

JULY - SEPTEMBER 2002  
www.netspace.net.au/~navyleag

VOLUME 64 NO. 3

\$5.45 (including GST)

# THE NAVY

The Magazine of the Navy League of Australia



HSV-XI

Large of the  
Indian Ocean

Australia's Maritime  
Doctrine - Part 5

VSTOL

ISSN 1322-6231



03

9 771322 623000

Australia's Leading Naval Magazine Since 1938

# We Want Your Watch!



**OMEGA  
300M DIVERS  
\$500  
MINIMUM!**

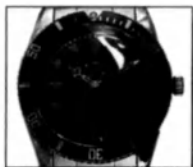


**OMEGA  
600M DIVERS  
\$1,200  
MINIMUM!**



**OMEGA  
1000M DIVERS  
\$1,500  
MINIMUM!**

**ANY  
OMEGA  
DIVERS  
WATCH**



**ROLEX OYSTER  
SUBMARINER  
Without Crown Protector  
\$1,300  
MINIMUM!**



**ROLEX OYSTER  
SUBMARINER  
Without Calendar Date  
\$1,500  
MINIMUM!**



**ROLEX OYSTER  
SUBMARINER/SEAWELLER  
With Calendar Date  
\$2,000  
MINIMUM!**

**ANY  
ROLEX  
Mens or Ladies  
WATCH**



**SEIKO  
300M DIVERS  
1960's  
\$500  
MINIMUM!**



**SEIKO  
600M DIVERS  
1970's Automatic Wind  
\$450  
MINIMUM!**



**OMEGA  
MILITARY  
1940's - 70's  
\$400  
MINIMUM!**



**IWC  
International Watch Co.  
1940's - 70's  
\$1,250  
MINIMUM!**

**ALSO BUYING: Any Rolex, Omega, Jaeger LeCoultre, Heuer, IWC etc**

Fresco Australia is Australia's largest dealer in vintage and one-owned time pieces - especially wristwatches. If you have one of the above watches and would be interested in selling it, please call us in Melbourne on 03 9663 0660 or send the watch along with the coupon to the right, by registered or certified mail to: FRESCO AUSTRALIA, Level 5/252 Collins Street, Melbourne, VIC 3000

**FRESCO**  
JEWELLER • GEMOLOGIST • HOROLOGIST

Phone 03 9663 0660 Fax 03 9650 8038  
Email watchco@vicnet.net.au

**FRECALL 1800 253 253**

**CASH  
PAID**  
BUTLE I.D.  
REQUIRED

NAME:

ADDRESS:

POSTCODE

PHONE:

DESCRIPTION OF CONTENTS

# THE NAVY

Volume 64 No. 3

## Contents

VSTOL - WAS IT A GOOD IDEA? By David Hobbs	Page 3
THE DELHI CLASS - SCOURGE OF THE INDIAN OCEAN By Ian Johnson	Page 8
AUSTRALIA'S MARITIME DOCTRINE PART 5	Page 11
HSV-XI	Page 27
<b>Regular Features</b>	
From the Crow's Nest	Page 2
Flash Traffic	Page 18
Observations	Page 25
Hatch, Match & Dispatch	Page 26
Product Review	Page 29

The opinions or assertions expressed in *THE NAVY* are those of the authors and not necessarily those of the Federal Council of the Navy League of Australia, the Editor of *THE NAVY*, the RAN or the Department of Defence. The Editor welcomes correspondence, photographs and contributions and will assume that by making submissions, contributors agree that all material may be used free of charge, edited and amended at the Editor's discretion. No part of this publication may be reproduced without the permission of the Editor.

Front cover: An F/A 2 Sea Harrier lifts off from the ski jump on HMS *ILLUSTRIOUS*. The Sea Harrier's days in the RN are numbered given its inherent inability to upgrade its engine to accommodate widening mission requirements and heavier weapon loads. On page 3 of this edition, coincidentally, David Hobbs examines the question was VSTOL a good idea? (RN)

## The Navy

All letters and contributions to:  
The Office of The Editor  
**THE NAVY**  
Navy League of Australia  
GPO Box 1719  
Sydney, NSW 1043  
E-mail to: editorthenavy@hotmail.com

All Subscription and Membership enquiries to:  
The Hon Secretary,  
Navy League of Australia, NSW Division  
GPO Box 1719,  
Sydney, NSW 1043

Advertising enquiries only to:  
Mr James Rickards  
(0419 731 371)

Deadline for next edition 5 August, 2002

## The Navy League of Australia

### FEDERAL COUNCIL

Patron in Chief: His Excellency, The Governor General  
President: Graham M Harris, RHD  
Vice-Presidents: RADM AJ Robertson, AO, DSC, RAN (Rtd); John Bond, CDRE; HJP Adams, AM, RAN (Rtd); CAPT H.A. Joseph, AM, RAN (Rtd)  
Hon. Secretary: Ron Corboy, PO Box 309, Mt Waverley, Vic 3149  
Telephone: (03) 9888 1977, Fax: (03) 9888 1083

### NEW SOUTH WALES DIVISION

Patron: Her Excellency, The Governor of New South Wales  
President: R O Albert, AO, RFD, RD  
Hon. Secretary: J C Jappsen, OAM, RFD, GPO Box 1719, Sydney, NSW 1043  
Telephone: (02) 9232 2144, Fax: (02) 9232 8383

### VICTORIA DIVISION

Patron: His Excellency, The Governor of Victoria  
President: J M Wilkins, RFD  
Hon. Secretary: Ron Gill, PO Box 1303, Box Hill, Vic 3128  
Telephone: (03) 9884 6237, Fax: (03) 9884 4482  
Email: npl1@optusnet.com.au  
Membership Secretary: LCDR Tom Kilburn MBH, RFD, VRD  
Telephone: (03) 9560 9927, PO Box 1303 Box Hill VIC 3128

### QUEENSLAND DIVISION

Patron: His Excellency, The Governor of Queensland  
President: I M Fraser, OAM  
Hon. Secretary: Adrian Horwack, PO Box 13402, George Street Post Shop,  
Brisbane, Qld 4003 Telephone: (07) 3263 1319

### State Branches:

Calvin: A Cunneen, PO Box 1009, Cairns, Qld 4870  
Telephone: (07) 4054 1195  
Townsville: I McDougall, PO Box 1478, Townsville, Qld 4810  
Telephone: (07) 4772 4588  
Mackay: K Milward, PO Box 5527, Qld 4741  
Telephone: (07) 4942 2965  
Bundaberg: I Lohse, PO Box 5141, Bundaberg West, Qld 4670  
Telephone: (07) 4151 2210  
Southport: I V Fox, PO Box 946, Southport, Qld 4215 Telephone: (07) 5532 2447

### SOUTH AUSTRALIAN DIVISION

Patron: Her Excellency, The Governor of South Australia  
President: Alan Preslett, RFD, 15 Sleeps Hill Drive, Panorama SA 5041  
Hon. Secretary: Miss J.E. Gill, GPO Box 1529, Adelaide, SA 5001  
Telephone: (08) 8272 6435 (H)

### TASMANIAN DIVISION

Patron: His Excellency, The Governor of Tasmania  
President: Mrs I M Cooper, 42 Amy Road, Launceston, Tas 7250  
Telephone and Fax: (03) 6344 1531  
Hon. Secretary: Mr K. Hand, 36 Strahan Road, Launceston, Tas 7250  
Telephone: (03) 6344 1191

### State Branches:

Launceston: Mr A. Lamborn, 67 Hanbuck Street, Launceston, Tas 7250  
Telephone: (03) 6344 3245  
Ulverstone: Mr D. Cunningham, PO, Box 93, Ulverstone, Tas 7315  
Telephone: (03) 6425 2164  
Devonport: Mr P O'Leary, 11 Tasman Place, Devonport, Tas 7310  
Telephone: (03) 6424 5064  
Burnie: Mr G. Davis, 40 Cherry Street, Burnie, Tas 7320  
Telephone: (03) 6431 4023

### WESTERN AUSTRALIAN DIVISION

Patron: His Excellency, The Governor of Western Australia  
President: A.H. Hewitt, JP  
Hon. Secretary: Mrs G Hewitt, 23 Lawler Road, Attadale, WA 6156  
Telephone: (08) 9330 3600  
State Branches:  
Geraldton: Mrs C. Jones, 24 Cunningham Street, Geraldton, WA 6530  
Telephone: (08) 9921 5772  
Albany: D Bray, Lot 46 Frederick Street, Glendowie, via Albany, WA 6330  
Telephone: (08) 9841 6542

### FEDERAL ADVISORY COUNCIL

F. Geoffrey Evans, OBE, VRD, Chairman  
Neil Rand, Chairman Rand Publications  
Wm. Boddy, AM  
Admiral Michael W. Hudson, AC, RAN (Rtd)  
Vice Admiral David Leach, AC, CBE, IVO, RAN (Rtd)  
Lachlan Payne, CEO Australian Shipowners' Association  
Vice Admiral Sir Richard Peek, KBE, CB, DSC, RAN (Rtd)  
John Strang, Chairman Strang International Pty Ltd

### Corporate Members

The Australian Shipowners' Association  
Hawker De Havilland Limited  
Computer Science of Australia Pty Ltd  
Strang International Pty Ltd

## Publicity – Good and not so good

In the last issue of *THE NAVY* the writer remarked "For better or worse the Navy receives a fair share of publicity (at times more than it wants) ...". Looking back over the past six months it is hard to know whether the considerable amount of publicity received by the RAN, prompted in the main by the 'children overboard' affair, has been good for the service or not.

On balance, in mid-May when this item is written, one is inclined to think the seagoing people have gained respect in the public's estimation but that this has not been reflected among those ashore, in particular in the upper echelons of the Defence Department.

In his youth the writer recalls that one of the exercises undertaken by cadets, scouts and others was to pass a simple message via a chain of messengers. As often as not and no matter how short the chain, the message was quite different by the time it reached its destination. It might be thought

surprising that despite the enormous advances in communications the problem seems to continue in our Defence Department.

If damage temporary or otherwise was caused to reputations in Defence and in the offices of the Prime Minister and Defence Minister, it was not caused so much by mishandling of messages originating in HMAS ADELAIDE as they passed through various channels to their destination, as to proceedings at the subsequent inquiry into a "Certain Maritime Incident". Comment on several of the statements made in the course of the inquiry are contained in the writer's 'Observations' in this issue of *THE NAVY*.

The Defence Department spends quite a lot of money on public relations and creating a favourable impression; however, one relatively small incident that happens to attract media attention can create impressions in the public mind no amount of money can buy.

By Geoff Evans

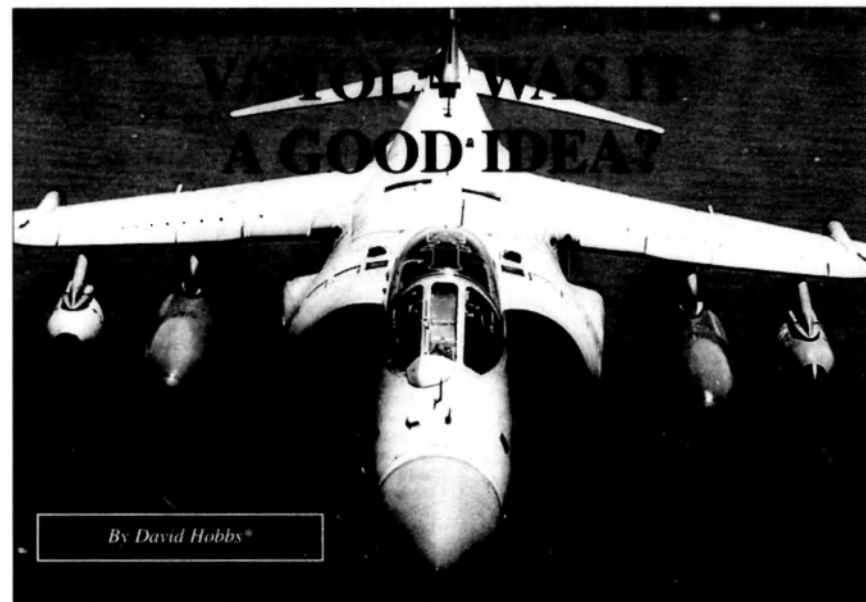
## The Battleships Giveaway

Join the Navy League of Australia today and be in the running for a free copy of the brilliant brand new TV documentary *The Battleships* (see 'Product Review' this edition).

The first eight people to join the Navy League from the publication date of this edition will be eligible for a free copy of the documentary, see centre section for application.

Thanks to Roadshow Entertainment the Navy League has eight copies of the documentary *The Battleships* to give away. Four DVD and four Video sets. Just join the Navy League of Australia by filling in the application form in the centre of the magazine. Make sure to also indicate specifically whether you want a DVD or Video copy of the documentary. The giveaway offer will close when you want to be considered for our giveaway offer.

Hurry, join now!



An F/A-2 Sea Harrier. The Sea Harrier of today is a different beast from its Falklands War days. The aircraft employs a very sophisticated air search radar, the 'Blue-Vision', and ASRAAM (Advanced Medium Range Air-Air Missile) for long range air superiority tasks and was until very recently, considered the best air superiority fighter in Europe. (RN)

The concept of producing a practical, winged, aircraft able to use aerodynamic lift for flight, yet capable of Vertical Take Off and Landing (VTOL) has fascinated designers since the dawn of powered flight. Whilst helicopters have achieved it, their fixed wing cousins have not, to anything like the same degree.

During World War II, the Germans produced a VTO (no 'L' because it did not land) 'target defence interceptor' called the Bachem BA 349 'Natter'. It was powered by a single Walter HWK 109 rocket motor augmented by four boosters and launched vertically up a rail structure 80 feet high. It had a rate of climb in excess of 35,000 feet per minute but a powered endurance of only two minutes and was, in effect, a 'manned missile' intended to intercept daylight bombing raids. It was armed with 33 Type R4M unguided rocket projectiles in the nose and, as soon as he had fired them, the pilot ejected himself and the rocket motor for parachute descents while the remaining wooden airframe structure crashed to the ground. Ten were deployed to Kirchheim-on-Teck in April 1945 but the war ended before they could be used operationally.

The "Natter" was a weapon of desperation but, no doubt stimulated by it, the Admiralty wrote a more rational specification in 1945 for a "quick reaction" fighter capable of countering Kamikaze aircraft. The Fairey Aviation Company sketched a design for a small, turbojet powered, delta winged 'tail sitter' that achieved VTO by being boosted up rails fixed to a carrier's flight deck. It would have landed 'more or less' conventionally. The end of the war against Japan took the urgency out of the requirement but it continued as a post war research project with some interest from the RN and RAF. A number of scale models were launched vertically from a rail structure at WRE Woomera. There was some USN interest in turbo-prop powered 'tail sitters' in the USA at the same time but these, too, came to nothing and the concept proved to be a dead end.

High speed research studies carried out at the Royal Aircraft Establishment, Farnborough, in the late 1940s led scientists to predict that future supersonic aircraft would need wings so small that conventional take off and landing on flight decks would not be possible. Thus, they believed VTOL would be inevitable for future generations of fast jets because there was no other way of operating them. The concept had nothing to do with simplified deck operations or improving rough sea landing capability.

By 1954, the Admiralty's Construction Department had prepared plans for a light fleet carrier capable of operating the new Supermarine N113 (Simitar) fighter in the short term but suitable for the operation of VTOL aircraft in the mid 1960s. The design was unfettered with conflicting requirements and, although not perfect, had greater aircraft operating potential than the Invincible class designed 15 years later. The same department produced sketch proposals for modifications to the Majestic class that would have enabled MELBOURNE and SYDNEY to operate the same types.

Ashore, NATO became interested in VTOL strike fighters. This followed a large and expensive programme of airfield construction in Europe intended to enable tactical aircraft to support NATO armies against any Soviet aggression. Despite the evidence from two world wars and Korea that airfields are extremely difficult to destroy, a belief grew that the new concrete runways and hard-standings were vulnerable to attack and that aircraft should be dispersed "into the field". The Treaty Organisation was trying to standardise a number of weapons and systems at the time, ranging from rifles and their ammunition to radars. In consequence two relevant



The early prototype of the Harrier, the P1127 (XP831) conducts a demonstration landing on HMS ARK ROYAL, 8 February 1963 (RN)

NATO Basic Military Requirements (NBMR) were written. NBMR 3 called for a lightweight, single-role, VTOL, strike aircraft capable of carrying a single nuclear weapon on a short-range tactical mission. It had to be able to take off and land vertically on unprepared fields near the Forward Edge of the Battle Area (FEBA). NBMR 4 asked for a VTOL tactical transport aircraft in the C-130 class able to support NBMR 3 in the field. Both completely underestimated the logistic problems posed by dispersed operations and took no account of bad weather recovery, homing through hostile or friendly airspace, intelligence briefing, site defence and many other practical details.

Britain, France, the USA and Germany all put effort into NBMR 3 but only Britain put design effort into NBMR 4. Aircraft such as the Hawker P1127, Dassault Mirage IIIV and VAK 191 were all flown for evaluation purposes with paper studies based on them put up for the glittering prize of standardised NATO production. The British Treasury hoped that production by an international consortium would radically reduce development costs for a new UK aircraft but NATO had no power to order anything itself and could only recommend a solution. Sensitive to the political issues at stake, it named the British and French entries as "joint technical winners" and left the various governments to make of that what they would.

In 1961, the British concept had evolved into a practical strike fighter design which was given the Hawker type number 1154. It was more capable than the NBMR had demanded and was to have a single Bristol Siddeley BS 100 engine, developed from the Pegasus, with rotating nozzles giving a far more elegant solution to the VTOL problem than the batteries of lift and thrust jets fitted in the rival designs. It could certainly land vertically and with a form of reheat known as "plenum chamber burning"; it was capable of VTO with a small military load for a few minutes endurance. It did much better with a short take off run, however, and was better referred to as a Vertical/Short Take off and Landing (V/STOL) aircraft. It would have been expensive to develop and operate but it would have been supersonic at height and would have offered a useful performance increase over aircraft like the Hunter and Scimitar. With an engine optimised to give a thrust to weight (T/W) ratio of better than 1:1 on landing, however, it would have had a poor Specific Fuel Consumption (SFC) in cruising flight. This would have led to a payload/radius of action capability inferior to that of other contemporary fighters, especially those designed in the USA. Export potential would not have been great, as it would have been expensive and very specialised. Sir Sydney Camm, Hawker's chief designer, is believed to have said that V/STOL fighters would not sell well until they approached the

capability of the F-4 Phantom. Time has shown him to be right.

To complicate matters, in 1961 the UK Defence Secretary insisted that the P1154 form the basis of a joint project to replace the de Havilland Sea Vixen in RN service and the Hawker Hunter in RAF service. This despite the fact that the former wanted a two seat, twin-engine, high flying fighter with a very powerful radar forming the core of an integrated weapons system and the latter a single seat, single-engine, low flying ground attack aircraft without radar. Further, the naval version had to be stressed for catapulting, carry a large fuel load to give endurance on combat air patrol (CAP) and weapons for at least two interceptions. The RAF version could accept less fuel and lighter structure to give "quick dash" strike capability. Two years were wasted trying to produce a common airframe that met these two very different requirements before the RN managed to convince the British Government that the USN Phantom II was the only aircraft capable of delivering the operational capability that it required. Eighteen months later the simplified RAF version was, in turn, cancelled in favour of a buy of Phantoms. The NBMR 4 design, by then identified as the Armstrong Whitworth Type 681 was also cancelled.

Some operational analysis of V/STOL operations was carried out in 1965 using nine aircraft derived from the P1127 and given the name Kestrel. Three each were purchased by the Governments of the UK, USA and Germany to form a Tripartite Evaluation Squadron, which operated from RAF West Raynham. Pilots and ground crews were drawn from the RAF, USAF, Luftwaffe and US Navy. The RN was not represented. When the squadron disbanded, six of the eight surviving aircraft went to the USA for further evaluation while two continued with development work in the UK. The Luftwaffe and USAF both concluded that operations from hardened aircraft shelters on conventional airfields by conventional aircraft were both cheaper and more efficient than dispersed operations by VTOL aircraft. Had there been operational merit in the latter, it is difficult not to believe that the USAF would have hastened it into service in the Vietnam War.

After all the investment, some interest in V/STOL remained in the UK and a developed version of the Kestrel went into operational service with the RAF in 1969. This had little to do with cost-effective delivery of an interdiction/strike capability and more to do with the sitting Labour Government's wish to provide some work for the British aviation industry which had suffered a series of cancelled projects in the preceding months. The new version was given the name Harrier, originally intended for the P1154 had it gone into service. 84 were ordered in the first batch but, significantly, the RAF ordered 200 of the cheaper but more capable Jaguar strike aircraft to form the main component of its strike force.



A USMC AV-8B Harrier (1970s). The USMC took up the Harrier design for use off its smaller helicopter carriers. They believed, quite rightly, that its V/STOL ability would give its troops an edge by having USMC Close Air Support assets readily available at short notice. (USMC)



A RAF GR-3 ground attack Harrier. RAF GR-3s were tasked with operating on the FEBA (Forward Edge of the Battlefield Area) in Europe against Warsaw Pact forces. Its ability to take off vertically or from very short runways was seen as an advantage as war gaming proved time and again that major airbases would be the first victims of a NATO - Warsaw pact conflict. The GR-3 also performed well in the Falklands War. (RAF)

In retrospect, this British fascination with the platform, rather than the operational effect it was intended to create is difficult to understand. It contrasts starkly with the German decision to focus on a strike capability that was best provided by conventional aircraft operating from conventional airfields. Even more difficult to understand is the NATO planners' assumption that concrete runways were the vulnerable part of the equation, not the aircraft or their logistic and technical support. On the ground, near the FEBA, aircraft and the hundreds of men and vehicles needed to make them work would have been vulnerable to small arms, mortar and artillery fire in addition to missile and air attack. In hardened shelters on an airfield in a rear area, they must have been less so, even though it took longer to reach an urgent target. The concept of dispersal away from airfields was quietly dropped in the 1970s.

The US Marine Corps was impressed by the Harrier's undoubted ability to deliver bombs in amphibious operations and to move ashore with the marines and their helicopters. I believe they were also impressed by the fact that it was so highly specialised in the short-range ground attack role that it was not likely to be miss-employed on naval missions as the F-8 Crusader and F-4 Phantom often were. The politics behind procurement can be surprisingly devious. Despite a licence agreement between Hawker Siddeley and McDonnell Douglas the AV-8A Harrier was built in such small batches that all were built in the UK.

After the cancellation of its CVA-01 carrier project, the RN found considerable political opposition to the idea of maintaining any sort of fighter aircraft in ships at sea. The Chief of Naval Staff, Admiral Sir Varyl Begg was an opponent of embarked aviation and acted quickly to run down the conventional carrier force. He focused attention on a future navy comprising cruisers armed with missiles and, to a limited extent, VTOL aircraft or helicopters. Design work started on a command cruiser which went through more than 50 iterations



A RN FRS-1 Sea Harrier of 800 NAS. During the Falklands War Argentine pilots had great respect for the Sea Harrier which they dubbed 'The Black Death'. (RN)

and which had an aviation facility which grew from a single spot for a helicopter aft to a runway running the length of the ship with an island structure to starboard. The latter proved so superior, even for the operation of a modest number of helicopters that it was adopted. The ability to embark Harriers was obvious and, from the outset, was a factor in the design of what became the Invincible class.

There is a myth that V/STOL fighters can use small, simple and, therefore cheap, ships, often called Harrier Carriers, which provide affordable capability. In researching background papers for this article, I found a Paper written in 1966, only six weeks after the cancellation of CVA-01, which puts the counter argument. It compares a baseline V/STOL aircraft, the Kestrel, with the maritime Jaguar, in development at the time for the French Navy and seeks to put numerical values on their relative cost effectiveness. Kestrels were more expensive to buy than Jaguars in the ratio 8.5. Because the latter was designed for cruise efficiency in flight and the former for its take off and landing performance, Jaguars have better SFC and carry more weapons further, faster. For a given task, fewer Jaguars than Kestrels would be needed.



Two RN FRS-1 Sea Harriers from 801 NAS off HMS INVINCIBLE conduct a 'cross-deck' landing on the US aircraft carrier USS RANGER (RN)

The Paper compares two weapon effort planning scenarios, sinking a destroyer sized contact and destroying a bridge. Different parameters were used, some favouring the Kestrel, some the Jaguar. On average, it was evaluated that 12 Kestrels would be needed to do the same task as 8 Jaguars and there are tasks that the latter could do that the former could not. Thus cost factors of 96 against 40 were given making the Jaguar more than twice as cost effective as the Kestrel. The larger number of Kestrels need a large ship from which to operate but it would be a simple V/STOL carrier. There is, therefore, a cost penalty of building the V/STOL capability into every aircraft rather than the single ship from which they operate. Taking the CTOL (Controlled Take Off and Landing) comparison further, the Paper examines the cost of putting V/STOL capability back into the carrier. It uses prices equivalent to half the cost of a Jaguar for each catapult and the cost of a whole Jaguar for the arrester wire system. For a Hermes sized ship with two catapults and arrester wires, this modified the cost factors to 96 against 50. It is still nearly twice as expensive to procure the less capable V/STOL aircraft and the 'cheap ship' has been 'bought' by expenditure on an expensive but less capable aircraft. The numbers may vary, but these factors still hold good for today's Joint Strike Fighter where comparisons show that the USN's carrier version is cheaper but goes further with more weapons than the V/STOL version. It is arguable that the British decision to take V/STOL to sea was politically rather than capability based.

Sea Harriers began to enter front line service with the RN in 1980. Although not as capable as conventional carrier aircraft, it was immediately apparent that they were more effective in their mobile base than the discredited dispersed operations had been ashore. The new aircraft's Release to Service was limited at first by the novelty of its deck operations and weapons systems. It was still being expanded five years later. In addition to INVINCIBLE, the former CVA HERMES was modified to operate Sea Harriers from 1981 onwards.

Fighters embarked on these two ships were fundamental to the British plans to liberate the Falkland Islands after their seizure by Argentinean forces in 1982. 28 out of RN's total, at the time, of 32 Sea Harriers were deployed in four Naval Air Squadrons, one of which was formed at short notice. They flew 2,000 operational sorties and achieved 32 confirmed kills of enemy aircraft in air to air engagements. They also carried out successful strikes against enemy shipping and shore targets. None were lost in air combat but two were lost to ground fire and others in operational accidents. An overall serviceability rate in excess of 90% was achieved.

This performance surprised many outside the RN and was sufficient to prevent Argentine air forces from defeating the amphibious landings. However, by comparison with the air defence system the Service had wanted but lost with the cancellation of the CVA-01 replacement carrier project, the performance fell short of the optimum. Enemy aircraft and missiles were able to penetrate the defences and inflict heavy casualties in ships and lives. This was predictable due to the lack of embarked Airborne Early Warning (AEW) aircraft and shortcomings in Sea Harrier performance and armament. With only a basic pulse radar, no Beyond Visual Range (BVR) weapon, no high speed dash to gain position and no embarked tanker aircraft to sustain them on CAP (Combat Air Patrol) or give flexibility in recovery, the Sea Harrier was markedly inferior to the aircraft it replaced.

It did well because of the highly skilled pilots available from previous conventional carrier operations, many of which were instructors with thousands of flying hours. It also had a very good weapon in the newly supplied American AIM-9L Sidewinder and an excellent landing capability in high sea states that caused excessive ship motion. Although rated as a Fighter/Reconnaissance/Strike aircraft, the FRS-1 Sea Harrier could hardly be compared with USN carrier aircraft in the last two roles and relied on above average pilot skill in the first to command success. In 1982 that level of skill was available.

Given this very public success, hopes for export sales rose and several navies bought Sea Harrier or AV-8 derivatives but only in small numbers. They include India (23 plus 4 trainers);



An Avion Boatswain's Mate launches a USMC AV-8B Harrier II from the flight deck of USS BATAAN (LHD-5) for a mission supporting Special Forces over Afghanistan. Its armament consist of two 500lb LGBs (Laser Guided Bombs) and a Sidewinder AAM for self-protection. The Harrier has come a long way from the P-1127 (USN)



Three generations of Harrier in formation from the Spanish Navy. From bottom to top, an AV-8B Matador (now used by the Thai Navy off its aircraft carrier HMCS CHAKRI NARUEBET), an AV-8B Harrier II and a PG-65 radar equipped AV-8B Harrier II+ (Spanish Navy/Armada)

Spain (32 plus 3 trainers); Italy (16 plus 2 trainers) and Thailand (7 plus 2 trainers purchased from Spain second hand). Total P1127/Harrier/Sea Harrier/AV 8 production has amounted to 15 prototypes, 237 first generation single seaters, 98 Sea Harriers, 395 AV 8B second generation single seaters and 86 trainers of all versions.

By the 1990s, the Sea Harrier FRS-1's capability as a fighter was becoming marginal and replacement with the F/A-2 was timely. This has the Blue Vixen pulse doppler radar, track-while-scan capability and up to four AMRAAM missiles constituting one of the West's best fire control systems, albeit fitted in a 40 year old airframe design. Even with this upgrade, it faces tough opposition in many areas of potential conflict. The 'A' indicates a limited attack capability giving this improved version a limited swing in performance.

Given this background, we have to answer several key questions before deciding whether V/STOL was a good idea for the RN.

**Q: Was V/STOL inevitable?**

A: Advances in wing design made it possible to produce very successful fast jets that could land on carriers conventionally. The RAE scientists were wrong: it was not, therefore, inevitable.

**Q: Was V/STOL ever viable for the USN?**

A: The USN considered and rejected it. It did not accept the reduction in operational capability that V/STOL brought with it. Even today, the USN will not accept the V/STOL version of the Joint Strike Fighter, which is being considered for the USMC.

**Q: Why did the USMC opt for it?**

A: It wanted a specific aircraft to support amphibious landings, moving ashore with the marines. Almost as important, it wanted one that could not be used for general fighter duties by the USN in a carrier battle group.

**Q: Was it the best fighter that the RN could buy?**

A: No, but it was the only aircraft that the British Government of the day, which cared little for cost effectiveness or capability issues, would allow it to buy. In practical terms, it was the only fighter that could be operated at sea once the mistake had been made of ordering ships of such limited capability as the Invincible class. In naval terms it was not the best fighter, nor was it the best that could be operated from a ship of the size the RN had planned to procure.



A F/A 2 Sea Harrier about to land back aboard HMS ILLUSTRIOUS with the Type 23 frigate HMS SOMERSET acting as plane guard in the background. The Sea Harrier is to be retired from RN service early in 2006 as it is unable to be upgraded with a more powerful engine for the extra tasks it is now required to do above the fleet air defence role. The Indian Navy, who operate FRS-1 Sea Harriers, are said to be interested in the 'Blue-Vixen' equipped/AMRAAM capable fighter after its retirement from RN service (RN)

**Q: Did it perform as expected?**

A: It performed better than expected in the Falklands War but desperately needed the capability upgrades in the F/A-2 version.

**Q: Could anything else have done better?**

A: An embarked AEW capability would have made the most significant difference in the Falklands War. A USN fighter operated from a larger ship would have been a better platform.

**Q: Is another V/STOL fighter a viable replacement for the Sea Harrier?**

A: Look at the JSF. V/STOL versions lack the radius of action and weapon carrying options of the CTOL versions and cannot guarantee to land on vertically with unexpended ordnance in the hot summer temperatures found in the Gulf. They are more expensive to buy and maintain and offer less operational capability. Even today, 41 years after NBMR 3, CTOL remains the more cost-effective option.

We must conclude from these answers that V/STOL was seen as a good idea politically and provided something for the work force to build after the spate of cancellations in the mid 1960s. In the negative climate of opinion that surrounded naval aviation in the 1970s, it was the only fighter option available to the RN and no Government wanted to listen to well reasoned arguments about cost, capability or effectiveness. In naval terms, it was not the best fighter available, nor did it represent the most affordable weapons system. The Service was fortunate to have the skill base to make it work and to 'fight above its weight' in the Falklands War. The ability of Sea Harriers to recover in rough weather was fortuitous since it had not been called for in the Staff Requirement. Comparisons with ARK ROYAL were inappropriate, since she was at the end of a very long capability stretch since her original completion and had, in any case, been scrapped. The new generation of carriers the RN had tried to procure, the CVA-01 class, were specifically designed to be good at operating CTOL aircraft in rough weather with an eye to possible strike operations in the Barents Sea. The true comparison should be made with them.

With the introduction of simple carriers and their limited V/STOL air groups, the RN not only lost the ability to operate affordable AEW aircraft but also the capability to cross deck strike aircraft with its biggest and most important ally, the

United States Navy. Worse, the change of direction made it impossible to purchase or make use of USN carrier aircraft types, forcing the RN down the lonely and expensive route of having to develop its own unusual and expensive fighter with few prospects of export sales. The USN had itself evaluated the idea of a Sea Control Ship with a mix of V/STOL fighters and helicopters embarked but had rejected it as being too expensive for the minimal capability provided! They cannot have been impressed by the loss of allied capability as the RN chose to follow this expensive option. The adoption of the CV version of the Joint Strike Fighter by the RN would reverse this situation and bring the Service back into line with its principal partner.

In historical terms, V/STOL was made to work and produced better results than the UK Government had a right to expect. Other aircraft and air defence systems would have performed better at a more competitive procurement cost had a more enlightened outlook prevailed in Whitehall. In terms of cost effective capability, V/STOL was not a good idea. A combination of F-4 Phantoms and Gannets was so nearly achievable and would have been better. A replacement combination of F-14 Tomcats and E-2C Hawkeyes could have gone into service in the 1980s and would still be very hard to beat even today.

**Postscript May 02:**

Those who opposed the procurement of a V/STOL fighter for the Royal Navy in the 1960s and 70s feared that weight growth, common to all previous carrier fighters in service, would eventually prevent the aircraft from flying. Their timescale was out but they were right. The principal reason for the Sea Harrier's early withdrawal from service in 2006 (see THE NAVY Vol 63 No 2, p19) is its lack of power from its early Pegasus engine. Fitting the Pegasus 107 engine into an airframe designed over 40 years ago would be technically complex and the cost of modifying 30 airframes was unofficially believed to exceed AU\$500 million.



A RAF GR-7 at altitude. The GR-7 is optimised for night attack and strike missions and can carry a substantial weapon load. GR-7s have been operating from RN aircraft carriers under the 'Joint Force Harrier Concept' for sometime and upon upgrade to the GR-9 standard will replace the Sea Harrier at sea in 2006. (RAF)

There is a lesson here that no matter how good the weapon system, a fighter that relies on vertical landing performance will always need engine development if it is to continue to fly as weight grows during its service career. Let us hope that the lesson is learned before the decision on which type of JSF for the RN to order is taken.

(\*) Commander David Hobbs, MBE, RN (Retd) joined the RN in 1964 and specialised as a pilot flying Gannet AEW aircraft, Hunter and Canberra aircraft and Wessex commando helicopters. He served in a variety of carriers including VICTORIOUS, HERMES, ARK ROYAL 4 and ARK ROYAL 5. Several staff appointments included the management of sea trials to clear the Invincible class to operate V/STOL fighters. He became curator and principal historian of the Fleet Air Arm Museum on leaving the Navy in 1997. A member of the Australian Navy League, David was one of the speakers at the second King-Hall Naval History Conference in Canberra held in July 2001.



