test bed RAN will look to if they ever seriously contemplate a return to fixed wing naval aviation. A posting of RAN personnel to 'observe' sea trials would tell an interesting tale.

In the UK, meanwhile, the STOVL decision has led the more numerate naval commentators to worry. According to Pentagon figures, each STOVL version of the F-35, to which Royal Navy is now committed, is currently jumping off the production line with a price tag of nearly U.S. \$300 million. Filling just one UK carrier would, at current prices, cost an eye-

watering £8 billion. The Royal Navy is praying this price tag will fall as production rates rise. But the F-35 has few friends on Capitol Hill, and a cash-strapped Pentagon keeps cutting orders. Which means the cost of an F-35 is unlikely to fall soon, or by much.

So while the huge ship prepares for sea, admirals may have to take risks with the aircraft she carries. Fortunately, the timing is propitious. The blistering pace of development in unmanned air vehicles (UAVs) presents opportunities for innovation, as portentous as the moment the Harrier first hovered onto the nautical horizon 40 years ago. Then, willingness to adopt unconventional aircraft saved fixed-wing naval aviation in the Royal Navy – and, in the South Atlantic, the navy's reputation. Today, naval UAVs may offer history a repeat performance. Without heavy pilots or flight instruments, and with networked naval radar, UAVs are quicker to develop, cheaper to make, safer to fight. And if they operate from mobile airfields, designers can sacrifice endurance for increased speed or weight, making naval UAVs more formidable than their land-based counterparts.

So when HMS QUEEN ELIZABETH does reverse gingerly out into the Firth of Forth sometime in 2015, she'll steam impassively towards an unconventional commission: some token F-35s perched on her deck, perhaps; a menagerie of unlikely drones in her hanger. Fortunately, she has the internal volume to adapt. Beneath her deck, there is ample space for the vastly complex air operations rooms of the future – the screens, the teams, the three-dimensional representations and the lightening-fast chains of command that must evolve before ships can fight a mix of manned and unmanned aerial armadas. Her size will, over time, prove her biggest asset.

Interview with Steven Carroll, Systems into Service Director, Aircraft Carrier Alliance

Steven Carroll is a senior member of the Aircraft Carrier Alliance team, which is engineering and building HMS QUEEN ELIZABETH and her sister ship, HMS PRINCE OF WALES. Up until August 2012, Steven was QUEEN ELIZABETH Class Programme Director at BAE Systems, where he had overall responsibility for supplying the ship's three biggest hull sections from shipyards in Portsmouth and Glasgow. Steven was recently appointed Systems into Service Director, in which role he will help bring the ships into commission.



The massive Aircraft Carrier Alliance crane "Goliath" lowering a large section of the carrier into position. Most of the carrier's modules are built elsewhere and brought to the shipyard for assembly with the rest of the modules.

What has been the most complex part of the project so far?

The most complex challenges were really addressed at the front end of the project – the engineering, design and supply chain. These challenges were accentuated because build would have to take place at different sites, but it was also complicated by the fact that the independent companies that make up the carrier alliance used their own engineering IT systems. We needed to get agreements

between companies on the design approach, and that needed a lot of upfront work and agreement, and took a lot of effort. By contrast, constructing the blocks has since gone incredibly smoothly.

Despite the fact the hull is built from pre-outfitted blocks, your supply chain still includes hundreds of other components, from engines and propellers to alternators and electronics.

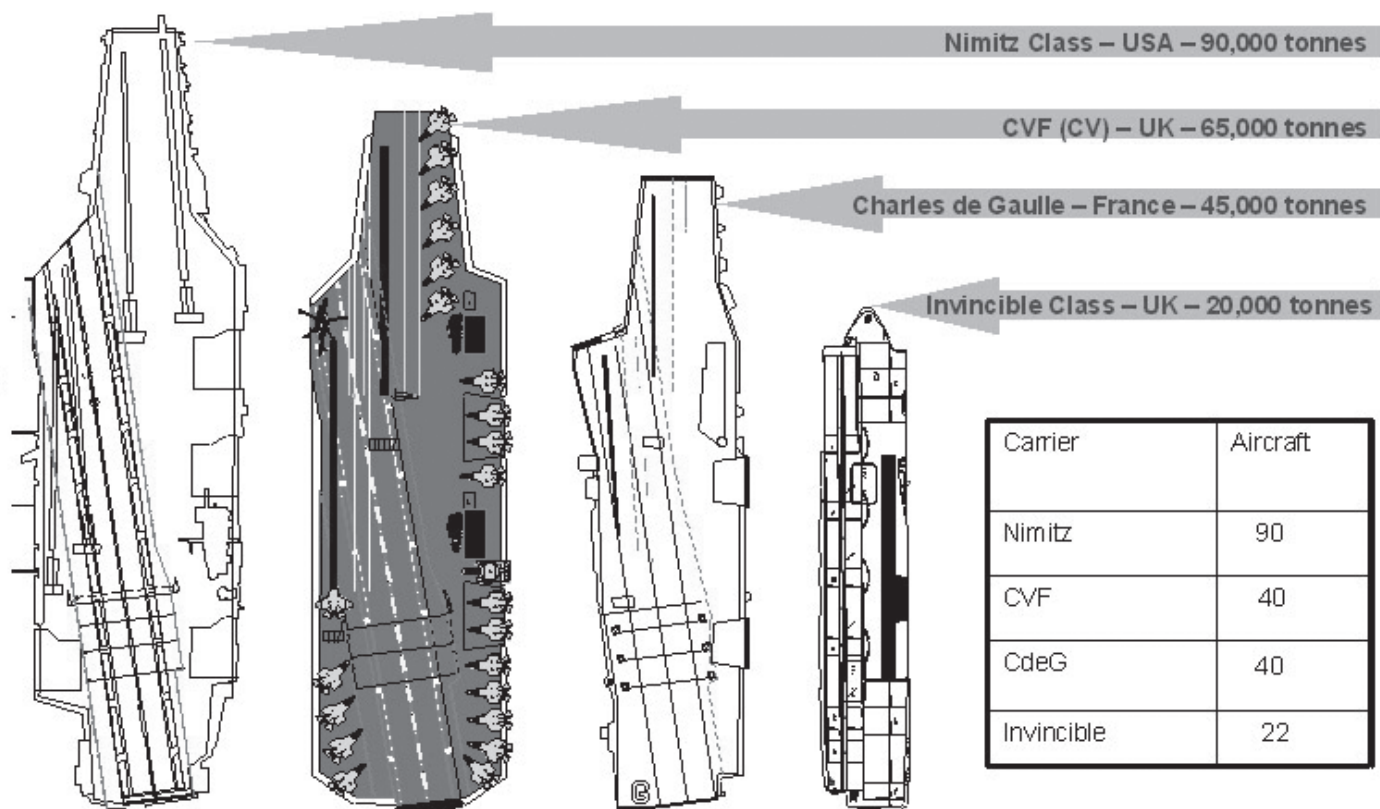
How have you managed this and kept construction on schedule?

We bought early because this buys us the ability to plan with certainty. If a unit arrives early, we have the engineering knowledge right there in front of us. So if we need to make changes – and there are always changes – then we have time to overcome them, before the project schedule says we have to fit that unit into the hull.

Because our supply chain is so complex, we engaged an expert logistics firm called Wincanton – who know what they're doing because they manage logistics for other industries including retail. They have a warehouse between Edinburgh and Glasgow just for us where all parts are sent. We just call off parts or modules from there when we need them. As a result, our overall milestone adherence is in the high nineties. Each of our hull blocks arrived in Rosyth on time.

How close to actual completion are the blocks when they arrive?

We aim to get them to 90% completion. There are some joins we can't do, and much of the sensitive equipment goes in last. But when you walk into a block at Govan or Portsmouth, it is painted and insulated with lights and cabling. Many of the compartments are locked and won't be open again until the ship is finished.



A comparison chart showing the relative sizes of contemporary aircraft carriers to the Queen Elizabeth class.

What's been the most challenging part of the project for you?

My biggest challenge is to plan correctly, including working out the best build strategy for each block. The last hull block for QUEEN ELIZABETH, which we have just sent off to Rosyth, is 11,000 tonnes, 83 metres long and 20 metres high, and will include the power propulsion and diesel generators already fitted. Planning how to build these is biggest challenge, because in effect you are building five or six ships at the same time – except they are all first-of-class!

Inevitably there will be changes once you get into production, but the challenge is how you deal with them quickly, and that comes down to material planning and resources. Overall, planning is the answer, and we do it in 12-week chunks.

What happens once the hull of HMS QUEEN ELIZABETH is completed?

The key element to progress after the build phase is the systems completion – which includes all the low-voltage electrics. We'll get the switchboards live, start diesel generator trials, and power up the ship. Then we will flood the dock so we can trial the main machinery, including the main engines, alternators, and anything mechanical that needs to be tested. The key is getting that done as soon as possible, to understand the issues and do the de-risking.

What's most likely to cause delays?

There are lots of complex and critical areas to work through. For areas such as power, propulsion and missions systems, however, we have test sites to simulate or in fact test mission systems before they go onboard. For example, we can configure the aircraft carrier island with radar operators doing different tests. And we can perform interface testing between different mission systems, so when they go on board they work first time. It also means we understand the dependencies between the combat and mission systems, so when the structure of the ship is complete, we can just plug them in.

How have you dealt with some of the most complex issues you've encountered?

Well, the systems are really the most complex parts of the ship. So where possible we have taken systems straight from other projects to minimise risk. The Type 45 Daring class destroyers were all new technology, and we've used a lot of systems straight from them.

What moment are you most looking forward to?

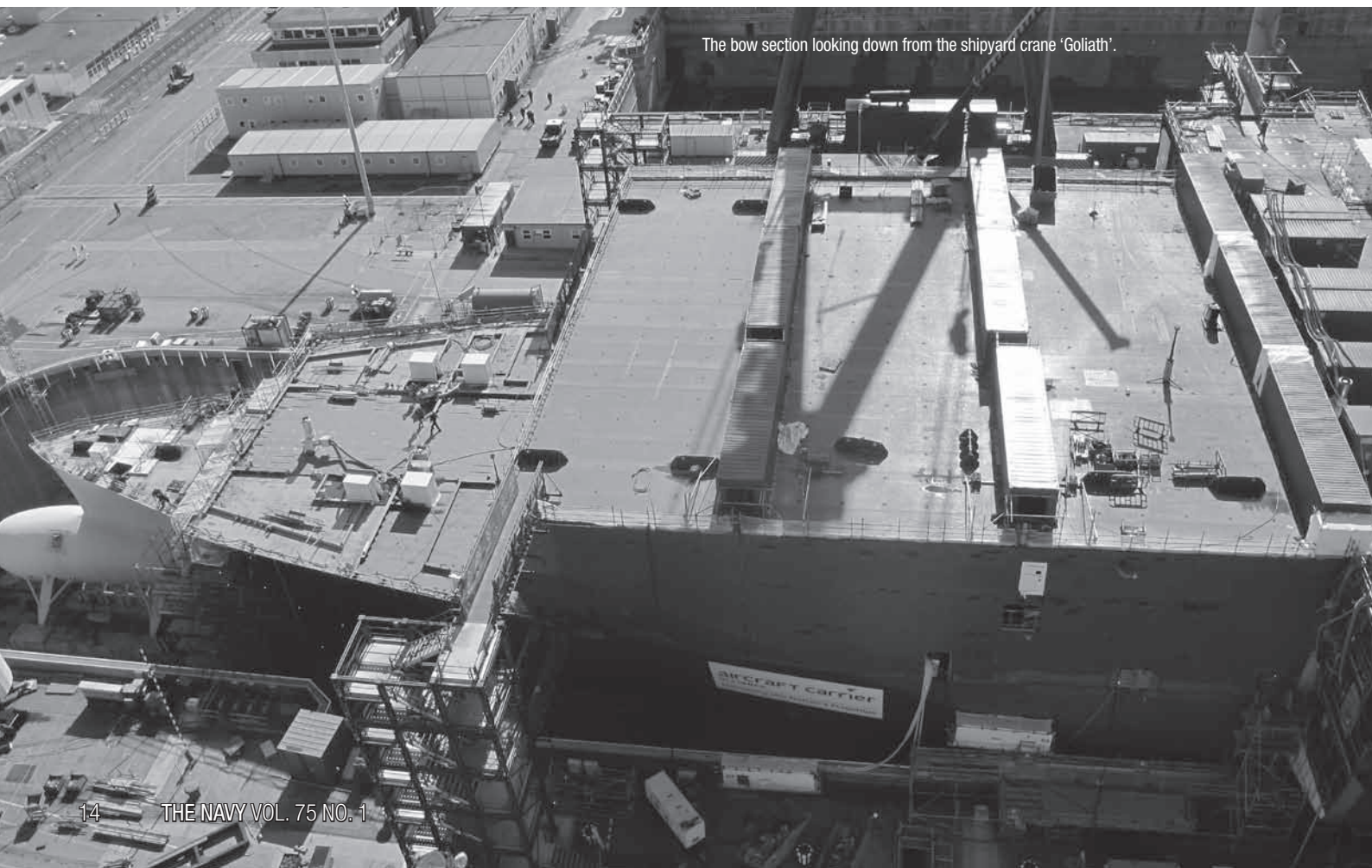
When the ship is structurally complete, the dock is flooded up and she is floated out. That will be quite a moment. Also I think the first entry into her home port, Portsmouth. And then the first time she flies off her first jet. The project has been an incredible endeavour, and there is so much pride in what we are achieving. This is a once in a lifetime project. We are delivering the nation's flagships: they navy and the country wants the best of the best.