# The Delhi Class Scourge of the Indian Ocean



INS MYSORE at anchor during the Indian Naval Review of 2001. MYSORE and her two sisters are the most powerful surface combatants built by India and employed by any Indian ocean power. (Brian Morrison, Warships & Marine Corps Museum)

Last year Fremantle became the first Australian port of call for the Indian Navy's latest guided missile destroyer, the Delhi class INS MUMBAI (D-62). THE NAVY's WA based correspondent Ian Johnson toured this impressive destroyer and filed this report.

MUMBAI's visit was timed as part of the Centenary Naval Review that was to be held in Sydney in early October 2001 before world events, and the possible commitment of the RAN in military action, forced the review's cancellation.

The officers and crew of MUMBAI were disappointed with the event's cancellation, yet were happy that their 2001 goodwill cruise would continue, even with events near India escalating towards war.

MUMBAI is assigned to the IN's (Indian Navy's) Western Command and is based at Mumbai (formerly known as Bombay). This was her first overseas cruise since commissioning earlier in 2001.

The IN, once a nation that relied on the UK and then the Soviet Union for ship designs, began to design a warship from scratch in the early 1970's. After the success of the six ship Godavari class frigate program, the IN began to plan for a destroyer size ship to be built at the Mazagon Dockyards in Mumbai.

## THE CLASS

Known by the IN as Project 15, the first of the class, INS DELHI (D-60) was laid down at the Mazagon Dockyard on 14 November 1986. The class are the largest warships built in India, yet as the project continued, delays began to occur as the Soviet Union, who was providing technical assistance as well as the weapons suite, began to collapse. When the Soviet Union finally dissolved in 1991, the Delhi class were already far behind schedule as the supply system from Russia failed. It would be another six years before supply problems were fixed and INS DELHI outfitted enough to begin sea trials in

1997. Her two sister ships, MYSORE and BOMBAY (whose name was changed to MUMBAI in 1999) were also delayed due to these problems. INS DELHI (D-61) was finally commissioned on 15 November 1997, with MYSORE (D-60) following on 02 June 1999 (after modifications from the lessons learnt from DELHI's construction) and MUMBAI commissioning in Mumbai on 22 January 2001.

The Delhi class were designed as multi-role ships that could operate either as part of a carrier screen or independently with a balanced weapons outfit to handle surface, sub-surface or air threats.

## DESIGN

The Delhi class design, which Russia's Severnoye Design Bureau assisted as a consultant, is described as a stretched RAJPUT (Kashin-II) with Godavari features. Because of the delays in building the Delhi class, design advances such as stealth were seen as too costly for the first three ships. It is hoped to incorporate these into the follow on class known as Project 15A.

MUMBAI's displacement is between 6,700 standard to 6,900 tons fully loaded, and is 163 metres long. These vessels are fitted for use as flagships and can accommodate an Admiral with staff.

The 320 crew live in quarters comparable to the RAN's Perth class destroyers, while the 31 officers live in two bunk cabins except for the Captain who has his own cabin.

One of the interesting aspects of MUMBAI is the near full gloss dark sea grey paint used on the outer hull, which makes light reflect off the ship, making it easier to find the ship



INS MUMBAI arriving in Sydney Harbour for the first time. The smoke emanating from her stacks made many Sydneysiders fear she was on fire (Brian Morrison, Warships & Marine Corps Museum)

visually on a clear day but difficult on bad days. All bulkhead signs are bilingual, with Sanskrit first, and English second, reflecting the use of English as a language used in all regions of India.

MUMBAI is powered by a Ukrainian-built Zorya Production Association M36 COGAG (Combined Gas And Gas) plant comprising two paired DT59 reversible gas turbines each using a RG 54 gearbox. The powerplant can generate in excess of 80,000 hp. The ship also has installed 2 Bergan-Garden Reach KVM-18 Diesel engines. The engines are housed in soundproofed boxes, lowering the acoustic signature of the ship. These engines move the ship at more than 32kts. The ship's cruising speed is 24kts with the class' maximum range not known.



A close up on INS MUMBAI. Note the two banks of eight SS-N-25 'Switchblade' ASCM on her starboard side. The class carries 16 of these Russian made anti-ship missiles, known in the West as 'Harpoons'. (Brian Morrison, Warships & Marine Corps Museum)

## WEAPONS AND SENSORS

The Delhi class is equipped with Russian weapons and Indian sensor suites. The ship's Air/Surface Surveillance radar consists of a Bharat/Signal RAWL/P318Z (LW-08) operating in D-band with an IFF interrogator mounted atop the antenna. MUMBAI is also equipped with a MR-775 Fregat (NATO code name: Half Plate) planar array radar. The ship relies on a Bharat Rashmi 3 P.a Frond (I-band) radar system for navigation.

MUMBAI's surface-to-surface missiles (SSMs) comprise sixteen Kh-35 Uran or SS-N-25 (NATO: Switchblade) SSM's, housed in four quadruple KT-184 launchers, angled out at 30°. These sea skimming missiles have an active radar homing seeker, a range of 130kms at Mach 0.9 and use a 145kg blast fragmentation warhead. All sixteen missiles can be ripple-fired at one-second intervals. Fire control for the missiles is provided by a Garpun-Bal (NATO: Plank Shave) radar. The Switchblade is the equivalent of the US Harpoon Block IC SSM hence its Western nickname of 'Harpoonski'.

MUMBAI's air defence relies on two single arm Kashmir SAM missile launchers one of which is located forward of the bridge and the other is aft just before the helicopter hangar. Each launcher has a magazine of 24 missiles. Guidance and target illumination for the missiles is provided by six MR-90 Orekh (NATO: Front Dome) fire control radars. The Kashmir launchers use the SA-N-7 (NATO: Gladfly) SAM which has a 70kg warhead and a speed of Mach 3 out to 25kms.

The ship is equipped with one 100mm AK-100 gun which is used against surface targets, firing 60rpm (rounds a minute) with a range of up to 15kms. The AK-100's fire control is provided by the MR-184 (NATO: Kite Screech) radar system.

MI MUMBAI has four multi-barrelled 30mm AK-630 Gatling guns (two on either beam) which can fire 3000rpm at a range to 2.5 kilometres to intercept incoming missiles. The AK-630 guns are controlled by two MR-123 (NATO: Bass Tilt) fire control radars using H/I/J-band frequencies.

Located just aft of MUMBAI's funnel is a 533mm PTA 533 quintuple torpedo tube launcher. The tubes can fire the SET-65E anti-submarine torpedo, which has both passive and active tracking sensors with a range of up to 15kms at 40kts and with a 205kg warhead. The tubes can also fire the Type 53-65 passive wake homing torpedo with a range of 19kms at 45 knots which carries a 305kg warhead.

Anti-submarine duties are shared with two 12 barrelled RBU-6000 ASW mortars which are located forward of the bridge. The RBU-6000 can reach targets up to 500m deep with a range of 6kms carrying a 31kg warhead. Both the RBU-6000 and the PTA 533 torpedo tube launchers are controlled by the Puga ASW system.

The Electronic Warfare suite of the Delhi class consists of the Bharat Ajanta ESM system as well as the Ellectronica TQN-2 jammer pods. The ship also has two PK-2 chaff launchers mounted alongside the aft SAM launcher.

All sensors and weapons are controlled throughout the ship's Bharat IPN Shikari (IPN 10) Combat Data System, wholly designed in India.

## AIR OPERATIONS

The Delhi class carries two helicopters located in two hangars aft. The air traffic control booth is located between the hangars, and a large flight deck is equipped with the French Samahe helicopter handling/landing system. The class can operate either the light Alouette helicopter or the heavier and much more capable Sea King. Apart from the standard ASW armament Indian Sea King helicopters are also fitted to fire the impressive British made Sea Eagle ASM.

## HISTORY

MUMBAI is the ninth ship to be named after the city formally known as BOMBAY. The eighth MUMBAI was an Australian built Bathurst class corvette commissioned as HMINS BOMBAY (J-249) which operated out of Sydney during the Second World War before returning to India, serving until 1960.



INS MUMBAI leaving Fremantle. Of note in this image is the two large hangar doors at the stern. The ship can operate two large Sea King ASW helicopters. Indian Navy Sea Kings can also be fitted with the British made Sea Eagle ASCM (roughly the equivalent of the Harpoon Block 1C) giving them a potent standoff anti-ship capability. (Graeme Fuller)



An interesting feature of the Delhi class is its use of five 533mm torpedo tubes for either the SET-65E active/passive ASW torpedo or the Type 53-65 passive wake homing torpedo for use against ships. The larger torpedo gives the ship greater stand off range when dealing with enemy submarines (15kms at 40kts) as well as another means of sinking surface ships (20kms at 45kts). (Graeme Fuller)

The current INS MUMBAI (D-62) is the first Indian warship to sail into a foreign harbour (Fremantle) with the new Indian Naval Ensign, which was changed in August 2000. During her sea trials MUMBAI became the first of her class to change a gas turbine after the ship's GT 3 unit experienced problems during builders trials in October. The gas turbine was replaced in record time on 7 November. This forced the ship's original commissioning date of 15 November 2000 to be pushed back to January 2001 as further trials on the new turbine were needed. In early 2001 MUMBAI conducted a simultaneous launch of two SS-N-25 Switchblade SSM's during her weapons trials, both missiles scored hits.



A close-up of two of the four SS-N-25 'Switchblade' octuple launchers the Delhi class carries. Nearly all Western warships are happy with only eight anti-ship missiles. (Graeme Fuller)

## CONCLUSION

MUMBAI is a most impressive warship, with a first class weapons and sensor suite. For a second attempt at building their own destroyers, the Indians have produced a better than average warship. They have learnt the lessons from this class for their new Project 15A ship already in the early stages of development at the Mazagon Dockyard in Mumbai.

*Note: Ian Johnson and Graeme Fuller would like to thank the Officers and Crew of the INS MUMBAI for their assistance in this article.*

# Australia's Maritime Doctrine Part 5



HMAS ANZAC in the Persian Gulf conducting embargo/sanctions enforcement operations in 2001. The nature of these operations sometimes involves the possibility of reprisal by the affected party requiring a warship to either deter such action or affect some measure of sea control. (RAN)

In part 5 of our presentation of the RAN's new Maritime Doctrine we detail Chapters 7 and 8 on Maritime Operations and Navy's people. The document was written by the Seapower Centre and is reproduced in *THE NAVY*, with the Centre's approval, given its importance to readers of *THE NAVY*, Australians and to the Navy League in general.

## Chapter 7 MARITIME OPERATIONS

### THE SPAN OF MARITIME OPERATIONS

Maritime forces possess considerable utility in a wide range of situations that span not only the *spectrum of conflict*, but also much peaceful human activity. Contemporary strategic thinkers, notably Ken Booth, have suggested that the roles of maritime forces in this context fall into one of three categories: military (or combat related), *diplomatic* (or foreign policy related) and policing (or *constabulary*). The Royal Navy makes the distinction in a slightly different fashion, dividing the roles of maritime forces into *military*, *constabulary* and *benign*. In Australian Joint doctrine, the distinction is drawn in a third way, between combat operations, *military support* operations and *shaping* activities. However, when discussing maritime activities, the idea of *constabulary* operations is particularly valuable because it emphasises the historically close and continuing relationship between maritime forces and domestic and international law enforcement. The differentiated category of benign roles within diplomatic operations is also important in comprehending just how flexible Navies can be.

The ability of maritime forces to undertake constabulary and diplomatic operations depends substantially on their ability to carry out their combat roles. The capability to do these things is thus largely a by-product of the resources and core skills developed for warfighting.

The major activities of maritime forces that fall into each of these three categories are shown adjoining the triangle. Although the circumstances surrounding benign operations are clear enough, the crossovers from military to constabulary roles and back are not always so distinct. As Sir James Cable has suggested, the distinction between combat and non-combat activities applies when the infliction of damage becomes an end in itself. The other important difference between military and constabulary activities is that the latter depend upon legitimacy deriving from a legal domestic mandate or an internationally agreed order, while the former, whatever the degree of force implied, threatened or exercised, is defined primarily by the national interest.

### COMBAT OPERATIONS AT SEA

#### Intelligence Collection and Surveillance

Although intelligence collection, surveillance and geographic information activities are conducted in both peace and conflict and have obvious application to national requirements outside conflict, they are vital enablers in maritime combat. Comprehensive intelligence and surveillance are fundamental to the generation of the degree of *battlespace awareness* that will be necessary to seize and maintain the initiative and achieve *battlespace dominance*. All maritime units can contribute to the development of this awareness and exploit its products. Space based assets, over the horizon systems, signals intelligence and other systems play a vital and increasingly important role, particularly in the provision of cueing information which allows local assets to be concentrated and focused against a particular threat or target. Submarines, because of their ability to remain covert, are



An Army Leopard tank drives ashore from HMAS TORBRUK. The ability of naval forces to suddenly present a threat and exploit a weakness to a land-based enemy's flank by the insertion of land forces from the sea has been a key military tactic for thousands of years. (RAN)

particularly effective in intelligence collection within their localities, while maritime patrol aircraft, surface combatants and their organic helicopters are the principal maritime contributors to surveillance operations over wide areas.

#### Cover

Cover is defined as the provision of support for less capable forces to ensure their protection and the completion of their tasking without interference from an adversary. This may require the deployment of *covering forces* in the proximity of the units requiring protection, but, given appropriate capabilities, cover may be effectively exercised through the simple threat of intervention. This is particularly applicable to situations in which it is desirable to contain the intensity or branching of a conflict. An adequate degree of cover in such circumstances can be an important *deterrent* of a would-be adversary and will ensure that the situation will not *escalate*. Cover is a concept which transcends environments and one of the most important services which different force elements can provide for others at their points of greatest vulnerability.

#### Interdiction of Commercial Shipping and Sealift

Combat operations are conducted against adversary shipping for either strategic effect or to meet an operational or tactical aim. In the case of strategic effect, this will usually be a systematic campaign aimed at reducing the adversary's ability to sustain the conflict by preventing his use of the sea for economic activity. At the operational level, the intent will be to prevent an adversary's reinforcement or resupply of deployed units and any attempt to conduct manoeuvre operations by sea.

#### Maritime Strike and Interdiction

Interdiction of an adversary's maritime forces, to prevent their use for sea denial, sea control or power projection, can be conducted from the sea or from the land and can be directed against targets at sea or in harbour. Strike assets in the form of submarines or attack aircraft will be the most common platforms employed for interdiction, but surface combatants, helicopters and maritime patrol aircraft can also be utilised to fire land attack weapons, or anti-ship missiles and anti-submarine weapons for operations at sea. Aircraft and submarines can be employed to lay offensive mine fields.

#### Containment by Distraction

By threatening an adversary's critical vulnerabilities it is possible to force the diversion of his maritime forces into defensive roles, thus preventing their use for the offensive.

#### Combat Operations in Defence of Shipping

The basis by which shipping can be protected is either by defending an area or by defending the *ships themselves*. Both methods are valid in particular circumstances, but the complexity of the maritime environment means that area operations must be approached with particular caution because they carry the risk of placing too many demands on sensor systems and allowing the adversary to achieve *surprise* in its attacks.

#### Barrier Operations and Defended Areas

Barrier operations may be conducted in situations in which geography and/or oceanography combine to create a *focal area* that can be closed to the adversary. Similarly, the requirement to concentrate assets in one particular locality may mean that defended area operations are the most effective method for their protection. Generally defence in depth is the most effective approach to the problem, with units allocated sectors based on the ability of their sensors and weapons to contribute to the force. Defensive minefields can be a particularly effective mechanism for achieving the aim.

#### Layered Defence (Convoy, Close and Distant Screening)

The concept of layered defence is one of the oldest in maritime strategy, including as it does the method of *convoy*. Escorting units, generally surface or airborne, maintain watch on their sensors and provide warning and weapon coverage against air, surface or underwater threats by acting as moving barriers around the ship or ships to be protected. Convoys of ships, or grouping them together for their own protection, is based on the simple fact that the concentration of defensive assets in close proximity increases the overall defensive capability of the escort available. Properly carried out, convoy operations may also reduce the period of vulnerability.



Search And Rescue (SAR) operations at great distances require not only the right assets but also the people who trained to deal with such difficulties. Here an RAN Sea King winches a sailor from the sea during an SAR exercise. (RAN)

#### Advance Force Operations

Advance force operations are conducted in advance of a main force, notably an amphibious force, in order to make acceptably safe the area in which the latter will operate. The maritime elements of such activities are primarily directed against submarines and mines or are concerned with developing improved knowledge of the operating environment. Advance force operations are asset intensive and time consuming and may themselves be vulnerable, especially in the case of mine countermeasures. They thus frequently require cover from other forces. The nature of these forms of maritime warfare means that advance force operations must be thought of in terms of threat *minimisation* rather than threat *elimination*.

#### Protection of Shipping

Naval Control of Shipping (NCS) is a term applied to a wide variety of procedures, the object of which is to ensure that maritime trade is affected as little as possible by threats or contingencies. NCS provides for a series of measures scaled to the nature of the threat to merchant shipping in any particular area, whether that threat is military or of another nature. These measures can range from the provision of briefing, debriefing and routing information to the most sophisticated escort and screening operations. Much NCS effort, particularly in guiding and monitoring the progress of merchant ships, assists substantially in developing the surveillance picture. Only in the event of extreme threats would such active measures as escort be adopted, either to cover a specific campaign or area of conflict, or, in the final event, to ensure national economic survival.

## COMBAT OPERATIONS FROM THE SEA

#### Maritime Mobility

The sea can be utilised for the projection of power against the shore in a number of ways. At its most basic, maritime means can be used to transport land forces into theatre and sustain their operations there by the provision of sealift. The limitation of this approach is that it requires the utilisation of developed port facilities for embarkation and disembarkation and the forces so transported are likely to require significant time to prepare themselves for operations after landing.

Thus, although *maritime mobility* in the form of sea lift can be a very useful tool of manoeuvre warfare, achieving *maritime manoeuvre*, the reality of operational contingencies and local threats will often require the use of *amphibious forces* which are capable of transporting land forces and disembarking them in a high state of tactical readiness in the absence of developed facilities.

#### Land Strike

The ability of maritime forces to strike directly at the land has historically depended upon the possession of organic fixed wing aircraft or large calibre guns. Surface combatants with medium calibre guns possess a limited capability to conduct bombardment. The development of extended range guided munitions and ship and submarine borne land attack missiles is likely to increase the potential for these operations in the future.

#### Amphibious Operations

Amphibious operations seek to exploit the superior mobility of seaborne forces to those on land as well as their ability to transport mass. They may be used to contribute to the campaign by interdicting the adversary's vulnerabilities on

land, by seizing an objective, conducting a turning movement to expose a vulnerable flank or, on a smaller scale, by infiltrating forces to interfere with the adversary's lines of communication. Not all amphibious operations are conducted by surface forces. Submarines can be particularly useful for covert insertions and extractions of Special Forces.

Amphibious forces can be particularly effective when conducting an *amphibious demonstration*. They may tie down much larger numbers of land-based forces by threatening but not conducting a landing. This utilises the inherent capabilities of ships to *poise* and be *persistent* and thus achieves *distraction* of the adversary.

The principal stages of an amphibious operation normally begin with the *advance force* or *pre-assault* operations by maritime forces already discussed. They may also include the landing of small numbers of personnel by covert means to conduct scouting and reconnaissance. The *amphibious assault* will be the main landing of forces to seize one or more landing points and secure an objective. Whether land forces seek to move out from that objective will depend upon the aim of the operation.



The processes by which men and women are trained for maritime combat involve both individual and collective efforts. The complexities of modern combatants and the systems that they carry mean that naval personnel of all ranks and specialisations require intelligence and a high level of education from the outset, while the provision of quality basic and specialist training on entry is essential. (RAN)

The term *assault* is employed to describe this part of the amphibious operation, but it must be emphasised that this will not be an attack on heavily defended coastal areas in the fashion of the operations in Normandy and the Central Pacific in World War II. Rather, amphibious forces will seek to land where the adversary is not and they will go ashore only when they are confident that local superiority exists on and under the sea and in the air.

The insertion of a smaller force for a particular and limited task and its withdrawal immediately on completion is known as an *amphibious raid*.

An *amphibious withdrawal* is an operation conducted to remove the landed force. It is a routine evolution for amphibious forces after their tasks have been completed because it is an important part of maintaining their flexibility and speed of response. When a withdrawal is required because of the arrival of superior land, sea or air power, very close co-ordination is required between all elements of the force to ensure a safe departure.



## Support to Operations on Land

Australia's naval forces do not possess the organic air capability to protect operations on land. They nevertheless have considerable potential to contribute to combat operations throughout the battlespace. Medium calibre guns in surface combatants can be used for naval surface fire support or shore bombardment operations, while air warfare weapons and sensors are used to contribute to anti-air operations over the coast. This will be particularly useful if it can be integrated with airborne early warning and control and fighter aircraft, or with land-based sensors and weapons. Army battlefield helicopters (organic to the amphibious task group) and naval utility helicopters can provide extensive support to operations on land. In littoral zones, maritime forces prevent the adversary moving forces by sea. This protects the seaward flank of friendly land forces and denies the adversary the ability to conduct *maritime manoeuvre*.

## SHAPING OPERATIONS

*Shaping operations* can also be described as *naval diplomacy* or the use of maritime forces in support of foreign policy. Some of the activities that fall under this heading include constabulary or *benign* operations. There are, however, significant elements that rely directly upon the inherent combat capabilities of maritime forces and are *diplomatic* in their intent. That is, their activities are designed to influence the policies and actions of other nation states. One important aim is to develop the conditions which will allow the successful conduct of coalition operations in the future. Many of the inherent characteristics of maritime forces described in Chapter Six (see *THE NAVY*, Vol 63, No 2.) are attributes that make maritime forces the instruments of first resort for governments. In particular, they possess the versatility and the range of response which makes them very useful tools in times of uncertainty and crisis, allowing governments the maximum freedom of decision.

### Presence

*Presence* is the term used to describe the operations of naval forces in areas of strategic significance that are intended to convey an interest. These may involve simple passage past another nation's coast, port visits or *exercises*. Warships represent perhaps the most sophisticated manifestations of particular societies and are thus unique symbols of a nation's identity. The influence of *presence* derives directly from such features as *access*, *flexibility*, *poise* and *persistence*. It depends, however, fundamentally upon credible combat power. *Presence* is not itself a threat of force, but a demonstration of capability that can be used to reassure, to impress and to warn. The means by which this can be achieved are legion and extend much further than the social activities of tradition, including many of the *benign* operations described below.

### Coercion

If a situation requires more direct action, maritime forces can be used to *coerce* a would-be adversary by demonstrating the readiness to deploy a degree of combat power which would make its aim unachievable or the consequences of achieving it not worthwhile. They are thus effective at achieving *deterrence*. In many circumstances, particularly those in which the main events are on land rather than in the maritime environment, such coercive action requires a high degree of joint co-operation to demonstrate credible capability in all environments. Maritime forces, including amphibious forces

have, however, particular value in terms of such action because they are able to achieve coercive effects without necessarily violating national sovereignty.

## MILITARY SUPPORT OPERATIONS CONSTABULARY OPERATIONS

*Constabulary operations* operate within the framework of domestic law and Australia's international law obligations. The amount and degree of force that can be applied must be strictly within the context of the mandate given.

### Peace Operations

*Peace operations* encompass those operations that support the diplomatic peace process. The major categories in the maritime environment are explained below.

### Peacekeeping

Peacekeeping formally refers to observer and interposition forces, although its popular usage extends much more widely to international intervention of any kind. Implicit in peacekeeping operations is that they operate under a mandate and according to conditions which are agreed by all the belligerent parties.

Open sea peacekeeping operations are rare: more commonly naval forces will be used to patrol coasts, estuaries and rivers to monitor ceasefires. Naval units may be used as neutral territory for talks, while naval personnel can be employed as military observers, liaison officers, HQ staff officers, disarmament inspectors or in medical or communications teams. Naval forces, particularly amphibious vessels and organic helicopters, can provide substantial logistic support.

### Peace Enforcement

*Peace enforcement* moves a step further than peace keeping. It may occur in circumstances where one or more of the belligerents have not consented to intervention by international forces and coercive action may be required to restore peace. The Gulf War in 1991 was an important example of such action, authorised under Chapter VII of the United Nations charter. The roles played by maritime forces will depend upon the nature and scale of the conflict, but may extend to high-level sea control and power projection operations, as well as the provision of logistic support.

### Embargo, Sanctions and Quarantine Enforcement

Embargo, sanctions and quarantine enforcement are a major maritime component of peace enforcement. While the level of force which may be employed is carefully controlled, the possibility of reprisal by the affected party generally requires such operations to be conducted in concert with a range of self-protective measures. Depending upon the nature of the threat, this may require sea control operations on an appropriate scale.

### Peace Building

Where reconstruction of a state or region is being attempted in the wake of conflict, naval forces can provide many facilities to assist with such work, both in platforms and personnel. Key areas where naval forces undertake such efforts include mine clearance, the opening of ports and ordnance disposal and salvage. Depending upon the scale of the task, such activities may take many years to complete. Australian units have worked since 1945 to clear enormous quantities of mines and other dangerous ordnance not only from



Battle readiness is an important aspect of all Navy training. Here a flight deck crew practice fighting fire after a helicopter crash. Crew cohesion, discipline, mutual trust and support are essential factors in sustaining battle readiness (RAN)

national territory and waters, but from South East Asia, Papua New Guinea and the islands of the South West Pacific.

### Defence Force Aid to the Civil Power

In constabulary terms, naval operations to provide military assistance to the civil power are usually aimed at supporting domestic law enforcement at sea within national jurisdictions. Defence Force Aid to the Civil Power involves the Governor General calling out permanent service personnel to prevent domestic violence where civil authorities are inadequate or unsuitable to do so. Maritime operations to provide military assistance to the civil power could include counter-terrorist operations such as the recovery of offshore gas or oil installations, or ships held by terrorists.

### Environmental and Resource Management and Protection

Fisheries protection is one of the oldest constabulary roles of naval forces and remains an important activity in an era of extending jurisdiction and increasing exploitation of and stress on fish stocks in both coastal and oceanic waters. Australian naval units have been engaged in this task since before the Commonwealth Naval Forces became the RAN in 1911. The role has extended considerably in recent years to include the surveillance and protection of offshore resource industries and the surveillance and monitoring of the natural environment and the actions of humans within it. The emphasis of such operations on direct national economic benefit has thus begun to include more wide-ranging concerns of environmental quality.

### Anti-Piracy Operations

Naval forces have international obligations to suppress piracy, which by definition is an activity on the high seas. Within territorial waters, piratical activities are legally described as *armed robbery at sea* and must be dealt with by domestic mandate. In circumstances where piracy or armed robbery at sea are actively interfering with commerce and other peaceful activities, the same measures which apply in other situations for the protection of merchant shipping will require to be applied in sea control operations. The more sophisticated, technologically advanced and aggressive the criminal activity, the more demanding such operations will be.

### Quarantine Operations, Drug Interdiction and Prevention of Illegal Immigration

Maritime forces play a significant role in combination with other Government agencies in operations such as the enforcement of quarantine regulations, drug interdiction and

the prevention of illegal immigration. Defence Force personnel are specifically empowered to undertake such activities by legislation such as the *Customs Act* and the *Migration Act*.

## THE BENIGN APPLICATION OF MARITIME POWER

### Evacuation

Seaborne forces can be key elements in *Service Assisted Evacuations (SAE)* and *Service Protected Evacuations (SPE)*. The increasing frequency of failed states and civil disorders in the last decade has seen the need for these operations increase. Evacuations will almost always be conducted on a joint basis and seek to utilise a seaport or airport, but an amphibious operation may well prove necessary in undeveloped areas. In the case of SAE, the safety of the evacuation is guaranteed by local authorities and the focus is on achieving the safe and timely removal of nationals or displaced persons. In SPE, protective operations safeguard the process. These may be of considerable scale and complexity and could extend to sea control measures. Apart from their ability to transport and support large numbers of people, maritime forces also provide significant assistance with shore to ship transport utilising boats and helicopters, as well as the command, control and communications facilities to coordinate operations.

One particular advantage which maritime forces have comes with their ability to poise and be persistent. Evacuations are not initiated lightly and the circumstances in which the requirement develops generally involve a high degree of uncertainty for governments. Seaborne units deployed to the locality assist in keeping options open while the alternatives are examined.

### Defence Assistance to the Civil Community

Defence assistance to the civil community differs from aid to the civil power in that it is related simply to the provision of help in civil matters and not the enforcement of law and order. It includes search and rescue and ordnance disposal in the domestic environment, but can extend to salvage, environmental management, pollution control and the provision of personnel and systems to help community development. One of the most important military assistance activities is *hydrographic surveying* but all maritime forces also make major contributions to the collection of *oceanographic and meteorological data*. Two important elements of DACC that deserve consideration in their own right are *search and rescue* and *disaster relief*.

### Search and Rescue

All vessels on the high seas and aircraft operating over them have obligations under international law to assist in search and rescue. In addition, individual sovereign states, including Australia, have accepted coordination responsibilities within their areas of interest. In Australia's case, this encompasses a significant proportion of the earth's surface, ranging well out from the coast and into the Southern Ocean. Naval and air forces may therefore be required to engage in search and rescue operations at very long range and in extremely demanding conditions with little notice.

### Disaster Relief

No nation is immune to natural or man-made disasters. Naval forces repeatedly demonstrate that their inherent capabilities make them uniquely valuable in providing both short notice

and long term assistance in disaster relief, not only for coastal locations, but sometimes well inland. While shipborne helicopters can be particularly useful and ships may act as logistic support bases, hospitals and command posts for long periods, the specialist skills available in ships also mean that their personnel can be invaluable sources of trained manpower for rehabilitation and repair work. Naval forces are self-supporting and do not create logistic burdens in situations where infrastructure has been destroyed or severely damaged. Disaster relief is one of the many activities to which naval forces can be expected to make an immediate and effective contribution with little or no warning.

**Defence Force Assistance to Allied and Friendly Nations**  
Defence Force assistance can be provided to other countries in a wide variety of ways. In addition to those benign activities already listed, maritime forces can exercise with and assist with the training of other national forces to increase their effectiveness. Examples include the provision of subsurface or air assets to practice the tactics of undersea and air warfare to a sophistication which is not possible in the absence of the relevant force elements, as well as the sharing of intelligence and surveillance data.

## Chapter 8 THE MOST IMPORTANT FACTOR

### THE HUMAN FACTOR

It is not technology which gives the Navy capability but the way that technology is employed. The capabilities represented by systems that can be effectively employed and sustained take many years to develop in maritime forces and they are much easier to lose than they are to create. It is people who generate the real capabilities that the RAN's surface ships, submarines, aircraft and support organisations represent. People are thus the *most important factor* for the Navy's operations. The RAN has a history of achievement and excellence which provides a firm foundation for its current activities and for the future, but this foundation is one that can rapidly be eroded if we do not give the Navy's people the priority they deserve.

Peacetime operations require nearly the same degree of commitment and effort and they, too, can be arduous and unremitting. Officers and sailors in seagoing units as well as the soldiers and airmen who go with them must live and work for long periods in very close proximity to each other. Even the biggest ships are cramped and confined and all are subject to the effects of weather and seastate. All in their crews must be constantly alert to the possibility of emergencies and the unexpected. Even in harbour, ships require watchkeeping personnel to ensure their safe operation and physical integrity.

#### Discipline

It follows from the nature of life at sea that naval discipline is as much self-discipline as it is externally imposed. There are occasions on which orders need to be obeyed instantly and without question, but the key elements of naval discipline are co-operation and teamwork. Naval discipline at its best is the result of a clear understanding of the code of behaviour required in a warfighting and seagoing service. It provides the framework by which personnel can operate effectively under the strain, shock and fear of maritime conflict.

#### Morale

*Morale* is defined as the state of mind of a group of people as reflected by their behaviour under all conditions. In developing morale, although it is a collective quality, it is necessary to start with the individual as the way to stabilise the group. The creation of high morale depends upon a way of life. Naval training must focus on the development of the qualities needed to create a spirit which, sustained by professional mastery and leadership, will never accept defeat.

#### Leadership

Leadership in the maritime environment is as vital as that on land. Its nature and exercise are, however, different because the nature of what is done at sea and on land are themselves very different. The focus at sea is on the effort of the entire crew to place the combat instrument which is the ship into the control of the directing mind of the commander. No bullet is fired, no missile can be launched without specific command direction. With very few exceptions this applies even in the most intense of combat situations and it is never widely delegated. By contrast, the infantry commander must lead his

men as individuals to make their singular contributions to the combat effort in accordance with his intent. It is a fair generalisation to say that the aim of leadership at sea is the ship's company and their ship as a fighting instrument and the aim on land is the individual as a fighting instrument.

This means that leadership at sea depends vitally upon professional competence, but in no way does it diminish the importance of the human element. One advantage that the leader at sea possesses is that *risk is shared by all* those onboard the ships involved in combat. The need for teamwork, the enclosed and confined nature of the shipboard environment and the long and arduous nature of maritime operations mean that leadership must be

vital, personal and consistent. The crowning example of naval leadership remains that of Lord Nelson, whose ability to generate enthusiasm and devotion amongst his subordinates at every level was a basic element of his success in battle. An outstanding Australian naval leader was Captain 'Heck' Waller whose command of HMAS Stuart (I) and the 'Scrap Iron Flotilla' in 1939-41 set a standard recognised by all who knew him.

#### Training

The processes by which men and women are trained for maritime combat involve

such capability set for achievement will depend upon the operational requirement but no unit will be deployed for peacetime service until it has

reached the *Minimum Level of Operational Capability (MLOC)*. An assessment as to whether a ship has achieved this state will be made by the staff of the *Sea Training Group*. Certain threats or contingencies will require priority to be given to particular warfare areas or techniques, while others can be held at designated peacetime standards. This focusing allows the most efficient allocation of resources, as well as ensuring that forces are provided as quickly as possible.

Designating the standards required for peacetime operations is a particularly important process. It must draw a balance between achieving standards which will make the transition to battle readiness as rapid as possible, as well as improving professional performance generally, and not asking more of personnel than they are able to give, not just in a single work up or commission, but for an entire seagoing career.

#### Battle Readiness and Combat Stress

Units must be in a battle ready state before they enter the area of operations. This condition is not something that is wholly susceptible to objective measurement and its attainment must be a matter of judgement on the part of those responsible for combat training and those who will command the operation. In reality, the preparations for deployment will be working against time and the package of preparative training will almost always be a compromise between operational imperatives and training ideals. It is almost certain that units will not achieve their highest degree of battle readiness until they have actually had some experience of combat and developed confidence in their own fighting abilities and in those of the other units with which they operate. This will be particularly true in the case of joint or coalition operations, in which pre-existing shared experience is less likely.