Defence projects have a reputation for being delivered late and over budget. Have you any advice for your opposite number in Australia, either on the Hobart ships or HMAS CANBERRA?

From a purely project management perspective, yes: 'The schedule is king'. If you can keep with the schedule, you will manage your costs. If you lose the schedule you will lose the costs anyway. You plan; you deliver. Also one of the biggest things is understanding 'acceptance'. What does the ship have to be and do, to be accepted by the customer? In defence contracting, that focus is critical.

So if BAE Systems asks you to come over and help finish Australia's amphibious carriers...?

... anything I could do to help! ■



The bow section looking down from the shipyard crane 'Goliath'.



01 CHOULES UPDATE

In September 2012 the Department of Defence provided an update on the circumstances surrounding the defect which occurred on one of the propulsion transformers in HMAS CHOULES in June 2012.

The replacement of the propulsion transformers related to the initial defect has now occurred.

Navy said that as detailed in previous advice, all remaining transformers have now also been inspected and similar signs of premature ageing have been identified. This ageing is within operational limitations and at varying levels.

However, following consultation with the transformer manufacturer, the Defence Materiel Organisation, the Defence Science and Technology Organisation, Lloyds Classification Society and the UK Ministry of Defence, the Chief of Navy has made the decision to replace the remaining four transformers on the CHOULES before the ship returns to sea.

The total cost of the replacement is expected to be in the order of \$10 million. The replacement transformers are currently under construction. HMAS CHOULES is scheduled to return to work by April 2013.

HMAS TOBRUK and Australian Defence Vessel OCEAN SHIELD will provide any humanitarian assistance or disaster relief response required by Government over that period.

USMC GETS THREE JSF

Three Lockheed Martin F-35B short takeoff/

vertical landing (STOVL) aircraft were officially delivered to the USMC during ceremonies at Marine Corps Air Station Yuma, Ariz., during November. The three jets are assigned to Marine Fighter Attack Squadron 121 residing with the host Marine Aircraft Group 13.

Official welcoming ceremonies at Yuma marked the handover of the jets to the Marines. The delivery of the first three operational-coded 5th generation F-35B STOVL fighters marks the beginning of STOVL tactical operational training at Air Station Yuma.

These three aircraft increase the number of STOVL aircraft delivered to the Marine Corps to 16 and bring the total number of F-35s delivered in 2012 to 20. Currently, 13 Marine Corps STOVLs are assigned to the 2nd Marine Aircraft Wing's Marine Fighter/Attack Training Squadron 501 at Eglin AFB, Fla., supporting pilot and maintainer training.

EGYPTIAN NAVY ORDERS TWO TYPE 209s

On 1 November 2012, the Egyptian Navy (EN) ordered two new Type 209 submarines from ThyssenKrupp Marine Systems (TKMS) Howaldtswerke Deutsche Werft (HDW).

This follows mid-September 2012 press reporting that indicated that the EN had already ordered two Type 209 submarines. On 31 August, Egypt's new navy chief, Vice Admiral Osama El Gindi also publicly made the announcement concerning the submarines that the sea service had ordered as part of a general modernisation effort.

With the contract now in place, the submarines could begin construction by early 2013 with delivery occurring in 2017. Egypt has been looking at replacement submarines

for over a decade for the four aging Chinese-built Improved Romeo (Project 033) class submarines that were built in the 1960s.

02 TYPE 206A SUBMARINES FOR COLUMBIA

On 28 August 2012, the Colombian Navy commissioned two former German Type 206A submarines in Kiel Germany. The two submarines were named INTREPIDO (former U-23) and INDOMABLE (former U-24) and will double the Colombian sea service's submarine force, which consists of two German Type 209s, PIJAO and TAYRONA.

The two submarines were procured in February 2012 and were delivered following an upkeep effort and training period. The submarines were last overhauled in the early 1990s which included the installation of the Atlas Elektronik DBQS-21 sonar as well as a new weapon control system, electronic support measures system and periscopes. It is estimated that the submarines were transferred with the DM2A1 torpedoes, the predecessor to the DM2A3.

ITALIAN NAVY FOR SALE

The European financial crisis has hit home with Italy announcing plans and dates for the decommissioning of a large part of its Navy. The list includes:

3 Sauro III Class Submarines: LEONARDO DA VINCI (S520), GIULIANO PRINI (S 523) and SALVATORE PELOSI (S 522); date not yet determined.

8 Minerva Class Corvettes: MINERVA (F 551) and SIBILLA (F 558) in 2012; DANAIDE (F 553) in 2013; URANIA (F 552) in 2014; SFINGE (S 554) in 2015 and DRIADE (F 555)

01 HMAS CHOULES leaving Sydney before her engine issues. (Chris Sattler)



02 U-24 in German service now commissioned INDOMABLE in the Colombian Navy.





in 2016. CHIMERA (F 556) and FENICE (F 557) have yet to be determined.

4 Artigliere (Lupo) Class Frigates: ARTIGLIERE (F 582) in 2012; GRANATIERE (F 585) in 2013; AVIERE (F 583) in 2015 and BERSAGLIERE (F 584) in 2016.

4 Maestrale Class Frigates: MAESTRALE (F 570) in 2013; ESPERO (F576) in 2014; ALISEO (F 574) in 2015 and EURO (F 575) in 2016.

3 Lerici Class Coastal Mine Hunters (MHC): LERICI (5550) and SAPRI (5551) in 2012 and the MILAZZO (5552) in 2015.

Replenishment Tanker STROMBOLI in 2016.

4 Aragosta Class Training Vessels: ASTICE, MITILIO, MURENA and PORPORA in 2015.

2 Coastal Replenishment Vessels: Will be identified at a later date.

4 Ocean Tugs: PROMOTEO in 2012 and GIGANTE, CICLOPE and ITS DRIADE (F-555), TENACE in 2013.

All of the above listed vessels were commissioned in the late 1970s through the early 1980s. However, all are in good material condition and will probably be considered for further service on the used international market.

The Lerici MHCs could also find their way to countries that require a viable MCMV force. The three Sauro III class submarines could also be attractive to those countries wishing to establish a submarine force.

03 DESTROYERS FOR SALE

On 08 August 2012, two former Royal Navy (RN) Type 42 class (Batch III) destroyers, HMS YORK (D98) and HMS EDINBURGH (D97) became available for resale on the used international market. Both vessels are

now listed on the United Kingdom's Disposal Services Authority website and will be sold in a government-to-government deal. Both vessels were commissioned in 1985 and have several years of service life remaining as both are in good material condition.

Leading candidates for both of these destroyers are Pakistan, Chile and Brazil; all of which have a history with RN ships and systems. Both will probably be transferred with the majority of the combat systems onboard as they are armed with 80s vintage systems and sensors. It is understood that the sale does not include the Sea dart anti-air missile system.

COLLINS-CLASS SUBS TO GET SONAR PROCESSOR UPGRADE

Thales Australia has signed a contract with the Australian Defence Materiel Organisation to upgrade the Scylla (TSM 2233) sonar systems on the RAN's Collins-class submarines, the company announced on 14 November.

The upgrade "will address obsolescence issues" on the Scylla active and passive bow array sonars by replacing software and installing commercial off-the-shelf (COTS) processing boards, Thales said. "Industry-standard COTS boards will replace bespoke originals, making the system easier to maintain and providing enhanced reliability," it added. The cost of the upgrade was not disclosed.

The upgrade will also provide power savings and weight savings of more than 1 tonne. "The Collins-class submarines have a very capable sonar suite, but time has moved on," Thales Australia CEO Chris Jenkins said. "We are now leveraging advances in technology

to deliver an important update that will treat obsolescence and result in substantial space, power, and weight savings." The update will be installed on the first of the six Collins submarines in 2014.

The software and processor upgrades are the second undertaken on the Collins-class fleet. In 2003 Thales was awarded a AUD22.9 million (then USD15.8 million) contract to provide a new suite of data processors and sonar displays as part of the Project SEA 1439 Replacement Combat System (RCS) programme.

04 40 MM MK-4 GUN COMPLETES FIRST AT-SEA FIRINGS

BAE Systems has completed first at-sea firings of its new 40 mm Mk-4 naval gun in waters north of Gothenburg, marking the culmination of the Mk-4 development programme.

The trial firings were conducted from the 36.5-metre patrol boat HMS JÄGAREN in the week beginning 29 October. Installation of the engineering development prototype on board had been completed the previous week.

Development of the private venture 40 mm Mk-4 mounting, the latest evolution of the Bofors 40 mm L/70 line, began in 2009 with the aim of providing small inshore patrol craft and offshore patrol vessels with a compact, lightweight, and affordable multirole weapon system.

The system has been designed to realise a 40% reduction in weight, volume, and price compared with the 40 mm Mk-3; BAE Systems believes the lower price point and reduced installation footprint will open up opportunities in the patrol craft market

03 The Type 42 Batch 3 destroyer HMS EDINBURGH (D97) now up for sale. (RN)



previously denied to heavier 40 mm turrets. While the previous 40 mm Mk-3 system weighs about 3,700 kg, the new non-penetrating Mk-4 mounting has been substantially re-engineered so as to bring weight down to less than 2,300 kg without ammunition. To achieve this reduction, a new elevating mass - brought across from the Swedish Army's CV-90 armoured vehicle family - is introduced, electric drives are used in place of hybrid electro-hydraulics, the cupola is more compact, and a fully-digitised modular system architecture is adopted.

The primary magazine holds 30 rounds. An intermediated magazine located in the lower holds an additional 70 rounds, giving an on-mount capacity of 100 rounds. Loading of ammunition from the intermediate magazine to the primary magazine is fully automatic, while the intermediate magazine can be reloaded from below deck.

Two different types of ammunition can be used, with the empty cartridge cases being ejected forward and outside the lower part of the mount.

According to BAE Systems, the Mk-4 can fire any 40 mm L/70 ammunition. However, the company promotes full compatibility with the latest programmable 3P ammunition. 3P ammunition can be programmed in any one of six different modes for different target threats: gated proximity for air defence; gated proximity mode with impact priority for air defence from large targets; time mode against small, fast, and manoeuvring surface targets and concealed onshore targets; impact mode for engaging surface targets; armour-piercing mode against armoured surface targets; and proximity in the default mode.

The 40 mm Mk-4 gun has a maximum range of 12.5 km, and a cyclic rate of fire of up to 300 rds/min. However, rather than being limited to single shot or fully automatic, the operator can now select any firing rate between 30 rds/min and 300 rds/min.

Weapon control is typically undertaken from an off-mount gyro-stabilised fire-control system using a digital interface. However, a local control option, using a gun-mounted TV camera as a sight, is also available.

05 TIGER TRIALS FROM SPANISH LHD

The Spanish Navy and Army have begun first of class flight trials on board the 27,500-tonne landing helicopter dock (LHD) SPS JUAN CARLOS I to evaluate interoperability with two of the main aircraft used by the Spanish Army's helicopter fleet.

Tests for loading and transporting the Tiger attack helicopter and AS 532UL Cougar transport helicopters from the army's Air Mobile Forces (Fuerzas Aeromóviles del Ejército de Tierra - FAMET) began in dock at the ship's home port of Rota, near Cadiz during October.

During the second phase of trials, conducted at sea, the Tigers and Cougars carried out start-ups, hot refuelling, weapons replenishment, and take-off exercises.

The first of class flight trials continued until early December.

Previously only the Army's Boeing CH-47D Chinooks had been involved in trials on board the ship. In January the heavy-lift helicopter conducted its first operational evaluation from the flight deck of JUAN CARLOS, during which the aircraft was embarked using the 18-tonne crane forward of the island

superstructure.

Compatibility checks were then performed with helicopter handling, refuelling and maintenance installations and equipment. The Chinook also completed a number of take-offs and landings from the four deck spots designated for operating large aircraft.

06 UK SELLS GOALKEEPER

The UK Ministry of Defence (MoD) has advertised the availability of Goalkeeper 30 mm close-in weapon systems (CIWSs) for government-to-government sale as the type's retirement from RN service approaches.

With the withdrawal of the final Type 22 frigate in June 2011 and the retirement of the last Invincible-class aircraft carrier in 2014, the number of Goalkeeper mountings in the active fleet will dwindle to just two: those fitted on board the assault ship HMS BULWARK.

Given the disproportionate logistics support and training costs associated with keeping such a small number in service, the UK MoD has taken the decision to retire Goalkeeper from RN service in 2015.

Fifteen mountings were originally purchased, being fitted to two Invincible-class carriers (three systems each), four Type 22 Batch III frigates (one system per ship) and two Albion-class assault ships (two systems each), plus a shore reference site.

However, the UK has also made a significant investment in the rival Raytheon Phalanx 20 mm CIWS since 1982, cumulatively acquiring an inventory of 36 mountings. An initial batch of 16 are currently being upgraded to Block 1B standard; the MoD and Raytheon are also in discussions regarding a possible additional buy of between eight and 12 new-

04 Trial firings at-sea of the new 40 mm Mk-4 naval gun from the 36.5-metre patrol boat HMS JÄGAREN. (BAE Systems)





build Phalanx 1B systems.

The availability of Goalkeeper CIWS systems for sale is being advertised by the Defence Equipment and Support organisation's Capital Equipment Sales team, which manages the sale and transfer of land, sea and air equipment from the MoD to foreign governments worldwide on behalf of the Disposals Services Authority. No details on the number of mountings available for sale or the timeframe for transfer have been released to date.

NEW LONG-RANGE ASM POISED FOR TESTS

Lockheed Martin is preparing to test-launch a new Long-Range Anti-Ship Missile (LRASM) from US Air Force bombers and is funding ship integration efforts for a vertical launch system (VLS) variant for the USN, company executives announced on 18 September.

LRASM is being developed under a US\$90 million Defense Advanced Research Projects Agency (DARPA) programme intended to help close a warfighting gap identified by US Pacific Fleet operators. A 2008 urgent operational needs statement from the Pacific Fleet requested weapon technology to defeat heavily defended ship targets.

Based on Lockheed Martin's AGM-158B Joint Air-to-Surface Standoff Missile - Extended Range (JASSM-ER) technology, LRASM includes a datalink to provide updates as the missile approaches the target area and an anti-radiation homing capability (supplied by BAE Systems) to detect and identify emissions from threats and to help guide the missile to the target. JASSM-ER has a range of 500nm; LRASM would surpass the range requirement of 200nm.

The company is building three demonstrator

vehicles at its JASSM-ER factory in Troy, Alabama. In 2013 officials plan to test-fire them in tactically representative missile flights from a B-1B Lancer bomber, one of seven air force aircraft that can carry the airframe.

If the flight tests are successful, LRASM would transition to an engineering and manufacturing development programme for an initial operating capability (IOC) in 2016, followed by a shipboard IOC for the navy as early as 2018, according to Lockheed Martin executives.

The intended launch aircraft on the navy side is the F/A-18E/F Super Hornet strike fighter (as used by the RAAF), but Lockheed Martin executives said the new weapon could also be integrated on the P-3 Orion and P-8 Poseidon maritime patrol aircraft.

Meanwhile, the company has approved investment of US\$30 million to commence work on integrating LRASM with the surface ship Mk-41 VLS that it supplies to the navy.

07 VIKRAMADITYA BOILER PROBLEMS

It has been reported that the delivery of India's modified Kiev-class aircraft carrier is to be further delayed following a boiler system malfunction during trials in the Barents Sea, according to Russian media reports.

VIKRAMADITYA (ex-ADMIRAL GORSHKOV) was scheduled to be handed over to the Indian Navy (IN) on 4 December 2012 following the completion of its 124-day post-refit trials programme.

However, a defence official quoted by Russia's Kommersant business daily on 17 September said the carrier's delivery will now

be postponed until October 2013 because of the substantial repairs now required.

According to the source there was no evidence of any issues when the carrier was travelling at low to medium speeds; however, when the ship attempted to gain maximum speed the steam boilers broke down. Seven out of the eight boilers were identified as out of order.

The failures were attributed to India's decision not to use asbestos thermal insulation (a major health hazard) in the propulsion system. Instead firebricks were used instead, which proved unable to withstand the high temperatures, the source said.

"The condition of the boilers themselves can only be assessed once the ship has been brought back to the Sevastopol dockyard, but the fear is that they will have to be completely replaced," the source told the newspaper.

Sea trials commenced in early June, first in the White Sea and from 8 July in the Barents Sea, where tests included at-sea flight trials with MiG-29K 'Fulcrum' strike fighters.

The IN intends to operate 16 MiG-29K/KuB fighters (12 single-seat and four twin-seat variants) from VIKRAMADITYA. These aircraft were ordered from Russia in a 2004 deal worth US\$252 million and to date 15 have been delivered to India.

'EXPEDITIONARY WARRIOR' EXPOSES RIFTS IN US AMPHIBIOUS DOCTRINE

Amphibious warfare doctrine adopted by the US Navy and US Marine Corps (USMC) is contradictory and out of step with guidelines employed by special operations forces (SOF), according to a report from the US Marine Corps Warfighting Laboratory.

05A +B

A Spanish Army Tiger attack helicopter (Top) and a Chinook heavy lift helicopter (bottom) during first of class flight trials on Spain's LHD JUAN CARLOS I. The trials are important to the RAN for when it conducts Tiger and Chinook flight trials on its first LHD CANBERRA in 2014-15. (Armada)

06

A 30mm Gatling gun Goalkeeper CIWS.



05A



05B



The authors of the report based their findings on results of the 'Expeditionary Warrior 2012 (EW12)' wargame, which was staged in March 2012 and employed a scenario set in Africa in 2024.

It was intended to highlight gaps in existing amphibious and naval strategic planning, given the rapid expansion of anti-access/area denial (A2/AD) capabilities worldwide. Efforts to counter the proliferation of A2/AD capabilities are a driving force for future US maritime strategies in the post-Afghanistan era.

EW12 demonstrated that strategies developed for the conduct of amphibious operations did not gel well together. Specifically, a conflict was identified between the USN's Composite Warfare Commander (CWC) concept and the USMC's Operational Maneuver from the Sea (OMFTS) and Ship to Objective Maneuver (STOM), according to the report.

CWC "is marked by meticulous co-ordination of environments across domains and functions that creates a 'bubble' to provide for the defence of the force and supports sea control", the report stated, while STOM and OMFTS advocate "bold manoeuvres to reach deep-inland objectives, suggesting an offensive mindset and an orientation toward power projection. EW12 players ... were unable to reconcile the two different approaches to warfighting".

Further confounding the exercise was the relationship between conventional maritime forces and special forces. While conventional forces seek a unity of command, SOF are more operationally independent from a national command structure; the report found a need for increased interaction

between conventional and SOF elements.

"[Conventional] and SOF often plan and train separately, under the assumption that they will be operating in different areas of operations. However, operational realities compel continuous interaction," the report said.

FIRST AWD DELIVERY POSTPONED TO 2016

Delivery of the first Hobart-class destroyer under construction for the RAN has been pushed back a second year to 2016, Defence Minister Stephen Smith announced on 6 September.

Speaking after a keel-laying ceremony in Adelaide for the lead ship, Smith said that extending the Air Warfare Destroyer (AWD) manufacturing schedule would "help avoid a decline in naval shipbuilding skills" before work begins on 12 future submarines to replace the navy's six Collins-class boats.

However, he also acknowledged that the delayed expenditure of \$100 million on the three-ship AWD programme would assist in achieving the government's objective of a budget surplus.

Under the revised schedule, the first of the 6,350 tonne destroyers, HOBART, will now be delivered by the AWD Alliance to the navy in March 2016, with second-of-class BRISBANE following in September 2017 and the third vessel, SYDNEY, in March 2019.

When the decision was made in 2007 to adopt Navantia's F-105 multirole frigate design as the basis for the Hobart class, the new ships were set for handover in December 2014, March 2016 and June 2017. These dates were put back by a year in May 2011,

when construction difficulties resulted in the reallocation of the 90 ship blocks being built by ASC in Adelaide, South Australia; BAE Systems in Melbourne, Victoria; Forgacs in Newcastle, New South Wales; and Navantia in Spain. In addition, three sonar blocks are being produced in Spain and the UK.

The second major re-baselining of the construction schedule was announced in a statement issued on 6 September 2012 by the Department of Defence, attributed to Smith and two of his ministerial colleagues. "The AWD Alliance has conducted a detailed analysis of the construction schedule and advised [the DoD] that the keel to keel interval should be extended to 18 months between each ship," the statement said.

"The revised AWD project plan will reduce peak demand on project critical resources and facilities, and reduces project risk. The new schedule will not increase the cost of the project nor result in the loss of any jobs. Very importantly, it will help retain skills in the naval shipbuilding industry."

The DoD statement said the new schedule has been welcomed by AWD Alliance members ASC, Forgacs Engineering and Raytheon Australia. Tony Lobb, Forgacs' executive director, was quoted as saying that it would enable the company to retain its 1,200-strong marine engineering workforce.

However, opposition defence spokesman David Johnston accused the government in a statement of pretending to be doing a favour to the defence industry, rather than admitting to damaging cuts to defence spending.

One thing that is yet to be explained is how does the delay effect the prospect for a fourth AWD. Does it mean the building 'window' is now open again for contract negotiations?

07

The IN's new aircraft carrier VIKRAMADITYA returning to port after its boiler malfunction.





CHINA LAUNCHES FIRST TYPE 052D DESTROYER

It has been reported in *Jane's Navy International* that China has launched the first of a new class of anti-air warfare destroyers for the People's Liberation Army Navy (PLAN), according to local reports.

The Type 052D lead ship - understood to be a follow-on to the Luyang II-class (Type 052C) destroyer - was launched at Jiangnan Shipyard on Changxing Island, near Shanghai, at the end of August.

Photographs of the new ship published by Chinese news portals show large conformal antennas for new Active Electronically Scanned Array (AESA) radar system mounted on the forward superstructure, similar to the Type 346 radar that equips the Luyang II destroyers.

The new destroyer appears to feature a new PJ-38 130 mm main gun, up from the 100 mm or 76 mm mounts that were adopted for other recent Chinese-built surface combatants. The images also hint at a change to the vertical launch system, with observers suggesting that the Type 052D might be equipped with a navalised version of the DH-10 land-attack cruise missile.

The Type 052D destroyer is thought to be about 160 m in length with a beam of 18 m, making it 5 m longer and 1 m wider than the Luyang II class.

08 X-47B MAKES NAVAL AVIATION HISTORY

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md. (NNS) -- The USN's X-47B Unmanned Combat Air System (UCAS) demonstrator successfully completed its

inaugural land-based catapult launch on Nov. 29 2012, marking the start of a new era for naval aviation.