The maintenance of a battle ready state is one of the primary responsibilities of commanders. They must be able to demand the utmost from their people and systems without exhausting them beyond the point of no return. This demand of effort also applies to commanders themselves, since they must be able to maintain their personal efficiency and conserve their strength for the critical periods. Crew cohesion and mutual trust and support are essential factors in sustaining battle readiness.

HMAS KANIMBLA (closer to camera) and HMAS ADELAIDE in the Persian Gulf conducting embargo/enforcement operations. (RAN)

#### Life at Sea

Life at sea is unlike any other. The maritime environment is tiring, demanding and unforgiving. Maritime operations are about unremitting attention to the task in hand and maritime warfare is characterised by long periods of surveillance and patrol followed by short bursts of intense and destructive combat.

# Flash Traffic

## US Navy announces DDX decision

The USN has announced that Ingalls Shipbuilding Inc., Northrop Grumman Ship Systems (NGSS) has been selected as the lead design agent for the DDX ship program.

This includes the award of a cost-plus award-fee contract in the amount of US\$2.9 billion for design agent activities such as the systems design of the DDX destroyer, and the design, construction and test of its major subsystems. NGSS was the leader of a team of contractors called the 'Gold Team' that included Raytheon Systems Co. as the combat systems integrator, and a number of other companies.

Gold Team's proposal also incorporated 'Blue Team' member Bath Iron Works (BIW) as a subcontractor to perform DDX design and test activities, which will ensure BIW will have the ability to produce a detailed DDX design and build these ships in the future.

The award of the DDX Design Agent contract signals the start of a revolution for the USN's surface combatant fleet, with the development of transformational technologies that will create new capabilities while reducing crew size and yielding significant combat advantage. DDX is the foundation of a family of surface

combatants, including a future cruiser, CGX, and littoral combat ship (LCS), providing the US with what is hoped to be a balanced set of war-fighting capabilities to meet the national security requirements in the 21st century.

"The award of the DDX Design Agent contract marks the beginning of a new family of surface combatants," said Edward C. 'Pete' Aldridge Jr., Under Secretary of Defense for Acquisition, Technology and Logistics. "This program and its spiral development approach will be the model for Navy acquisition in the years to come. DDX is the Joint Strike Fighter equivalent for shipbuilding."

The DDX program will provide a baseline for spiral development of the DDX and the future cruiser or CGX with emphasis on common hull-form and technology development. Advanced combat system technology and networking capabilities from DDX and CGX will be leveraged in the spiral development of the littoral combat ship to produce a survivable, capable near-land platform for the 21st century. The intent is to innovatively combine the transformational technologies developed in the DDX program with the many ongoing R&D efforts involving mission focused surface ships to produce a state-of-the-art surface combatant to defeat adversary

attempts to deny access for US forces.

## New RAN ammunition facility

Construction has begun on the \$25 million Twofold Bay multi-purpose wharf and is the first visible step in a project that will bring millions of dollars into the Eden and Bega Valley regions.

The Parliamentary Secretary to the Minister for Defence, Fran Bailey, said the wharf is part of a \$40 million defence project that will meet the Navy's long term logistic and ammunition requirements for its east coast based fleet.

"This is an enormous boon for the Eden and Bega Valley regions, maximising employment opportunities, including in the indigenous community, and potentially attracting an additional \$5m of private investment in the region," Ms Bailey said.

"The Navy will use the wharf for between 45-70 days a year and it will be available for public use when not required by Defence under an agreement struck between the Federal Government and the NSW State Government," she said.

Ms Bailey acknowledged the strong advocacy and support for the project by the Federal Member for Eden-Monaro, Gary Nairn.

Baulderstone Hornibrook Pty Ltd was awarded the \$25 million design and construction contract for the project in late December 2001 with a planned completion date of September 2003. The contractor is now approaching local sub-contractors with a view to sourcing local construction materials and services.

A state-of-the-art Port of Brisbane dredge vessel has already arrived for the start of dredging of the ship-turning basin in the East Boyd Bay section of Twofold Bay.

Dredging is the first of the main construction activities that will include setting of steel wharf and jetty piles, construction of wharf and jetty superstructure, construction of wharf access road and provision of services to wharf.

## UK Apache to take scapls in the littoral

The RN has announced that the British Army's Agusta-Westland Apache AH Mk 1 attack helicopter will begin Ship Helicopter Operating Limitations (SHOL) trials aboard the RN's helicopter carrier HMS OCEAN and one of the service's three Invincible-class aircraft carriers in 2004.

The UK Ministry of Defence plans to 'double-earmark' one AH Mk 1 attack squadron to support amphibious operations from January 2004. The unit will be embarked in situations such as those encountered by the UK armed forces in Sierra Leone in 2000 and during the US-led Operation 'Enduring Freedom' in Afghanistan.

Although some 'at-sea' problems are expected it is thought that the helicopter would disembark from the ship to a forward land base in theatre. However, the unpredictability of campaigns could require the aircraft to remain aboard ship for months at a time requiring a marineship programme.

Current at-sea issues with the Apache design are understood to include the aircraft's high centre of gravity, caused by its mast-mounted AN-APG/78 Longbow fire-control radar, possible interference from ships' electronic systems has also been identified as a concern, as well as the aircraft's tricycle undercarriage design and the suitability of its weapon systems for storage aboard RN vessels.



A British Army Agusta-Westland AH Mk 1 Apache during flight trials. The helicopter is going to be modified to operate at sea and in the littoral regions around the world. (Westland Helicopters)

The US Army has conducted limited shipborne trials of the AH-64A Apache which suggested that there are considerable issues involved with the

platform's operation from naval platforms.

While not marinised, the UK AH Mk 1 is powered by Rolls-Royce Turbomeca RTM322 engines more powerful than the standard Apache power plant, a manual blade-stowing system, a rotor de-icing system and back-up fly-by-wire controls. All of which will aid in at-sea operations.

## Morocco receives new frigates

The first of two frigates modelled on the French Navy's Floreal class was handed over to the Moroccan Navy on 12 March.

Built by Alstom Marine's Chantiers de L'Atlantique Saint Nazaire shipyard, the MOHAMMED V should be joined by sister vessel HASSAN II, due to sail for Casablanca at the end of this year.

MOHAMMED V's hull is essentially the same as those of the French Navy's Floreal class and is powered by four SEMT-Pielstick 6PA6 7060kW diesels. Systems include: a Thales Naval Nederland WM-28 fire control radar; a Matra Najir 2000 electro-optical fire direction system; a Northrop Grumman (formerly Litton) Bridgmaster E navigation system; and an OtoBreda 76/62mm compact gun. Morocco recently acquired two Eurocopter AS565MA Panther helicopters and these will be operated from the new frigates using DCN's Système Automatique de Manutention d'Helicopteres Embarques rail-based landing system.

## ESSM Scores

Raytheon's Evolved Sea Sparrow Missile (ESSM) has achieved two major milestones this year. On 27 March 02 it made its first at-sea interception of a Harpoon anti-ship missile. The ESSM was fired from the USN's Self Defence Test Ship in home-all-the-way guidance mode before destroying the Harpoon, which was following a low-level trajectory. According to Raytheon, preliminary data shows ESSM successfully completed all test objectives.

In another ESSM test conducted on 1 May 02 from the USN's Self Defence Test Ship the missile successfully intercepted a supersonic target.

The ESSM was launched off the Southern California coast from a Mk-29 Octuple launcher. It was the fifth successful at-sea firing of ESSM and the second successful target intercept.



An ESSM leaves the tube of a Mk-29 Octuple launcher on the USN's Self Defence Test Ship. The ESSM has already demonstrated its ability to counter both subsonic sea-skimming and supersonic high-diving missiles. (Raytheon)

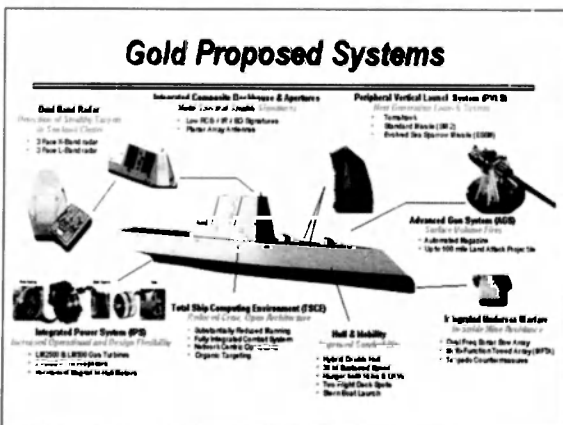
The missile was tested against a diving (8g) Vandal target representing an anti-ship missile threat. The target was detected by the ship's combat system and assigned to ESSM. The ESSM round was fired using home-all-the-way guidance. The missile acquired the target, initiated terminal guidance and flew to intercept, with the proximity fuze detecting the target and initiating warhead detonation. Preliminary data indicate all test objectives were met.

ESSM is an advanced ship self-defence missile, designed to protect ships by destroying currently fielded and near-term projected anti-ship missiles, particularly those that fly at low altitudes and manoeuvre during their terminal flight phase.

Raytheon is developing ESSM at its Missile Systems business unit in Tucson, Ariz., under a U.S. Navy contract for low-rate initial production. It is being developed for the USN and nine of the other 11 member nations of the NATO SEASPARROW Consortium including Australia for fitting to the RAN's FFG and Anzac ships.

## 'Product Recall', Bangladesh frigate returned to maker

On 18 February 02 the Bangladesh Navy decommissioned its latest frigate, BNS BANGABANDHU. The frigate was returned to its builder, Daewoo



The winning Gold Team's proposal for the USN's new DDX surface combatant.

Shipbuilding and Marine Engineering in South Korea, for a partial re-build under the provision of a warranty contract.

Delivered in June 2001 (see *THE NAVY* Vol. 63 No. 4, p17) to replace the Salishury-class frigate BNS U/MAR FAROOQ (ex-HMS LLANDAFF), the Bangladesh Navy found the frigate 'unsuitable' for operational deployment following its shakedown cruise. The Bangladesh Navy is said to be demanding the replacement of the sonar system and other unspecified 'combat inadequacies'.

Additional weapons systems are reportedly also to be fitted during the 'warranty service'. After its refit, the frigate – now referred to simply as the DW-2000H in Bangladesh – will be re-commissioned into the Navy and returned to service, assuming no other problems. The frigate was South Korea's first major warship export and was equipped mainly with Italian-designed weapons and a Thales command-and-control sensor suite.

The ship, ordered in 1997, has proven politically controversial in Bangladesh, where critics have claimed that its operations and maintenance costs are prohibitive and that it represents too sophisticated a warship for the maritime security tasks that are the focus of the Bangladesh Navy. As a result, the procurement of the frigate and its problems were the subject of an investigation which has indicated graft and corruption in the Bangladesh Department of Defence decision to purchase the ship.

## CHARLES-DE-GAULLE update

A Rolls-Royce subsidiary will deliver two propellers for the French aircraft carrier CHARLES DE GAULLE by the end of the year to the French ship building agency DCN.

The aircraft carrier suffered an embarrassing failure of the propellers during its first shakedown cruise and had to return to Toulon to have them replaced by less efficient propellers designed for its predecessor (see *THE NAVY* Vol 63, No.3, p 17).

DCN gave a contract for two new propellers to Atlantic Industrie de Nantes, the French manufacturer that made the original propellers for the CHARLES-DE-GAULLE, then put out an international tender for another two propellers, which Roll's Bird Johnson subsidiary in Pascagoula, Mississippi, won. They are in the course of completion and will be delivered to DCN at the end of the year.



The French nuclear powered aircraft carrier CHARLES-DE-GAULLE. The carrier is still plagued with propeller problems which will hopefully be fixed by year's end. (DCN)

In other news, while participating in Operation Enduring Freedom, CHARLES DE GAULLE broke off its operations in the Arabian Sea to travel to Singapore to assess its suitability as a regular supply centre for the French fleet.

CHARLES DE GAULLE stopped in Singapore between 3-8 May and then headed back to the Arabian Sea for a joint exercise with the Royal Saudi Navy.

The ship was planned to visit Australia as well but operational demands precluded her stop over.

However, the reason for the trip to Singapore is widely thought to be a sales pitch for the Singaporean requirement for 20-24 new generation fighter aircraft, of which CHARLES DE GAULLE has seven new-generation Rafale fighters on her flight deck. The Rafale's maker, Dassault Aviation, sees Singapore as a potential customer for the Rafale.

The Rafales aboard CHARLES DE GAULLE are air combat fighters and, as such, did not conduct operations over Afghanistan. However, it is reported that they logged a total of 400 flying hours in exercises in the Arabian Sea, many of them conducted with US Navy F/A-18 Hornets from the aircraft carrier USS JOHN C STENNIS.

Since late December the French Navy's (Marine Nationale's) 16 Super Etendard fighters deployed on CHARLES DE GAULLE have logged a total of 669 operational flights over Afghanistan. These included 250 missions, 60% of which were ground support operations and 40% reconnaissance flights over 437 targets. The CHARLES DE GAULLE's two E-2C Hawkeye airborne early warning

aircraft also flew 482 hours on reconnaissance flights for coalition forces in Afghanistan.

## Boeing delivers first Harpoon Block II kits to Denmark

Following the installation of the necessary upgrade kits, the Danish Naval Materiel Command has taken delivery of its initial Harpoon Block II missiles, marking the first international sale of the upgraded missile. The kits are to be installed by the Royal Netherlands Navy for the Royal Danish Navy at their joint missile maintenance facility in Den Helder.

The Harpoon Block II kit provides a new Guidance Control Unit flight computer, a new guidance section shell and a Global Positioning System (GPS) antenna. When installed, the Harpoon missile has a more accurate navigation system than its predecessors, and can be used for coastal clutter suppression.

The Block II missile incorporates guidance technologies from two other Boeing weapons programmes – the low-cost, inertial measuring unit from the Joint Direct Attack Munition; and the software, mission computer, integrated GPS/Inertial Navigation System, and GPS antenna and receiver from the Standoff Land Attack Missile Expanded-Response. These technologies are designed to expand Harpoon's capability to attack coastal, in-harbour and land targets.

The US Navy completed flight-testing of the Harpoon Block II in November 2001. Denmark was the first country to sign a \$10 million contract for 50 upgrade kits in 1997. This modification upgrades about half of the Royal Danish Navy inventory.

## South Korean Navy gets first International Mk-45 Mod 4 Gun

United Defense and World Industries Ace, have delivered the first internationally produced Mk-45 Mod 4 gun to the Republic of Korea (ROK) Navy. This is the first time a Mk-45 Mod 4 gun was sold overseas and is the culmination of teamwork by WIA and United Defense over the past 27 months.

United Defense and WIA jointly produced components for the Mod 4 guns. United Defense provided technical assistance, spare parts, and training, while WIA did final assembly and test in Korea.

The Mod 4 variant of the ubiquitous naval gun has a longer barrel, a stealthy turret shielding and able to fire the ERGM (Extended Range Guided Munition) as well as standard 127mm rounds. The longer barrel increases the range of a standard shell from 24kms to more than 40kms.

United Defense won a competitive \$22 million contract in December 99 to co-produce three Mk-45 Mod 4 guns for Korea's KDX II lightweight destroyer shipbuilding program. WIA will deliver the second gun in October 2002 and the third one in August 2003. Since the original contract, United Defense has begun discussions with WIA to co-produce the next purchase of guns for the Korean Navy.

## New RN First Sea Lord

Her Majesty The Queen has graciously approved the appointment of Admiral Sir Alan West to succeed



The RN's new First Sea Lord, Admiral Sir Alan West, who commanded the frigate HMS ARDENT during the Falklands Conflict a little over 20 years ago. (RN)



Caught in flight. A 127mm shell is caught in flight by the camera after being fired by a Mk-45 Mod 4 gun. The Mod 4 version of the Mk-45 is able to take the new ERGM round, its longer barrel also means that a standard projectile can reach over 40kms compared to 24kms for the Mod 2 version (fitted to the RAN's Anzac). (Raytheon)

Admiral Sir Nigel Essenigh as First Sea Lord in September 2002, and, on promotion to Admiral, Sir Jonathon Band to succeed Admiral West as Commander in Chief Fleet.

Admiral West, at present Commander in Chief Fleet, will take over the post of First Sea Lord and Chief of the Naval Staff on 17 September 02 when Admiral Essenigh retires after 37 years service. Vice Admiral Band, currently serving as Deputy Commander in Chief Fleet, takes over as Commander in Chief Fleet on 2 August 02.

Born in 1948, Admiral Sir Alan West joined the Royal Navy in 1965. He has spent the majority of his career at sea, serving in fourteen different ships, and commanding three of them. He qualified as a Principal Warfare Officer in 1975, and Advanced Warfare Officer (Above Water Weapons) in 1978, and also as a Fighter Controller. He is a graduate of the Royal Naval Staff Course, the Higher Command & Staff Course, and the Royal College of Defence Studies.

In 1980, promoted to Commander, he took command of the frigate HMS ARDENT, taking the ship south to the Falklands in 1982, where she was sunk during the successful retaking of the Islands. He was subsequently awarded the Distinguished Service Cross for his part in the action and led the Victory Parade through the City of London.

He has held several appointments in the Ministry of Defence and played a prominent role in the reorganisation of the MOD, the introduction of a new budgetary system within the Services,

and headed the study into women's integration and their service at sea. Promoted to Rear Admiral in February 1994, he was responsible for naval manning, numbers and structures, as well as career management and deployment. He moved the department from London to Portsmouth, set up a new organisation and prepared it for agency status.

In February 1996 he became Commander UK Task Group, and was almost permanently deployed in one of the aircraft carriers leading the two largest and longest UK naval deployments since the Falklands and Gulf conflicts. The only European seaborne principal subordinate commander in NATO, he was also a UK-designated Joint Force Commander. He was promoted to Vice Admiral in October 1997 and appointed as Chief of Defence Intelligence.

He was knighted in the Millennium New Year's Honours List and promoted to Admiral in November 2000, when he took up his position as Commander-in-Chief Fleet, Commander-in-Chief East Atlantic, and Commander Allied Naval Forces North.

## Canada acquires Phalanx IB

The massive US defence company Raytheon is being awarded a US\$29.8 million contract to produce 21 Phalanx Block 1B upgrade kits for the Royal Canadian Navy. This represents the single-largest contract to date for the surface mode upgrade for the Phalanx Close-In Weapon System.





A Mk-15 Block 1B Phalanx. This newer version has a higher rate of fire, longer range, more on mount ammunition, is more accurate and can now also be remotely controlled and fired from the operations room via its television camera against stationary or moving surface targets.

All 21 kits will be produced at Raytheon Missile System's Louisville, Kentucky, facility and installed at the Raytheon Canada Naval Defence Systems Centre in Calgary, Alberta, Canada. The first kit will be delivered in September 2002 with the remaining kits following over a three-year period.

"This is a major undertaking for both Raytheon and the Canadian Navy," said Dennis Carroll, Director of Phalanx Systems in Tucson, Ariz. "Not only does this initiative promote Phalanx in the international community, it also makes the Canadian fleet one of the most modern in the world."

Phalanx is a rapid-fire, computer-controlled radar and 20mm gun system that automatically acquires, tracks and destroys enemy threats that have penetrated all other ship defence systems. More than 850 systems have

been built and deployed in the Navies of 21 nations. Most recently, Phalanx Block 1B was installed aboard USS HOWARD (DDG-83) and USS BULKELEY (DDG-84), the U.S. Navy's newest Arleigh Burke-class Flight IIA Aegis destroyers.

"The Block 1B surface mode, our most advanced system, provides unequalled capabilities in near-shore, littoral environments", said Carroll. "It provides protection to ships and their crews against an increased number of threats including small, fast gunboats; standard and guided artillery; helicopters; mines and a variety of shore-launched, anti-ship missiles."

## China 'concerned' over ASC sale

The sale of the Australian government's 'nearly-idle' Australian Submarine Corporation (ASC) is reported to be encountering difficulties. It is believed that China has expressed strong concerns during talks in Beijing between Prime Minister Howard and senior Chinese leadership figures over any US companies buying an interest in the Adelaide-based submarine builder.

The concern expressed involves the potential ASC has to the US to build submarines for Taiwan given the US's inability to make diesel-electric submarines. President George Bush has promised Taiwan diesel-electric submarines.

ASC recently delivered its last Collins-class submarines to the RAN, and it is anticipated that once the installation of a Replacement Combat System is completed around 2005 ASC will be without any substantial work orders.

With plans to privatise ASC this year, Australia has already signalled its preference to secure General Dynamics Electric Boat Corporation (EBC) as ASC's buyer, given the substantial US involvement in rectifying many of the Collins' problems.

However, Australia's 'One China' policy at this stage negates any sale of submarines to Taiwan but EBC's acquisition of ASC could enable a vast amount of intellectual property on conventional submarine construction to be transferred to EBC's US yard to circumvent Australian policy.

## Canada still lacking SSK capability

It has been reported that the Royal Canadian Navy has discovered a dent in one of the four Upholder class submarines being acquired from the RN, and, to add insult to injury, is waiting to see if it will have to replace the diesel generator exhaust valves in all the submarines.

HMCS VICTORIA, formerly HMS UNSEEN, has a 900cm<sup>2</sup> by 0.25cm depression in its hull, below the waterline. The dent was found when VICTORIA was in dry dock in Halifax for a hull inspection during an intermediate docking period. It is understood that the Canadian Navy will launch a formal investigation to determine the cause, and when it happened. If the dent occurred while VICTORIA was in the UK Canada will seek costs from the RN for the repair.

VICTORIA had been in dry dock in Birkenhead UK for a shaft replacement and the dent had not been apparent then. The boat then underwent sea trials before sailing to Halifax.

While the dent affects the maximum design depth, there is still a large safety margin to the diving depth. Nevertheless, the RCN has restricted diving depth by 25%.

The RCN is studying three options regarding the dent: wait until the submarine's extended docking period in late 2003 to fix it; strengthen the area; or cut out the patch and weld in a new section of steel.

Meanwhile, a UK-Canadian team is examining cracks found in the diesel-generator exhaust, hull and back-up valve of HMCS CHICOUTIMI (formerly HMS UPHOLDER).

HMCS VICTORIA is due to return to sea in July/August, but if the valves have to be replaced that will slip by about three months. HMCS WINDSOR entered its Canadian work

period at the beginning of April and, barring any added complications, is expected to be ready for sea trials later this year. HMCS CORNERBROOK (formerly HMS URSULA) has completed reactivation in the UK and is ready to start sea trials.

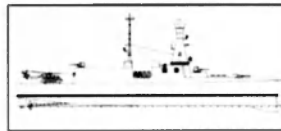
## 10 New frigates for Italy

Italy's senate and house parliamentary defence committee has approved a Eur5.68 billion (US\$5.2bn) frigate replacement programme. The programme envisages the Italian Navy commissioning 10 New Generation Frigates (NGFs) between 2008 and 2018.

The NGFs will be built in two configurations – four as anti-submarine warfare (ASW) platforms and six general purpose/land attack vessels. The programme also calls for commonality between the two types to reduce procurement and life-cycle support costs.

The new ships will replace the current inventory of two Lupo- and eight Maestrale-class frigates built between 1977 and 1985, all of which are due to retire in 12-15 years. Two Lupos have already been decommissioned; the remaining pair will follow by 2003. To bridge the gap, some of the Maestrales will undergo a limited overhaul between 2003 and 2008 to extend their service life until the NGFs are commissioned.

A preliminary feasibility study 'Project 123', was completed by the Naval Staff's Studies and Projects Department earlier this year. The study called for a hull of no more than 5,000 tons; 135m long, with a maximum continuous speed of 27kt and a cruising



A drawing of the Italian Navy's planned New Generation Frigate.

range of 6,000nm at 18kt. The design will adopt an electric propulsion architecture and a high level of automation to cut operating costs and reduce manning requirements to around 130. Survivability will be improved by reducing signatures, making use of internal compartmentalisation and selective armouring.

Both versions will be fitted with the SAAMIT (surface-to-air anti-missile/Italy) self-defence system (based around the EMPAR multifunction radar and vertically launched Aster 15 missiles) and a 127mm lightweight gun with extended-range guided ammunition. Secondary systems include two 76mm guns with course-corrected ammunition for short-range self-defence and a flight deck with hangar for an NH90 helicopter. A hull-mounted sonar and MU-90 ASW torpedo launchers will also be a common feature.

The ASW variant is believed to have an active variable-depth sonar and towed-array receiver, together with eight Milan ASW missile launchers, placed amidships.

## Federal Budget boosts RAN funds

Australia's defence efforts received another boost in the recent Federal Budget. The Treasurer, Peter Costello,

announced increases to meet the cost of current commitments to the war on terrorism and enhanced domestic security arrangements in the aftermath of the September 11 terrorist attacks in the United States, and for the RAN's continued commitment to maritime surveillance and border protection operations.

### Overall funding rises

Overall Defence Department funding amounts to \$19.3 billion for 2002-03. This is up \$711 million compared to the current financial year, 2001-02, which was boosted by \$1.1 billion in February after the Government was returned in the November general election. In addition to the costs of the current operations, the increases cover price rises and the impact on the Defence Budget of the depreciation of the Australian dollar.

### Border protection significant

Defence Minister Robert Hill said the Budget allocation would continue Australia's contribution to the international coalition against terrorism, including Operation Slipper deployments of Special Forces, an RAN Task Group in the Persian Gulf, and RAAF refuelling aircraft in Kyrgyzstan. He said also the protection of Australia's borders was "one of the Defence Force's most significant responsibilities."

Defence and Customs have funding in the Budget to trial the high frequency surface wave radar that provides over-the-horizon border surveillance.

### Capability delivery sustained

The Deputy Chief of Navy, RADM Brian Adams said that Navy capabilities would account for \$5.8 billion of the funds provided by Government for our defence capabilities, and that Government will expect those



The MV-22 Osprey took to the skies of the US on May 29 for the first time after being grounded for over 17 months following the tragic Dec. 11, 2000 mishap. The first MV-22 test aircraft to resume flying has improvements in its hydraulic and flight control software systems that make it practically a brand new aircraft and the safest Osprey yet, according to V-22 program officials. (US Naval Air Systems Command).



The phoenix has risen. Then (left) and now (right). The rebuilt USS COLE is back in service after being attacked by suicide bombers in the Yemeni Harbour of Aden. Unconfirmed reports have suggested that the damage to the ship was far more extensive than originally estimated but that the ship had to be repaired as a sign of US resolve towards terrorism (this was well before Sept 11 2001). One US Admiral is on record as saying that the blast which nearly sank the Arleigh Burke class destroyer was equivalent to a 3,000lb bomb. (USN)



capabilities to be delivered "in ways that are financially prudent and sustainable into the future."

Future Navy capabilities are also provided for – a key commitment in the Defence 2000 White Paper was the introduction by about 2013 of at least three Air Warfare Destroyers – Phase 1 studies for this long-term project will examine the ADF's future maritime air warfare capability requirements.

#### Capital equipment increases

Expenditure on new capital equipment investment budget will increase from \$3.5 billion to \$4.1 billion, with a number of Navy-related major projects well advanced – the Anzac build program, Huon Class minehunter coastal acquisition, provisional acceptance of HMAS Rankin, the last of the Collins Class new submarines, continued redevelopment of HMAS ALBATROSS – including a helicopter underwater escape trainer and helicopter wash facility, and transition of Navy and Air Force radio network operational capability and staff to the replacement integrated high frequency communications system.

Automated sites will eventually operate in the Riverina, and at Shoal Bay, Townsville and North West Cape. The project for replacement of the Fremantle Class Patrol Boats will continue, and tenders for new ammunition storage facilities at Eden in southern New South Wales are to be called in mid-2002 – construction of the wharf began in March this year.

#### Recruiting & retention improve

A few months ago, the Navy Capability Management Committee

(NCMC) met in Canberra to review funding priorities for the coming Budget year. All FEG (Force Element Group) Commanders attended, together with representatives of Navy Headquarters, Maritime Command, Systems Command, and the DMO – supported by many of their respective Business Managers. Because recruiting and retention rates have now started to improve, RAN numbers are expected to increase in 2002-03 by more than 2% to over 12,800 – the highest level since 1999-2000 – and continue to increase steadily towards the target strength of around 14,000. Funding will permit Systems Command to continue with the ongoing review and civilianisation of non-MRU billets, a commitment made by the Chief of Navy in September 2000.

From Navy News

## CDF pays tribute to unique unit

CDF ADML Chris Barrie recently unveiled a plaque commemorating the EMU (Experimental Military Unit) personnel of the RAN and the United States Army who served together in the Vietnam War.

Over a thousand people gathered at Bomaderry on the south coast on Saturday April 27 02 to participate in the service.

In the presence of US Ambassador Thomas Schieffer and many Australian and American veterans and their families, ADML Barrie dedicated the monument to the men of the 135th AHC (Assault Helicopter Company)

of the US Army, which included many members of the RAN's Fleet Air Arm.

CDF said the 135th AHC was a unique combat unit. From October 1967 to June 1971 a detachment of RAN Fleet Air Arm personnel was integrated with the US Army unit. The Australians and Americans of the 135th operated troop carrying and ground attack helicopters in the war against insurgency in the Republic of South Vietnam. It was designated by the US Command as the Experimental Military Unit, or EMU, and had as its motto 'Get the bloody job done'.

The 135th AHC confirmed its motto with an unsurpassed record, a high reputation, and hard work, which was not without loss and sacrifice.

History records eight RAN personnel were killed in the war in Vietnam; five were members of the EMU. Thirty-two American EMU's were also killed in combat.

The nearly 50 strong group of Australians were Fleet Air Arm and support personnel posted as the RAN Helicopter Flight – Vietnam, a detachment of 723 Squadron, based at HMAS ALBATROSS, in Nowra. Four flights spent a year's tour of duty flying and maintaining US Army helicopters with their American counterparts.

RAN personnel were involved in all areas of 135th activities. A US army officer commanded the fully integrated international unit, totalling some 300 personnel, with an Australian Navy aviator as its XO and second in command.

Australian pilots were in command of the helicopter platoons and Australian technical personnel were in leadership positions throughout the maintenance areas. Australians were also in charge of the food preparation and the medical support facilities.

Part of the daily task of the multinational unit was helicopter insertion and recovery of troops, providing air to ground attack, re-supply of ammunition and equipment, and recovering casualties, throughout all weather conditions, night and day, at times under direct enemy fire.

Former member CPOATWO Jim Hill said, "For me the EMU monument is a unique reminder of the close Australian links with United States."

"It is dedicated to those Australian and United States service personnel of two different armed services of two allied nations who were integrated into a single military unit and fought a bloody, controversial and unconventional war, did it well and with honour."

By LCDR Frank Eyck, Navy News



USS CARL VINSON. The US company Northrop Grumman Corporation has been awarded a US\$42 million planning contract from the USN to facilitate preparations for the overhaul and refuelling of the nuclear-powered aircraft carrier USS CARL VINSON (CVN-70), scheduled for 2004. This will be the ship's first and only refuelling during a service life expected to span approximately 50 years. (USN)

# Observations

By Geoffrey Evans

## 'A CERTAIN MARITIME INCIDENT'

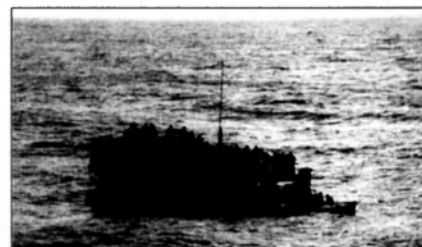
The terms of reference for the Senate Select Committee inquiring into a 'Certain Marine Incident' – the so-called 'children over board' affair involving HMAS ADELAIDE – are wide and have allowed some interesting statements and allegations to be made by participants. The inquiry is incomplete as this item goes to the publisher.

Former Chief of Naval Staff and Fleet Commander, Vice Admiral Sir Richard Peek, enlivened proceedings at one stage while vigorously supporting the Captain of ADELAIDE and his ship's company. The Admiral also made the valid point that the services are not businesses – "the services are no more businesses than is the parliament, the police force or the teachers. They are services and services cannot be organised in the same way as businesses. I think that

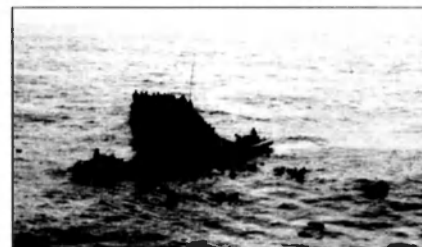
accepted that in recent years personal staff, who might be expected to share the political aspirations of their minister, have become a not-to-be-disregarded factor in the discharge of ministerial responsibilities, once the prerogative of non-political public servants. The armed forces and civil servants are unlikely to welcome any intrusion into their present relatively stable relationship.

The relationship between the defence force and the civil authority has been the subject of debate in Australia for over 100 years, leading in the first place to the creation of a naval board in 1905 to administer the force formed from colonial Navies following Federation. Debate on the subject has continued from time to time and it is curious to think an incident at sea in northern waters has caused the matter to be raised again.

The Senate Committee's final report should make interesting reading.



The images you were not meant to see, which were actually leaked to a television station. Had they not been leaked it is highly likely they would have never been seen (RAN)



is part of the problem in the current organisation of the defence forces".

Admiral Peek's statement will undoubtedly be widely supported in the ADF but a further comment about the (present) 'stupid' chain of command may not be received so enthusiastically by Defence leaders. However it does appear that the current division of responsibilities has caused confusion – a "who is responsible to who for what" situation – in some parts of the defence force.

Not the least interesting matter to be discussed at the inquiry concerned the role of ministerial staff 'advisers' who come and go as portfolios change hands. It seems to be

## A LIMIT TO THE SIZE OF SHIPS

It has been interesting to read in various shipping publications comment on the seemingly ever increasing size of merchant ships, in particular of passenger ships designed in the main for cruising.

Tankers and bulk cargo carriers have been growing in size for many years, but they carry small crews and as they load and unload at purpose-built ports and berths, are hardly noticed by most people: Big passenger ships are a different matter altogether.

To one who can recall the 'big' 28,000 - 30,000 tonne ships such as P&O's CANBERRA and HIMALAYA and the Orient

Line's *ORCADES* (his favourite) and *ORIANA*, the scale of almost everything pertaining to the present generation of liners is quite staggering.

P&O-Princess Line's *GRAND PRINCESS*, for example, has a dwt of 108,806 tonnes, or three and a half times that of the group mentioned in the preceding paragraph, has 13 passenger decks including internal promenades and a garden on the upper deck (to remind travellers of home?), with all berths occupied 3,100 passengers can be embarked plus a crew of 1,100 – no doubt many of who would belong to the catering staff.

Marine craft have been growing in size throughout the ages and from a shipbuilders point of view there would not seem to be a limit, limits however, there are, such as the depth of water in straits, channels, harbours etc., able to

accommodate deep draught vessels, facilities in ports and berths able to handle the human and inanimate contents of ships and the cost of such ships in the first place: The economic factors.

The International Maritime Organisation (IMO) is examining other factors, not least the safety aspects of the super-liners. Fire continues to be a major hazard in ships; collisions and groundings take place despite advances in electronic warning devices and communications.