"Carrier-based unmanned aircraft will change the concept of operations for the carrier-controlled airspace," said Rear Adm. Mat Winter, the programme executive officer for Unmanned Aviation and Strike Weapons. "The N-UCAS program's goal is to demonstrate integration of an unmanned aircraft into a carrier environment and reduce technical risk associated with developing potential future unmanned, carrier-compatible systems."

The USN's first-ever steam catapult launch of the pilotless X-47B ensures the vehicle can structurally handle the rigors of the unique and stringent aircraft-carrier environment.

Since the birth of naval aviation, engineers have relied on experienced test pilots to help evaluate aircraft flying qualities and structural suitability. In this test, the USN UCAS integrated test team relied solely on data from a pre-programmed automated X-47B aircraft to achieve these data points.

"This test, in addition to the extensive modeling and simulation done prior to today, gives us great confidence in the X-47B's ability to operate on the flight deck," said Capt. Jaime Engdahl, the Navy UCAS program manager.

The combined Navy and Northrop Grumman team continued ground-based catapult verification and final flight software validation at Pax River before embarking on USS HARRY S. TRUMAN (CVN 75) during December for its initial sea trials.

The USN will use the X-47B to demonstrate the first carrier-based launches and recoveries by an autonomous, unmanned aircraft in 2013.

SM-6 AWAY

The USN's Standard Missile SM-6 Extended Range Active Missile is due to achieve initial operational capability (IOC) and face the milestone decision on the start of full-rate production by March 2013. The 2012 US Department of Defense acquisition report submitted to Congress on 14 November 2012 pointed out that this date was 11 months later than previously scheduled.

The report stated that the delay was due to the need to remedy deficiencies identified in the initial operational testing and evaluation of the SM-6 in June-July 2011, when it was determined that the missile was neither operationally effective nor suitable. The USN requested US\$21 million in reprogramming to evaluate the fixes put in place during a renewed White Sands Missile Range test programme during October 2012.

The fourth batch of SM-6 low-rate initial production missiles is currently in production at a rate of 89 missiles per year. If all goes well, the SM-6 will transition to full-rate production during Fiscal Year 2014.

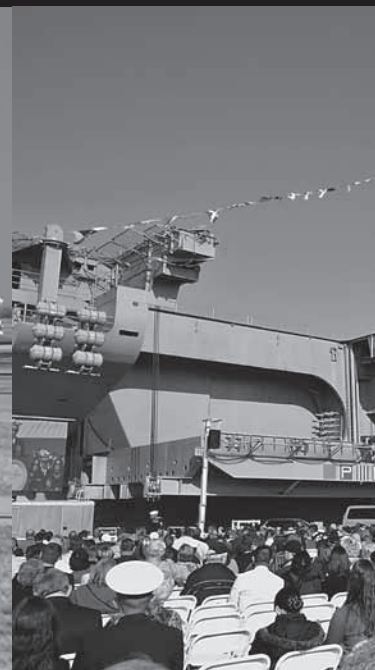
09 ENTERPRISE DEACTIVATED

Nearly 12,000 past and current crewmembers, family and friends attended the inactivation of aircraft carrier USS ENTERPRISE (CVN-65) Dec. 1, 2012, at Naval Station Norfolk, Va.

ENTERPRISE, the world's first nuclear powered aircraft carrier, recently completed its 25th and final deployment and returned to its homeport of Naval Station Norfolk for a scheduled inactivation, held prior to the ship's terminal offload programme and subsequent decommissioning.

08 The USN's X-47B Unmanned Combat Air System (UCAS) demonstrator on the land-based catapult launcher on Nov. 29 2012. The successful test marks a historic moment in naval aviation. (USN)

09 Nearly 12,000 past and current crewmembers, family and friends attending the inactivation ceremony of the USN aircraft carrier USS ENTERPRISE (CVN-65) on Dec. 1, 2012, at Naval Station Norfolk, Va.



The inactivation ceremony was the last official public event for the ship, and served as a celebration of life for the ship and the more than 100,000 Sailors who served aboard.

The Chief of US Naval Operations, the Commander of United States Fleet Forces, nine of twenty-three prior commanding officers, many decorated war heroes, and thousands of Enterprise veterans attended the event.

"ENTERPRISE is a special ship and crew, and it was special long before I got here" said Captain William C. Hamilton, Jr., the twenty-third and final commanding officer, during the ceremony.

"Before I took command of this ship, I learned the definition of 'enterprise', which is 'an especially daring and courageous undertaking driven by a bold and adventurous spirit.' Fifty-one years ago, this ship was every bit of that definition."

"Here we are 51 years later," he continued, "celebrating the astonishing successes and accomplishments of this engineering marvel that has roamed the seas for more than half the history of Naval Aviation. Daring, courageous, bold, and adventurous indeed."

In honor of that spirit, Secretary of the US Navy Ray Mabus, in a video message played at the ceremony, announced that the name ENTERPRISE will live on as the officially passed the name to CVN-80, the third Ford class carrier and the ninth ship in the USN to bear the name.

Commissioned on November 25, 1961, the eighth ship to bear the illustrious name ENTERPRISE, the "Big E" was the world's first nuclear-powered aircraft carrier.

A veteran of 25 deployments to the

Mediterranean Sea, Pacific Ocean, and the Middle East, ENTERPRISE has served in nearly every major conflict to take place during her history. From the Cuban Missile Crisis in 1962 to six deployments in support of the Vietnam conflict through the Cold War and the Gulf Wars, ENTERPRISE was there. On September 11, 2001, ENTERPRISE aborted her transit home from a long deployment after the terrorist attacks, and steamed overnight to the North Arabian Sea. Big 'E' once again took her place in history when she launched the first strikes in direct support of Operation Enduring Freedom.

10 PLA-N AIRCRAFT CARRIER NAMED LIAONING

On 9 September 2012, the People's Liberation Army-Navy (PLA-N) commissioned its first aircraft carrier LIAONING (CV-16). The commissioning follows sea trials and a 10-year refit at Dalian Shipyard.

Given the pennant number 16 and named LIAONING after the province in which it was rebuilt, the 59,439-tonne former Soviet Navy carrier was handed over by Dalian Shipbuilding Industry Company (DSIC) to the PLA-N in the presence of "top Chinese leaders", a statement said.

The LIAONING is the ex-Russian aircraft carrier VARYAG that was procured from the Ukraine in 1998. Upon receipt, the VARYAG entered Dalian Shipyard where it entered a decade-long refit and modernisation effort that included upgrading:

- New main propulsion systems, shafting and props and rudders
- New auxiliary systems

- Aircraft launch and recovery systems on the flight deck
- Top Plate Type 381B air-surface search radar
- Dragon Eye 3D phased array radar
- Electronic warfare suite supporting ESM/ECM systems and mechanical decoys
- Band Stand fire control radar
- Navigation and carrier control approach radars
- FL-3000N short range air defense system
- Type 1030 30mm close-in weapon system

The refitted LIAONING will employ the Shenyang Aircraft Corporation J-15 fighter aircraft (based on the Russian Su-33 obtained from the Ukraine in 2004 and avionics from the indigenous J-11B aircraft), JL-9 training aircraft, and helicopters.

J-15 on board at sea testing has already commenced with two test aircraft conducting successful landings and take offs from the carrier. ■

10

A Shenyang Aircraft Corporation J-15 fighter aircraft (based on the Russian Su-33 obtained from the Ukraine in 2004 and avionics from the indigenous J-11B aircraft), landing on board the new carrier at sea.





MARITIME TERRORISM – HOW SERIOUS A THREAT TO AUSTRALIA?

By Sub Lieutenant D.M. Greenwood, RAN

"We warned Australia before not to join in [the war] in Afghanistan, and [against] its despicable effort to separate East Timor. It ignored the warning until it woke up to the sounds of explosions in Bali."

(the late) Osama Bin Laden¹

Australia is a target for terrorists; a target with the largest ocean jurisdiction of any country in the world and a coastline of over 35,000km. Furthermore it is a maritime nation heavily reliant on its sea lines of communication (SLOC), especially through the Straits of Malacca which is plagued by piracy and has been the target of terrorist groups. There are a number of other concerns such as the effects of a high profile attack on Australian shipping or use of Australian transport infrastructure to transport terrorism related materiel.

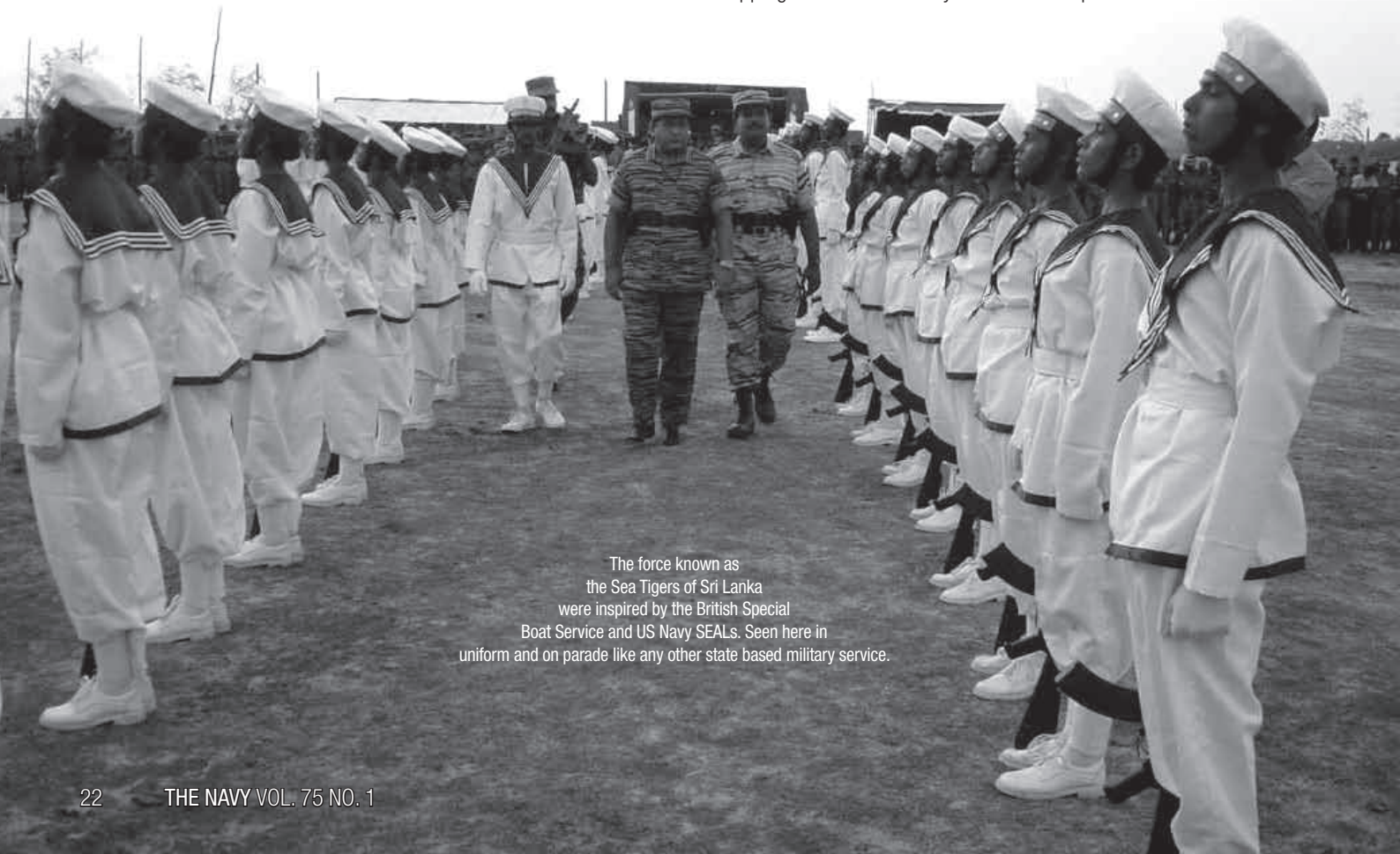
Maritime terrorism is a relatively rare phenomenon, accounting for about two per cent of international incidents over the last 30 years², but there has been a discernable rise in incidents over the last ten years and the main areas in which such incidents occur impact directly on Australia's SLOC.