Ever since the loss of the 47,000 tonne *TITANIC* and 1503 lives in 1912, passenger safety at sea has been a vital consideration of marine architects and shipbuilders; one might expect the new floating cities to create a few more headaches for both.

## Hatch, Match & Dispatch

### Hatch

#### BALLARAT Launches

BALLARAT, the eighth ANZAC class Ship, has been launched at Tenix Defence's Williamstown dockyard in Victoria on Saturday, 25 May, 2002.

The ANZAC Ship Project is a collaborative project between the Australian and New Zealand Governments for the development and construction of 10 new guided missile frigates – eight for the Royal Australian Navy (RAN) and two for the Royal New Zealand Navy (RNZN).

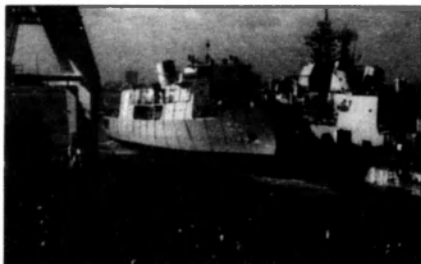
So far Tenix has delivered HMA Ships ANZAC, ARUNTA and WARRAMUNGA to the RAN and HMNZ Ships TE KAHIA and TE MANA to the RNZN.

The Commonwealth awarded the ANZAC Ship Project contract to Tenix Defence in 1989. This 17-year, fixed-price contract is currently worth approximately AU\$6 billion and is the largest defence contract ever awarded in Australia to date.

Managing Director of the Tenix Group, Mr Paul Salteri, said the success of the ANZAC Ship Project was testament to the quality of Australian workmanship and engineering ingenuity.

"The Tenix-built ANZAC frigates have proved to be a sophisticated world-class vessel capable of meeting the operational and strategic needs of both the Royal Australian and Royal New Zealand Navies," he said.

BALLARAT will now be fitted out with sophisticated new combat and communications systems and hardware. The ship is scheduled for delivery to the RAN in mid-2004.



The eighth Anzac class ship built by Tenix of Melbourne enters the water for the first time. (Kevin Dunn, Fleetline)

### Match

#### DIAMANTINA Commissions

Saturday May 4 2002 saw the RAN commission its next Huon class Minehunter HMAS DIAMANTINA at a ceremony at HMAS WATERHEN in Sydney.

The blessing of the Almighty was called down on the vessel during the Service by three RAN chaplains with SMNMUSN Tracy Bourke leading the Naval Hymn and National Anthem accompanied by RAN Band-Sydney under LEUT Paul Cotter.

The 720-tonne fibreglass warship was built at ADI's Carrington shipyard in Newcastle.

Her hull is designed to withstand tremendous underwater shocks. DIAMANTINA's hull is single skin without any ribs or reinforcing frames.

The hull also has very low magnetic signature and noise levels.

On board, all machinery and equipment is mounted in cradles or suspended from bulkheads to further enhance shock resistance, reduce noise and protect ship systems.

CN, VADM David Shackleton indicated during his speech he was very pleased with the new minehunter. Guest of honour for the commissioning ceremony was Maureen Bryden, whose father, CMDR Maurice Rose, commissioned the first DIAMANTINA.

The minehunter's principal task is to keep Australia's maritime focal points for trade free from the threat of mines.

Once mines are detected the ship deploys a remote control mine disposal vehicle to identify and neutralise the mine.



The White Ensign is broken for the first time on the newly commissioned Minehunter HMAS DIAMANTINA. (Brian Morrison, Warships & Marine Corps Museum Int)



The INCAT Catamaran HSV-X1, on lease to the USN, in company with the RN Type 22 Batch 3 frigate HMS CAMPBELLTOWN in the Persian Gulf. HSV-X1 is currently conducting operations with the US Military in the War Against Terrorism as part of its evaluation (USN).

The Australia designed and built catamaran HSV-X1 is steadily being put through its paces by the USN in an experimentation programme to see what value the ship has to future maritime operations. The following has been provided by the ship's maker, INACT Catamarans of Tasmania.

Versatility is the new order of the day for the US military and versatile is just what HSV-X1 *JOINT VENTURE* is proving to be. With her capability to quickly deploy troops and equipment before speeding away from danger HSV-X1 is turning the heads of her many observers.

HSV-X1 *JOINT VENTURE*, on charter to the US military from Bollinger/Incat USA, made a name for herself when she served as the Mine Countermeasures Command and Control ship during Gulf of Mexico Exercise. More recently the craft has been under the watchful eye of Marine Corps operational commanders as they explore its potential operational and tactical roles for the first time.

On February 5, the craft left her homeport at Naval Amphibious Base, Little Creek in Norfolk, Virginia and set out on a high-speed winter Atlantic transit. HSV-X1 completed the passage, unfueled, in an impressive five days and 17 hours at an average speed of 27 knots.

The purpose of the crossing – Battle Griffin, an exercise off Norway alongside NATO forces between March 7 and 14.

HSV-X1 was used as a platform to test various concepts, such as its ability to move equipment via coastal routes from an arrival port in southern Norway to the exercise in northern Norway.

Yet another list of firsts to the already impressive catalogue of achievements saw HSV-X1 carry out replenishment and re-supply at sea; special insertion and redeployment operations; reconnaissance; command and control; anti-submarine and mine warfare; humanitarian assistance and evacuation; surface warfare and force protection. Never before has a high speed craft accomplished so much.

The observers could not fail to be impressed. During the early stages of the exercise the craft performed a pre-dawn departure for an amphibious raid on Kyrkseteroera, some 75 nautical miles distant. En route she was diverted to hide in a

very small fjord as information received indicated the port facility had not yet been secured. Arriving off a pier at high speed the vessel slowed when within 730 metres and, after a very quick berthing completed discharge of Light Armoured Vehicles (LAVs) and other vehicles in ten minutes, with troops following behind. Within minutes HSV-X1 Joint Venture was underway again, departing the area at high speed and proceeding to sea to escort the MV *Obregon* into port.

As night fell on that hectic day, HSV-X1 came into her own. A night raid into enemy territory took enemy combatants advancing up the fjord toward friendly forces completely by surprise.

The following day MV *Obregon* was again under HSV-X1 escort and an advance reconnaissance of the entire 40 nautical miles route was completed in just one hour.

Most apparent was HSV-X1's ability to navigate at high speed in the very tight confines of Norway's fjords using the electronic chart system ECDIS and radar, particularly in poor visibility due to snow and rain. Additionally, the craft displayed her capability of operating free from mechanical problems in sub-freezing temperatures with frequent snow. Captain Philip Beierl, Officer in Charge said "HSV-X1 was also able to take advantage of narrow weather windows, as we did by departing Trondheim eight hours early, to get ahead of a predicted weather front. A slower vessel would have had to wait two days for a safe departure." In doing so, Captain Beierl demonstrated his advanced understanding of strategic capabilities only available to fast craft that easily out run bad weather.

Captain Beierl continued "The craft showed that we could operate safely at 15 knots in beam or following seas of 6 metres significant wave height."

If HSV-X1 needed to prove she was a workhorse then she did just that towards the end of the exercise, completing a winter intra-theatre lift of US Marine Corps (USMC)



HSV-X1 heading to sea from the US West Coast. It is understood that the USSN is keen to fit a Mk 31 RAM launcher to the ship to test its ability to provide its own self defence from anti-ship missiles and aircraft. (USN)



HSV-X1 has now proven itself in a NATO exercise off the freezing coast of Norway. Here the ship approaches a wharf during a snow storm. (USN)

retrograde cargo for Larvik. Captain Beierl said "26 LAVs, six Humvees and 100 troops, plus long range fuel brought the craft to absolutely full load. Calm weather allowed us to travel an outside passage down the coast, rather than the inside route, saving us several hours. Over 650 nautical miles of Norway's coastal and inland waters was covered in 24 hours at an average speed of 27 knots. On arrival we offloaded USMC cargo in just 22 minutes." Despite very heavy seas in the final offshore leg of the circuit the round trip was completed in less than 2.5 days.

One of the highlights of the week was when HSV-X1 played host to His Majesty King Harald V. of Norway, the Norwegian Minister of Defence, the Chief of Defence and the US Ambassador to Norway. The party got to see at first hand the impressive capabilities of the craft during a 40 knot passage from Orkanger to Hommelvik, Norway. A demonstration illustrated rapid arrival and departures from austere ports with the craft accelerating to high speed, turning around three miles out and returning to pier-side in under 15 minutes.

Battle Griffin provided the Marine Corps with an opportunity to explore the employment of the HSV-X1 in an inter-theatre deployment role and utility of the High Speed Craft (HSC) technology during expeditionary manoeuvre warfare. The exercise provided valuable insight and feedback on the capabilities and any additional requirements for potential procurement and development of the vessel in the future.

Just some of the many accomplishments achieved by HSV-X1 *JOINT VENTURE* were:

- flexibility to respond on very short notice to new requirements with little or no outside support



HSV-X1 unloading a USMC AAV-7 Amphibious Armoured Personnel Carrier (USMC)



HSV-X1 at dock in the US. Some commentators consider it a national embarrassment that the US Military is conducting further research, development and experimentation on an idea first tested by the RAN during the Timor crisis and with a product made in Australia. Who said our best ideas always have to go off shore to get a proper hearing? (USN)

- sustained speeds of 40 knots in confined waters leading to tactical surprise by opposing forces not expecting such rapid movements
- ability to launch an amphibious raid into an austere port with complete offload of vehicles and troops in ten minutes
- ability to carry and precisely lay large numbers of mines
- ability to easily manoeuvre in formation with conventional warships

With Battle Griffin complete HSV-X1 *JOINT VENTURE* turned her bows towards the English Channel and sailed for Rota, Spain where administrative control of the craft was transferred to the US Army for the next stage of her evaluation by the US military.

Transiting the English Channel the craft maintained full speed until entering the Bay of Biscay and turning south. After several hours at slow speed in 4.5 metre head seas Captain Beierl made a 300 nautical miles diversion into the bay to stay in conditions that permitted high speed running. Captain Beierl said "we skirted around Spain's Cape Finisterre a few hours ahead of a storm. There is no question, a slower ship would have been forced to divert into a French or UK port for at least three days before the weather cleared. We had the ability to divert hundreds of miles and still make schedule."

During the passage HSV-X1 also lost one main engine due to a cylinder head problem. Despite this and the diversion, the craft arrived in Rota on three engines ten hours ahead of her original schedule.

The craft has since joined US forces in the war on terrorism in the Persian Gulf.

# PRODUCT REVIEW

## The Battleships

Documentary

A Rob McAuley Production

Producer/Director Rob McAuley

Series Director/writer/editor Peter Butt

Narrator Robyn Williams

209 minutes

Available on DVD & as a Double-Box Set Video for approximately \$59.95rp each from all ABC Shops, ABC Centres, Online and leading video retailers.

Preview copy supplied by Roadshow Entertainment/The ABC

Reviewed by Mark Schweikert



Before the nuclear bomb "No weapon evoked so much passion and fear as the battleship. The largest and most expensive weapon ever built it had a dramatic role in shaping the modern world". This is the opening statement in the new and brilliant television documentary *The Battleships* and sums up the central focus of the series. The story of the battleships is told in four epic one-hour episodes - *A Thrust for Blood 1800-1906*; *Clash of the Dreadnoughts 1906-1916*; *The Darkness of the Future 1916-1939*, and *Terror from Above 1939-Now*.

*The Battleships* is a Rob McAuley production. Many will remember that other superb documentary series produced by Rob, *The Liners*, which details the history of another great world shaping man-made creation, the ocean liner. Those who have seen *The Liners* will remember the impressive level of research and fascinating footage contained in the documentary which "lifted the bar" for naval and maritime documentaries to be judged by. *The Battleships* certainly lives up to the standard that Rob set. His new documentary is a concise yet broad history of the capital ship, the Navies that operated them and the battleship's empire building contribution to the history of the world.

The German High Seas Fleet captured on film from an aircraft for the first time during the Battle of Jutland

*The Battleships* is enriched with eyewitness accounts and contributions from naval experts around the globe, the series spans almost two centuries - from the Battle of Trafalgar through to the Gulf War examining the rapid evolution of firepower and battleship design - from canvas to steam; timber to steel armour; muzzle-loading cannons to 18-inch guns, and beyond to rocket-launchers and missiles. As the spearhead for colonial expansion and in defence of the great empires, the battleship reigned supreme. As one observer put it in an interview on the documentary, "the battleship drew the line between nation and empire".

Some of the revelations and insights about the capabilities of the ships featured are amazing and for many will come as a first, making the documentary a very interesting and satisfying journey of discovery.

One such revelation involves the British capital ship *VICTORY*. This wooden battleship had 27 miles of rigging, four acres of canvass, took 6 years to build and was made from 2000 oak trees. One broadside from her three gun decks was able to hurl half a tonne of metal at an enemy ship. Apart from describing ships the documentary it also takes one on a virtual tour of some of these ships as they are today as museum pieces.

Another little known insight involved the potential 1928 Anglo-US war. With Britain and the US competing vigorously for dominance of the sea via a naval arms race a release valve was needed. This came in the form of the Washington Naval Treaty which limited the number and size of the world's capital ships. Without it some believe that the US and Britain would have gone to war for a second time.

Another little known fact discussed was Hitler's plans for a 144,000 tonne battleship with a speed of 34kts and eight 20-inch guns. This behemoth would have been impervious to everything but another battleship equal too or greater in size and fire power than her.

The world renowned experts interviewed for the series are without doubt the 'who's who' of the naval academic world and include such eminent historians as: Norman Friedman, Eric Grove, Jon Sumida, Gary Weir, David Lyon, Andrew Lambert, Richard Hill, Paul Sirlwell, Mark Peattie, Kiyoshi Ikeda and many more. Museum ships such as *VICTORY*, *MARY ROSE*, *MIKASA*, *NORTH CAROLINA*, *TEXAS* are toured for the viewer and some of the ship's curators are also interviewed about the ships in their charge. Eyewitnesses

interviewed span time and distance from the sinking of the German Fleet at Scarpa Flow to the attack on Pearl Harbor.

This documentary abounds with fascinating footage such as the USS MAINE disaster in Cuba of 1893 – which spurred the 1898 naval war between the US and Spain, the launch of HMS DREADNOUGHT by King Edward in Feb 1906 with a bottle of Australia wine, the battle of Jutland with the world's first combat aerial photography of the German High Seas Fleet turning for a second time to engage the UK Grand Fleet, the wrecked German Fleet at Scarpa Flow, HMAS AUSTRALIA being sunk off Sydney Heads and many more astounding images and footage.

Although a potential 'anti-climax' for battleship history enthusiasts, the documentary does deal with the ascension of the aircraft carrier over the battleship and rightly so as this is part of the battleship story. The aircraft carrier is also without doubt the capital ship of today and with the documentary's focus being capital ships as opposed to straight out battleships this end to the series is appropriate.

Unlike other documentaries on the subject, *The Battleships* is not a Jutland, Iowa, UK or US centric view of the capital ship, nor does it try to emotionalise and sensationalise the subject as other lesser documentaries have tried to in order to account for an acute lack of substance both in historical information and footage.

*The Battleships* is truly the thinking mans naval documentary and cannot be recommended highly enough.

## Pearl Harbor

Two DVD Movie set

A Jerry Bruckheimer/Michael Bay production

Touchstone Home Video

Distributed by Buena Vista Australia

183 minutes main feature

47 minute 'Making of' documentary

Reviewed by Mark Schweikert



The long awaited special edition DVD movie Pearl Harbor is now available and thanks to Buena Vista Australia THE NAVY has obtained a copy for review. The special

features included on this two DVD set comprise the original theatrical trailer; the Faith Hill Music Video 'There you'll be'; a short documentary on the Japanese Perspective of the movie and a documentary on the 'Making of' the Movie *Pearl Harbor*, and of course the movie itself which was reviewed in *THE NAVY*, Vol 63 No 3 p30.

To those who enjoyed the movie the special edition DVD set is well recommended. The 'Making of' documentary gives a whole new insight and understanding of the film and would have served critics well had they seen it.

*Pearl Harbor* is a balanced account of December 7, 1941 and was never intended to demonise either side's participation on that infamous day. Leading man Ben Affleck says, during the 'Making of' documentary that "I wouldn't have done it (*Pearl Harbor*) if I thought it was a piece of propaganda". World renowned Japanese actor Mako, who plays Admiral Yamamoto, said that the Japanese are not portrayed as evil or dark and that the absence of sensationalism to promote an emotional response against the Japanese is a selling point of the movie to a world-wide audience, to which the makers wished to reach.

*Pearl Harbor* doesn't glorify War or the opening stages of WW II but the use of special effects and the effort gone into demonstrating the intense ferocity of the day can make some believe, incorrectly, that is anything but an open and honest attempt to describe this tragic event. Other criticisms involve the two characters experiences as being unrealistic and to this point many are right. However, as the director explains, the story of *Pearl Harbor* was so incredibly large that no single experience could do justice or adequately explain what occurred. Thus, in order to tell the story the two central characters are put through a collection of actual experiences, what happened to them happened to someone is the director's philosophy behind the characters. For example, during the attack on Pearl Harbor two pilots did manage to get airborne and shoot down six Japanese planes.



The massive gimble made from 350,000lbs of steel for the movie to depict the capsizing of the battleship USS OKLAHOMA. Superstructure and background was then added by computer later.

To get an idea of the real story of December 7 1941 over 70 Pearl Harbor Veterans were interviewed for their perspective. Many also visited the set to act as advisers to the 'work in progress'. 'Doolittle Raid' survivors were also interviewed and visited the set during shooting. The information and experiences passed on by these veterans' gives the movie a better grounding in realism than many would think or know.



From the documentary on the making of *Pearl Harbor*, eight drums of petrol linked by 'det cord' on the bow of a decommissioned Spruance class destroyer. No miniature models were used in the making of the film in order to promote more realism.

The film was shot on location in Pearl Harbor with the battle scenes over the harbor taking six weeks to complete. The US Department of Defense gave the movie unprecedented access and permission to use the military facilities and personnel not only at Pearl Harbor but at other US Military establishments and ships, such was their confidence in the director's work. Aircraft used in the film are actual WW II aircraft with extra aircraft computer added to give a better perspective on the numbers involved. The film used a collection of flying 'warbirds' which included four P-40 Warhawks, three Zeros, three Kates, three Vals and three B-25 Mitchell bombers. The special effects team also received permission to place explosive charges on a number of decommissioned ships in Pearl Harbor to create the impression of an actual attack. This was coupled with actual Japanese aircraft flying over, in and around Pearl Harbor and the ships. The special effects team used 7,000 sticks of dynamite, 2,000ft of 'det cord' and 4,000 gallons of petrol to create massive explosions on the many decommissioned USN ships. It would have been rather perplexing for tourists visiting the USS ARIZONA memorial to see propeller driven aircraft with Japanese markings flying around the harbour at low level with large explosions and pillars of black smoke rising from a collection of ships just a few kilometres away.

Another fascinating element to the making of the movie involved flying condition B-25 Mitchells being hoisted aboard the aircraft carrier USS CONSTELLATION for the at sea 'Doolittle Raid' scenes. The B-25s had to compete for deck space with S-3 Viking and F/A-18 Hornets landing and taking off for their own take off scenes from the carrier. The last time a B-25 took off from a US carrier was during the 50th anniversary of the Doolittle Raid.

Other bits of trivia from the making of documentary involve some of the lead actors actually attending US Army boot camp to get a better perspective on military life and what it means to be a service member.

Nearly all extras were US military personnel with over 8,000 WWII uniforms and other period clothing having to be made for the film to generate a feeling of realism, for which the director and producer are well known for in Hollywood.

The two DVD set of *Pearl Harbor* is well recommended.

## STATEMENT of POLICY

The strategic background to Australia's security has changed in recent decades and in some respects become more uncertain. The League believes it is essential that Australia develops capability to defend itself, paying particular attention to maritime defence. Australia is, of geographical necessity, a maritime nation whose prosperity strength and safety depend to a great extent on the security of the surrounding ocean and island areas, and on seaborne trade.

The Navy League:

- Believes Australia can be defended against attack by other than a super or 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 to our allies.
- Supports the ANZUS Treaty and the future reintegration of New Zealand as a full partner.
- Urges a close relationship with the nearer ASEAN countries, PNG and the Island States of the South Pacific.
- Advocates a defence capability which is knowledge-based with a prime consideration given to intelligence, surveillance and reconnaissance.
- Advocates the acquisition of the most modern armaments and sensors to ensure that the ADF maintains some technological advantages over forces in our general area.
- Believes there must be a significant deterrent element in the Australian Defence Force (ADF) capable of powerful retaliation at considerable distances from Australia.
- Believes the ADF must have the capability to protect essential shipping at considerable distances from Australia, as well as in coastal waters.
- Supports the concept of a strong modern Air Force and highly mobile Army, capable of island and jungle warfare as well as the defence of Northern Australia.
- Supports the development of amphibious forces to ensure the security of our offshore territories and to enable assistance to be provided by sea as well as by air to friendly island states in our area.
- Endorses the transfer of responsibility for the co-ordination of Coastal Surveillance to the defence force and the development of the capability for patrol and surveillance of the ocean areas all around the Australian coast and island territories, including the Southern Ocean.
- Advocates measures to foster a build-up of Australian-owned shipping to ensure the carriage of essential cargoes in war.
- Advocates the development of a defence industry supported by strong research and design organisations capable of constructing all needed types of warships and support vessels and of providing systems and sensor integration with through-life support.

As to the RAN, the League:

- Supports the concept of a Navy capable of effective action off both East and West coasts simultaneously and advocates a gradual build up of the Fleet to

ensure that, in conjunction with the RAAF, this can be achieved against any force which could be deployed in our general area.

- Is concerned that the offensive and defensive capability of the RAN has decreased markedly in recent decades and that with the paying-off of the DDGs, the Fleet will lack air defence and have a reduced capability for support of ground forces.
- Advocates the very early acquisition of the new destroyers as foreshadowed in the Defence White Paper 2.
- Advocates the acquisition of long-range precision weapons to increase the present limited power projection, support and deterrent capability of the RAN.
- Advocates the acquisition of the GLOBAL HAWK unmanned surveillance aircraft primarily for offshore surveillance.
- Advocates the acquisition of sufficient Australian-built afloat support ships to support two naval task forces with such ships having design flexibility and commonality of build.
- Advocates the acquisition at an early date of integrated air power in the fleet to ensure that ADF deployments can be fully defended and supported from the sea.
- Advocates that all Australian warships should be equipped with some form of defence against missiles.
- Advocates that in any future submarine construction program all forms of propulsion be examined with a view to selecting the most advantageous operationally.
- Advocates the acquisition of an additional 2 or 3 updated Collins class submarines.
- Supports the maintenance and continuing development of the mine-countermeasures force and a modern hydrographic/oceanographic capability.
- Supports the maintenance of an enlarged, flexible patrol boat fleet capable of operating in severe sea states.
- Advocates the retention in a Reserve Fleet of Naval vessels of potential value in defence emergency.
- Supports the maintenance of a strong Naval Reserve to help crew vessels and aircraft in reserve, or taken up for service, and for specialised tasks in time of defence emergency.
- Supports the maintenance of a strong Australian Navy Cadets organisation.

The League:

Calls for a bipartisan political approach to national defence with a commitment to a steady long-term build-up in our national defence capability including the required industrial infrastructure.

While recognising current economic problems and budgetary constraints, believes that, given leadership by successive governments, Australia can defend itself in the longer term within acceptable financial, economic and manpower parameters.





Two RAF CH-47 Chinooks about to land back aboard HMS OCEAN after a Special Forces insertion mission into Afghanistan. The Chinook's long range, speed, reliability and flexibility, even in a maritime environment, is making it the workhorse of the war against terrorism both in the high rugged mountains of Afghanistan and the hot tropical jungles of the Philippines. Dust and mud can be seen on the two helicopters as they make their approach. (RN)



At sea aboard HMAS KANIMBLA (LPA-51) Jan. 15, 2002. RAN crew members prepare to launch a Rigid Hull Inflatable Boat (RHIB) of the US Navy's Special Boat Unit 20 (SBU-20), Detachment 'November'. Both countries are conducting multi national Maritime Interdiction Operations (MIO) against Iraq during Operation Enduring Freedom. Two USN SEAL Special Forces RHIBs (Rigid Inflatable Boats) also operated from HMAS KANIMBLA.

The anti-terror fleet. Naval ships from five nations sail in formation for a rare photographic opportunity in the Arabian Sea. From top row left to right: Italian frigate, ITS MAESTRALE (F-570), French destroyer FS De GRASSE (D-612), USS JOHN C. STENNIS (CVN-74), USS PORT ROYAL (CG 73), French aircraft carrier, FS CHARLES DE GAULLE (R 91), British Royal Navy amphibious warfare ship HSM OCEAN (L-12), French frigate FS SURCOUF (F-711), USS JOHN F. KENNEDY (CV-67), Dutch frigate, HNLSM VAN AMSTEL (F-831), and the Italian destroyer ITS LUIGI D'URAND DE LA PENNE (D-560). The coalition forces are deployed in support of Operation Enduring Freedom. (USN)



# THE NAVY

The Magazine of the Navy League of Australia



*The  
Creswell  
Oration*

*Regional  
Anti-Ship  
Missiles*

*The Battle  
of Salamis  
480 B.C.*

*Australia's  
Maritime  
Doctrine  
– Part 6*

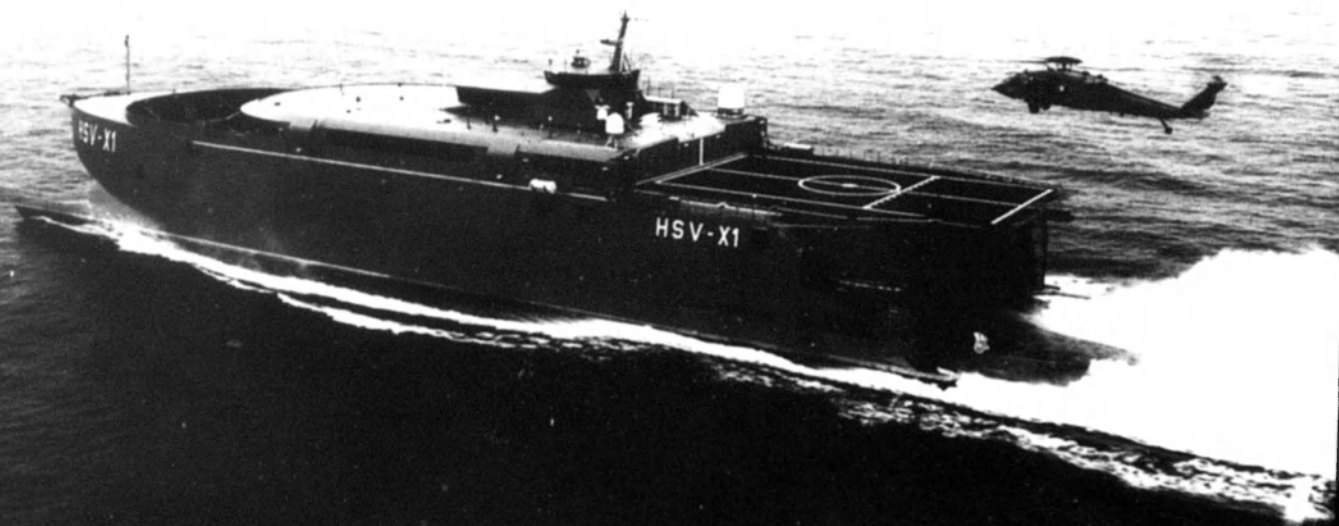
*Australia's Leading Naval Magazine Since 1938*

ISSN 1322-6231



04

9 771322 623000



The Tasmanian built 'Joint Venture', currently being leased to the USN, at sea and at speed with a new USN MH-60S about to land on its flight deck. The USN has indicated it is extremely impressed with the Tasmanian 'Cat' and may be close to placing an order for up to 100 vessels. (USN)

HMCS SUMMERSIDE passes a large iceberg while taking part in Exercise Narwhal Ranger. Exercise Narwhal Ranger was a Canadian joint operation with the army and air force and is the first of a series of operations to reintroduce the RCN to the icy North and get the three branches of the armed forces working together. (RCN)



# THE NAVY

Volume 64 No. 4

## Contents

<b>THE BATTLE OF SALAMIS – 480 B.C.</b> By Paul Morrison, Warships & Marine Corps Museum Int	Page 3
<b>REGIONAL ANTI-SHIP MISSILES AND THE LITTORAL PROBLEM</b> By Dr Roger Thornhill	Page 7
<b>AUSTRALIA'S MARITIME DOCTRINE PART 6</b>	Page 14
<b>THE CRESWELL ORATION</b> RADM Peter Briggs AO, CSC, RAN (Rtd)	Page 29
<b>Regular Features</b>	
From the Crow's Nest	Page 2
From Our Readers	Page 2
Flash Traffic	Page 18
Observations	Page 27
Hatch, Match & Dispatch	Page 33
Product Review	Page 34
League Policy Statement	Page 36

The opinions or assertions expressed in *THE NAVY* are those of the authors and not necessarily those of the Federal Council of the Navy League of Australia, the Editor of *THE NAVY*, the RAN or the Department of Defence. The Editor welcomes correspondence, photographs and contributions and will assume that by making submissions, contributors agree that all material may be used free of charge, edited and amended at the Editor's discretion. No part of this publication may be reproduced without the permission of the Editor.

Front cover: While flying over the USS WASP (Landing Helicopter Deck-1), two CH-53E Super Stallions prepare to take fuel from a KC-130 Hercules. The helicopters are part of Marine Medium Helicopter Squadron 261 (Reinforced) the Aviation Combat Element for the 22nd Marine Expeditionary Unit (Special Operations Capable), while the KC-130 is from Marine Aerial Refueler Transport Squadron 252. Photo by: Senior Airman Cheresa D. Clark USAF

## The Navy

All letters and contributions to:

The Office of The Editor

**THE NAVY**

Navy League of Australia

GPO Box 1719

Sydney, NSW 2001

E-mail to: editorthenavy@hotmail.com

All Subscription and Membership enquiries to:

The Hon Secretary,

Navy League of Australia, NSW Division

GPO Box 1719,

Sydney, NSW, 2001

Advertising enquiries only to:

Mr James Rickards

0419 731 371, rickardsmedia@yahoo.com.au

Deadline for next edition 5 November, 2002

## The Navy League of Australia

### FEDERAL COUNCIL

Patron in Chief: His Excellency, The Governor General

President: Graham M Harris, RFD

Vice-Presidents: RADM AJ Robertson, AO, DSC, RAN (Rtd); John Bird,

CDRE HJP Adams, AM, RAN (Rtd); CAPT H.A. Joseph, AM, RAN (Rtd)

Hon. Secretary: Ray Corbo, PO Box 309, Mt Waverley, Vic 3149

Telephone: (03) 9888 1977, Fax: (03) 9888 1083

### NEW SOUTH WALES DIVISION

Patron: Her Excellency, The Governor of New South Wales

President: R O Albert, AO, RFD, RD

Hon. Secretary: J C Jeppesen, OAM, RFD, GPO Box 1719, Sydney, NSW 2001

Telephone: (02) 9232 2144, Fax: (02) 9232 8383

### VICTORIA DIVISION

Patron: His Excellency, The Governor of Victoria

President: J M Wilkins, RFD

Hon. Secretary: Ray Gill, PO Box 1303, Box Hill, Vic 3128

Telephone: (03) 9884 6237, Fax: (03) 9884 4482

E-mail: rgill11@optusnet.com.au

Membership Secretary: L UOR Tom Kilburn MBE, RFD, VRD

Telephone: (03) 9560 9927, PO Box 1303 Box Hill VIC 3128

### QUEENSLAND DIVISION

Patron: His Excellency, The Governor of Queensland

President: I M Fraser, OAM

Hon. Secretary: Adrian Burwick, PO Box 13402, George Street Post Shop,

Brisbane, Qld 4003. Telephone: (07) 3263 1319

### State Branches:

Cairns: A Curneen, PO Box 1009, Cairns, Qld 4870

Telephone: (07) 4054 1195

Townsville: I McDougall, PO Box 1478, Townsville, Qld 4810

Telephone: (07) 4772 4588

Mackay: K Millward, PO Box 5527, Qld 4741

Telephone: (07) 4942 2965

Bundaberg: I Lahse, PO Box 5141, Bundaberg West, Qld 4670

Telephone: (07) 4151 2210

Southport: I V Fox, PO Box 946, Southport, Qld 4215. Telephone: (07) 5532 2447

### SOUTH AUSTRALIAN DIVISION

Patron: Her Excellency, The Governor of South Australia

President: Alan Preskett, RFD, 15 Sleeps Hill Drive, Panorama SA 5041

Hon. Secretary: Miss J.E. Gill, GPO Box 1529, Adelaide, SA 5001

Telephone: (08) 8272 6435 (H)

### TASMANIAN DIVISION

Patron: His Excellency, The Governor of Tasmania

President: Mrs J.M. Cooper, 42 Army Road, Launceston, Tas 7250

Telephone and Fax: (03) 6344 1531

Hon. Secretary: Mr K. Hunt, 36 Strahan Road, Launceston, Tas 7250

Telephone: (03) 6344 1191

### State Branches:

Launceston: Mr A. Latham, 67 Hardwick Street, Launceston, Tas 7250

Telephone: (03) 6344 3245

Ulverstone: Mr D. Cunningham, PO Box 93, Ulverstone, Tas 7315

Telephone: (03) 6425 2164

Devonport: Mr P. O'Leary, 11 Tasman Place, Devonport, Tas 7310

Telephone: (03) 6424 5064

Burnie: Mr G. Davis, 40 Cherry Street, Burnie, Tas 7320

Telephone: (03) 6431 4023

### WESTERN AUSTRALIAN DIVISION

Patron: His Excellency, The Governor of Western Australia

President: A.H. Hewitt, OAM, JP

Hon. Secretary: Mrs G Hewitt, 23 Lawler Road, Attadale, WA 6156

Telephone: (08) 9330 3600

### State Branches:

Geraldton: Mrs C Jones, 24 Cunningham Street, Geraldton, WA 6530

Telephone: (08) 9921 5772

Albany: D Bray, Lot 46 Frederick Street, Gledhnow, via Albany, WA 6330

Telephone: (08) 9841 6542

### FEDERAL ADVISORY COUNCIL

F. Geoffrey Evans, OBE, VRD, Chairman

Neil Band, Chairman Baird Publications

Wm. Bolitho, AM

Admiral Michael W. Hudson, AC, RAN (Rtd)

Vice Admiral David Leach, AC CBE, IVO, RAN (Rtd)

Lachlan Payne, CEO Australian Shipowners' Association

Vice Admiral Sir Richard Peek, KBE, CB, DSC, RAN (Rtd)

John Strang, Chairman Strang International Pty Ltd

## Corporate Members

The Australian Shipowners' Association

Hawker De Havilland Limited

Computer Science of Australia Pty Ltd

Strang International Pty Ltd



## FROM THE CROW'S NEST

### Where is Australia heading?

In mid-year a number of changes in senior ADF appointments took place at a time when for several reasons defence issues were receiving much closer-than-usual public attention.