But what exactly is maritime terrorism? How is it different to piracy, and is there any link between the two? How much of a threat does it pose to Australia, and is there anything being done to mitigate any threat? This brief paper will try to provide some answers to these questions.

DEFINITIONS: PIRACY VS MARITIME TERRORISM

Detailed discussion on defining terrorism is not possible here³, so for the purpose of this paper we will use the definition in the *Criminal Code Act* of 1995. This defines terrorism as an act or threat intended to advance a political, ideological or religious cause by coercing or intimidating an Australian or foreign government or the public, by causing serious harm to people, property, creating a serious risk to the health and safety of the public, or seriously disrupting trade, critical infrastructure or electronic systems⁴. Maritime terrorism would therefore include such act/threats on maritime assets including but not limited to shipping, ports, naval installations or trade systems.

Piracy and maritime terrorism employ similar methods, are committed with similar levels of violence and are mitigated through similar means. What distinguishes the two is the motive of the perpetrators; pirates are motivated by personal gain⁵ while terrorists are motivated by more altruistic goals such as the furtherance of a particular political or religious belief. For instance, pirates are interested in maintaining shipping routes which they can use to exploit. Terrorists on the other



The force known as the Sea Tigers of Sri Lanka were inspired by the British Special Boat Service and US Navy SEALs. Seen here in uniform and on parade like any other state based military service.

A Sea Tiger fast attack craft propelled by four 250hp outboard motors. The Sea Tigers achieved considerable success against the Sri Lankan Navy by sinking up to 29 Sri Lankan patrol boats and a freighter.



hand are concerned with disrupting these routes to cause economic damage to their enemies. Collaboration between the two groups is much feared by world governments, but no link has ever been proved⁶.

Maritime terrorism can be divided into two broad categories. The first category is the use of maritime assets to commit terrorism, which covers naval forces formed by terrorist groups and the use of commercial vessels, supply systems or ports to transport terrorist resources. The second category is acts of terrorism against maritime assets or critical infrastructure; this includes acts such as hijacking and direct violence to inflict damage and/or casualties and targeting shipping, warships and ports.

USE OF MARITIME ASSETS TO COMMIT TERRORISM

Probably the best example of using maritime assets for terrorism is the quasi-naval force formed by the Liberation Tigers of Tamil Eelam (LTTE, or Tamil Tigers) in Sri Lanka. The force was known as the Sea Tigers and was inspired by the British Special Boat Service and US Navy SEALs. In addition to the commando tactics employed by the Sea Tigers, they were a suicide force in keeping with the LTTE ethos of *thatkodai* (to give oneself)⁷, making them a potent component of the LTTE struggle for a Tamil homeland in the Sinhalese dominated country. Possessing a number of small vessels and with 2,000-3,000 personnel, they achieved considerable success against the Sri Lankan Navy by sinking up to 29 Sri Lankan patrol boats and a freighter. They were finally vanquished in 2009 following a concerted military offensive and naval blockade by the Sri Lankan armed forces. Interestingly, at one captured boatyard several submersibles were discovered under construction⁸.

The sophistication of the Sea Tigers is unique in the history of maritime terrorism. More common is the use of maritime assets to smuggle arms or other materials used to commit acts of terrorism. It is widely known that only a small percentage of shipping containers are ever inspected, and containers can be tracked and followed by smugglers with access to cargo system computers⁹. The very ease of access

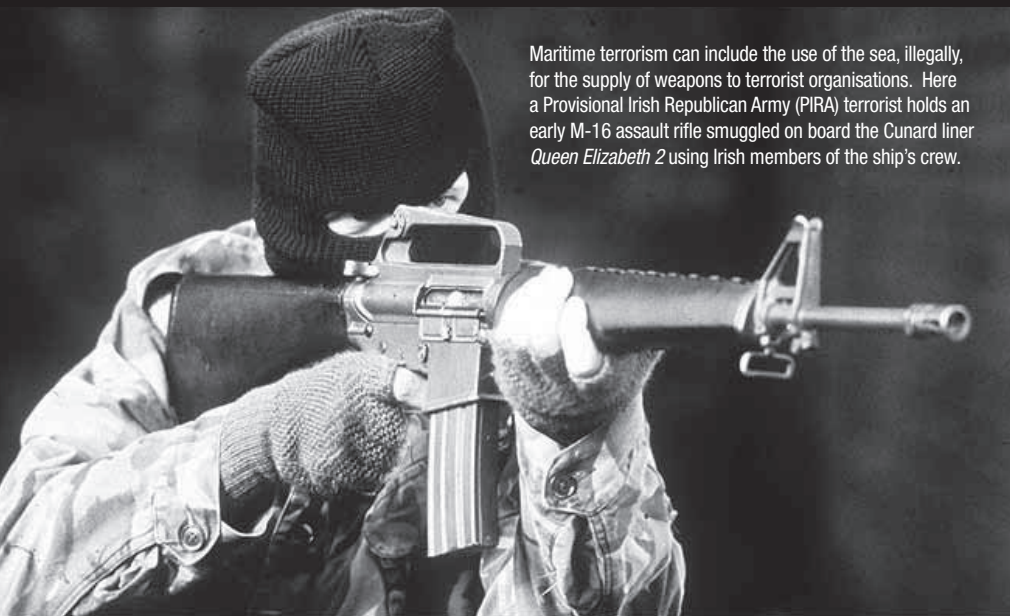
with which global shipping routes have been devised can work against them by facilitating the transport of illicit cargo destined for use by terrorists. Here we can see a possible nexus between terrorist groups and organised crime, with the latter being hired as 'contractors' to maintain terrorist supply routes. Such a nexus occurred in the case of the Provisional Irish Republican Army (PIRA) during 'The Troubles' where shipments including M16 and AR15 rifles, and Smith and Wesson handguns were smuggled on board the Cunard liner *Queen Elizabeth II* using Irish members of the ship's crew. The weapons were procured in the US by an arms smuggler with organized crime contacts in the US and Corsica.

State-sponsored terrorism also plays a part, where a government will actively supply terrorist groups or even rogue states with arms or other materiel and transport it, generally by using commercial shipping. Libyan dictator Muammar al-Gaddafi sympathised with the PIRA campaign against British rule in Northern Ireland and regularly supplied them with arms and funds from the 1970s onwards. These arms were regularly imported by sea, circumventing the much stricter controls on airborne cargo systems. Shipments comprising hundreds of weapons were transported using commercial vessels and although some were seized by authorities, most managed to get through resulting in an *oversupply* of weapons to the PIRA¹⁰.

ACTS OF TERRORISM AGAINST MARITIME ASSETS OR CRITICAL INFRASTRUCTURE

Modern international maritime terrorism probably dates back to 1961 with the bloodless hijacking of the cruise ship *Santa Maria* by Spanish and Portuguese rebels off the coast of Brazil, but the first act to really capture the world's attention was the hijacking of the MS *Achille Lauro* off the coast of Egypt on 7 October 1985. Four members of the Palestine Liberation Front seeking the release of Palestinian militants from Israeli jails hijacked the ship and killed one of the passengers, a 69 year old wheelchair-bound Jewish man named Leon Klinghoffer, throwing his body overboard along with his wheelchair.

In October, 2000 Al-Qaeda terrorists rammed an explosives-laden



Maritime terrorism can include the use of the sea, illegally, for the supply of weapons to terrorist organisations. Here a Provisional Irish Republican Army (PIRA) terrorist holds an early M-16 assault rifle smuggled on board the Cunard liner *Queen Elizabeth 2* using Irish members of the ship's crew.

dinghy into the USS COLE in the port of Aden, Yemen, resulting in 17 deaths. On 6 October 2002 the oil tanker *Limburg* was similarly targeted off the coast of Yemen, killing one of the crew and injuring a further 12. The *Limburg* explosion caused 90,000 litres of burning oil to spill into the Gulf of Aden and US\$45 million worth of damage to the ship. Economic costs of the attack to the Yemeni ports industry were estimated at US\$3.8 million per month¹¹.

Closer to home, the Abu Sayyaf Group (ASG) in the Philippines targeted *SuperFerry 14* on 27 February 2004, resulting in the deaths of 116 people – the deadliest act of maritime terrorism to date. Using sticks of dynamite hidden within a TV, ASG were able to cause mass casualties for a reported cost of only US\$400. This further exposed the fact that dockyard security, especially for ferries, was extremely lax in some ports and that ferries were particularly vulnerable to attacks resulting in mass casualties¹².

Terrorist targets are not limited to commercial shipping vessels or cruise ships. Other assets at risk include ports, supply systems, critical infrastructure, naval installations and warships. Possibly of concern are vessels transporting material that could be weaponised such as Liquid Natural Gas (LNG), nuclear waste or even just a large oil tanker. For example there has been a marked increase in the delivery of LNG carriers in the last decade, with now over 300 LNG vessels on the high seas¹³. There is only a remote possibility that these vessels could be turned into floating bombs, but even a simple leak or discharge of their cargo could result in serious environmental and economic damage.

Even naval assets ashore are not immune to terrorist attack. In May 2011, terrorists attacked PNS MEHRAN in Karachi, Pakistan. 15 militants from the Tehrik-i-Taliban Pakistan group stormed the airfield and began destroying aircraft using rocket propelled grenades and shooting indiscriminately at personnel. This attack at the headquarters of the Pakistan Navy Fleet Air Arm killed 18, wounded 16 and followed two bomb blasts the previous month. Two P-3C Orion aircraft were destroyed at an estimated cost of 6.47 billion Rupees (more than AUD\$68 million)¹⁴.

The low cost of terrorist operations makes them especially difficult to prevent. Terrorism is a tactic of the weak against a much stronger enemy, and the asymmetry of terrorism can be startling. For example, the COLE attack cost an estimated US\$10,000 but resulted in US\$250 million worth of damage as well as the deaths of 17 American personnel¹⁵. Terrorism is a dangerous game of maximum return for minimum investment.

THE THREAT TO AUSTRALIA

Australia and Australian interests are targets for international terrorists. As the 2004 Department of Foreign Affairs and Trade (DFAT) White Paper says: 'Key economic and commercial interests, including airports, airlines, shipping and transport infrastructure, have also been identified as targets.'¹⁶ That

said, the odds of an attack on Australian ships are low given the difficulties in attacking a large ship, and the fact that land-based targets abound and are easier to attack. Ferries however, could still present an attractive soft target for those seeking mass casualties.

Australia's heavy reliance on SLOC could be seen as a potential area of risk, especially through the strategically important but pirate-plagued Malacca Straits. However, risk models have shown that the potential disruption to trade would be minimal and at worst would delay shipments by a matter of days. Ships would simply take alternate (albeit longer) routes, with air freight another option for some commodities. Total severing of trade routes would require resources beyond the reach of terrorist groups, and any attempt to do so would simply be uneconomical.¹⁷

The somewhat infamous passenger ship *Achille Lauro* was hijacked off the coast of Egypt on 7 October 1985.



More disturbing would be an attack on some of the iconic structures on Sydney Harbour by using a ship-borne bomb, similar to attacks on the COLE and *Limburg*. Terrorism exists to provide maximum public exposure to a particular cause and an attack on such Australian symbols would certainly grant such exposure. Sydney harbour is also home to significant naval assets including Fleet Base East and HMAS WATERHEN. The difficulties in staging such attacks however would

put them out of the realm of possibility for most if not all terrorist organisations. Dr. Geoffrey Till, writing in a paper on the protection of shipping, has stated that 'Isolated terrorist attacks...seem very unlikely when there are so many much easier and more rewarding targets ashore.'¹⁸ Ashore, adequate intelligence to provide suitable force protection measures is still vital to ensure naval installations don't become targets like the attacks in Karachi.

While the overall risk may be small there is still concern in the wider community that we are too exposed to any potential attack. A recent article in The Australian has indicated fears in the US of terrorist attacks on northern oil and gas rigs on our North-West Shelf¹⁹ which have the potential of disrupting US\$300 billion worth of investment in the area. In addition, many of the oil installations in the area are unmanned, making them even more tempting targets for terrorists.