The principal changes were those of Chief of the Defence Force (CDF), Chief of Navy (CN) and Chief of Army (CA); the Chief of Air Force (CAF) remained in place. The deputies of CDF, CN and CA also changed.

It might be though odd to change three of the four senior ADF officers at the same time, but leaving this aside the incoming Chiefs took up their appointments in different circumstances to those their predecessors had inherited.

First and foremost was the September 2001 terrorist attack on New York's World Trade Centre and its consequences which, together with the government's "border protection" policy, placed

considerable pressure on an ADF already under strain as a result of the East Timor and other peace-keeping/making commitments. The outcome of the American Presidential election and the Australian Federal election also played a part in focussing public attention on other than local events.

It is almost beyond belief that countries including Australia, still paying for the human and material costs of 20th Century wars, should again be considering war as a solution to problems. If ever there was a time for far-sighted and cool-headed national leadership, this would seem to be that time.

Australia's political leaders will no doubt consult the armed forces chiefs when determining the path the country is to follow in the immediate and near future; it so happens the present Chiefs are well qualified to provide advice, perhaps unusually so, and it might be accepted their counsel will be heeded.

By Geoff Evans

## FROM OUR READERS

Dear Editor,

I greatly enjoyed the article in the last issue on the DELHI class. It does seem the Indians consider that naval ships should actually be armed with offensive weapons, particularly when one compares this with the lightly armed or un-armed ships of the over-stretched RAN.

The articles on Australia's Maritime Doctrine would be of more value if Australia actually had the equipment to do all the things our doctrine espouses. That is not to criticize the efforts of the people of the RAN who have long experience of politicians wanting more 'bang' than they pay for.

Graeme Andrews OAM,  
Past editor of *Australian Sea Heritage Magazine*  
RAN/RANFR 1955-1980

Dear Editor,

I am part of the organising crew for an upcoming Reunion for all ex crew members of HMAS SUPPLY. This Reunion is to be held on the Long weekend of June 2003. The location is to be the Rooty Hill R.S.L. in Sydney's western suburbs.

Any ex crew interested in attending are asked to contact either myself, Ken Witchard on (02) 6492 3060, or RW 'Bubbles' Curran on (02) 6843 1850, or visit the web page at <http://www.w.uen.bigpond.com/WitchWeb/index.htm>.

So far we have located about 30 ex crew members and this Reunion is open to all ex crew Officers and Sailors alike from the very first crew in 1962 to the last in the 80's.

Ken Ex: ABQMG R109525  
HMAS SUPPLY 73-74  
E-mail: [WitchWeb@bigpond.com](mailto:WitchWeb@bigpond.com)

Dear Editor,

I do not share the enthusiasm of your reviewer for the ABC TV series "THE BATTLESHIPS". I confess though to missing one or two broadcasts. To me it has the now usual ABC bias against things British, in this case the British Battleship. Was there mention of HMS WARRIOR, the first iron battleship? No matter how well built German battleships were, they were not successful in the longer term. Much was made of US Battleships in European waters in WWI e.g. USS TEXAS. Their contribution was not important nor lasted for long even if she had the biggest hospital afloat. Surely through the centuries and decades, like it or not, the British battleships and the fleets they made up were the most effective and successful. Can any one show otherwise. This was not demonstrated in this series in my view.

Bruce Turner

Dear Editor,

Firstly let me express my thanks to your magazine for the Product Review of the television series, THE BATTLESHIPS. It was indeed a delight to receive such positive comments on our attempts to present such a highly technical, maritime subject in a form that a general audience could enjoy and appreciate. I have received word from the ABC to say that the series had won the highest rating for the year for that particular time slot. So I guess we must have done something right.

British Admiral of the Fleet, Lord Lewin was to have been our technical advisor on the series, but unfortunately he died just as we were about to go into production. In one of my last conversations with Lord Lewin, he made me promise that we "would get it right". We tried very hard to keep our promise to Lord Lewin, and my hope is that we did in fact get it pretty right.

Regarding the letter to the Editor from Mr Bruce Turner. Perhaps, through your magazine, I could reply to Mr Turner.

Dear Mr Turner,

Thank you indeed for your comments regarding THE BATTLESHIPS. It is gratifying to know that the series evoked a response from you, albeit harsh criticism of our treatment of the British battleship together with a couple of other items you feel we got wrong. In response, I offer the following comment.

Firstly, this was not an ABC production. It was produced by my Sydney-based company, Rob McAuley Productions and licensed to the ABC for broadcast. As Producer of the series, the editorial buck stops with me – not with the ABC. So, Mr Turner – your shot at the ABC regarding "the now usual bias against things British, in this case the British Battleship" is somewhat ill-informed.

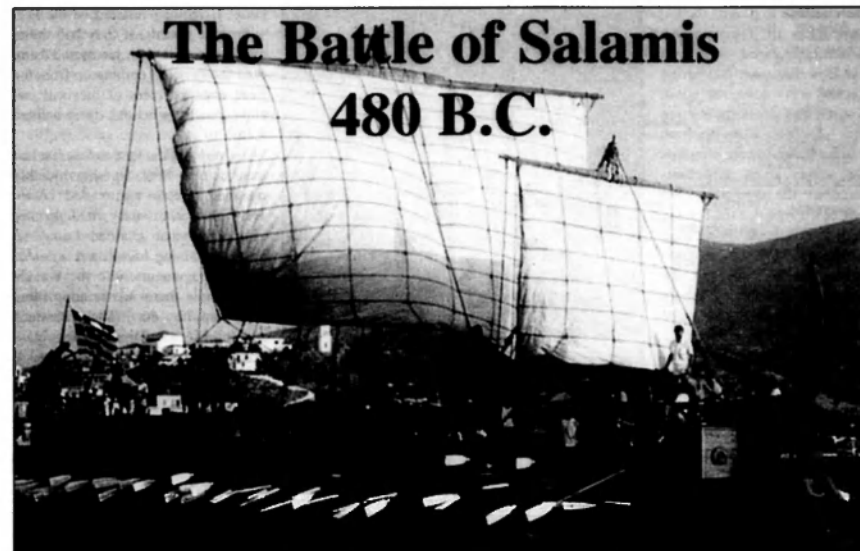
It is patently obvious that you did not see the entire series before making your comments. In the first episode, an entire sequence was devoted to HMS WARRIOR – its design – its unique armoury of guns – and its place in Royal Navy history.

The USS TEXAS received prominence for a number of reasons. It is the only Dreadnought class battleships still in existence. We set out in both World Wars – and we were also able to interview one of the sailors who served on it in WWI. His eye-witness account of the surrendered German High Seas Fleet being escorted to Scapa Flow was indeed unique. At 105 years of age, Paul Elliott – a pharmacist's mate on the USS TEXAS is the last remaining battleship veteran of World War I. I am sorry that you felt we had overplayed his role and the USS TEXAS story, but very obviously a vast number of the viewers here and around the world thought all the elements came together to provide a unique and very special sequence in the series.

Your comment regarding the series not acknowledging the superiority of the British battleships is a little baffling. We set out to make a series about the battleships of the world – without bias – treating friend and foe alike. As the series was made for an international market, our editorial aim was to present a fair and balanced story of these great ships and the men who sailed them. We had the privilege of interviewing a wide range of RN veterans – from Admiral of the Fleet, right down through the ranks, and not one of these extraordinary sailors has been critical of the way we presented the British battleships – or the Royal Navy.

So thanks for your comments, Mr Turner, I trust this information will encourage you to purchase a copy of the series form your nearest ABC Shop so that you can at least watch the complete series before making any further comments or criticisms.

Rob McAuley  
Producer  
THE BATTLESHIPS



A modern replica of a Greek Trireme that fought at the Battle of Salamis in 480 B.C. against the Persians.

By Paul Morrison,  
Warships & Marine Corps Museum Inc

Some sea battles have changed the course of a campaign and even a war – very few change the course of world history.

One such battle was fought nearly 2,500 years ago. The victory gained by this battle was to give prominence to sea power – for it was perhaps the first time that dominance in maritime power altered the outcome of a war and world history. Nearly all the wars fought up to that time had been decided by large armies, but in 480 B.C. Greece had no large armies when she was threatened by the greatest military power in the ancient World – Persia.

The events of 480 B.C. were later recorded in detail by the Greek historian, Herodotus, who was born sometime around 490 B.C. As a young man Herodotus travelled widely throughout Greece and the Mediterranean world, compiling his book, "The Histories". During his travels he would have spoken with some of the veterans who took part in the sea battle of Salamis. His chapters on this battle not only give an interesting insight into naval tactics of the time but also the politics of war.

### Plans for Invasion

Revenge was one of the main reasons for Persia's plan to invade Greece in 480 B.C. Ten years previously the Persian King Darius had decided to punish the Athenians for their support of the Greek city-states in Asia Minor. These city-states had risen up in revolt against their Persian rulers. After ruthlessly putting down the revolt Darius made plans to destroy Athens.

A large Persian army was landed on the plain of Marathon to the south of Athens. An Athenian army of 9,000 men under General Miltides hurriedly marched to meet them (their physical stamina saw them cover approximately 33kms in quick time with armour, hence the term Marathon to describe a modern long distance race) – surprising the Persians as they were setting up camp near the beach. Herodotus writes, "In the Battle of Marathon, some 6,400 Persians were killed, the

losses of the Athenians were 192". The Persians fled to their ships.

Ten years later in 480 B.C. Darius' son Xerxes, who was now king on the death of his father, decided to avenge the loss at Marathon with another invasion on a far greater scale. The army was immense – numbering more than 180,000 fighting men, with the fleet accompanying the army around the coastline of Asia Minor and into Greece consisted of some 800 triremes, as well as smaller warships and a large number of supply ships. Triremes were the largest warships of the period and the 'capital ships' of their day. They consisted of three banks of oars and carried a crew of more than 200. A contingent of up to 50 fighting men was also carried onboard. Logistics support for the massive land army in and around the rugged mountains and valleys of Greece would be impossible to transport by land but achievable by sea. The Persians thus relied greatly on their supply ships, which the warships had to defend if Xerxes was to succeed.

### Thermopylae

Acting on advanced warning the Greeks were determined to stop the Persian land advance at Thermopylae, a narrow pass between the sea and the mountains in northern Greece.

A fleet of 271 Greek triremes under the dual command of Themistocles (Athens) and Eurybiades (Sparta) was quickly assembled at Artemisium, between the island of Euboea and

the mainland to protect the sea approaches to Thermopylae. Here they engaged the Persian warships that were supporting Xerxes' army down the coast. A storm had struck the Persian fleet a few days before, causing losses to both warships and supply ships. Herodotus describes the confusion that took place amongst the Persian ships. "After the wind had dropped and the sea had gone down, the Persians got the ships they had hauled ashore into the water again, and proceeded along the coast... Fifteen of the Persian ships were far behind in getting under way, and the men aboard, happening to catch sight of the Greek ships at Artemisium, mistook them for their own, and on making towards them fell into the enemies' hands."

The Greek land forces at Thermopylae numbered some 7,000 Hoplites and they were under the command of the Spartan King, Leonidas. Hoplites were heavily armoured infantry - unusual in that most infantry of this period were only lightly armed and wore little if any armoured protection. The Hoplites were equipped with heavy shields, plumed helmets, breastplates and greaves. They carried long spears and short swords and fought in closed ranks or in a novel formation called a phalanx. This method of warfare was well suited to the valleys and mountains of Greece where it was difficult to deploy large numbers of soldiers and cavalry in open battle.

An old wall in the centre of the Thermopylae pass was quickly repaired, and for several days Leonidas and his men halted the Persian attempts to break through the pass - a pass too narrow for the Persian King to deploy his cavalry and chariots as well as take advantage of his superior numbers (180,000 vs. 7,000). Xerxes was even forced by desperation to deploy his own elite bodyguard, the Immortals into the battle but they too were forced back. It was only when a Greek traitor, Epialtes, led elements of the Persian Army along a hidden mountain trail behind the defenders that the battle was decided.

Leonidas now ordered the Greeks to withdraw from the pass before they could be encircled while he and his 300 Spartans fought a rearguard action. Herodotus recorded the final stages of the battle. "As the Persian Army advanced to the assault, the Greeks under Leonidas, knowing that they were going to their deaths, went out into the wider part of the pass much further than they had done before; in the previous days' fighting they had been holding the wall and making sorties from behind it into the narrow neck, but now they fought outside the narrows. In the course of that fighting Leonidas fell, having fought most gallantly, and many distinguished Spartans with him..."

"They withdrew again into the narrow neck of the pass, behind the wall, and took up a position in a single compact



A modern replica of a Greek Trireme under oar power. This is the dreaded sight that many in the Persian Fleet would have seen in September of 480 BC in the confined waters around the Greek island of Salamis.

body. Here they resisted to the last, with their swords, if they had them, and, if not, with their hands and teeth, until the Persians coming on from the front over the ruins of the wall and closing in, from behind, overwhelmed them."

When news of the land defeat reached the Athenian fleet, the ships quickly weighed anchor and sailed south. They had successfully held the sea approaches that guarded Leonidas' flank, sustaining losses in a series of small engagements with the Persian fleet - now there was nothing more they could do. The Persians controlled the Thermopylae pass which led on to the open plains of Attica, and beyond these plains to Athens.

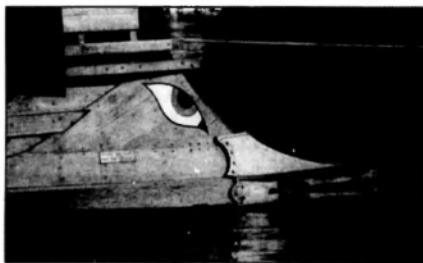
### The Athenian Navy

When the Athenian warships returned to Athens they found that the cities of the Peloponnesian Peninsula to the south were building a defensive wall across the narrow isthmus that divides northern and southern Greece. Athens lay to the north and outside of this

wall. The Athenian Army was too small to defend the city but Athens had a strong Navy - the largest in Greece.

It was Themistocles, an Athenian statesman who had convinced the city a few years before to build this fleet. Herodotus writes: "The Athenians had amassed a large sum of money from the produce of the (silver) mines at Laurium, which they proposed to share out amongst themselves; Themistocles, however, persuaded them to give up this idea and, instead of distributing the money, spend it on the construction of two hundred warships. The Athenians also found it necessary to expand this existing fleet by laying down new ships and meet the invader at sea with all the force they possessed, and with any other Greeks who were willing to join them."

The Athenian warships were triremes - more than 100 feet (33 metres) in length and with a beam of no more than 14 feet (5 metres); they had a shallow draught to allow them to be beached at night. The bow was armed with a bronze ram under



The bronze ram fitted to the bow of a Trireme was designed to punch a hole in the enemy's ships in order to sink them. The bow of Greek Triremes were also painted with a set of eyes as the Greeks believed this gave the ship mythical vision at night and in bad weather.

the waterline, and in the upper bow above the main deck was a fighting deck from where soldiers could board or fend off attacks from any vessel it had rammed. To board an enemy vessel, two boarding gangways or apophatha were lowered from either side of the bow. A large pair of eyes were also painted on the bow to give the ship "vision" during storms or at night.

There were three banks of oars and the rowers were not slaves but free men. They were assisted in their rowing by a flute player (Auletes) to give timing to the oar strokes. A ship would not normally exceed four knots, but for limited periods as in battle the ship could exceed 10 knots. There were sailors onboard as well as carpenters, and between forty and fifty soldiers. The ship's Captain was called a Triarch (Captain of trireme), and there were also four other ship's officers: Kubernetes (helmsman), Keleustes (in charge of rowers), Proreus (bow officer), and Pentekontarchos (Junior officer).

Herodotus writes that the Athenians consulted the Oracle at Delphi (a temple where offerings were made in exchange for information about the future) as to what they should do against the Persian invasion. The Oracle told them of the death and destruction they would face, but also added, "That the wooden wall only shall not fall..." The Athenians after some debate, for there were those amongst them who thought that the wooden wall was a reference to the wall around the Acropolis, the fortified section of the city, now realised "that by this expression the oracle meant the ships, and they urged in consequence that everything should be abandoned in favour of the immediate preparation of the fleet"

### Strength of the Greek Fleet at Salamis

Herodotus gives the following number of ships for the Greeks - "the Athenians with 182 ships, half the whole fleet, - 40 from Corinth; 30 from Aegina; 20 from Megara; 20 from Chalcis; 16 from Lacedaemon (Sparta), 15 from Sicily; 10 from Epidaurus; 7 from Ambracia; 7 from Eretria; 5 from Troezen; 4 from Naxos; 3 from Hermione; 3 from Leucas; 2 from Ceos; 2 from Styra; 1 from Croton; and 1 from Cynthus. The total number of warships was 368.

"It was under the commander, Eurybiades, a Spartan but not of royal blood... For the other members of the confederacy had stipulated they would not serve under an Athenian. The Athenians waved their claim (to command the fleet) knowing that a quarrel about the command would certainly mean the destruction of Greece."

### Strength of the Persian Fleet at Salamis

Herodotus mentions that there were 1,327 warships from the Persian allies and subjugated states present at Salamis. These included 300 from Phoenicia; 260 from the Greek cities in Asia Minor; 237 from the Greek cities allied to the Persians; 200 from Egypt; 150 from Cyprus; 100 from Cilicia; and 80 ships from various other cities.

Herodotus also writes, "The fastest ships were the Phoenician. All the ships carried Persians and Medes as



A map of the positions of both fleets during the Battle of Salamis.

marines..." Most of these marines would have been archers using composite bows for the Persians relied greatly on the bow in their battles. Ancient Greek historians later referred to the war with the Persians as the "War of the Spear against the Arrow". Against the armoured Greek hoplites with their large round bronze shields, in their closed ranks, and who were trained to move swiftly, the Persian archers would have been at a great disadvantage once their ship was rammed and boarded as the stand off range and killing power afforded by the bow would be negated.

### Prelude to the Battle

The Athenians evacuated most of their civilian population to the large island of Salamis, out in the bay and not far from their city. A small group of hoplites stayed in the city to defend the natural fortification and temple complex which was the

Acropolis - for even in such overwhelming circumstances the Greeks refused to abandon their gods. The defenders on the Acropolis though were quickly overwhelmed and the city was burnt by the invading Persian Army. "Having left not one of them alive, they stripped the temple of its treasures and burnt everything on the Acropolis. Xerxes, now absolute master of Athens, dispatched a rider to Susa (his own capital) with news of his success."

A council of the Greeks was hurriedly convened on Salamis. Many in the council argued that the fleet and the population should withdraw behind the wall then building on the Isthmus to the south, but Themistocles, whose idea it was to build the fleet persuaded them to fight at Salamis. "We shall be fighting in narrow waters, and there, with our inferior numbers, we shall win. Fighting in a confined space favours us but the open sea favours the enemy."

### Opening Phase of the Battle

The island of Salamis straddles the entrance to the Bay of Eleusis. There are only two narrow channels around the island which lead into the bay, both of which can be easily blockaded. The Persians blockaded the



A stone carving of the Greek leader Themistocles. It was his lobbying of the Greeks that saw them spend money on a Navy, which ended up saving them from the invading Persians at the Battle of Salamis.

western entrance with their Egyptian warships whilst assembling most of their fleet in the wider channel to the east. The Greek fleet lay at anchor in a bay of the island inside this eastern channel. "The Greeks were in a state of acute alarm, especially those from the Peloponnese: for there they were, waiting at Salamis to fight for Athenian territory, and certain, in the event of defeat, to be caught and blocked up in an island, while their own country was left without defence, and the Persian Army that very night was on the march for the Peloponnese."

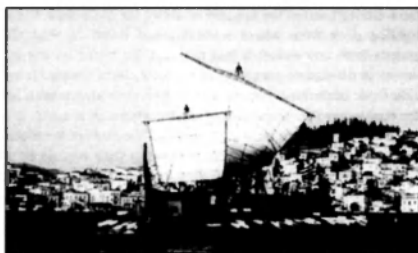
Aeschylus, an eyewitness to the battle later wrote that the Persians were drawn up in three lines outside the entrance to the channel. On the mainland nearby, a throne was erected from where the Persian King Xerxes could watch the battle.

On 20 September 480 B.C. at the break of day, the Persian fleet began its advance through the eastern channel. The lines formed up into columns with the Phoenicians leading. "The Athenian squadron found itself facing the Phoenicians on the Persian left wing." As the Phoenicians came through the channel, which was about 4 miles (6.4kms) wide, they faced the Greek fleet which was in an 'L' formation. The Greek ships suddenly began to back water, leading the Persian fleet further into the narrowing channel. "The Greeks checked their way and began to back astern, and they were on the point of running aground when Ameinias of Pallene, in command of an Athenian ship, drove ahead and rammed an enemy vessel. Seeing the two ships foul of one another and locked together, the rest of the Greek fleet hurried to Ameinias' assistance, and the general action began. Such is the Athenian account of how the battle started."

Other ships lay in wait in the bay and now ambushed the Persians on their left flank, driving them towards the shore of the mainland. In the ensuing confusion, the Persian ships began to crowd the narrow channel which was now only about 2 miles wide. Herodotus wrote, "The Greek fleet worked together as a whole, while the Persians had lost formation and were no longer fighting on any plan. None the less they (the Persians) fought well that day – far better than in the actions



A stone carving of the Persian ruler Xerxes on his throne overlooking the straits of Salamis during the battle with the Greeks for what would be described today as a battle for sea control.



A modern replica of a Greek Trireme under oar and sail power. A Trireme would not normally exceed four knots, but for limited periods as in battle, the ship could exceed 10 knots.

off Euboea. Every man of them did his best for fear of Xerxes, feeling that the king's eye was on him"

### Main Phase of the Battle

The Persian ships in the narrow channel had difficulty in turning to meet the enemy. Their speed would have been slow and in many instances they would have been broadside to the ramming Greek ships.

Herodotus recorded, "The greatest destruction took place when the (Persian) ships which had been first engaged turned tail, for those astern fell foul of them in their attempt to press forward. The enemy was in hopeless confusion; such ships as offered resistance or tried to escape were cut to pieces.... Such of the Persian ships as escaped destruction made their way back to Phalerum and brought up there under the protection of the army."

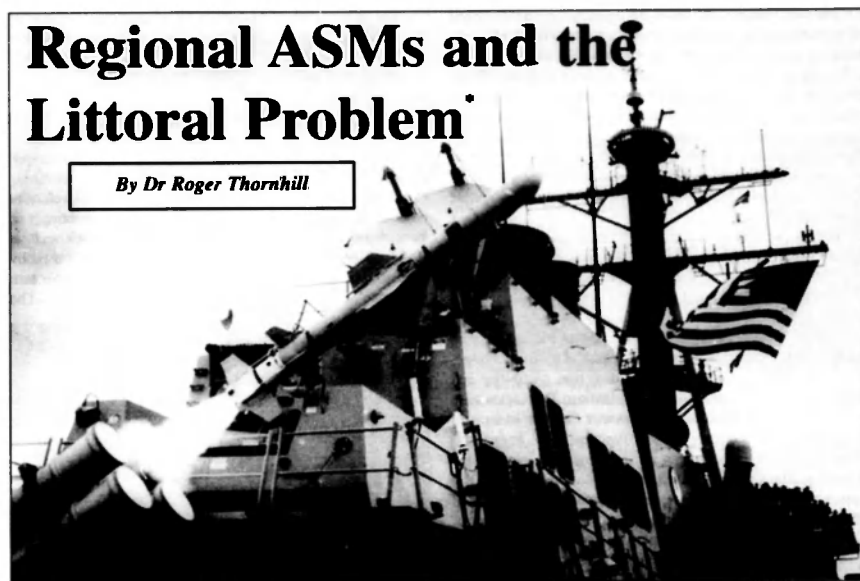
By sunset the battle was over. "Amongst those killed was the son of Xerxes' brother, and many other well-known men from Persia. There were also Greek casualties, but not many; for most of the Greeks could swim. Most of the enemy, on the other hand, being unable to swim, were drowned." Though Herodotus names many of the Persian commanders killed in the battle there is no mention of ship losses. "After the battle the Greeks towed over to Salamis all the disabled vessels which were adrift, and then prepared for a renewal of the fight, fully expecting that Xerxes would use his remaining ships to make another attack..." But the Persians were defeated and Xerxes, realising his sea borne logistics lines were no longer safe, reluctantly ordered his fleet, and thus the army, to withdraw. The losses suffered by the Persian fleet were thought to be a third or more of its total strength (450 ships). Although not a decisive defeat it was enough though to force the Persians on the defensive. A year after the Battle of Salamis, they were decisively defeated in a land battle at Plataea which brought the Persian invasion to an end.

### Conclusion

What would have happened if the Battle of Salamis had been lost? The Athenians had already made plans in the event of such a loss. Transports and warships were ready to evacuate the Athenian population from the island under cover of darkness. They were to be resettled in the Greek colonies in either Sicily or Southern Italy. It was possible that other Greek cities faced with defeat by the Persians would have followed, for it is doubtful that the wall across the Isthmus between northern and southern Greece would have stopped the invaders. Athens and her allies would have dominated Italy, and perhaps there would have been no Rome – western history would therefore have taken a different course. ↓

# Regional ASMs and the Littoral Problem

By Dr Roger Thornhill



The first test firing of the new Boeing Harpoon Block II with GPS to help it avoid inadvertently hitting land masses and civilian ships. It also has a secondary land attack capability. (Boeing)

Anti-Ship Missiles (ASM's) have enjoyed sensationalist media coverage over the last 30 years despite sporadic use and mixed results. However, this has not stopped some from attributing more to the ASM than reality allows. As Navies and militaries around the world shift operations to the littoral, Dr Roger Thornhill examines the current regional ASM arsenal and the littoral problem that many are faced with.

The 2000 Australian 'Green Paper' on defence, a public discussion document on how Australia should conduct its defence, cited the proliferation of ASMs in the region to coerce readers into a re-think on the viability of surface ships in Australia's military strategy. While the paper was correct in articulating that there are a large number of different types and users of ASMs in the region, over 20 different types and versions used by approximately 12 countries, it failed to highlight their level of sophistication and thus their influence on a modern Navy's operations, such as those of RAN/RNZN.

The level of ASM technology found in the region ranges from the 1950s to the 1990s. Older missiles are the most prolific and due to their age, pose the least threat. Further, many fail to appreciate the huge reconnaissance and targeting requirements of ASMs. The lack of this critical element relegates the ASM, regardless of sophistication, to a shipboard defensive weapon restricted to horizon-to-horizon engagements only. It should also be noted that the ASM is not 100% effective nor immune to counter measures.

To complicate matters, the financial burden of acquiring training rounds and missile war stocks by many regional countries have led some to argue, with a degree of merit, that future use of their ASMs may consist of harassing attacks only. This prediction is consistent with Argentine use of Exocet in the Falklands. One or two missiles fired at the periphery of a battle group with no real identification or targeting conducted. The Argentines had little training on the AM 39 Exocet and only five missiles. Had their training with

the missile been more complete and their war stocks larger, a different outcome from the conflict may have eventuated.

The following is a list of ASMs found in Australia's region with an explanation of each missile's characteristics. It is presented in isolation from the user's reconnaissance and targeting abilities and the counters that ships could employ to defeat them.

### SS-N-2 'Styx' a, b, c, d (4K30)

Entering service in 1958 with the Soviet Navy the 'Styx' is still used today by three regional Navies and can lay claim to the title of 'grandfather' of modern, non-Western, ASMs. Its most successful use came in 1967 when three missiles hit the Israeli destroyer EILAT sinking it off Port Said.



A Russian SS-N-2 Styx ASM being loaded into the missile launch tube of a fast attack craft.

The first version, the SS-N-2a, employs an MS-2 1-band (8-10 GHz) active radar seeker with a barometric altimeter to locate its target. The missile uses vacuum tube technology and is fitted with a 454kg hollow charge warhead with impact and proximity fuses. Its radar seeker locks onto a target after eight returns have been received, usually at about 12kms. Closer to the target the missile switches off and a gyroscope then guides the missile as radar returns are too close for the 1950's system to interpret. The missile cruises to the target at Mach .90 at an altitude anywhere from 100 to 350m out to a range of approximately 40kms.

The SS-N-2b version was a major redesign of the original missile which included a new 513kg hollow charge warhead, slightly increased range, the option of an IR seeker to complement the MS-2 radar and the ability to use a 15KT nuclear warhead.

The SS-N-2c version was another major redesign with an MS-2A solid-state radar seeker which improved range, bearing accuracy, low level target detection capability and improved clutter suppression/discrimination. The seeker also has improved ECCM (Electronic Counter Measures) capabilities and a home on jam function. The barometric altimeter was replaced with a radio altimeter to enable sea-skimming attack profiles with a terminal altitude of 2.5m. The missile also has a maximum speed of Mach 1.3 and a range of 80kms.

The SS-N-2d is similar to the 'c' Styx missile but has an L-band (1-2GHz) radar seeker and an electro-optic seeker to supplement the radar in case of jamming.

Users: India (B, C, D), North Korea (A) and Vietnam (B, C, D).

## SY-1/HY-1 & HY-2

In 1959 the Soviet Union sold SS-N-2a 'Styx' ASMs to China who then reverse-engineered them as the SY-1. However, flight-testing of the Chinese variant didn't conclude until 1966 when it entered Chinese service and dubbed the 'Silkworm' by US intelligence. The missile suffered from simple ECM (Electronic Counter Measures) and an unreliable altimeter which would cause the missile to drop height during flight.



A Chinese HY-1J ASM being loaded onto one of the PLAN's ships. Note the similar appearance of the HY-1 to the Russian SS-N-2 Styx ASM which China copied to make the HY-1 series of ASMs.

Noting the SY-1's deficiencies the Chinese developed an improved version known as the HY-1. This missile has a much improved radar seeker, rocket motor, booster and autopilot but didn't go into production until 1975 due to flight test problems. Both missiles have a 454kg hollow charge warhead and a range of 40kms at Mach .9.

The HY-2 ASM is thought to be an improved version of the HY-1 with greater range (95kms) and a selection of seeker heads. In addition to the 1-band seeker of the HY-1 the HY-2 is offered with an IR seeker (HY-2A) and a monopulse active radar seeker (HY-2G).

Users: Bangladesh (SY-1, HY-2), China (SY-1, HY-2) and North Korea (HY-1).

## YJ-1 (C-801) & YJ-2 (C-802)

The Chinese YJ-1 'Eagle Strike'/C-801 (C-801 refers to the export version) was first revealed in 1984 but thought to have been under development since the mid-1970s. It is designed as a replacement to the 'Styx' based ASMs used by China and was developed during a period of 'Western influence', hence its resemblance to the French Exocet. The



A Chinese YJ-1 (C-801) ASM being fired from one of their destroyers. The YJ-1 (C-801) closely resembles the French Exocet missile and is a replacement for China's obsolete SY-1, HY-1 and HY-2.

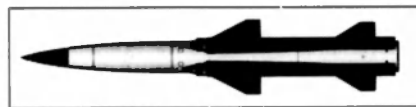
YJ-1 uses a solid propellant rocket motor, is radar guided and has a 165kg semi-armour piercing warhead. Guidance to the target area is via an INS (Inertial Navigation System) with a monopulse J-band (10 - 20 GHz) active radar for the terminal phase. It follows a sea-skimming profile, 20m for mid-course and then 5-7m for terminal phase, which is controlled by a radio altimeter. The missile has a maximum range of 40kms when launched from sea level and a maximum speed of Mach .85.

The YJ-2/C-802 (C-802 being the export version) differs from the YJ-1 in that its solid propellant rocket motor is replaced by an air-breathing turbo jet engine giving much greater range, approximately 130kms. It first entered service in 1994 and is also thought to use the same guidance and warhead as the YJ-1.

Users: China (YJ-1, YJ-2) and Thailand (C-801).

## SS-N-22 'Sunburn' (3M80/3M82 Moskit)

The SS-N-22 'Sunburn' ASM epitomises the Soviet belief that fast is better than smart. The Sunburn ASM travels at Mach 2.5 to give its target the least amount of time to react and thus initiate a hard and/or soft kill counter. It also demonstrates that the Soviets realised that their ASM technology was behind in the 'smart' area and susceptible to Western counter measures. The Sunburn entered Soviet service in 1984 and has a 300kg semi-armour piercing warhead and a liquid-fuel ramjet engine to maintain its



A drawing of a Russian built SS-N-22 'Sunburn' ASM

supersonic flight profile which takes only two minutes to complete (over its maximum range of 90 - 120kms). The missile uses an INS with data link back to the launch platform to get it to a point 10-15kms from the target where its radar seeker is activated. The missile's seeker can function in three modes: active, passive home on jam and a combination of the two. Once the target is fixed the missile enters its terminal phase which can consist of either a sea-skimming, pop-up or weaving manoeuvre. Once the target is acquired the missile descends to 7m and can execute evasive manoeuvres up to 10g, although this reduces speed and potentially accuracy given the missile's speed. The missile also has no known re-attack capability which, given its very small acquisition window due to its supersonic speed, could produce inaccuracies.

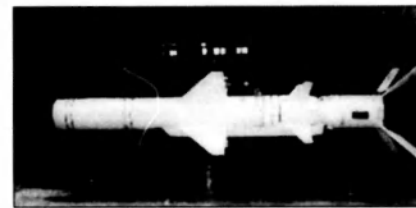
Users: China



An SS-N-22 'Sunburn' being fired by a Russian Sovremenny class destroyer. The SS-N-22 is a large, rocket powered, supersonic ASM which China believes will give it an anti-carrier capability against the USN in any future China-Taiwan conflict.

## SS-N-25 'Switchblade' (3M24 Uran)

The SS-N-25 Switchblade represents a departure from standard Soviet philosophy and technology in ASMs. Rather than a large, technically simple, rocket powered supersonic ASM, the SS-N-25 mirrors western technology and thinking, it's technically advanced, relatively small, has a turbo jet engine and is subsonic. Its resemblance to the US Harpoon has earned it the title of 'Harpoonski'. The missile was first seen at the 1992 Moscow air show. It has an active radar seeker, the ARG-35, which operates in the I/J band (8 - 20 GHz) with a range of 20kms. It can search in azimuth +/- 45 degrees and +/- 10/-20 degrees in elevation. It has a 145kg semi-armour piercing fragmentation warhead with a delayed fuse and a range of approximately 130kms. The missile uses an INS with



A Russian SS-N-25 'Switchblade' ASM. Given its resemblance in looks and mission profile to the US Harpoon many in the West have dubbed it 'The Harpoonski'.

radio altimeter to arrive at the target area. It cruises at Mach .9 at 5-10m until the radar, switched on at about 25kms from the target's expected position, locks on the ship, it then descends to 3m and then 1.5m for the final few seconds. The Switchblade can be salvo fired with a two second delay between launches.



An Indian Navy Project 25A missile corvette. The Indian Navy is the region's prime 'Switchblade' user. Indian ships employing the missile type generally have at least 16 of the missiles (John Mortimer)

Users: China (it was recently revealed that China would be acquiring the air launched version), India and Vietnam.

## MM 38/AM 39/MM 40 Exocet

Perhaps one of the more widely known ASMs, the MM 38 Exocet (French for Flying Fish) was first cleared for production in 1974. The MM 38 uses an ADAC 1-band (8 - 10 GHz) single axis active monopulse radar seeker, with a range of 25kms against fast attack craft, and an INS with radio altimeter. The 165kg fragmentation warhead is linked to an autopilot controlled proximity and delayed impact fuse. The missile's range is approximately 40kms at Mach .9 using a solid propellant rocket motor.

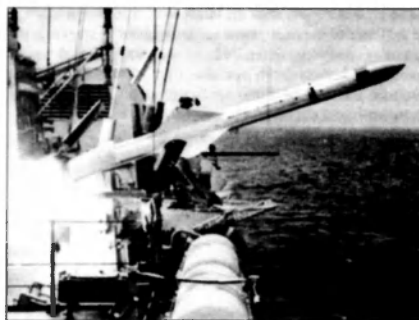


An MM 38 Exocet ASM at the point of launch. Given the MM 38's age many of the region's stocks of the missile are in desperate need of maintenance just to be considered reliable enough to leave the launch tube.

Exocet travels to its target at approximately 100m which is thought to be high enough to provide greater range for the seeker and yet low enough to mask its approach. At around 15kms from the target's expected location the ADAC seeker is activated. Once a target is detected the missile descends to 9m before descending to 2m (highly dependant on sea state).

The new MM 40 Exocet features a number of improvements over its 1970's cousin. The Block I version has digital processing and a larger search and acquisition radar angle. The Block II has a new J-band (10 - 20 GHz) Super ADAC radar seeker with improved ECCM performance, the ability to distinguish between different targets and with a chaff





An MM 40 Exocet being fired from one of Malaysia's Lekiu class frigates. The MM 40 is a generation ahead of the MM 38 of Falklands fame.

discriminator function. The manufacturer also claims that the missile has a lower RCS and IR signature than the MM 38 and able to be used in sea state 7. Its range has also been increased to 75kms, still with solid propellant rocket motor, and with a 155kg warhead with both impact and proximity fuses.

Users: Brunei (MM 40 Block II), Indonesia (MM 38), South Korea (MM 38), Malaysia MM 38, MM 40 Block II) and Thailand (MM 38).

## OTOMAT Mk 2

The Italian Otomat missile began production in 1976 for the Italian Navy. However, in 1973 work began on a new longer ranged Otomat known as the Mk 2. The turbo jet powered Mk 2 has a range of 160kms, a 210kg semi-armour-piercing warhead and a speed of Mach 9. To utilise the missile's full range a mid-course guidance system is fitted allowing the shooter to relay updated target information to the missile's INS. The missile is capable of sea-skimming attacks only and uses a single-axis, pseudo-monopulse seeker. Otomat cruises at 15 - 20 m until about 7kms from the target (known through accurate targeting and mid-course updates) when it



The Royal Malaysian Navy Laksamana corvette, LAKSAMANA TUN ABDUL JAMIL. The Laksamana corvettes are armed with six Otomat Mk 2 ASM launchers as seen on the stern of the corvette. The Otomat has an excellent stand off range and mid-course guidance update ability but many wonder if the RMN can fully exploit the missile's capabilities. (RMN)

radar switches on and scans a 40-degree sector in azimuth only. Once the target is acquired the missile descends to 10m for the run into the target where it further descends to 2m in the terminal phase.

Users: Malaysia (Mk 2).

## Gabriel

With its Arab neighbours acquiring large quantities of SS-N-2 from the Soviets, Israel, being under an arms embargo, decided that it too should have an ASM. Work on the Gabriel ASM began in the early 1960s and was complete by 1969. The



An Israeli made Gabriel ASM being fired from a RSN (Royal Singapore Navy) fast attack craft. (RSN)

sinking of the Israeli destroyer Eilat in 1967 further strengthened their resolve for an indigenous ASM.

The Gabriel has a 150kg HE warhead and uses a semi-active seeker. When the seeker acquires the target through reflected radar energy the missile enters its terminal phase and descends to 4.5 - 6m. Gabriel can also be guided manually through an optronic system on the launch craft. This feature is generally used in severe ECM conditions. Gabriel is powered by a solid rocket motor propelling the missile to a speed of Mach .7 out to a range of 20kms.

Users: Singapore and Thailand.

## Hsiung Feng I/II

The Hsiung Feng ASM was thought to be a reverse engineered Gabriel ASM given Taiwan's use of the Gabriel I and II, but Taiwanese sources suggest a far more complex missile. Taiwan set to work on their own ASM in 1980 producing the Hsiung Feng I, which closely resembles the Israeli Gabriel II ASM. It uses a radar seeker with INS, radio



The Taiwanese made Hsiung II ASM is unique as its targeting system is made up of two guidance sensors, radar and IR, making this 'multi-spectral' ASM a difficult proposition to decoy.

altimeter, solid rocket motor and sustainer and a 150kg warhead. The Hsiung Feng I uses a similar attack profile as the Gabriel and has a range of 36kms at Mach .9.

The Hsiung Feng II was developed as a longer ranged ASM given the refusal of some nations to sell ASMs to Taiwan, for fear of upsetting China. This missile has an active radar seeker with planar array which is complemented by an IR seeker. The Hsiung Feng II is able to assign priority to

either sensor if it feels its being jammed or environmental considerations come into play (heavy rain, fog etc). The missile is housed in a similar launch canister as the Harpoon Mk-141 launcher.

Users: Taiwan.

## Sea Eagle

The British Aerospace Sea Eagle missile was first put into production in 1982, entering British service in 1984, to meet the UK's requirement for an air-launched sea-skimming ASM.

The missile uses an INS for the mid-course mode and a J-band (10 - 20GHz) active pulse radar seeker for the terminal phase. The radar seeker is programmed to switch on 18kms from the target. However, the missile can be programmed to



An Indian Airforce Jaguar with a British made Sea Eagle ASM on its centreline pylon. The Sea Eagle is regarded as one of the region's more dangerous ASMs given the level of technology in its seeker and guidance systems. India is now the sole user of the Sea Eagle which it also employs from its Sea King helicopters and 'Bear' long range maritime patrol aircraft (Indian Airforce)

climb from its sea-skimming cruise mode when 30kms from the target's expected position to conduct its own search. It is capable of ignoring decoys or counter measures, flying random evasive manoeuvres during the final phase and can attack from any bearing. The missile has a range of 110kms at Mach .85 and a 230kg semi-armour piercing warhead with delayed impact fuse. It uses a kerosene fuelled turbo jet engine which is said to have a very low IR signature and smoke free. The UK recently withdrew Sea Eagle from its order of battle leaving India as the sole user of this ASM. It is not known if left over UK stocks or support infrastructure for the weapon was sold to India. If not, then India may have some difficulty in maintaining the Sea Eagle over the next few years.

Users: India.

## SS-N-27 (3M54E) Club

The SS-N-27 was first seen in the early 1990's as a concept missile and known by the names: P-10 Alfa, AFM-L and KS-127 however, 3M54E 'Club' is the name given to it by the Russian manufacturer Novator. The 'Club' concluded testing



The SS-N-27 is regarded as one of the more dangerous ASMs in the world. It has a range of approximately 220kms, employing wings and an air breathing jet engine like its 'cruise missile' ancestors. Once its target is detected it drops a supersonic rocket powered dart from the nose which then does a 'corkscrew' manoeuvre to evade hard kill counter measures before hitting the target ship.

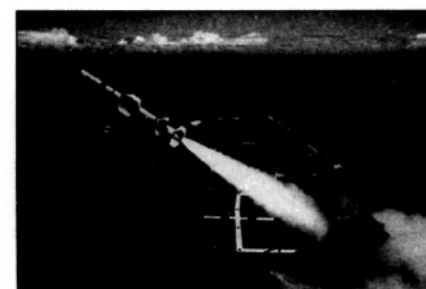
in 1999 in the Baltic and is a rather unique ASM. It has a range of approximately 220kms using a turbo jet engine and cruise wings (demonstrating its SS-N-21 cruise missile pedigree). Approximately 20-30kms from its target, which it approaches by an INS, the missile pops up, acquires the target by its own radar seeker and then drops a supersonic dart which accelerates to Mach 3 at sea-skimming height using a solid fuel rocket motor. The smaller dart makes detection more difficult than the larger 'cruise' body with its turbo-jet and wings. During the terminal phase the missile can either weave or conduct a corkscrew manoeuvre to counter shipboard defences. The later manoeuvre tends to reduce its speed considerably as the solid rocket fuel has already been exhausted by this stage which also precludes any re-attack ability if it misses the target. The Club's warhead is thought to be approximately 250kgs and comes in two versions, the 'Club-S' is launched from a submerged submarine and the 'Club-N' from a vertical launch tube on a surface ship.

Users: India (S & N versions)

## Harpoon

Harpoon first entered service in 1977 as a basic ASM and since then has undergone a number of Block improvements. In June 1982 the Block IB came with a sea-skimming capability and better ECCM. The Block IC, 1984, featured greater range, improved ECCM, better electronics, indirect attack capability via waypoint programming and terminal phase tactical options.

Harpoon is guided to its target by an INS and uses a PR-53/DSQ-28 J-band (10 - 20GHz) two axis active radar seeker with a flat phased array radar capable of 90-degree searches.



An RAN FFG fires a Harpoon ASM. Harpoon suffers in the littoral from land-induced clutter. Its unrestricted use in the archipelagic environment to Australia's north must be held in question. (RAN)

It has a 221kg semi-armour piercing warhead with delayed impact fuse, a turbo jet engine with a speed of Mach .85 and a maximum range of 120kms (Block IC variant).

At 2kms from the target the Block I would climb and make a 30 degree dive attack onto the target. The Block IB comes with the pop-up dive attack mode and the option of sea-skimming all the way to the target. The Block IC has a number of improvements over the B version. It can fly at high altitude for the first phase of the attack to avoid land masses or friendly ships and approach the target indirectly by means of up to three waypoints.

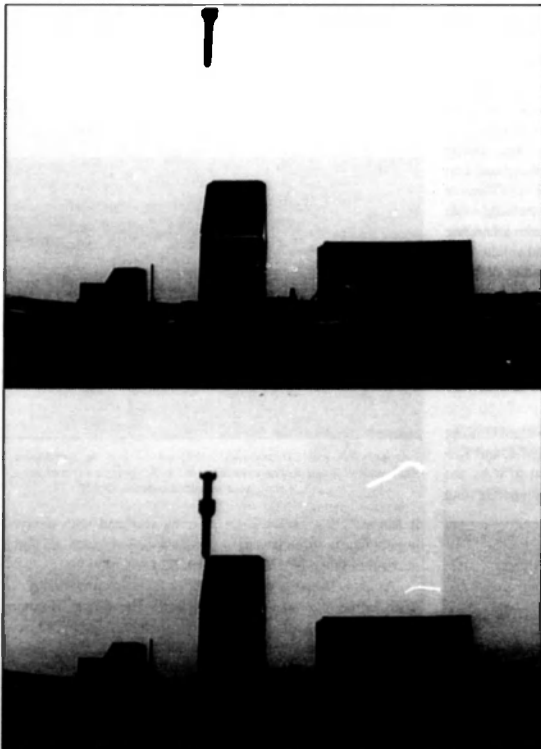
Users: Australia, Indonesia (no test firings reported nor acquisition of missile stocks), Japan, South Korea, Singapore, Taiwan and Thailand.



## The Littoral Problem

With 80% of the UN's membership having a coastal border the littoral becomes an ever increasingly important and potential area of future conflict. Despite this fact, nearly every ASM presented so far has a major deficiency when used in the littoral/archipelagic battle space. Given the dependence on radar seekers the current generation of ASMs are unable to distinguish targets when backgrounded by land – the British withdrew the Sea Eagle ASM from service recently for this reason. Most ASMs in use today were designed with the classic open ocean naval battle in mind that had no landmass clutter to return multiple confusing radar pictures to the ASM.

The littoral also presents the problem of a compressed battle space littered with friendlies, non-combatants, man-made structures and natural features which the ASMs listed are unable to discriminate against. Further, ASMs with a long range like Harpoon are more likely to continue on if its target is obscured by land and hit a non-combatant of a neutral flag or another politically sensitive asset. Use of such a missile then becomes less attractive to responsible militaries or those with few stocks. The recent Australian White Paper's focus on Harpoon use in the littoral seems to have neglected this



Two frame by frame images of the first Harpoon Block II striking a land target. Block II will give many navies a long range precision land attack capability previously only enjoyed by the USN. (Boeing)

problem. In reality it could mean that its use will be restricted or banned.

The following five missiles, due to enter service shortly with Navies around the world, have been designed to overcome the littoral problem, giving their users a distinct advantage when operating in this environment.

### Harpoon Block II

The new Block II Harpoon is designed to operate in the littoral environment through the application of a number of new and existing technologies. Its new guidance system incorporates technologies from two other existing weapons – the low-cost, inertial measuring unit from the JDAM (Joint Direct Attack Munition); and the software, mission computer, integrated Global Positioning System (GPS)/INS, and the GPS antenna and receiver from the SLAM-ER (Stand-off Land Attack Missile Expanded Response) missile.

The new mission computer can be fed a database of coastlines to allow accurate navigation and target/landmass discrimination. Its search pattern can also be controlled by limits placed on it by the GPS correlating landmass and coastline data. Upon finding the ship target the Harpoon Block II can attack in the same manner as the Block IC. The accurate navigation solution also allows the missile to overfly land and aid in discriminating target ships from islands or other natural or man made structures. An added benefit of this Block upgrade is the ability to attack land targets such as SAM sites, harbour facilities, runways, buildings etc. It is understood Boeing is keen to sell Harpoon Block II to the RAN for the Anzac upgrade programme giving it a littoral ASM and land attack stand off capability, a perfect fit to the recent Australian White Paper's focus for future operations.

Users: none in the region – at this stage.

### Maverick

While the AGM-65 Maverick has been around for some time it's the RNZN's employment of the new maritime enhanced version on its Super Seasprite helicopters which make it even more useful as an ASM. Given the missile's IR TV passive guidance it does not suffer from the problems of land mass clutter or confusion as radar guided missiles do. Further, the operator can identify the target before firing thus having the option of aborting if the target turns out to be not the intended. Although the new Maverick is specifically designed to be used against ships it also retains its land attack pedigree giving the RNZN a rather unique littoral attack capability against ships and shore installations.

Users: RNZN.

### Penguin

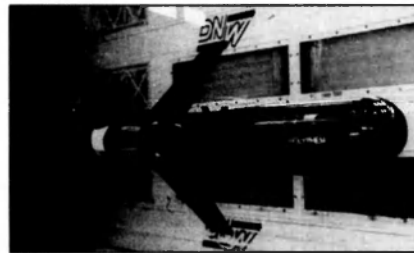
The Norwegian Penguin ASM was designed from the outset with the littoral problem in mind. Norway needed an ASM that it could use along its jagged coastline that would not fly into the first mountain the ASM's radar seeker found. Penguin uses a passive IR seeker with an INS to find and attack ships



Three images of a Penguin ASM being fired from a USN Seahawk during the recent RIMPAC 2002 exercise off Hawaii. The Penguin is being acquired by the RAN for use of the new Super Seasprite helicopters. (USN)

near land masses. It has the capability to fly over land, make pre-programmed changes in height and direction and can also be programmed to fly over a selected number of ship targets before making its attack. It comes with a 120kg semi-armour piercing warhead and has a range of approximately 35kms. In its terminal phase the missile is programmed to dive at the ship's waterline for maximum damage from blast and flooding. The missile will be used from the RAN's Super Seasprite helicopters and hopefully the Seahawks.

Users: RAN.



A Polyphem missile undergoing wind tunnel testing. The Polyphem is a wire-guided missile making it impervious to Electronic Counter Measures and impossible to detect by passive means.

### Polyphem

One of the more interesting and useful missiles for the littoral environment currently under development is the German Polyphem. The missile is an optically guided rocket controlled by a fibre optic data link cable feeding IR TV images back to the firer – allowing for target identification and an indication of a hit. The IR seeker can detect ship targets at 8,300m or 42 seconds from impact and identify the type of ship at 1,350m or 12 seconds before impact. Its INS, with GPS, takes the missile to a point near the target where the firer then guides the missile during the terminal phase.



A test Polyphem being fired from a ground launcher

Polyphem has a range of approximately 60kms and a 20kg fragmented shaped charge warhead. It is immune to ECM and can be used against and by ships, shore installations, vehicles and helicopters.

Users: none at this stage.

### Triton

The German Triton missile is very similar to Polyphem except that it is used by submarines while submerged against ASW helicopters, fixed wing aircraft or against land targets. Four Triton missiles are housed and fired from a launch container the same size and shape of a standard 533mm heavy weight torpedo which is loaded into the submarine's torpedo tube like a regular torpedo. Upon reaching the surface the missile climbs and accelerates to its cruise phase where it behaves as Polyphem would with the same type of targets capable of being engaged. A fibre optic cable links the missile with a stand alone console in the submarine's control centre displaying IR TV images from the missile's seeker. Triton is due to be test fired from a submarine in 2003 and fitted to the German Navy's Type 212 SSKs.

Users: none at this stage.

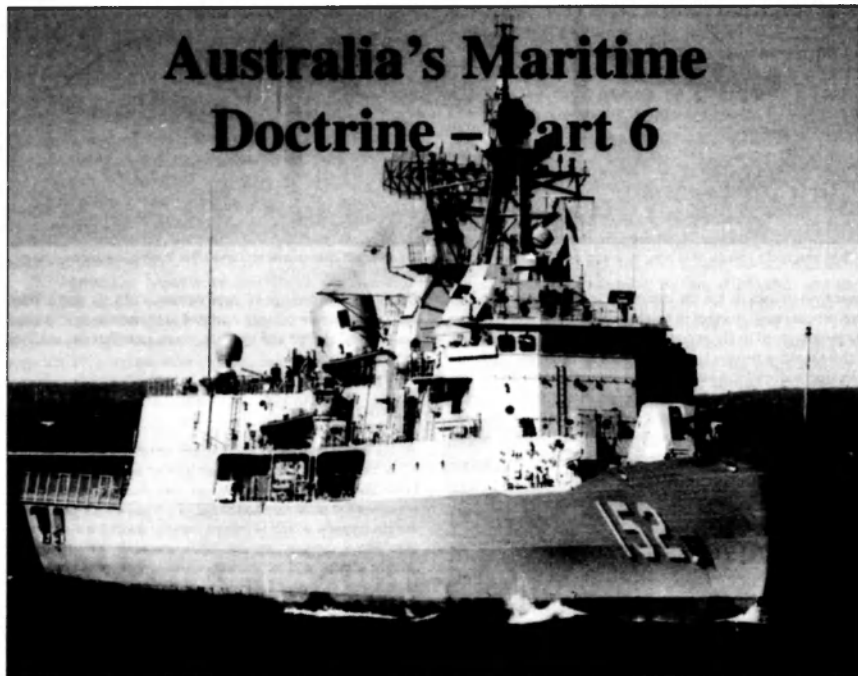
### Conclusion

Many ASMs currently in service around the region will experience problems when used in the littoral, some will be totally useless. Also, the age and level of sophistication of most makes countering them a somewhat straightforward exercise. The reconnaissance requirement for the proficient use of any of the region's ASMs is often a forgotten and neglected crucial factor in their successful use. The high cost of more advanced ASMs makes them either unattainable by many, or forces them to be ineffective users relying on the confidence trick/bluff of deterrence. All these factors contribute to reduce the effect and influence of the ASM in the littoral environment. However, technology, in the form of new missiles such as Harpoon Block II, Maverick, Penguin, Polyphem and Triton, can re-address littoral deficiencies. Proficient users make the littoral battle space an even more dynamic and dangerous domain even for the professional Navy.

It should be noted that despite the deficiencies of the ASMs listed earlier the littoral does remain a dangerous place for the surface Navy. As ASM radar seekers suffer from increased radar clutter from land so do many ship based radars which can be rendered blind to an ASM attack. However, many Navies have already addressed this problem through development and improvements in surveillance and hard and soft kill counter measures. Despite this, Western Navies still need to be extra vigilant in the littoral.

\*This article first appeared in *Asia-Pacific Defence Reporter* and is reproduced with the Editor's permission.

# Australia's Maritime Doctrine - Part 6



The Australian built Anzac class frigate HMAS WARRAMUNGA proceeding down Cockburn Sound in WA. While many only see the 'sharp end' of a navy, HQ, shore support facilities, industry and hydrography services all act as vital enablers and force multipliers of maritime power. (RAN)

In part 6 of our presentation of the RAN's new Maritime Doctrine we detail Chapter 9 on The Enablers of Maritime Forces. The document was written by the Seapower Centre and is reproduced in *THE NAVY*, with the Centre's approval, given its importance to readers of *THE NAVY*, Australians and to the Navy League in general.

## Chapter 9

### THE ENABLERS OF MARITIME FORCES

The enablers of maritime forces are the structures, systems and elements which support the armed forces within the maritime environment.

#### ORGANISATION

The effective organisation of the Navy is fundamental to its efficiency and its capacity to accomplish its missions. The objective of the RAN's current structure is to align the entire Service and its supporting agencies into a system which is focused on the delivery of combat capability.

The Chief of Navy commands and is responsible for raising, training and sustaining the RAN. Under him are five major elements: Navy Headquarters (NHQ), the Force Element Groups (FEGs), Navy Systems Command (NAVSYSCOM), Support Command (Navy) (SCA(N)) (until late 2000) and Maritime Command (MHQAUST). The Maritime Commander Australia has operational responsibilities to the Commander Australian Theatre and the Chief of Defence Force.

The core of this structure are the Force Element Groups (FEGs) as the centre of capability output and management with responsibilities direct to the Chief of Navy for capability management and direct to the Maritime Commander for operational output delivery. The FEGs are divided into Aviation, Submarines, Surface Combatants, Patrol Forces, Amphibious and Afloat Support, Hydrography, and Mine Warfare and Clearance Diving.

Navy Systems Command and Support Command (Navy) provide services commonly required to some extent by all seven FEGs. The FEGs are functionally located within Maritime Command. The FEGs draw together FEG specific operations and preparedness, doctrine, research, development and capability proposals, integrated logistics and configuration management, repair and maintenance, training and personnel requirements, and resource management.

The FEGs define and articulate their requirements, priorities and expectations from other agencies and service providers. They monitor the delivery of goods and services to achieve goals defined by the Chief of Navy and the Maritime Commander.

Navy Headquarters supports the Chief of Navy in directing Navy capability management and the delivery of the Defence

Output for which the Chief of Navy is responsible, together with Navy contributions to other Defence Outputs.

Navy Systems Command integrates centres of knowledge and expertise in key technology areas with logistics requirements, personnel (including training) and safety. It is the provider of Navy services required by other elements. It is responsible for command, control, communications, computers and intelligence (C4I); the delivery of personnel and training; systems support; safety, certification and audit; and command of fleet bases and establishments.



NUSHIP STUART at the Tenix dockyard in Melbourne. BALLARAT can be seen in the background just prior to her launch. Navies are particularly demanding in terms of technology and manufacturing and the RAN is no exception. An effective relationship with national industry is vital for the development, manufacture and support of sophisticated combat forces. (Tenix)

Support Command (Navy) is the Navy Component of Support Command Australia. The fundamental charter of the Support Command is to provide Joint Logistics and systems to take advantage of national economies of scale. Within its Logistics Operations branch and its Commodore Logistics Navy branch, Support Command (Navy) provides a wide range of logistics, material support and minor project management services for the Navy as a whole, as well as to other ADF agencies. Support Command will soon be folded into the new Defence Material Organisation which will take responsibility for provision of these services. Acquisition of major projects will also fall within these new arrangements.

Maritime Commander Australia has responsibility to the Chief of Navy for the full command of assigned assets and to Commander Australian Theatre for the planning and conduct of operations as directed. While the Chief of Navy sets strategic Navy requirements and priorities, the Maritime Commander is responsible for implementing these at the operational level. The Maritime Commander thus has dual responsibilities: to the Commander Australian Theatre as the Naval Component Commander (NCC) and to the Chief of Navy as the commander and operator of the Fleet. Sea training, assessment and cross-FEG operational integration are major activities for Maritime Headquarters.

#### NATIONAL INDUSTRY

An effective relationship with national industry is vital for the development and support of sophisticated combat forces. Navies are particularly demanding in terms of technology and manufacturing. Properly managed, however, the successful meeting of such demands on shipbuilding, system development and integration, as well as in service support brings substantial benefits for industry and for the national economy.

A careful balance needs to be maintained by countries such as Australia to ensure that capability requirements are properly met while such national benefits are gained over the long term. The fact that many elements of maritime capability seek to exploit the latest advantages in technology as they develop means that accepting technical risks is an inevitable accompaniment of this process. Success in meeting this challenge depends upon close co-operation between all levels of Government, Defence and industry.

#### MARITIME LOGISTICS

Logistic support exists to ensure that combat forces can meet readiness levels and be deployed, sustained and redeployed to meet the operational aims of the commander. Logistic support includes the provision of the stores and spare parts required by units, the supply and re-supply of fuel and lubricants, ammunition and food, and the provision of medical support, maintenance support, personnel support and hotel services. Maritime logistic support exists to provide these services to maritime combat units.

In practice, logistic support will often be conducted on a joint basis and logistic related issues lend themselves readily to the economies of effort possible by integration of the needs of the various environments. There are, however, significant differences between the three Services' logistic systems. The strategic, operational and tactical levels of logistics consist of many support organisations manned by ADF, Defence civilian personnel and contractors. Continuity of logistic support is paramount to combat success.

The naval logistics system is structured very differently to those of the other Services because of the differences in the environment in which the Navy operates. Generally speaking, Navy's fundamental unit of combat is a warship. Its logistic capability is inherent in the design. Ships deploy from their home ports with spare parts typically of an endurance level of 90 days, rations typically of 30 days and with large quantities of fuel onboard.



HMAS WESTRALIA conducts an underway replenishment of HMAS ADELAIDE. Logistics support at sea is imperative if a Navy is to keep ships on station. (RAN)

Naval forces are therefore largely self-sustaining for long periods if supported by an underway replenishment group and the "pull" forward of mission critical stores. This contrasts to the "push" system used for land forces where the fundamental unit of combat is the soldier who has limited capacity for self-support.

Australia's strategic circumstances reinforce the truism that the sea remains the principal medium for the movement

of large quantities of material. This means that much logistic effort, whether directed towards maritime combat forces or not, will be by sea. Shipping must thus be considered a joint logistic asset. Its protection may well become a critical issue within a campaign that has few other apparent maritime dimensions.



Shore support facilities such as the submarine training establishment in WA are vital to train new submariners and sharpen the skills of existing submariners. (RAN)

The logistic capacity of maritime forces can also act as a force multiplier. Ships can provide a large range of logistic support to land and air units and are especially useful in providing these services in the interim while single services' support units are deploying. That maritime forces are largely self-reliant and are not adversely affected logistically by different operating areas to the same extent as land or air forces remains a strategic advantage. Furthermore, although the concepts of lines of communications can be applied to both land and maritime environments, they do not mean the same thing and pose very different problems of security and protection.

## Shore Support

The logistic support process is founded directly upon shore support, a concept which embraces not only service facilities such as bases and supply depots, but private contractors, both domestic and international, as well as formal arrangements with allied governments for access to material and technical support. The sophistication of such support will depend upon the point within the logistic chain that it operates, as well as the urgency of the need.

The operations of deployed maritime forces can be greatly assisted by the provision of local host nation support. Even at its simplest, in the form of sheltered anchorages, such support can considerably reduce the difficulties of re-supply and provide the opportunities for stand-downs and deep maintenance which will considerably increase the length of time which units can remain operationally efficient in area. However, it is also true that such host nation support is not an absolute necessity for maritime forces, provided that sufficient seaborne support exists to accomplish the mission.

## Reach and Sustainment

However capable the maritime combat forces, their potential is enormously increased by the presence of support vessels. In fact, unless maritime units are acting purely in

coastal defence roles at short distances from their shore bases, there are very few modern maritime operations which can be conducted effectively without such support. At its most sophisticated, extending to repair ships as well as stores, ammunition, food and fuel supply units, such support can make maritime combat forces indefinitely independent of the shore. This level of capability is currently possessed in full measure only by the United States and to a degree by the United Kingdom. Smaller forces, such as those of Australia, nevertheless achieve a high degree of force multiplication by the possession of replenishment ships which are primarily configured to provide liquid fuels but can also supply limited amounts of ammunition, stores and food. Within the Australian context, a credible surface task group for extended maritime operations will always include a replenishment ship. The inter-operability of most maritime forces for replenishment is itself a significant force multiplier that allows the rapid combination of coalition forces in an emergency.

Larger combinations of maritime forces can achieve economies of scale in the critical areas of spares, stores support and repair expertise. Mechanisms exist for the stock holdings of vital spare parts to be "screened", such that they can be transferred from one unit to another which has a defect. This procedure is regularly conducted during international exercises and operations and extends to the loan of expert maintainers to rectify difficult defects. The process is greatly assisted by commonality in equipment between Navies.



The former HMAS JERVIS BAY being overflown by a Sea King helicopter in East Timor. The ability of the RAN to 'Take Ships Up From Trade', such as JERVIS BAY, was an important enabler to the East Timor Operation. (RAN)

## Ships Taken Up From Trade

Support capabilities can be improved by taking merchant ships up from trade and converting them to the extent required by the operation. These vessels cannot replicate the capabilities of built for the purpose replenishment units, but they can play a vital role in maximising the capacity of the latter by acting as re-supply units between shore bases and the

operational area. If vessels are to be taken up from trade, then mechanisms need to exist for their identification within the national register and charter or requisitioning. In these circumstances, the possession of a substantial national flag merchant fleet can be an important strategic advantage. Merchant vessels can also be employed to provide sea lift for the movement of land forces and their logistic support. Nations with smaller merchant fleets may be forced to purchase or charter ships for these purposes from overseas sources, an expedient which can be difficult to achieve in emergencies.

## ENVIRONMENTAL KNOWLEDGE

Understanding of the environment in which maritime forces operate is critical to the success of operations. Credible maritime combat capability therefore depends fundamentally upon the ability to access and analyse environmental knowledge. If this does not exist, then deployment plans can be flawed by the use of unsuitable platforms, surveillance intentions can be thwarted by the inability of sensors to meet requirements and weapons may prove ineffective against key targets. There are three main areas of effort in this regard, all of which are important for commanders and planners at all levels of warfare. They are hydrography, oceanography and meteorology.



Hydrographers in a small boat conduct a survey of the approaches to Dili Harbour during the East Timor Operation. Without accurate underwater charts Navy's ability to operate in unfamiliar water is greatly reduced. (RAN)

## Hydrography

Naval hydrographic forces work in peacetime to survey and chart littoral and ocean areas in accordance with strategic guidance. Much of this effort is focused towards the requirements of commercial shipping, generally aimed at shortening trade routes, reducing existing uncertainties or anomalies from older surveys and allowing deeper draught ships or fishing vessels to operate safely. There are obvious flow ons for combat forces from this activity, but surveying work in peacetime can also be used to improve the understanding of areas in which operations may take place. These can involve either the littoral, including beach surveys which extend to the hinterland of possible landing areas for amphibious forces, or deep water, particularly where submarine operations are involved. These activities give combat forces increased freedom of manoeuvre.

Hydrographic units also have important roles during conflict. They may be required to conduct precursor surveys



Two of the RAN's inshore hydrographic vessels. Much of the RAN's hydrographic effort is focused towards the requirements of commercial shipping, generally aimed at shortening trade routes, reducing existing uncertainties or anomalies from older surveys and allowing deeper draught ships or fishing vessels to operate safely. (RAN)

for amphibious operations or to act in conjunction with mine countermeasure forces in assessing shipping routes which will be safe from mines.

## Oceanography

Oceanography plays a vital role in undersea warfare, not only for submarines themselves, but also for anti-submarine and mine warfare forces. For efficient operations, these units require not only an extensive knowledge of the watermass in which they are operating, but the means to analyse prevailing conditions and predict sensor and weapon performance. In peacetime, much effort must go towards the development of sophisticated databases of watermass characteristics, such as temperature, current and turbidity, and the refinement of predictive models. In addition to training and exercises, these activities contribute much to weapon and sensor development for the long term. In time of conflict, such efforts may require to be both continued and concentrated within specific operation areas and the means provided to planners and operational units to exploit such knowledge in the most effective ways. This requires the maintenance of a core of personnel expert in the subject and skilled in providing the appropriate advice and guidance.

## Meteorology

Similar requirements apply to the effects of weather on naval operations. Planners and commanders need to draw on comprehensive databases, well developed prediction systems and expert analysts. In time of peace, the gathering of data within expected areas of operation is a constant activity by all units, while the effects of weather need to be clearly understood by those developing operational concepts and new weapons and sensors. In the operational environment, meteorologists are vital contributors towards ensuring that units are deployed and operated to best effect within the prevailing conditions.

# Flash Traffic

## Amphibious Watercraft go ahead



A computer generated image of the Army's new watercraft (ADI).

Minister for Defence Robert Hill has announced the signing of a \$32.73 million contract with Newcastle shipbuilder ADI Limited for the design and construction of six Amphibious Watercraft for the Australian Army.

Senator Hill also announced that a contract for \$10.66 million has been concurrently signed with ADI Limited to provide 15 years through life support for the watercraft.

These lightweight vessels, to be built from aluminium and powered by two diesel engines and waterjet propulsion, will build on the total amphibious capability of the Australian Defence Force.

The new watercraft will enable the Army to deploy greater amounts of tanks, vehicles, soldiers and supplies from ship to beach in a significantly shorter time than is currently possible with the existing LCM 8 capability.

In particular, the new watercraft will improve the discharge rate of unloading cargo by more than 30%.

Senator Hill said the new watercraft will be carried on the decks of the Royal Australian Navy ships HMAS MANOORA and KANIMBLA. The craft will be based in Townsville at the 10 Force Support Battalion at all other times.

"This project is expected to create 40 jobs in the Newcastle area," Senator Hill said.

When the watercraft are introduced into service they will be maintained in Townsville by ADI Limited through a

sub-contract with a local company, which will create additional employment in the area.

The first watercraft is planned to undergo extensive trials late next year with the final craft expected to be finished in 2005.

## RAN patrol boat tenders short listed

Three companies have been shortlisted to tender for the supply of patrol boats for the Royal Australian Navy, after they were endorsed by Defence Minister Robert Hill.

The shortlisted tenderers are ADI, Defence Maritime Services partnering with Austal, and Tenix.

ADI would construct the boats in Newcastle, DMS and Tenix in Perth – providing significant economic and employment opportunities in these areas.

Competition for the final shortlist to go on to stage two of the contract process was intense – highlighting the fact that Australia has a competitive small vessel shipbuilding industry.

Nine companies provided tenders, seven of which qualified to produce the vessels.