COMBATING THE THREAT

A key weapon we have to combat terrorism is intelligence. The most recent Counterterrorism White Paper states, 'Australia's counter-terrorism efforts are intelligence-led and focused on prevention. This approach hinges on strong partnerships and cooperation at the national level, effective engagement at the international level, and effective information sharing.'²⁰ Our intelligence organisations have an important role in protecting the Australian homeland and our interests overseas, with coordination between relevant agencies managed by the Counter Terrorism Control Centre, formed in 2010 as a result of that year's White Paper.

Several legislative initiatives have been put forward to enhance the security of the world's ports and protect shipping²¹. Not only have warships reviewed and ramped-up force protection, the International Maritime Organisation has formulated the International Ships and Port Security Code (ISPS) establishing guidelines on how much security should be provided at international ports and the vessels using them. The US also has the Container Security Initiative (CSI) and the Customs-Trade Partnership Against Terrorism (C-TPAT). Such initiatives have been adopted in the UK and other major ports worldwide intent on maintaining supply routes through the US²². This highlights another key weapon – cooperation.

Australia has created multi-agency taskforces to combat crime in Australian ports²³. While some are primarily law-enforcement initiatives tackling organised crime, corruption and smuggling, they are integral in maintaining port security and therefore in assisting counter-terrorism efforts. Such taskforces include Taskforce Polaris in Sydney, comprising 49 agents from the Australian Federal Police, Australian Customs and Border Protection Service, Australian Crime Commission, NSW Police and NSW Crime Commission²⁴. Recommendations from Polaris have led to stricter controls on dockyard workers and stevedoring companies to enhance vetting procedures and restrict access to cargo system computers. Such increased intelligence and surveillance will benefit any counter-terrorism undertakings and help reduce the risk of terrorists having inside access to port facilities either for the purposes of direct attack or, more likely, using ports as a means of transporting illicit goods. Cooperation extends to other countries through Australia's Border Protection Command. The 2010 White Paper said, 'Australia will continue to refine its approach to transport security, both domestically and internationally, to take into account anticipated long-term growth in the aviation and maritime transport sector and changes in the nature of the terrorist threat.'

NAVY'S PART IN COUNTER-TERRORISM

There are several ways the ADF and the Navy in particular can and do contribute to the overall counter-terrorism effort in Australia, both directly and indirectly as part of general law-enforcement or anti-piracy activities.²⁵ According to the 2010 White Paper, 'Given the important role of defence forces in maintaining national security, regional defence engagement also focuses on governance and professionalism to strengthen regional counter-terrorism structures and institutions.'

The 2010 White Paper highlights the necessity of secure borders both through direct enforcement and engagement with regional powers. The Navy has direct involvement in protecting Australia's borders through Border Protection Command and plays an important role in fostering regional links to promote a multinational approach to maritime security. The Canberra Times has stated 'Tasking the military with engaging with other militaries indicates a desire to build relationships with foreign governments, which hopefully leads to addressing more



The USS COLE being lifted onto a ship lift vessel for transport to the US for repairs after terrorists nearly sank her in Aden with the maritime equivalent of a truck bomb. (USN)

The 105,000 tonne Liquid Natural Gas carrier Northwest Sandpiper. A fully laden ship like this with its explosive cargo would make a great mass destruction weapon by driving deep into a target's harbour before detonation. Not much could stop it.



contentious issues such as maritime piracy, counter-terrorism and organised crime²⁶. The Navy's contribution to Tactical Assault Group East is part of its direct response to any possible attack. The 2004 White Paper further stated: 'The ADF's regional links, together with increased intelligence resources, contribute to our knowledge of the regional security environment, including the terrorist threat to Australian interests'. Navy's Communication and Information Warfare branch is an important part of this intelligence network, providing Navy with information necessary to determine operational risk profiles. It can also assist in providing other agencies with intelligence gathered through Navy activities.

Regarding the threat to our North-West Shelf oil installations, CDF Gen. David Hurley has stated that the ADF will be making its presence felt in the area, stating in *The Australian*²⁷ that '...the ADF only positioned itself for the most likely threats, which were terrorist attacks on rigs. The ADF had a counter-terrorism capability in place, he said. "There is no conventional threat to that area". Such increased presence would include more visible patrols by aircraft and naval vessels, and a major exercise to be held in the area in the next two years.

CONCLUSION

Maritime terrorism has been of concern since 1961 but didn't garner international attention until the *Achille Lauro* hijacking in 1985. Since then, the most advanced 'terrorist navy', the LTTE Sea Tigers, has come and gone. However there have been sporadic but increasingly regular attacks on shipping resulting in multiple casualties and significant economic damage. These have not been limited to commercial targets and have included warships and naval bases. Of significant concern is the susceptibility of international cargo systems being used for the transport or illicit cargo for terrorist use.

Overall, maritime terrorism poses a small threat to Australia. However, the consequences of a terrorist act on Australian maritime assets could be much more catastrophic than any other form of attack. The sheer size of seagoing vessels carrying dangerous cargo and the number of passengers carried on a single cruise ship or ferry mean the possibility of catastrophic damage and mass casualties should any attack take place. In Sydney Harbour naval assets and iconic Australian structures could be targeted resulting in the kind of unforgettable media images seen during the attacks on the World Trade Centre.

Several initiatives have been formulated to increase security at ports and harbours including the ISPS, CSI and C-TPAT. Australia has adopted these and in addition formed taskforces such as Polaris to clamp down on organised crime and corruption at ports. Navy also has direct contributions to the effort through border protection duties, representational visits and provision of personnel to TAG.

Navy has an important role in the intelligence sphere through its engagement with foreign powers and this cooperation combined with intelligence gathered from other national security or law enforcement agencies constitute our most important counter-terrorism assets. The chances of an attack are remote, but still exist - we must therefore continue to monitor and assess the threat and stay one step ahead of those who wish to cause us harm. *Si vis pacem, para bellum*²⁸. ■



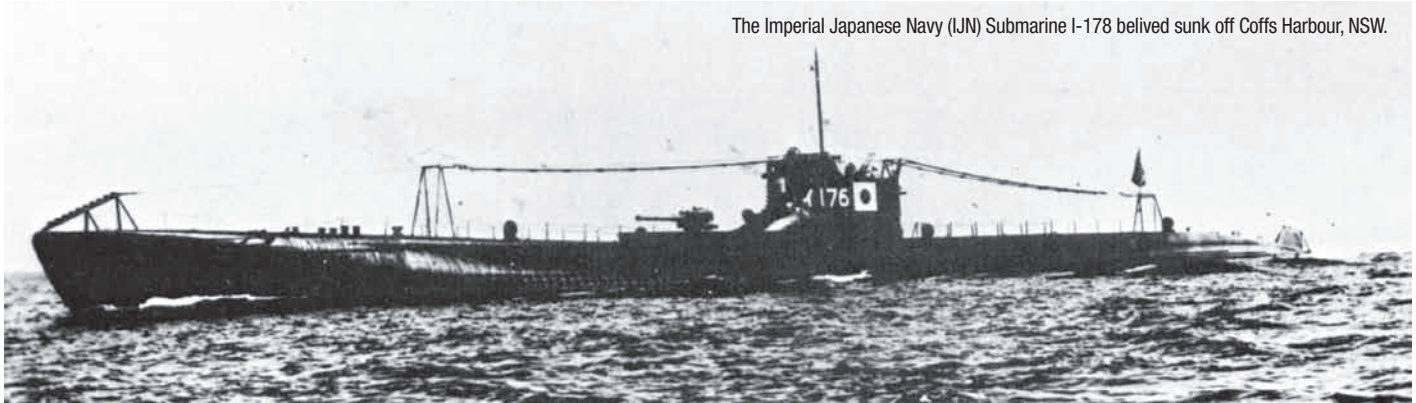
A USN BAMS (Broad Area Maritime Surveillance) Global Hawk reconnaissance aircraft. The Global Hawk's long loiter time make it ideal for tasks requiring vigilance over parts of the ocean. (USN)

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WHO SANK I-178?

By Geoff Crowhurst



The Imperial Japanese Navy (IJN) Submarine I-178 believed sunk off Coffs Harbour, NSW.

During World War Two the Imperial Japanese Navy lost 129 submarines in action. While 70 were sunk by surface vessels, aircraft accounted for 18. Credit for one of those submarines, I-178, went to the United States Navy, however the evidence points elsewhere.

I-178 was completed at the Mitsubishi Yard at Kobe in 1942. Its captain was Commander Utsuki Hidejiro. After a shake down cruise it was assigned to Submarine Squadron (SubRon) Three of the Sixth Fleet. It left Japan on 30th March 1943 and arrived at its new base at Truk on 7th April.

I-178 departed Truk on 10th April 1943 with orders to patrol the east coast of Australia to support I-177. After an uneventful passage it arrived off the Australian coast. Due to the destruction of most of the IJN submarine records in the last weeks of the war, few details are known about I-178's patrol. However it is known that at 18.45 on 27th April 1943 it fired a Long Lance torpedo into the US Liberty ship *Lydia M Childs* (7,176 tons), 90 miles east of Newcastle. Carrying a cargo of tanks, the freighter quickly sank. Fortunately the entire crew of 62 survived and were rescued later that day by the corvettes HMAS WARRNAMBOOL and DELORAINE. Exiting the area on the surface, I-178 had a lucky escape when it survived three bombing runs by an RAAF 11 Sqn Catalina, due to a faulty master arm switch that stopped the bombs being released. Finishing its patrol, it returned to Truk on 18th May.

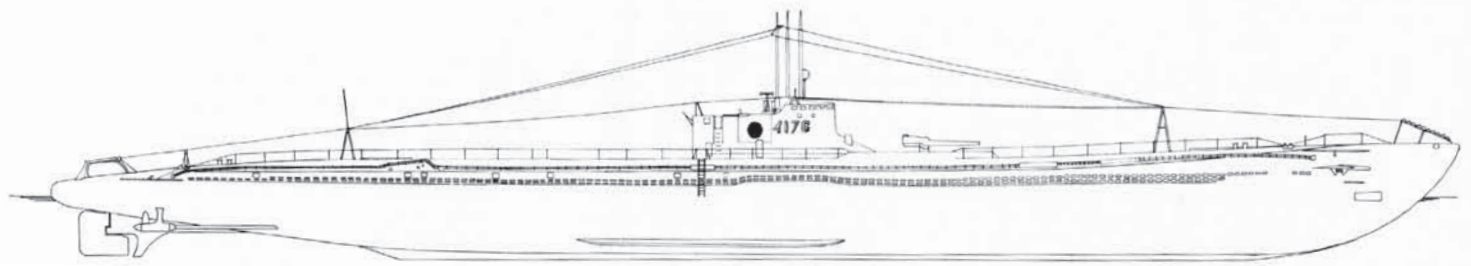
It did not stay there for long as the commander of Sixth Fleet, Vice-Admiral Komatsu, ordered it back to the same area to reinforce I-174, which had left for Australia on 16th May. Cdr Utsuki spent two days replenishing his patrol stores then sailed again on 20th May. Utsuki had another uneventful journey to Australia. He sent a number of radio messages including contact reports in the next few weeks. Although Sixth Fleet credit him with damaging one large and one small vessel, Australian records do not support these claims. On 17 June 1943 Sixth Fleet at Truk received a "routine signal" from Utsuki. After that nothing was heard from I-178 again. On 4th August 1943 Sixth Fleet declared I-178 lost with all hands off the east coast of Australia and on 1st September that year it was removed from the Navy List.

MAN AND MACHINE

Utsuki Hidejiro was born in Tochigi on the island of Honshu. He graduated from the Imperial Naval Academy at Etajima 52nd in his class as a Midshipman in 1924. From then on little is known about his career until he was given command of the minelaying submarine I-122 on 28th March 1941. He commanded I-122 when it laid a minefield off Darwin in January 1942. On returning from this patrol he transferred to I-5 which he commanded for three war patrols. On 31st October he was sent to Japan to oversee the final fitting out of I-178, officially taking command on 26th December 1942.