The RPB project is designed to provide replacements for the RAN's Fremantle-class patrol boats (FCPBs). The new Patrol Boats are expected to cost approximately \$375 million. They will be expected to provide over 3,000 operational sea days per year, 1,800 days will be directed towards Coastwatch operations, plus a surge capacity of 600 additional days per year to deal with short-warning missions. The current FCPB fleet averages around 2,700 operational sea days per year. The new boats will be larger and have improved seakeeping abilities over the FCPBs as well as a range of 3,000nm, (or 25% greater than the FCPBs). Maximum continuous speed shall be no less than 25kt.

The shortlisted companies will be invited to provide detailed tender proposals by the end of October. Defence expects to be in a position to recommend to Government a preferred tenderer by late this year, with a view to signing it in the new year.

This would ensure the replacement patrol boats would be ready for service in the second half of 2004, consistent with the Government's 2000 Defence White Paper commitments.

The new Patrol Boats will have the ability to carry an additional 20 personnel for emergencies in a separate facility isolated and lockable from the boats other spaces. They will carry two rigid-hull inflatable boats, no less than 6m long and capable of sustaining 25kt in sea state 4 when fully laden, and an unrefueled range of 100nm at 12kt. The patrol boats will have a full electro-optical suite for day/night surveillance operations. The system must be capable, in tropical conditions, to detect a fishing boat at a range of 12km; detect a person in the water at 1,000m; and classify a fishing boat at 10km. Radar and searchlight will also be fitted.

The boats will be armed with a 25mm stabilized lightweight gun (similar to that found on the Huon class MCM), supported by two 12.7mm machine guns.



One of the short listed patrol boats.

## Sixth Indian submarine to have Club-S missile system

The Zvyozdochka shipbuilding plant in Severodvinsk is to refit, repair and upgrade the Indian Navy Kilo diesel-electric submarine INS SINDHUGOSH under the terms of a contract signed in Delhi between Russia's arms export agency Rosoboronexport and the Indian Ministry of Defence.

INS SINDHUGOSH, built by the Admiralty Shipyard in St Petersburg, was commissioned into the Indian Navy in 1986.

SINDHUGOSH arrived in Russia last month and will become the third Indian Kilo to be refitted and modernised at the Severodvinsk yard. SINDHURAJ and SINDHUKESARI, have been upgraded at the Admiralty Shipyard in St Petersburg.

The modernisation refit, due to be completed in 2004, will see SINDHUGOSH retrofitted with the Club-S strike missile system (which incorporates 220km-range 3M-54E anti-ship cruise missiles, see page 11 this edition) developed by the Novator Design Bureau. It is also possible that SINDHUGOSH may also be equipped with the 3M-14E land-attack cruise missile also associated with the Club-S system.

Acceptance trials of the Indian Navy's first three modernised Project 877EKM Kilo class submarines involved six successful 3M-54E test launches, demonstrating both minimum (20km) and maximum range capability against surface targets. However, in April 2001 a missile launched on an Indian Ocean test range failed to hit its target.

June's Defence Weekly reported a fault with the target on the test range was subsequently blamed for the failure: an anchored target with a corner radar reflector simulating a frigate-class surface ship was displaced, and the reflector began to radiate signals in a direction perpendicular to a flight trajectory of the missile's third supersonic stage. As a result, the ARG-54 seeker failed to acquire the target.

All three of the Indian Navy's Project 1135.6 ships will be armed with the Club-N missile system, consisting of an eight-cell vertical launcher and onboard missile-planning and launch-control system. A Garpun-Bal radar system will provide targeting data.

## Largest class ever graduates from CRESWELL

The RAN College HMAS CRESWELL has graduated the largest intake of new entry officers in its history.

One hundred and five officers passed out of the College in what was the culmination of two days of ceremonies. These began with a Ceremonial Sunset and then the Passing Out Parade itself, reviewed by the then

Chief of the Defence Force, ADML Chris Barrie, in one of his last official engagements before leaving the Navy and the ADF. Admiral Barrie himself joined the Naval College in 1961.

Visitors to the Ceremonial Sunset saw the tradition of the Australian National Flag and the Navy's White Ensign lowered together, to the music of the Royal Australian Navy band and the salute of an armed guard. The evening gun was fired, signalling the last night the class of officers would have as initial trainees.

The passing out parade, which was held the following morning, saw the new class arrayed in their finest uniforms and assembled once again as an armed guard. They were joined by their instructors and staff of the Royal Australian Naval College, under the command of CAPT Andrew Cawley, on the quarterdeck of the college. Many distinguished visitors both Service and civilian also watched the parade, as well as families and friends of the trainees.

A sad note in the proceedings was the mention of the death of one of the trainees some weeks before graduation, MIDN Robert Maguire died in a car accident.

At the end of the parade, a march past, ADML Barrie took the salute. The award of prizes and a flyover followed. The new officers then celebrated with CDF, the college staff, members of their family and friends.

By LEUT Tom Lewis, NAVY NEWS

## US ERGM flight test success

In a first-of-a-kind test, 'Team ERGM' successfully fired a precision guided projectile from a representative gun system and guided it to a designated target area last June. The flight test exceeded tactical end-game accuracy requirements, and the test demonstrated terminal accuracy performance sooner than called for in the program's development plan.

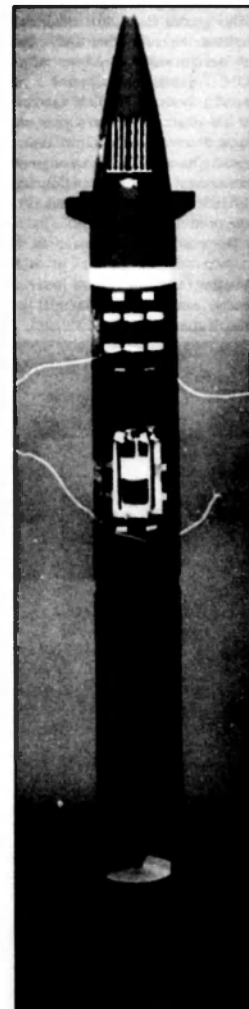
Led by Raytheon Company and the Naval Surface Warfare Center Dahlgren Division, the All Up Round (AUR) guided flight of the Extended Range Guided Munition (ERGM) took place at White Sands Missile Range, N. M.

In the flight test, ERGM was launched from a representative Mk45 Mod 4 gun system, using a tactical

propellant charge, and successfully executed navigation and guidance after global positioning system (GPS) acquisition.

This flight test achieved all test objectives.

The projectile demonstrated proper navigation and guidance despite experiencing extreme G-forces during



A cutaway of an ERGM showing its deployable wings and submunition warhead.



gun launch. The 18-mega joule propellant charge impacted the projectile like a 40 ton hammer travelling at 70 miles per hour, almost immediately accelerating the round to 1,875 mph. The test also demonstrated a flight range of 39 nautical miles in under four minutes time of flight and airframe stability and control with proper internal system operation.

This guided flight test successfully completed the subsystem and system level design validation tests of the ERGM guidance, control and propulsion systems. The final validation tests are planned for next year after introduction of the new unitary warhead. This marks the start of ground environmental and flight performance qualification testing phase, which is the precursor to fleet deployment.

"The real accomplishment in this test was demonstration of GPS acquisition and navigation over an extended range after a tactical gun

launch, which we did flawlessly," said Brian O'Cain, Raytheon's ERGM program manager.

"Unfortunately, range safety footprint constraints and the current gun position prevented us from stretching ERGM's legs and flying to a longer range target. With this launch energy and rocket motor we could have easily exceeded 50 nautical miles".

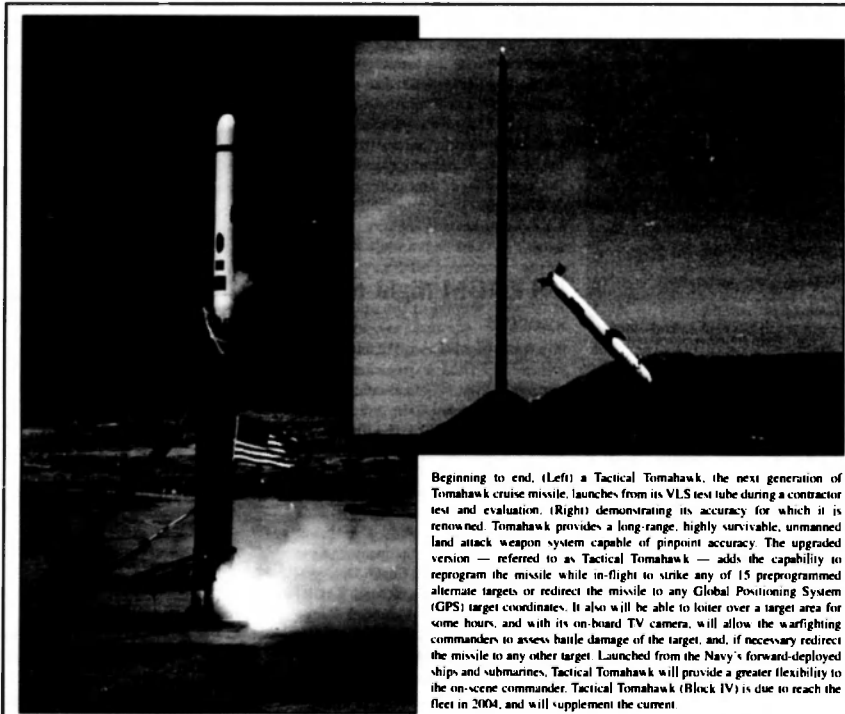
## Former Navy League Federal President Dies

John Brooke Howse KStJ VRD, Federal President of the Navy League from August 1968 to December 1971 and long-serving ACT President died in Canberra in July aged 88.

John Howse served in the RAN during World War II and retired at the rank of Commander RANVR. He joined the Navy League soon after the war and became closely associated with the Sea

Cadet movement. As a member of the Australian Sea Cadet Council, with Council Chairman Captain Neil Boase RAN (the Director of Naval Reserves) and Council colleague Geoff Evans (who succeeded him as Federal President), he toured Australia and discussed with State representatives the future of the Australian Sea Cadet Corps, an increasingly expensive responsibility of the Navy League. The report of the three-member committee led to the formation of the Naval Reserve Cadets (now Australian Navy Cadets) in 1973 as a naval responsibility. John and his wife, Valerie, continued to support the cadets as well as other organisations in Canberra for many years.

John Howse had a distinguished career in business and was a member of the Federal Parliament representing the NSW seat of Calare 1946-60. He was a Trustee of the Australian War Memorial 1967-73.



Beginning to end, (Left) a Tactical Tomahawk, the next generation of Tomahawk cruise missile, launches from its VLS test tube during a contractor test and evaluation. (Right) demonstrating its accuracy for which it is renowned. Tomahawk provides a long-range, highly survivable, unmanned land attack weapon system capable of pinpoint accuracy. The upgraded version — referred to as Tactical Tomahawk — adds the capability to reprogram the missile while in-flight to strike any of 15 preprogrammed alternate targets or redirect the missile to any Global Positioning System (GPS) target coordinates. It also will be able to loiter over a target area for some hours, and with its on-board TV camera, will allow the warfighting commanders to assess battle damage of the target, and, if necessary redirect the missile to any other target. Launched from the Navy's forward-deployed ships and submarines, Tactical Tomahawk will provide a greater flexibility to the on-scene commander. Tactical Tomahawk (Block IV) is due to reach the fleet in 2004, and will supplement the current

## Lockheed Martin-Northrop Grumman Team selected for US Coast Guard Deepwater project

The United States Coast Guard today awarded Integrated Coast Guard Systems (ICGS) a contract to carry out a far-reaching modernization program for the agency's Deepwater forces — the ships, aircraft, command and control, and logistics systems that protect the United States and support the Coast Guard's many missions. The contract was announced in a ceremony held in Washington, D.C.

ICGS — a co-equal partnership of Northrop Grumman Corporation and Lockheed Martin Corporation — was awarded a contract valued at US\$11 billion to modernize the Coast Guard's Deepwater assets over a 20-year period. The program's total potential value over three decades is estimated at approximately US\$17 billion.

Deepwater is the largest recapitalisation effort in the history of the US Coast Guard and will involve the acquisition of up to 91 ships, 35 fixed-wing aircraft, 34 helicopters, 76 unmanned surveillance aircraft, and upgrade of 49 existing cutters and 93 helicopters, in addition to systems for communications, surveillance and command and control.

"The nation depends on the Coast Guard to protect our homeland and secure over 95,000 miles of shoreline, save lives and protect the environment," said Lockheed Martin chairman and chief executive officer Vance D. Coffman. "We are proud to partner with the Coast Guard to assure its ability to meet its evolving missions through a transformational modernization program."

Coast Guard Commandant Admiral Thomas H. Collins said that the Northrop Grumman / Lockheed Martin joint venture offered a superior solution, a strong management approach, a low-risk implementation strategy and an Open Business Model™, all of

which address the Coast Guard's modernization needs. This performance-based contract will develop, acquire, and sustain an affordable, integrated system of surface, air, command, and logistics assets, while maximizing operational effectiveness at the lowest possible total ownership cost.

ICGS will manage over 100 companies from 32 states, as well as four international teammates, to implement its comprehensive plan for the Coast Guard. The ICGS Open Business Model™ approach maximizes competition and assures best value to the Coast Guard and the American taxpayer throughout the life of the program.

ICGS has structured a program that will greatly enhance the US Coast Guard's core system capability within the first five years of the contract, and ensure a low-risk transition to the full vision of the Deepwater system. In the first five years, ICGS will:

- Provide a network centric capability of robust C4ISR (Command, Control, Communications, Computers,



26 June 2002, the last of six Aviso A69 corvettes was handed over to the Turkish Navy. The sixth boat, renamed TCG BAFRA, is seen here leaving Brest for its new base, Izmir, where it will be commissioned into the Turkish fleet. (DCN)



Intelligence. Surveillance, and Reconnaissance) resources on new and existing air, land and sea assets.

- Upgrade older assets until new ships, aircraft and systems are fielded.
- Provide more capable systems with greater speed, longer endurance, and better onboard working spaces, all with a common integrated support infrastructure that will significantly lower operating costs.
- Design, build and deploy the first of a new class of cutters for the Coast Guard – the National Security Cutter (NSC).

ICGS' long-range Deepwater solution will transform the force into mission-designed, fully integrated assets with complete life-cycle support.

## Submarines for Malaysia

The Malaysian Ministry of Defence has awarded European naval shipbuilders DCN International and Izar a contract to build two medium-size Scorpene submarines.



A Cutaway model of the Scorpene submarine being acquired by Malaysia. (DCN)

The two new-generation conventional attack submarines (SSKs) will be built jointly by DCN and Izar. The first, to enter service in 2007, will be assembled in Cherbourg (France) and the second, to enter service in 2008, at Izar's Cartagena shipyard in Spain.

The Scorpene SSKs – already chosen by the Chilean Navy (two units currently in production) – feature state-

of-the-art developments derived directly from France's submarine building programs. The Scorpene offer excellent size- and cost-effectiveness ratios.

Designed for missions ranging from anti-submarine and anti-surface warfare to special operations and intelligence gathering, Scorpene SSKs feature advances in hull shape and modular construction plus a range of state-of-the-art technologies. The combat system combines proven weapons handling and fire control with a complete sensor suite. It is not known at this stage if AIP (Air Independent Propulsion) will be added to the contract.

## Dutch submarine joins fight on drugs

The Royal Netherlands Navy (RNLN) has revealed that one of its Walrus-class submarines has been deployed to the Caribbean to conduct covert surveillance missions in the fight against drugs.

HrMs ZEELEEUW has been engaged in detecting, tracking and reporting suspect ship movements (including suspicious speedboats) off the coasts of Colombia and Venezuela since May, using its towed array sonar, hull-mounted sonar and above-water sensors such as periscopes and electronic support measures masts.

HrMs ZEELEEUW worked jointly with Dutch P-3C Orions, frigates and other patrol assets assigned to the area in order to relieve USN assets for the War on Terror.

The 2,800-tonne diesel-electric submarine has also taken part in a US Navy-run Prospective Commanding Officers Course off Puerto Rico, acting as sparring partner to the Los Angeles-class SSNs USS HARTFORD and JACKSONVILLE.

## Greece orders fourth Type 214

Howaldtswerke Deutsche Werft (HDW) has won a EUR700 million (US\$695m) contract to build a fourth Type 214 air-independent propulsion submarine for the Hellenic Navy. The boat, like two of three already on order, will be constructed at the HDW-owned Hellenic Shipyards in Skaramanga near Athens.



A German Type 212 starting sea trials. The 212 and 214 share many similar features.

## FEARLESS for Brazil?

It is understood that the Brazilian Navy is negotiating with the UK to acquire the former RN amphibious assault ship HMS FEARLESS.

FEARLESS was the last steam-powered ship in the RN and retired from service in March of this year after 37 years of service. During its final eight-month deployment the vessel operated in the Gulf as part of Exercise 'Saif Sareea II' (see *THE NAVY* Vol 64 No. 1, pp 24-28) and then participated in Operation 'Veritas', the UK contribution to the US-led Operation Enduring Freedom.

Currently alongside at Portsmouth Naval Base, FEARLESS is due to move to a lay-up berth in the base pending a final decision on its disposal.



A British Army Lynx flies past the LPD HMS FEARLESS. FEARLESS may be sold to Brazil and see out her days in the South Atlantic, where she is no stranger having seen extensive service during the Falklands War. (RN)

It is understood that Brazil is interested in buying both FEARLESS and its decommissioned sister ship, HMS INTREPID, which has been laid up at Portsmouth Naval Base for several years as a source of spares, with the intention of further cannibalising INTREPID to provide a source of spares and components for its sister vessel. However, there are now contrary indications that while INTREPID will be used as a source of spares, the ship itself may not form part of the sales package.

## India and France conduct naval exercise

India and France conducted joint naval manoeuvres in the Arabian Sea in mid-May as part of Exercise 'Varuna II', their second bilateral exercise in as many years. Held off Goa, this was the first time a French aircraft carrier has taken part in a joint exercise with the Indian Navy.

Participating in 'Varuna II' were French aircraft carrier CHARLES DE GAULLE and the guided-missile destroyer CASSARD; India contributed the Rajput (Kashin II)-class destroyer INS RANVIJAY and Godavari-class frigate INS GODAVARI. French Super Etendard and Rafale M fighter aircraft and four Indian Sea Harrier FRS.51s also took part. India decided to withdraw INS VIRAAT, its only aircraft carrier, from the exercise at the last moment because of tensions with Pakistan.

"As India is a democracy and has a powerful navy, it's important for us to exercise with it and build up confidence in areas of mutual interest," said Rear Adm François Cluzel, the French task force commander.

Indian Minister of Defence Georges Fernandes visited CHARLES DE GAULLE on 14 May with Chief of the Indian Navy Adm Madhvendra Singh. The aim of 'Varuna II' was to improve defence co-operation and interoperability between India and France.

## Argentina seeks aircraft carrier

Argentina has again articulated its aspiration for an aircraft carrier capability, despite the country's economic disaster.

Argentina has been without a carrier since 1988, when the UK-built VEINTICINCO DE MAYO was retired to undertake a US\$200 million refit, which was never completed due to budget cuts. In the mid-1990s Argentina was offered the French aircraft carrier CLEMENCEAU, but could not afford it.

In 2001 Brazil offered its own ageing 17,500-tonne carrier, MINAIS GERAIS, following its acquisition of the SAO PAULO (ex-FOCH), for only US\$2 million, to be used for training



The Brazilian Majestic class carrier MINAIS GERAIS with an Argentine Super Etendard landing. The Brazilian and Argentine navies air arms are developing a joint air group to operate from Brazil's new aircraft carrier, SAO PAULO.

purposes. However, the offer was declined because of the carrier's inability to launch any of Argentina's aircraft fully loaded.

The Argentine Navy's aims to build an aviation-capable principal ship, with a displacement of 15,000-20,000 tonnes, to be built in the next decade, comes under a project called 'Plan Apolo'.

While plans are being formulated the air arms of Argentina and Brazil have conducted another joint exercise to hone and retain carrier air power skills.

Between 1-5 May, surface vessels and aircraft of the Armada de la Republica Argentina (ARA) took part in a joint exercise, ARAEX 2002, with the Brazilian Navy off the Argentine coast, vessels included Brazil's Clemenceau-class aircraft carrier SAO PAULO (A 12). For five days Super Etendards and S-2ET Trackers operated alongside Brazilian A-4 Sky Hawks from the flight deck of SAO PAULO.

Since the exercise both navies have begun talks to create a joint Brazilian-Argentine air group.

Since 1998 half of the Brazilian Navy's combat pilot trainees have been trained by the US Navy, the other half by the Argentine Navy in its Naval Aviation School at Punta Indio. However, due to costs and a Brazilian Navy assessment of newly graduated pilots, which demonstrated that those trained by the Argentines performed better, the Brazilian Navy plans to send all of its fixed-wing combat aviation trainees to Argentina.

## Aegis Baseline 7.1 testing complete

Lockheed Martin Naval Electronic & Surveillance Systems (NE&SS) Surface Systems has completed equipment testing of the latest iteration of the US Navy's Aegis Weapon System, known as Baseline 7.1.

The Arleigh Burke-class guided-missile destroyer USS PINCKNEY (DDG-91) will be the first ship to receive the Baseline 7.1 fit, with installation planned to take place towards the end of this year.

Major enhancements have been made within Baseline 7.1, including theatre ballistic missile (TBM) detection and tracking, improved littoral warfare capability, and increased target handling and detection sensitivity.

This latest Aegis system configuration also includes the new AN/SPY-1(DIV) radar, and further migrates the overall system to a commercial off-the-shelf computing architecture. Offering much improved performance in cluttered littoral environments, SPY-1(DIV) also incorporates a new Linear Track Processor to expand capability to the TBM defence mission.

## First South African MEKO corvette named

The first MEKO A200 corvette for the South African Navy (SAN), AMATOLA, was named at the Blohm+Voss shipyard in Hamburg on 7 June.

The first and third corvettes are to be constructed at Blohm+Voss in Hamburg, with HDW building the second and fourth of class in Kiel. Blohm+Voss will conduct sea trials for the AMATOLA in November, following which it is expected to be transferred in late December to South Africa. The SAN plans to commission the AMATOLA in August 2004.

The SAN MEKO A200s are to be fitted with eight EADS Aerospatiale Exocet MM 40 Block II surface-to-surface missiles, a vertical-launching system with 16 South African Umkhonto surface-to-air missiles, a refurbished 76mm Oto Melara gun mount taken from the SAN's Warrior fast-attack craft and a 35mm dual-



Lifted from the ocean floor, the revolving gun turret from the Civil War ironclad USS MONITOR breaks the surface of the Atlantic Ocean off the coast of Cape Hatteras, N.C., and is placed onto the 300-foot derrick barge *Winan*. The raising of the 120-ton turret climaxed a five-year salvage operation run by the U.S. Navy and the National Oceanic and Atmospheric Administration (NOAA), which controls the underwater sanctuary where the wreckage is located. Since its designation as the nation's first marine sanctuary in 1975, MONITOR has been the subject of intense archaeological investigation. U.S. Navy divers assigned to Mobile Diving and Salvage Unit 2 (MDSU-2) provided expert deep-sea salvage crews to assist NOAA in the recovery of the ship's gun turret, 11-inch Dahlgren cannons, and other artifacts from the historic ship. The turret still shows dents from cannonballs shot at it by the Confederate ironclad CSS VIRGINIA in the famous battle in Hampton Roads. (USN)

half. Although the plan requires an entire crew-rotation after each patrol this is seen as a minor point with the advantages of having more assets available outweighing any other issues. After a certain period the asset can be rotated back the US for maintenance and another take its place. US studies have shown that foreign porting of assets to reduce transit time will provide at least twice the availability rates for the platform thus providing a force multiplier effect.

## Taiwan to launch stealth patrol boat

The Republic of China (Taiwan) has launched the first prototype of a 150-tonne stealth-designed fast attack missile patrol boat (PCFG) in Kaohsiung.

Developed by the ROC Navy's Ship Development Centre, the design is intended to reduce the radar and infrared signatures of the patrol boat.

Dubbed the 'Kuang Hua-6' (Glorious China) programme, the navy plans to begin building 30 boats in October 2003 to replace its ageing 47-tonne Hai Ou-class (Sea Gull) PCFGs.

The new patrol boats will carry four Hsiung Feng-2 (Brave Wind) anti-ship missiles (see pp 10-11 this edition), compared to the Hai Ou-class, which only carries two older Hsiung Feng-1 missiles.

## Typhoon SSBN completes refit

The nuclear-powered ballistic missile submarine (SSBN) TK-208, originally commissioned in 1985, completed its scheduled refit at the Sevmashpredpriyatiye shipyard at Severodvinsk on 26 June.

After trials reportedly scheduled to last until 2005), the TK-208, now renamed DMITRI DONSKOI (after the legendary Muscovite hero), will rejoin the Northern Fleet based at Nerpichya in Zapadnaya Litsa. The refit was intended to keep the submarine in service until 2010.

The refit has taken over 10 years to complete due to shortages of resources and has included upgrading the submarine through the use of systems and components associated with the

upcoming Project 955 Borei-class SSBN.

The main armament of the Typhoon-class SSBNs remains 20 RSM-52 (SS-N-20 'Sturgeon') submarine-launched ballistic missiles (SLBMs).

## Historic gun restored

A significant piece of Australia's military history is now in better shape thanks to the men and women of HMAS KANIMBLA. While operating near Christmas Island during the ships recent OP RELEX II Deployment, several sailors and soldiers from KANIMBLA expended much blood and sweat to refurbish a 6-inch gun emplacement and observation post which overlooks Flying Fish Cove.

The 6-inch gun was made in 1900 and installed at Christmas Island in late 1940. It was manned by men from the Royal Artillery who made up part of the island's garrison. Christmas Island was, and still is, a large supplier of Phosphate for the Australian and South East Asian agricultural market and with the potential threat of war with Japan the island's defences were increased. In February 1942 a Japanese submarine sank a Phosphate carrying vessel off the island and the gun was fired in anger in an attempt to sink this submarine.

In March 1942 the Japanese invaded Christmas Island. The majority of the island's garrison was made up of Indian Army troops who refused to fight the Japanese. Several of these men rose up

in a mutiny against the British troops on the island and murdered them before surrendering to the invading Japanese. The five Royal Artillery men manning the 6-inch gun, near Flying Fish Cove, were amongst those killed and their bodies dumped over the nearby cliffs into the sea.

Following the end of World War II the gun fell into disrepair. In 1983 a major restoration of the gun emplacement was undertaken. When the site was visited in July this year, however, it was found the ravages of time had taken their toll with the gun showing substantial weathering and the emplacement and observation post were overgrown with trees and weeds.

An offer was made to the Christmas Island Shire Council to refurbish the gun emplacement site and this was eagerly accepted by the Councils Chief Engineer Mr Gary Dunt (Ex WOETC) and the Island Administrator (CDRE Bill Taylor, RAN Retired).

KANIMBLA's volunteer work parties, consisting of both Navy and several Army personnel embarked, turned to with a will and stripped the gun of its layers of rust, repainted it and the emplacements external walls and removed 20 years worth of dust, rubble, weeds and trees. The trees surrounding the observation post were cut down as were 50 metres of thick vegetation on the seaward side of the gun to allow both to be more visible to visitors to the island. Some concreting was also undertaken to strengthen the emplacement.



The historic 6-inch gun on Christmas Island after it was restored by the crew of HMAS KANIMBLA. (LCDR Greg Swinden)

The Christmas Island Shire Council provided most of the tools, concrete and paint for the venture with KANIMBLA supplying the muscle. The refurbishment took place over several weekends with groups of sailors and soldiers, voluntarily giving of their own time to ensure this important part of Christmas Islands history remains intact and in good condition.

The site will become part of the Christmas Island Museum linked to the nearby Colonial Administrators House, which is also being refurbished and due to be opened as a Museum in September 2002.

By Lieutenant Commander Greg Swinden

## Australian companies win systems contract for German warship design

Defence Minister Robert Hill and Industry Minister Ian Macfarlane have congratulated the Australian companies CEA Technologies and Saab Systems Australia for their selection in a new warship design announced by Blohm + Voss GmbH in Germany.

The CEA-Saab Naval Advanced Air Warfare System was unveiled at the MECON 2002 Conference in Hamburg which was attended by naval staff from over 40 countries.

The Australian system was specifically designed for the Blohm + Voss new generation frigate design. The proposed 3,500 tonne frigate would be the first in the world to incorporate CEA's active phased array radar. This radar allows vessels to engage multiple targets at extended range and similar radars have previously only been fitted to ships of nearly twice the size.

The radar is integrated with the latest evolution of Saab Combat Management System that is based on commercial off-the-shelf technology, incorporates surface-to-surface and surface-to-air missile control systems and allows the vessel to operate with coalition and US forces.

"The Australian Navy plans to fit a production system on one of our frigates with a view to undertaking future sea trials," Senator Hill said. "If these trials are successful, there is the potential for Australia to use this system in the future."

purpose gun supplied by Denel. The corvettes will also be able to carry one AgustaWestland Super Lynx helicopter.

## USN to home-port SSNs at Guam

Initial USN home-porting of nuclear-powered attack submarines (SSNs) in Guam is on track to begin later this year. Plans call for a total of three SSNs to be based there, starting with the USS CITY

OF CORPUS CHRISTI in October 2002. The USS SAN FRANCISCO will join it in November 2002 and a third still undetermined boat will arrive in February 2004.

Home porting of assets outside the US is seen as a way of increasing availability of the capability. By basing submarines at Guam instead of the continental US the transit time for those submarines to and from a patrol area, such as the Persian Gulf, is reduced by

Mr Macfarlane said: "This landmark selection of Australian companies to provide leading edge technology in a highly competitive international market clearly illustrates the technical knowledge and innovative practices Australian defence industry possesses."

## VADM Taylor passes away

It is with regret that *THE NAVY* magazine notes the passing of a former Chief of Navy, Vice Admiral Rodney Graham Taylor.

VADM Taylor joined the RAN in 1954 as a Junior Entry Cadet Midshipman and graduated from the Royal Australian Naval College in 1957. He went on to serve both at home and abroad.

In addition to serving in a number of RAN ships, he also served in Her Majesty's Yacht *BRITANNIA* and later qualified as a sub-specialist navigator.

VADM Taylor saw active service in Vietnam and was mentioned in despatches during the first deployment

of the guided missile destroyer, HMAS *BRISBANE*.

Other significant career highlights included service as Commanding Officer HMAS *VAMPIRE* (1979-80), Commander Third Australian Destroyer Squadron and Commanding Officer HMAS *TORRENS* (1983-85), Deputy Fleet Commander and Chief of Staff (1987-88), and the inaugural Commodore Flotillas (1989).

In 1990 he was promoted to Rear Admiral and held the appointments of Assistant Chief of Defence Force - Operations (1990-91) and Deputy Chief of Naval Staff (1991-94). RADM Taylor was made an Officer in the Order of Australia in 1992.

Promotion to the rank of Vice Admiral followed, along with appointment as Chief of Naval Staff in March 1994. VADM Taylor served in this role with great distinction. During his command, VADM Taylor oversaw considerable development and change in the Navy. In this time the first of the Anzac class frigates and Collins class submarines entered service.



VADM Taylor

Feeling strong commitment to Navy's people, he continuously stressed the importance of preserving Navy's values, tradition, ethos and professionalism during the defence efficiency review and the subsequent defence reform program. In February 1997, VADM Taylor's title became Chief of Navy.

# Observations

By Geoffrey Evans

## COMMAND CHANGES

As reported elsewhere in *THE NAVY*, several changes in senior ADF appointments took place mid-year; the following comments relate only to those involving naval personnel.

The principal change was that of Chief of the Defence Force (CDF). Admiral Chris Barrie handing over to General Cosgrove on completion of a 4-year term. Professionally well qualified and with a Masters Degree in Business Administration, Admiral Barrie commanded the ADF during a difficult period of 'peacetime' stringency and sudden operational demands that stretched the resources of the armed forces to the limit; the demands were met but continue as a challenge for General Cosgrove. Apart from administrative skills Admiral Barrie must be given credit for the ADF's part in the East Timor venture, an operation for which the armed forces received much praise.



VADM Russ Shalders, Vice Chief of the Defence Force



The new Chief of Navy Vice-Admiral Chris Ritchie, RAN, AO

The RAN's chief also changed; Vice Admiral Chris Ritchie replaced Vice Admiral David Shackleton as Chief of Navy (CN) at the end of the latter's 3 years as head of arguably the most stretched of the services. Rather like Admiral Barrie with academic as well as professional qualifications, on appointment VADM Shackleton tackled his responsibilities with vigour and introduced changes in the RAN too numerous to record in this article - and not all accepted with glee by 'Old Navy' personnel even if they were probably necessary.

In the writers view VADM Shackleton did much to restore the status of CNS/CN as head of his service. For some time as



RADM Rowan Moffit, Deputy Chief of Navy.



The 100th Super Hornet has been delivered to the USN and is seen here at Boeing's St Louis facility where they are built. (Boeing)

a result of interminable changes in Defence command arrangements, the role of chiefs of the Navy, Army and Airforce appeared to becoming less important than hitherto; David Shackleton made it quite clear he was the RAN's 'boss' even if his operational responsibilities remained shared.

In terms of operational experience, VADM Ritchie took up his appointment with the advantage of having served as Commander of the Australian Theatre (COMAST), Maritime Commander, Captain of the destroyer BRISBANE during the Gulf War and other significant naval and defence appointments: Given the troubled international scene his appointment would seem to be a bonus for the Navy – and for Australia.

## The Deputies

If their immediate superiors are professionally experienced, the same can be said of the deputies who were also appointed mid-year.

Due to space considerations it is hard to do justice to the careers of any of the officers named in *Observations*: that of the Vice Chief of the Defence Force (VCDF), VADM Russ Shalders, is no exception. Since graduating from the RANC in 1971 VADM Shalders has had a wide variety of sea and shore appointments and undertaken advanced courses in the UK, Australia and USA. His sea commands include the PNG Defence Force patrol boat SAMARAI (in 1975 as a Lieutenant) and HMA Ships SYDNEY, DARWIN (during the Gulf War) and PERTH: He has also served as Commodore Flotillas and came to the public's notice when as a Rear Admiral he was seconded to the Customs Department in 1999 as the inaugural Director General of Coastwatch and built that multi-departmental body into a cohesive organisation. Prior to his appointment as VCDF VADM Shalders was Head of the Defence Personnel Executive.

Like other seaman officers before him, Deputy Chief of Navy RADM Rowan Moffitt (1975 RANC graduate) served his apprenticeship in patrol boats and specialised in surface warfare and navigation: he served as navigator in TORRENS, BRISBANE (and later as XO, acting Commanding Officer and Commanding Officer), HOBART and as staff navigator to the patrol boat and mine warfare commander, RADM Moffitt commanded NEWCASTLE as well as BRISBANE. His last two appointments were as Director General Navy Capability Management and Commander of the ADF Warfare Centre at RAAF base, Williamtown.

It is sometimes said that Deputies are akin to the fifth spoke in a wheel – of use only if a main spoke fails. This is far from the case with the VCDF and DCN who have extensive responsibilities in their own right as well as understudying their chief. These responsibilities will be outlined in a future issue of *THE NAVY*.