I-178 was a KD7 type submarine and was the final model of the Kaidai class. It displaced 1,833 tons (surfaced) and was 346 feet in length. It was powered by twin diesels generating 8,000 horsepower which gave it a top speed of 23 knots. It also had two electric engines that drove it at 8 knots submerged. It had an endurance of 75 days. It was armed with six torpedo tubes forward. The KD class was the first Japanese submarine not to have stern tubes. It carried 14 Long Lance torpedoes. Gun armament consisted of a deck mounted 4.7 inch gun and a 25 mm anti-aircraft gun.

KD7's were underachievers. Much was expected from them but they failed to deliver. The entire class was sunk between August 1942 and October 1944, nine to enemy action and one to a training accident. In return they sank only seven merchant ships, one hospital ship (I-177 under command of LtCdr Nakagawa torpedoed *Centaur* on 14 May 1943) and a submarine (USS CORVINA). Along with many other Japanese submarines, they spent a lot of time on supply missions rather than on combat patrols (although I-178 did not perform supply missions).



A line drawing of the KD-7 class submarine of the IJN.

WHO DIDN'T SINK I-178?

Credit for sinking I-178 usually goes to one of three USN ships. Two submarine chasers and one destroyer. Several sources name SC 699 or SC 669 as sinking I-178 on 29th May 1943 off the island of Espirito Santo. Both were stationed in the South Pacific in mid 1943. On 29th May 1943 SC 669 was patrolling the harbour entrance of Espirito Santo when sonar picked up a strong return from a submerged submarine. SC 669 attacked the contact with depth charges and Mousetrap (USN name for the British Hedgehog, which launched explosive projectiles forward of the ship that exploded on contact with the submarine). They were rewarded with air bubbles, oil and debris including a Japanese

allowed a certain degree of latitude, a diversion to Espirito Santo would add over 1,000 miles to I-178's patrol and decrease the amount of time available for operations off Australia, its primary mission. Utsuki would go to his primary patrol area and if targets were scarce, only then would he move off to other hunting grounds. As I-178 left Truk on 20th May, it would still have been in transit to Australia on the 29th, when SC 669 made its attack.

Secondly, the Santa Cruz Islands were not in SubRon Three's area of operations. They were patrolled by boats from SubRon Seven, which included RO-107. Submarine commanders were reluctant to stray into other squadron's operational areas. Finally and perhaps most conclusive of all, surviving Sixth Fleet records show I-178 in contact until the middle of June 1943. Further, the official Australian history states that I-178 was operating off the east coast in June 1943. These facts effectively eliminate the possibility that I-178 was the target of SC 669's attack on 29th May off Espirito Santo.



One of the claimants for the sinking of I-178 is the Bagley class destroyer USS PATTERSON see here.

The third vessel given credit for sinking I-178 is USS PATTERSON (DD-392), a Bagley Class destroyer on escort duties off the Solomon Islands. Late on the night of 25th August 1943 it was escorting a convoy from the New Hebrides when a radar contact was established with a submerging submarine. PATTERSON then gained a sonar contact and made repeated depth charge attacks. Five minutes after its last attack, sonar picked up the sound of a "...deep underseas boom...". PATTERSON was later awarded with the destruction of I-178.

life jacket. SC 669 was given credit for sinking a Japanese submarine, but for RO-107 – not I-178.

Theodore Treadwell, an American historian who specialises in submarine chasers, has written two books on them. He states ... "SC 669 was the only subchaser in the entire war to receive official credit and recognition for the sinking of an enemy submarine. It happened not far from the harbour entrance to the island of Espirito Santo ... at 10.45 on the morning of 29 May 1943". Credit for RO-107 is officially given to SC 669 by the Office of the Chief of Naval Operations, Naval History Division, USN. SC 699 was never credited with a submarine kill. Due to the similarity between their numbers, it is understandable that SC 669 can be misidentified as SC 699. However doubts have been raised about the veracity of SC 669's claim. Surviving Japanese records state that RO-107 was in contact with Sixth Fleet in both June and July 1943. So if it wasn't RO-107, was it I-178?

I-178 can be discounted for three reasons. Firstly, Utsuki was ordered to patrol the east coast of Australia. While submarine commanders are

PATTERSON's crew neither saw the submarine nor recovered any debris from the explosion that could identify their target as I-178. Why then were they given credit? Timing has a lot to do with it. PATTERSON had an experienced crew and skipper. When a claim for a submarine kill was forwarded it was assessed favourably on the strength of that experience. On 1st September 1943 Imperial Naval Command removed I-178 from the naval list. This information was forwarded to subordinate commands via routine orders. US code breakers had been reading the Japanese Naval code for some time. USN Intelligence would have seen this at the same time as PATTERSON's claim for a submarine kill a week earlier and put the two together. However it is not possible that PATTERSON attacked I-178 for one very important reason.

I-178 was a KD7 class submarine. It had an endurance of 75 days. It left Truk on May 20th. USS PATTERSON made its anti-submarine attack on 25th August. That is 97 days after I-178 set sail. That is a full three weeks beyond its endurance capability. Australian intelligence from 1943 estimated that the average Japanese submarine patrol lasted



RAAF Avro Ansons were used off the NSW coast for ASW patrols.

six weeks, which is 42 days. It is inconceivable that I-178 would have still been at sea at this time and at a position almost 1,000 miles away from Truk. Boat and crew would have run out of fuel and food well before day 97. This, and a total lack of corroborating evidence either observed or picked up by PATTERSON at the time of its ASW action effectively rules out the possibility of I-178 being PATTERSON's victim.

WHO DID SINK I-178?

At 1720 on 16th June 1943 convoy GP55 sailed across the bow of I-174 approximately 60 miles southeast of Coffs Harbour. GP55 was made up of ten cargo vessels and three LST's (Landing Ship, Tank), and was escorted by five RAN Bathurst class corvettes. At 17.22 two of the ships on the starboard side of the convoy exploded as they were simultaneously hit by Long Lance torpedoes. LST 469 was badly damaged but managed to stay afloat to be towed into harbour. The other ship, USAT (US Army Transport) PORTMAR sank soon afterwards. When the torpedo exploded it ignited PORTMAR's cargo of fuel, causing the ship to burn fiercely and spill burning oil into the sea. I-174 retreated to the southeast pursued by HMAS WARRNAMBOOL and KALGOORLIE. It survived five depth charge attacks with only minor damage. Once free of its attackers, it turned east and left the area.

All the next day Avro Ansons of 71 Sqn RAAF patrolled the area of the attack without success. Joining them were the corvettes HMAS DELORAINE and KALGOORLIE, along with the V & W Class destroyer HMAS VENDETTA. Joining the effort that night were Beauforts from 32 Sqn RAAF flying from Coffs Harbour and Lowood.

On the night of the 17th, a Beaufort (A9-261) of 32 Sqn (Pilot Officer Harrison) flying out of Coffs Harbour picked up a spike on its radar scope just prior to midnight, in the area of the previous day's convoy attack. Closing in on the contact, the crew observed a submarine travelling on the surface silhouetted against the reflection of the moon on the water. Harrison dove straight into the attack. Coming in at between 30 -50 feet, he released three depth charges over the submarine. He immediately pulled up to gain enough height to avoid damage from the explosion and in doing so briefly lost sight of the submarine. When the target was re-acquired the submarine was low in the water, with only the top of the conning

tower showing. Harrison swooped in again at the same altitude as before and dropped his last depth charge approximately 170 feet in front of the target. After this second attack he watched the submarine re-surface so that its decks and upper hull were again visible.

Having expended his depth charges, Harrison reported his attack to base and requested assistance. Back at Coffs Harbour the stand-by Beaufort (A9-274) was scrambled. Harrison stalked the submarine, which remained on the surface. He dropped flares in an attempt to attract the attention of RAN warships he knew to be in the area and to guide the next Beaufort to the scene. The flares revealed that the submarine was trailing an oil slick for about two miles behind it. Harrison returned to Coffs Harbour when the next Beaufort (Flying Officer Cushway) arrived after thirty minutes.

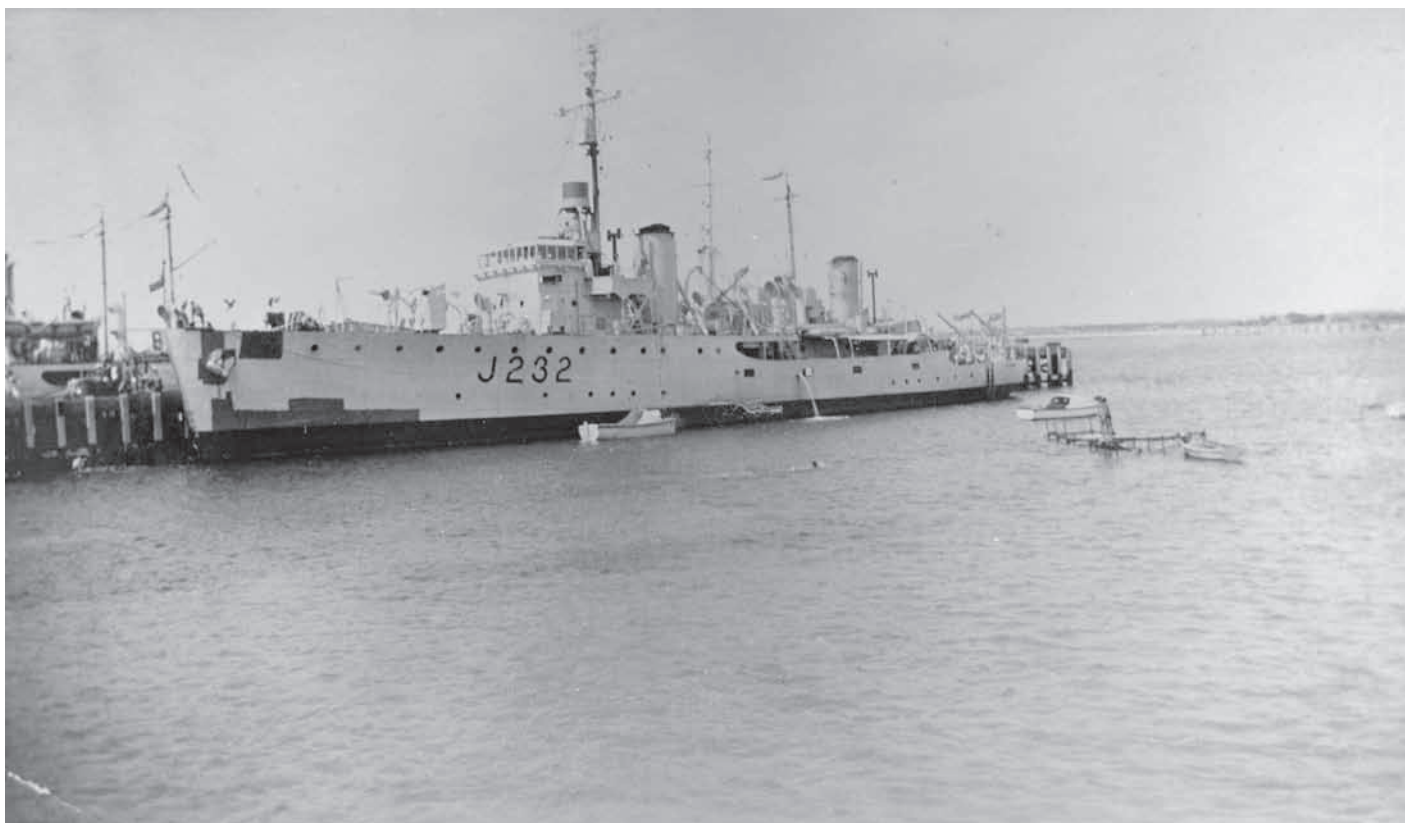
Cushway made an immediate attack on the submarine from 200 feet. He released all four of his depth charges which exploded in the water 40 feet in front of the submarine. He then stalked the submarine, continuously illuminating it with flares. While circling the submarine he observed a naval vessel close by. Unable to contact the ship by radio as they were on different frequencies, he flew over it and signalled it by Aldis lamp. He received no reply. The ship, HMAS DELORAINE, made no effort to assist. Cushway returned to the submarine and carried out a strafing attack with the Beaufort's .303 machine guns in another attempt to attract DELORAINE'S attention. Getting no response, he strafed the submarine a second time. The submarine replied with 25mm anti-aircraft fire which fortunately did



The most likely contender of the sinking of I-178 is a RAAF Bristol Beaufort, like the one pictured here, operating out of Coffs Harbour.

not hit the aircraft. Cushway had radioed his base for a replacement aircraft but was unable to loiter until it arrived. When he left the submarine, it was still on the surface steaming in circles, leaking oil and only making 10 -12 knots. The third Beaufort arrived thirty minutes after Cushway was forced to depart but despite an extensive visual and radar search was unable to locate the submarine.

The next day a maximum effort ASW search was mounted by all



The RAN corvette HMAS DELORAINE. DELORAINE was close to the final action involving I-178 but could not be contacted to join the hunt. (RAN)

available naval vessels and ten Ansons from 71 Sqn RAAF. On standby were six Vultee Vengeance dive bombers, ready to attack as soon as the submarine was located. One of the corvettes found a large oil slick off the Nambucca Heads but when the oil was examined, it was found to be burnt oil and was attributed to USAT PORTMAR. Other large oil slicks were found but not examined. RAAF command awarded 32 Sqn a "damaged".

That the submarine was damaged in the first attack is indisputable. The aircrew saw the submarine almost blown under the water immediately after the first depth charges exploded. It took two – three minutes to surface again. Over the next hour the submarine remained on the surface. Standard operating procedure is to dive to escape aircraft. When Cushway attacked he was met with anti-aircraft fire. This means that extra crewmen had been brought on deck to man the 25 mm anti-aircraft gun and the commander didn't expect to dive anytime soon. The submarine didn't dive because it couldn't. Cushway's depth charges exploded 40 feet from the submarine. Each depth charge contained 250 pounds of Torpex, a very powerful explosive. The shock wave of 1,000 pounds of Torpex exploding at close range caused further damage. It was last seen steaming in circles at 10 – 12 knots trailing an oil slick. When the third Beaufort arrived 30 minutes later, it had gone.

There are two possibilities regarding the submarine's actions after Cushway left the scene. It escaped, or it sank. The crew could have managed to repair the damage in the intervening 30 minutes and left the area, either surfaced or submerged. However, circling at 10 – 12 knots and trailing a two mile oil slick indicates a high degree of damage. During the whole contact, from the Harrison's attack to Cushway's departure, the submarine never worked up to full speed. The likely cause is engine damage from the first attack. A speed of 10 – 12 knots suggests that one engine was not working as this

speed represents half of the submarine's surface speed of 23 knots. An explosion that could produce such severe damage to the engines would also cause cracked batteries. Any hull breach resulting in even minimal amounts of seawater mixing with cracked batteries would produce chlorine gas. Circling could be a defensive manoeuvre but more likely damage to the rudder. Remaining on the surface indicates damage to the hull that either stops the submarine diving or requires the vessel to remain on the surface due to a hull breach and chlorine gas leak. Together, this indicates severe damage.

I-174's patrol diary survived the war, so we know that it was 60 miles away from Coffs Harbour when the attacks were made. No allied submarine reported being attacked or was lost on that night, so the attacks were not a friendly-fire incident. That leaves I-178 as the one and only submarine known to be off the east coast of Australia on 17/18th June 1943 that remains unaccounted for. It was Utsuki's misfortune to be transitting an area patrolled by alert ASW assets who were expecting to find a Japanese submarine.

It is most likely that I-178 sank off Coffs Harbour sometime in the early hours of 18th June 1943. The Japanese certainly thought so. On 4th August Imperial Naval command posted I-178 as lost with all hands "off the east coast of Australia". After the war Japanese naval historian Kimata Jiro went further and gave 32 Sqn credit for sinking I-178. As the USN could not have sunk it, the most likely candidate is 32 Sqn RAAF. Without the actual wreck itself, 32 Squadron's "damaged" should be upgraded to a "probable kill". And somewhere off the coast of Coffs Harbour, the wreck of I-178 remains undisturbed. ■

BOOKS

British Battleships 1919-1945

By R.A. Burt,
Seaforth Publishing, Barnsley, 2012.
Hardback, 448 pages. Illus. Index.
ISBN 9781848321304
UK RRP 45 pounds.
Reviewed by RADM James Goldrick

British Battleships 1919-1945 is a revised and expanded edition of *British Battleships 1919-1939*, originally published in 1993. It covers all the battleships and battle cruisers in Royal Navy service during the Second World War, as well as including material on the units which saw service after 1918 but did not survive to the start of the new conflict. In addition, Burt devotes some space to the large light cruiser conversions which became the aircraft carriers FURIOUS, COURAGEOUS and GLORIOUS.

The new edition is slightly longer than its predecessor and has 25% larger pages, which are of a somewhat better grade of paper. These changes have allowed the addition of 75 new photographs, the majority from Burt's personal collection, which – judging by what is in the book – must be remarkable. The number of hitherto unpublished photographs of the oldest ships and of the between the wars period generally is particularly notable, as is Burt's effort to include views of life in the big ships. There is a sense that the author's real interest is in this time rather than the later years. Indeed, the treatment of the five King George V class which saw service in 1939-45 is, although adequate, comparatively short and it is arguable that the original title dates of 1919-1939 remain accurate.

In some ways, the photographs set the tone. This is a book written for enthusiasts by an enthusiast. The author admits that the new edition is in response to the many readers with an interest in the subject, who sought what can be described as 'more of the same' as a follow-on to his earlier publication. The fact that interest in such 'great ships' is so strong is reflected by the way in which the market continues to absorb new works on the subject.

The amount of research evident in the text is matched only by the author's attention to detail but, notwithstanding a concluding chapter defending the alleged defects of British capital ships, there is relatively little deep analysis. To be fair, what is provided does provide much data for any serious would-be analyst, given the extensive use of material from the Ships' Covers and other Admiralty files, while the needs of the modeller are amply met by the combination of text, photographs and drawings. Given the limits of the author's approach and his obvious interest in the lives of the crews, perhaps the most valid criticism is that there should have been more on the habitability issue. This gets something of a mention (favourably) from the early reports of the performance of the battleships NELSON and RODNEY, but rather more could have been said as to what the priorities were and whether they were being met.

Burt's favourable judgements have an element of sentiment and it is true to say that a book such as this casts some light on but does not resolve questions as to the quality of British design. Nevertheless, it does provide a great deal of data. There were always finance and technological limitations, as well as occasionally dubious staff requirements (such as the requirement to fire on all bearings in depression which limited the sheer of the forecastles, with consequent effects on sea keeping). Given all this, a comparison of British ships with their foreign contemporaries – including those of the USN – does suggest that, ton for ton and within the money available (a key factor), the Royal Navy possessed better vessels.

But design is very much more than the platform. It is difficult to escape the suspicion that the culture of the Royal Corps of Naval Constructors and its role in ship production tended to emphasise naval architecture a little too much at the expense of ship systems and their engineering. Conversely, accepting that the USN of the day had much more money to spend than the British, it may also be true that the culture of the American navy paid too much attention to engineering somewhat to the detriment of the qualities of their ships as platforms.

In all, although a few of the drawings are somewhat crude, this is a meticulously put together and beautifully produced book that is well worth the money – particularly at the current exchange rate. The number and quality of the photographs alone would justify its purchase for many. It is very much for the enthusiast, but there is also a great deal within which will be of value to the serious historian. Recommended.

In Good Hands: The Life of Dr Sam Stening, POW

By Ian Pfennigwerth.
Longueville Books, Woollahra NSW, 2012.
ISBN 9780987227836
334 pp
\$29.95 plus \$7.00 postage though www.nautilushistory.com.au

In Good Hands is the biography of Surgeon Lieutenant Commander Samuel 'Sam' Stening, DSC, RANR. A paediatrician in civilian life, like his three brothers Sam joined the services at the outbreak of war. He chose the RAN and served first in the Indian Ocean and then in the famous 'Scrap Iron Flotilla' in the Mediterranean, where his ship, *Waterhen*, was sunk in June 1941.

Posted to the cruiser HMAS PERTH for her return to Australia, Sam married Olivia in August 1941 but stayed with the ship for her final deployment to Java and her sinking in Sunda Strait on 1 March 1942. Sam was the only medical officer to survive and, although wounded, found himself plunged into the POW doctoring experience from the moment of his rescue by a Japanese destroyer. Conditions ashore in Serang in Java were primitive and the patient load enormous, but this was only the start of a gruelling three and a half years of captivity, during which Sam attended to POWs from several Allied countries

in eight POW camps in Japan. His family, meanwhile, were unaware whether he had survived or died.

With few medical supplies, his ingenuity, and some surprising help from Japanese civilians, Sam battled the effects of extreme weather, constant punishment, overwork, starvation, and disease on his patients. The pressure on him was exacerbated as in three of the camps he also served as commanding officer, introducing responsibilities that sometimes clashed with his medical ethos. Nevertheless there were many POWs who owed their life to his care and his intervention on their behalf with a cruel and hopelessly inefficient Japanese POW administration. Sam and Olivia finally managed to make very tenuous contact, with most mail in both directions failing to arrive and Sam increasingly distressed at the thought that he had let his wife down in being captured.

After liberation, physically and mentally exhausted by his experiences, Sam drew on the strength of Olivia and support from his family to re-establish himself in paediatrics, and he rose to the top of his profession in Sydney. A stalwart of the Women's Hospital in Crown Street, where an intensive care ward was named for him, and of the Royal Alexandra Hospital for Children, Sam helped gain professional respect for his specialty, establishing it as a 'proper' field of medicine, until his death in 1983.

In Good Hands is naval historian Dr. Ian Pfennigwerth's sixth book and his second associated with the WW2 cruiser HMAS PERTH.

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 indispensable 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 New Zealand, PNG and the South Pacific Island States
- Supports close relationships with ASEAN, Japan, South Korea, India and China.
- 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.
- ship, 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 and huge operational advantages of nuclear powered submarines and their value in training our anti-submarine forces, urges the continued consideration of nuclear power as an option for those vessels.
- 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.
- Notes the potential combat effectiveness of the STOVL version of the JSF and supports further examination of its application within the ADF.
- Supports the development of Australia's defence industry, including strong research and design organisations capable of the construction and maintenance of all warships and support vessels in the Navy's order of battle, and recognises the fundamental importance of a stable and continuous shipbuilding program for the retention of design and building skills and the avoidance of costly start up overheads.
- Supports the efforts by Navy to rebuild the engineering capability to ensure the effective maintenance and sustainability of the fleet.
- Advocates the retention in preservation (maintained reserve) of operationally capable ships that are required to be paid off for resource or other economic reasons.
- Supports a strong Naval Reserve and Australian Navy Cadets organisation.
- Advocates a strong focus on conditions of service as an effective means of combating recruitment and retention difficulties.

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

- Supports the concept of a Navy capable of effective action in war off both the east and west coasts simultaneously and advocates a gradual build-up of the fleet and its afloat support elements to ensure that, in conjunction with the RAAF, this can be sustained against any force which could be deployed in our general area.
- 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 2013 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), a large strategic sealift
- 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.

The League:

The Indian Navy's (IN's) new Akula-II class nuclear power submarine (SSN) INS CHAKRA.



China's new aircraft carrier LIAONING just after her commissioning into the PLA-N. Since then she has conducted first of class flight trials with China's copy of the Russian SU-33 Flanker.





THE NAVY LEAGUE OF AUSTRALIA

SIXTH ANNUAL MARITIME AFFAIRS ESSAY COMPETITION 2013

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

TOPICS

- 20th Century Naval History
- Modern Maritime Warfare
- Australia's Commercial Maritime Industries

CATEGORIES

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

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

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

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

PRIZES

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

DEADLINE

20 September 2013

Prize-winners announced in the January-March 2013 issue of *THE NAVY*.

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

Navy League Essay Competition
Box 1719 GPO, SYDNEY NSW 2001

or emailed to editorthenavy@hotmail.com.

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

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