## Statistics can be Interesting

Arriving too late on the *Observations* desk to be included in an earlier issue of *THE NAVY*, the May US Naval Institute's journal *PROCEEDINGS* contained a review of the US merchant marine and maritime industry and information likely

to be of interest to *THE NAVY*'s maritime-orientated readers. Some of this information follows:-

### Top 20 Maritime Shipping Nations by Deadweight tonnage

Nation/Ownership or Parent Company	Nation/Ship Registry
1 Greece	1 Panama
2 Japan	2 Liberia
3 Norway/NIS	3 Greece
4 United States	4 Malta
5 China	5 Bahamas
6 Hong Kong	6 Cyprus
7 Germany	7 Singapore
8 South Korea	8 Norway/NIS
9 Taiwan	9 China
10 UK	10 Hong Kong
11 Singapore	11 Marshall Islands
12 Denmark	12 United States
13 Russia	13 Japan
14 Italy	14 India
15 India	15 St. Vincent & The Grenadines
16 Saudi Arabia	16 Italy
17 Turkey	17 Isle of Man
18 Sweden	18 Turkey
19 Brazil	19 South Africa
20 Belgium	20 Philippines

It will be noted that there is scarcely any relationship between the ship's owner and the flag it wears. Also, that our island trading nation is not mentioned (it is understood to be about thirtieth) regrettably reflecting the disinterest of most Australians in the shipping industry.

In the review the principal shipbuilding countries are stated to be:

Cargo ships: Japan 40%, South Korea 30%; Passenger Ships: Finland, Italy and France.

It is sad to note the absence of the United Kingdom as a major shipbuilder but it has been reported that the decline in British shipping has been arrested and overall, the maritime industry is the largest in Europe.

Rather surprisingly for the world's largest trading nation (some 2 billion tonnes of cargo pass through US Ports and waterways annually) 95% of inward cargoes are carried in foreign-flag ships: The outwards figures is also high although specific cargoes must be carried in nationally owned vessels. To compare, Australian ports handled 550,122,000 tonnes in 2000/1, while almost 97% of our trade – imports and exports – is transported in foreign ships\*. The US also operates/maintains a substantial number of merchant ships required or earmarked for military purposes.

Cabotage, the name given to legislation designed to protect a nation's coastal shipping, is in force in the United States and some fifty other countries including Australia: In Australia however, it is by no means strictly enforced and the issue of so called 'single voyage' permits (which in practice can be extended almost indefinitely) allow foreign ships to transport coastal cargoes at the expense of the local industry.

(\* Local statistics by courtesy of the Australian Shipowners' Association.



# Australian Navy Foundation Day "CRESWELL ORATION" 101st Anniversary Celebration



Birth of the RAN  
The Leap From Obsolete Monitor To Battle Cruiser In Four Years  
A Periscope Perspective

Address to the Navy League's Victorian Division  
by Rear Admiral Peter Briggs AO, CSC, RAN (Rtd)

The ships inherited by the new Australian Commonwealth Navy at Federation in 1901 were tired, old and inadequate even for training. Creswell's report to Minister Playford in September 1905 paints a pretty grim picture:

- No new ships or officers for 20 years.
- Only two active and fit Lieutenants on the permanent list of three.
- a service on the verge of collapse and slowly dying.

When the order was placed three years later on 8 December 1909 for a Battle Cruiser, two Cruisers and two submarines, permanent personnel strength was virtually unchanged from that at Federation, when it was 239 officers and men.

Less than four years later, on 4 October 1913 the Fleet of the newly born Royal Australian Navy enter Sydney Harbour:

- Battle Cruiser, HMAS AUSTRALIA at 19,200 tons
- Light cruisers SYDNEY, MELBOURNE of 5,400 tons
- Destroyers PARRAMATTA, YARRA, WARREO of 700 tonnes – (to an Australian instigated design)

The two submarines AE 1 and AE 2, arrived in Sydney on 24 May 1914 to complete the Fleet Unit. The RAN strength then stood at 3,800 men, 850 loaned by Royal Navy and 2950 permanent members of the RAN.

This was an enormous project by any measure.

The story leading up to this extraordinary achievement is the topic of my talk today.

## Limitations of Periscopes & My Naval History

Those who have looked through a periscope protruding 2-3ft above the surface will know the limited field of view and horizon (often the back of the next wave), which is beheld. This is a relatively new area of naval history for me and I am conscious many in the audience will be better versed in it than I!

I have drawn heavily on written work by George Macandie, David Stevens, Peter Firkins, Chris Coulthard – Clark and Michael White. David Campbell has kindly provided critical oversight. However, the analysis and conclusions are mine. If anyone apart from me should attract notice it is John Wilkins for inviting a submariner to speak on such a topic!

I will consider the topic in five parts:

- The historical setting,
- Some of the Strategic factors at play,
- The impact of technology changes underway during the period,
- What was actually done to bring all this about, and
- Finally, take a punt at who was the father for this extraordinary prodigy?

## The Historical Setting

The Royal Navy had a long history of involvement in Australia's early political and social life. Their perspectives were often cast with the wider world situation in mind –



The first naval board: front row (L-R), Creswell, Senator Pearce and Capt Hughes-Onslow. Back row (L-R), Manisty and Clarkson

competition with France, Spain and Russia in the nineteenth century, Germany and Japan in the early years of the 20th century. The Australian colonies felt their isolation and vulnerability.

The States reacted individually, by establishing Naval forces, erecting fortifications and acquiring a motley collection of vessels for coastal defence.

The Colonial Defence Act of 1865 legitimised these moves. By 1884 Australia hosted five separate Naval Forces and the Royal Navy's Australia Squadron. The ageing of the resident Royal Navy's Australia Squadron added to the locals' sense of vulnerability.

Attempts by the first Fleet Officer and Commander in Chief of the Australia Station, RADM Tryon in 1884 to achieve amalgamation failed but did lead to augmentation of the Royal Navy Squadron – the commencement of colonial contributions toward the expenses of these ships.

New Zealand got the best of the deal: their annual contribution was Sig 20,000, with cf Sig 106,000 from the Australian colonies.

The debate on the need for an independent Australian naval capability, although very much focussed on coastal defence against raiding cruisers, continued. Many in Australia opposed an independent naval capacity. Given the world wide naval supremacy of the Royal Navy, this group felt such proposals anti British, disloyal and unnecessary. The media mocked early attempts to achieve a capability – some things have not changed! The Admiralty for their part could not understand why anyone could doubt their capacity and commitment to imperial defence.



The Great White Fleet of the USN entering Sydney Harbour. The USA became a Pacific power and the visit of the Great White Fleet in April 1908, at the invitation of Prime Minister, Alfred Deakin, made a great impression on the local populace. It was a strategic pointer to the future of the Australian Navy.

They argued strenuously at a succession of Imperial Defence conferences for the need for unity of command. They regarded the local forces with disdain and refused to allow any links between them and the Royal Navy. Matters of naval policy were best left to the Admiralty, they felt! At Federation in 1901 the Federal Parliament gained powers to make laws for the naval and military defence of the Commonwealth.

There were obviously many high priority issues and with 80% of customs and excise monies going to the States for the first 10 years there were few funds available for Defence. Those funds available were heavily biased toward preparing military forces.

Creswell's report to the Minister of Defence in September 1905 argued the strategic folly of preparing the Army in preference to naval forces for the defence of Australia.

He complains of a 15:1 ratio of expenditure in favour of the Army.

He argued, for the Army to have been called into action, it follows that the Navy would have first had to be defeated at sea.

Since that defeat was inevitable (because the Navy was inadequate) it was logical to invest in an Army. Some would say that the Alice in Wonderland appeal of that argument survives to this day.

The Federal Parliament seems to have been in constant turmoil. There were 10 Defence Ministers between 1901 and 1910 – the brief for the incoming Minister must have been well polished!

The Naval Agreement Acts of 1902-03 extended the Royal Navy role, increased the capacity of the Royal Navy's Squadron based on Australia ports, but left control solely with the Admiralty. Some locals were trained and three drill ships, to be manned as far as possible by locals, were planned. Eight cadetships were offered annually for Australians to be trained as officers with the Royal Navy.

Following his appointment as The Director of Naval Forces in December 1904, Captain Creswell tabled the first of his plans in June 1905. He recommended a navy based on:

- 3 x 3,000 ton destroyers,
- 16 x 550 ton torpedo boat destroyers and
- 13 torpedo boats.

The focus was on coastal defence.

At the same time, following the arrival of Jackie Fisher as the First Sea Lord, the Admiralty had shifted its stance. It advised the Committee of Imperial Defence not to oppose the establishment of an Australian Navy. Progress! However, the Foreign and Colonial Office overruled this new found pragmatism.

Annual contributions grew to Stg 200,000. The locals grew more unhappy and nervous.

### The Strategic Setting

The reason for this growing concern in Australia lay with international developments in Europe and, more particularly their impact in the Pacific. The German East Asiatic Cruiser Squadron based in China was modern and more capable than the Royal Navy Australian Squadron.

The growing power of Japan was also a major concern in Australia. Japan's navy had been trained by the Royal Navy and modernised with British designed ships. The likely interruption of maritime trade in the event of hostilities was viewed with concern in Australia. This was accentuated by the Admiralty recall of all its battleships to the China Station and downgrading of several of its ships on the Australia Station.

The USA became a Pacific power and the visit of the Great White Fleet in April 1908, at the invitation of Prime Minister, Alfred Deakin, made a great impression on the local populace. It was a strategic pointer to the future.

In March 1909, the First Lord of the Admiralty rose in the House to point to the accelerated battle shipbuilding programme of Germany, which meant the Royal Navy would lose numerical superiority by 1912. Alarm spread through the Empire. Germany had usurped France and Russia as the British Empire's most likely foe.

### The Changing Technology of Naval Warfare

The period at the turn of the century and establishment of the Commonwealth coincided with rapid changes in Naval technology. The Germans were rapidly overhauling the British at the forefront of naval technology and out building them. The arrival of Jackie Fisher as First Sea Lord in October 1904 galvanised the Admiralty and accelerated the changes underway to introduce modern technologies into the Royal Navy.

This was focussed on big gun battleships; greatly improved rates of fire, longer range guns and developments in fire control, which gave greatly improved accuracy. The Dreadnought class battle ships epitomised these developments. They were quickly followed by the higher speed but more lightly protected Battle Cruisers.

The move from coal to oil fired turbine driven ships started in destroyers and spread quickly to the battleships, with consequent increases in speed and endurance in these ships. Adoption and development of radio proceeded at a pace akin to the internet today. Mobility and gun power were the new measures of capability.

Many existing Fleets were rendered obsolete overnight by these changes.

The submarine emerged as a future weapon system - but reliability and technology were limitations in the early years. Also, the standard role envisaged by the Royal Navy for the submarine appears to have been in coastal defence, or as a mobile mine field in advance of the battle fleet.

Both tactics failed in WWI.

The German Navy, not for the last time, demonstrated an ability to develop the capability, technology and tactics required for submarine operations and apply it with great effect in the strategic sea denial operations undertaken during WWI.

I should reflect on the foresight and boldness of those who acted against the traditionalists of the day and bought two submarines for Australia, AE-1 and 2, for the embryonic RAN. The Australian boats were amongst the first fitted with radios – a capability which was to play a small, but critical part in the Gallipoli campaign.

### The Birth of The RAN

In September 1906, Deakin announced an initial three - year programme of eight coastal destroyers and four torpedo boats – following Creswell's recommendations. However, the plan made little progress.

In December 1907, following discussions at the Imperial Conference Deakin announced that the force structure had been modified to include nine small submarines and six coastal destroyers. Creswell protested vigorously and voiced angry complaints of Deakin's foolishness in matters of naval strategy. Commanders Colquhoun and Clarkson carried out a ship building study, visiting shipyards in Japan, USA and the UK.

In the UK, they engaged the services of Professor John Biles to design a fast oil-burning destroyer, which was to become the River class. These were a considerable advance on the equivalent vessels then being built for the Royal Navy. From the beginning, our need to adapt the stock European designs to our requirements was recognised. Deakin set aside Stg 250,000 for a naval construction programme prior to losing office in November 1908.

Creswell reiterated his plans for a navy based on destroyers and torpedo boats to provide coastal defence to the

incoming Prime Minister, Andrew Fisher, who announced a three-year plan based on 23 destroyers.

Finally, action! Tenders were called for construction of three – 700 ton River class destroyers, PARRAMATTA, YARRA and WARREGO in February 1909, using the funds set aside by Deakin.

The first ship, PARRAMATTA was launched on a bleak day in Scotland in February 1910. The Admiralty appears to have been unimpressed by these Ships, the launching was not attended by any member of the British cabinet and apologies were received from the First Lord of The Admiralty and First Sea Lord! Of course, one should not read too much into this, Battleship launchings were common place at this stage of the build up to war.

Meanwhile the mounting alarm over German naval expansion and financial stringencies at home stirred the Admiralty into action. Britain called an Imperial Conference in 1909 to consider the whole question of imperial defence.

The First Sea Lord, Jackie Fisher, seized on offers from New Zealand and Australia to fund construction of a Battleship. He argued for a tactical unit formed around a Battle Cruiser, with three cruisers, six destroyers as scouts and three submarines. This tactical unit would form the nucleus of an Australian Navy.

He proposed to transfer responsibility for naval defence of the Australia Station to Australia.

The Commonwealth delegation was unprepared for the pace of change or the urgency, which now infected the Admiralty. Creswell argued against Fisher's Fleet Unit proposal, suggesting instead using the funds to develop the foundations of naval infrastructure, rather than spending money on a battle cruiser.

Fortunately, the Admiralty carried the day, by offering to:

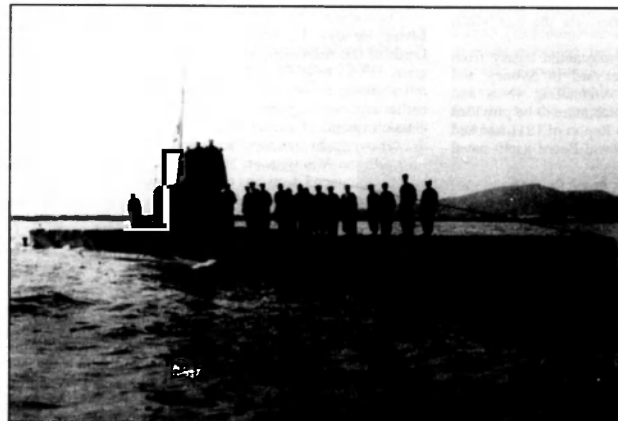
- Pay any capital costs in excess of Stg 500,000,
- Hand over control of the Australian station, and
- Transfer to the Commonwealth all imperial dockyards and shore establishments.

Their motives were not entirely altruistic. Even with the offered subsidy, the establishment of an Australian Navy, with responsibility for the defence in this area of the Pacific would allow withdrawal of the Royal Navy's Australia Squadron (which was already well advanced under pressure of obsolescence and funding shortfalls). The moves would save the Admiralty Stg 500,000 per year plus the cost of running the Garden Island Dockyard.

In Australia, Prime Minister Alfred Deakin promptly agreed the Admiralty's proposal. Deakin had earlier negotiated a full interchange between Australian and British naval personnel. This proved to be fundamental to the successful and rapid build up of personnel.

The first contingent travelled to England in 1910 and completed their courses with impressive grades.

The Deakin Government ordered the battle cruiser in December 1909 as it lost government. The incoming Government of Andrew Fisher adopted the plan. Prime Minister Fisher refused the British offer of funds and the purchase was funded entirely from the Commonwealth budget. The Australian Naval Defence Act of 25 November, 1910, provided the legislative cover.



The famous Australian submarine AE-2. The Australian boats AE-1 and 2 were amongst the first fitted with radios – a capability which was to play a small, but critical part in the Gallipoli campaign.



The Naval Board was reconstituted in March 1911 with Creswell promoted and knighted as the first Naval member.

The King approved the title Royal Australian Navy and the right to fly the white ensign on 10 July 1911, and the Australian Commonwealth Navy became the Royal Australian Navy.

After Jackie Fisher retired as First Sea Lord in 1910, the level of cooperation dropped significantly. Any move toward greater independence for the RAN was rapidly overtaken by the onset of WW I, when the Fleet was placed under Admiralty control.

## What was actually done to bring all this about, this transformation from moribund to modern fleet?

Personnel was the obvious major challenge:

- The Fleet Unit required 2,500 men, with another 900 ashore (no sea shore ratio in those days!).
  - They needed an additional 3,160 officers and men! The strategy sounds familiar: New pay rates.
  - Expand Williamstown training depot.
  - Commence the TINGIRA training ship scheme.
  - Activate the Senior Naval Officers in the states as recruiters.
  - Invite Australians in the RN to transfer.
  - Recruit retired ex RN POS, and.
  - Borrow the balance from the RN
- The breakdown on 1 June 1913 was:
- RN loan 900.
  - Ex RN retired 480.
  - Australians transferred back from the RN 360.
  - Recruited and trained in Australia 1,660

1,660 in say 3 years, was an extraordinary feat from a standing start.

On the logistics front the fledgling Navy was very fortunate to have the services of Paymaster-in-Chief Eldon Manisty RN (later Rear Admiral), as the Finance and Civil member of the Naval Board.

The Board had three years to prepare for the reception, support and administration of the new fleet.

The Naval Secretary, George Macandrie remarks that Manisty's thorough knowledge of the needs of a modern navy, his legal qualifications as a barrister and his untiring energy, enabled him to push on with preparations which caused the Fleet Unit to be in a state of readiness for the war which occurred on 4 August 1914.

Of course the RAN inherited a substantial legacy from the RN – a first class naval dockyard in Sydney and a comprehensive infrastructure of victualling yards and ammunition depots. But there was much more to be provided for a modern fleet and the Henderson Report of 1911 had laid this out – the establishment of the Naval Board itself; naval bases and so on.

TINGIRA was commissioned for boys' training in April 1912.

The cruiser ENCOUNTER was borrowed from the RN for crew training before BRISBANE, then building at Cockatoo, became available.

The cruiser PIONEER was also borrowed, this time for gunnery training. Recruit training was undertaken at Williamstown Naval Depot.

Soon recruits were coming in faster than could be handled. By March 1913 there were 1,004 men under training. Schools were established for wireless telegraphy, signalling, gunnery and torpedo training. These were later transferred to Flinders Naval Base.

These matters are easy to trivialise but in the aggregate, they amounted to a stupendous administrative achievement for which Manisty deserves full credit. The other key

personality in this process was Captain, later Vice Admiral, Sir William Clarkson. Clarkson was a trained naval architect and engineer, who accompanied PROTECTOR to Australia in 1884 as the second engineer. He served with Creswell in South Australia and saw active service in PROTECTOR during the Boxer rebellion in China. He was heavily involved in the design and construction of the three River Class destroyers and was highly regarded by various Ministers of the day, who commissioned him to purchase and establish the small arms factory at Lithgow. This was in addition to his naval duties; he was appointed as the third member of the Naval Board at its establishment in 1911.

The initial term of the Naval Board was not a happy one. Clarkson fell out with Creswell over the siting of bases arising from the Henderson Report and the establishment of Cockatoo Island as a shipbuilding dockyard. I must say history has borne out the wisdom of Clarkson's stances.

At the outbreak of War, Clarkson was appointed by the Government to oversee shipping and maritime transportation in addition to his duties as third naval member, which included a very successful shipbuilding programme.

This was the beginning of a series of high exposure postings to controversial and contentious public duties for Clarkson. His success was rightly recognised by his knighthood and promotion to Engineering Vice Admiral – the RAN's first (and possibly only) such promotion.

It is hardly surprising and perhaps typical of the dysfunctional Board that preparations for the two submarines arrival were lacking. Two months before their arrival the Naval Board was discussing where to base them; less than three weeks before their arrival it was decided to advertise for suitable depot ship. Perhaps Creswell's earlier opposition to submarines fostered an air of antipathy amongst many senior officers.

## So who was the Father?

Rear Admiral George Tryon as the first Flag Officer and C-I-C of the Australia Station deserves an honourable mention as one of the grandfathers.

Creswell is traditionally viewed as the professional father of the RAN. However, the impression I develop in reading the records and his correspondence is of a man with strongly held views, which dated from his experiences as a junior Lieutenant in the Royal Navy, and who did not move with the political, technology and strategic factors, which were so rapidly shaping the environment.

Consequently, his political masters frequently ignored his advice. He argued courageously, but to no effect against the Lords of the Admiralty, with whom he became persona non grata. His letter to Deakin protesting the latter's decision to order submarines in 1907, Deakin having rejected Creswell's earlier arguments against the purchase, was, in my opinion, a classic example of a letter which should be left in the bottom drawer overnight, and then never sent:

- Prime Ministers are not noted for changing publicly announced decisions on such matters;
- Creswell had after all, also achieved his major goal – purchasing six destroyers, after years of political vacillation.

Experience with AE-1 and AE-2 indicates that his technical concerns over mobility and sea keeping were vastly overstated. AE-2 steamed 30,000nm in its first 12 months in commission without incident, although there were some challenging engineering feats needed to achieve this record. He gets full marks for determination and persistence – for his unwavering advocacy for an independent Australia Navy and infrastructure necessary to defend the Ports and sea borne trade.

A review in 1915 of the Department of Defence's financial and business operations functions, conducted by a respected businessman commented critically on Creswell, who he found

to be: "an exceedingly pleasant old gentleman", but with "only the foggiest idea of modern management" and "and expensive luxury in his present position".

The Minister of the day, Jensen, who chaired the Naval Board, must bear the majority of the blame; he failed to lead and appeared determined to exploit for his own advantage any disunity. Couldn't happen today I hear you say!! This is hardly the setting for the successful birth of a navy!

Looking behind the numerous conferences, committees, plans and proposals to those who made the decisions, I would suggest that Deakin and Jackie Fisher shared the honours for conception.

Deakin's involvement began with his leadership of the Australian delegation at the 1887 Naval Agreement Conference. He continued to provide this leadership in various roles as Minister and Prime Minister, for the next 31 years. He settled on the strategic objective of an independent Navy, controlled by the Commonwealth Government, from the earliest. He correctly recognised that this could only be achieved with the wholesale support of the Royal Navy and resisted efforts to proceed ahead of such agreement. When the opportunity came he acted with alacrity.

Jackie Fisher was the other half of the duo, who initiated this journey. He displayed the courage to back his convictions and a drive, which brooked no bureaucratic delays in the Admiralty.

The decision made, the Royal Navy was unstinting in providing talented personnel to support the endeavour.

The colonial sceptic would say that the strategic and financial circumstances facing Britain provided the mother of necessity.

Finally, I suggest the successful result relied heavily on the individual efforts of Manisty and particularly, Clarkson to

achieve the end result.

Paymaster-in-Chief Eldon Manisty RN, as the logistician and Engineering, and Captain William Clarkson as the engineer on an otherwise dysfunctional Naval Board must be regarded as the midwives, without whom the successful birth would not have been achieved.

## Conclusions

It is a fascinating period of our history.

I could not help but note the familiar themes:

- The lack of trust between the politicians and the naval professionals – both operating with great dedication, but to different agendas.
- The misguided influence of the partly informed media.
- The well-intentioned but badly informed vocal minority of citizens.
- The failure to recognise the contribution of the logistician and engineering specialist and their role at the strategic level of management – which continues today.
- At the end of the day, the ability at the sharp end to get on and make things happen, despite all the aforementioned negative assistance.
- As a result, in less than 4 years Australia had a Navy, albeit one commanded by Royal Navy Officers for some years to come.

In my opinion Creswell's reputation as the professional father of the RAN must be tempered by his limitations in managing the political and strategic issues. Without Deakin's vision and the drive of Jackie Fisher, responding to the press of Strategic circumstances, the Royal Navy's unstinting support and the individual efforts of Manisty and Clarkson the story would have been quite different. ↓

# Hatch, Match & Dispatch

## MATCH HMAS STUART

On 17 August 2002 NUSHIP STUART was commissioned into the RAN as HMAS STUART.

STUART is the fourth of eight Anzac ships that are being constructed in Australia for the Navy by Tenix. HMAS ANZAC was the first to be commissioned in May 1996 with PERTH to be the last to commission in October 2006.

The STUART is the first warship of its class to be commissioned and home-ported in Sydney.

"The Anzac ships are highly modern, multi-role frigates that undertake a number of important tasks including surveillance and patrol, protection of shipping and strategic areas, naval gunfire support in support of the Army, regional disaster relief and search and rescue," said Defence Minister Senator Hill who attended the commissioning ceremony along with CDF General Cosgrove and Chief of Navy Vice Admiral Ritchie.

Senator Hill said the frigates' surface and sub-surface warfare capabilities would be further enhanced with the installation of the Harpoon surface-to-surface missile, which will be produced this financial year and enter into service in 2004. The Harpoons will be fitted behind the bridge in two Mk-141 octuple launchers.

Other enhancements being considered under the Anzac Ship Alliance, a long term alliance contract signed in July 2001 by Defence, Tenix Defence Systems and Saab Systems for development of all future Anzac ships capability change packages, include a further mine and obstacle avoidance sonar and torpedo self-defence system. The \$5.279 billion Anzac ship project, which is proceeding on time and on budget, has provided significant employment and business opportunities across Australia, with around 600 companies involved in the provision of equipment and services to the project's prime contractor, Tenix Defence Systems.



NUSHIP STUART on sea trials off Melbourne (Tenix)

# PRODUCT REVIEW

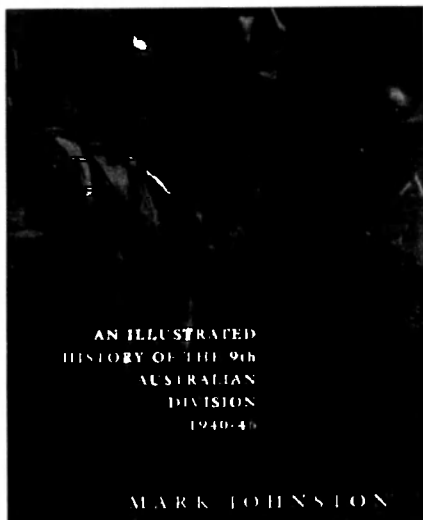
## The Magnificent 9th – An Illustrated History of the 9th Australian Division 1940 – 46

By Mark Johnston

Allen & Unwin Books 2002

Hard Cover, 272 pages Illustrated

Reviewed by Paul D. Johnstone



A key to the success of this book is stated within the introduction when the author remarks how the opportunity to conduct thorough research for this topic will never again be able to be undertaken with the passing of so many who were the 9th Division. This includes the ability to express and share as an eyewitness accounting the hazards and challenges of the Western Desert, the Jungles of South East Asia and New Guinea.

The many oral histories, as well as the generous inclusion of private collections of photographs, contribute widely to the success of this book. I for one enjoyed how personal experiences were so well blended with the chronological journey of the raising of the 9th Division in 1940 and its subsequent adventures until its disbandment in 1946.

The book has excellent coverage of the 9th's exploits in both maps and photographs. Many of the wide variety of the photographs are from private collections and differ greatly from those so often repeatedly exhibited in many other publications. Perhaps the only downside is that each illustration does not have a caption beneath it to assist with more readily identifying the finer details of the photograph or map rather than the bold cross – reference to the photographs

during the prose. The author's research is most thorough in that he actually points out many of the staged photographs that were constructed for prop-aganda purposes by "Chet's Circus" a British photographic unit whose role was to reconstruct battle scenes.

Insight and detail is provided into many of the experiences and attitudes that prevailed in the 9th Division during this period. One constant within the book is how poorly armed, ill equipped and unprepared these men were for the enormous challenges laid down before them. Clearly demonstrated is the AIF's ability to scrounge, make do and improvise under some of the most hostile and worst conditions, often channelling wit, courage and humour into a quest for survival and ultimately a significant contribution to military victory in the darkest hours of the Second World War. The Magnificent 9th – An Illustrated History of the 9th Australian Division 1940 – 46, is a well researched, well written and well illustrated informative history and is highly recommended reading.

## Mutiny on the Globe: The Fatal Voyage of Samuel Comstock

By Thomas Farel Heffernan

Bloomsbury Publishing

Softcover, 280 pages

\$29.95

Reviewed by Doug Steele.

I'll be honest. When I was first handed a copy of this book and read the description on the back cover – 'a fascinating event in Nantucket's whaling history' – I thought it looked a bit dull and obscure. Nonetheless, I gave it a go and I'm glad that I did. I was immediately drawn into a story that is part Moby Dick, part Robinson Crusoe, and part Mutiny on the Bounty, but what made it all the more engaging is that it is historical fact. For me, history is at its most fascinating when it demonstrates how fact can be stranger than fiction.

In Mutiny on the Globe Heffernan tells the story of Samuel Comstock, a young man from 'rugged stock' who was eerily insensitive to physical pain, seemingly incapable of emotion, a risk taker, a liar, a womaniser who became obsessed with the idea of 'native nymphs', and most of all, a budding psychopath. In a scenario reminiscent of Francis Ford Coppola's 'Colonel Kurtz' in Apocalypse Now, Samuel was obsessed by the idea of living the rest of his life as the only white man among natives of a Pacific island. Samuel believed he would quickly be elected King, and "once in power he would make the island a pirate kingdom, launching a native navy that would capture everything in sight. His exploits would turn him into a fable; he would gain immortality as the terror of the South Seas." The plan devised by Samuel went like this: join a whaling ship, sail for the Pacific, kill the Captain and officers, take it over, land at an island inhabited by savages, murder the rest of the crew, become king, and turn the natives into a private army. Simple.

Heffernan does a good job of tracing the influences on Samuel and his formulation of the idea. He then describes in quite gory detail how Samuel goes about conducting the mutiny, including how the Captain, officers and non-cooperative crewmembers all met extremely violent deaths. The mutineer's use of oversized whaling tools to do the job is, to say the least, horrifyingly innovative.

Having reached the pivotal point in Samuel's grand plan for realising his 'destiny', the remainder of the story follows the consequences for Samuel and the remaining crew. Needless to say, this is where things went awry. Having reached the Mili Atoll in the Marshall Islands, the men discover that the natives' temperament is quite different to Samuel's romantic conception. All but two are killed, and the survivors are kept as a mixture between a slave and a pet until a daring rescue almost two years later.

Heffernan's treatment of the wider historical context in which the events took place is an intriguing aspect of this book. This was a time when growing up in New York was unimaginably miserable; stagnant and squalid, with a nightmarish fire hazard and no reliable water supply. I found it interesting how Manhattan had an inland lake that had to be drained and filled when effluents, rubbish, and the dumping of dead animals had irreversibly polluted it (white Broadway, on the other hand, was lined by poplars and four-story

homes). It was a time when harsh reality forced youth to mature quickly: as his Schoolmaster prepared to give Samuel – aged six – the equivalent of the cane as punishment for misbehaving, Samuel defiantly warned him "Ah! Friend Mark, it will be of no use; father has used up a whole poplar tree on me, already; but to no purpose." And it was also a time when the Pacific was viewed with the same sense of immensity, adventurism, mystery, awe and inherent danger that we now ascribe to the depths of space. Of course, prolific stories about remote islands populated by 'vivacious native girls' who swam out to meet ships clothed only with 'a large green leaf' that was 'generally lost by swimming any length of the way' only served to fan the flames in many a young man's mind.

In the end the psychopathology of Samuel Comstock overshadows everything else in the Globe story. Describing this book as 'a fascinating event in Nantucket's whaling history' simply does not do it justice. Heffernan deals with the contributing historical, social, and psychological (or is that psycho-pathological?) factors in such a way that the reader can clearly see the storm clouds gathering. Delusion, frustration and deep-seated aggression are clearly conspiring to drive an already unbalanced Samuel off the rails. And when it does happen, it happens in spectacular fashion – and proves that truth really can be stranger than fiction.



## Notice is hereby given that the ANNUAL GENERAL MEETING

of

### THE NAVY LEAGUE OF AUSTRALIA

will be held at the Brassey Hotel, Belmore Gardens, Barton, ACT  
On Friday, 15 November 2002 at 8.00 pm

#### BUSINESS

1. To confirm the Minutes of the Annual General Meeting held in Canberra on Friday 16 November, 2001

2. To receive the report of the Federal Council, and to consider matters arising

3. To receive the financial statements for the year ended 30 June 2002

4. To elect Office Bearers for the 2002-2003 year as follows:

– Federal President

– Federal Vice-President

– Additional Vice-Presidents (4)

Nominations for these positions are to be lodged with the Honorary Secretary prior to the commencement of the meeting.

5. General Business:

– To deal with any matter notified in writing to the Honorary Secretary by 5 November, 2002

– To approve the continuation in office of those members of the Federal Council who have attained 72 years of age, namely John Bird (Vic), Joan Cooper (Tas), Arthur Hewitt (WA), Gwen Hewitt (WA), John Jeppesen (NSW), Tom Kilburn (Vic) and Andrew Robertson (NSW).

## ALL MEMBERS ARE WELCOME TO ATTEND

By order of the Federal Council

Ray Corboy, Honorary Federal Secretary, PO Box 309, Mt Waverley VIC 3149

Telephone (03) 9888 1977 Fax (03) 9888 1083



The strategic background to Australia's security has changed in recent decades and in some respects become more uncertain. The League believes it is essential that Australia develops capability to defend itself, paying particular attention to maritime defence. Australia is, of geographical necessity, a maritime nation whose prosperity strength and safety depend to a great extent on the security of the surrounding ocean and island areas, and on seaborne trade.

The Navy League:

- Believes Australia can be defended against attack by other than a super or 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 to our allies.
- Supports the ANZUS Treaty and the future reintegration of New Zealand as a full partner.
- Urges a close relationship with the nearer ASEAN countries, PNG and the Island States of the South Pacific.
- Advocates a defence capability which is knowledge-based with a prime consideration given to intelligence, surveillance and reconnaissance.
- Advocates the acquisition of the most modern armaments and sensors to ensure that the ADF maintains some technological advantages over forces in our general area.
- Believes there must be a significant deterrent element in the Australian Defence Force (ADF) capable of powerful retaliation at considerable distances from Australia.
- Believes the ADF must have the capability to protect essential shipping at considerable distances from Australia, as well as in coastal waters.
- Supports the concept of a strong modern Air Force and highly mobile Army, capable of island and jungle warfare as well as the defence of Northern Australia.
- Supports the development of amphibious forces to ensure the security of our offshore territories and to enable assistance to be provided by sea as well as by air to friendly island states in our area.
- Endorses the transfer of responsibility for the co-ordination of Coastal Surveillance to the defence force and the development of the capability for patrol and surveillance of the ocean areas all around the Australian coast and island territories, including the Southern Ocean.
- Advocates measures to foster a build-up of Australian-owned shipping to ensure the carriage of essential cargoes in war.
- Advocates the development of a defence industry supported by strong research and design organisations capable of constructing all needed types of warships and support vessels and of providing systems and sensor integration with through-life support.

As to the RAN, the League:

- Supports the concept of a Navy capable of effective action off both East and West coasts simultaneously and advocates a gradual build up of the Fleet to

ensure that, in conjunction with the RAAF, this can be achieved against any force which could be deployed in our general area.

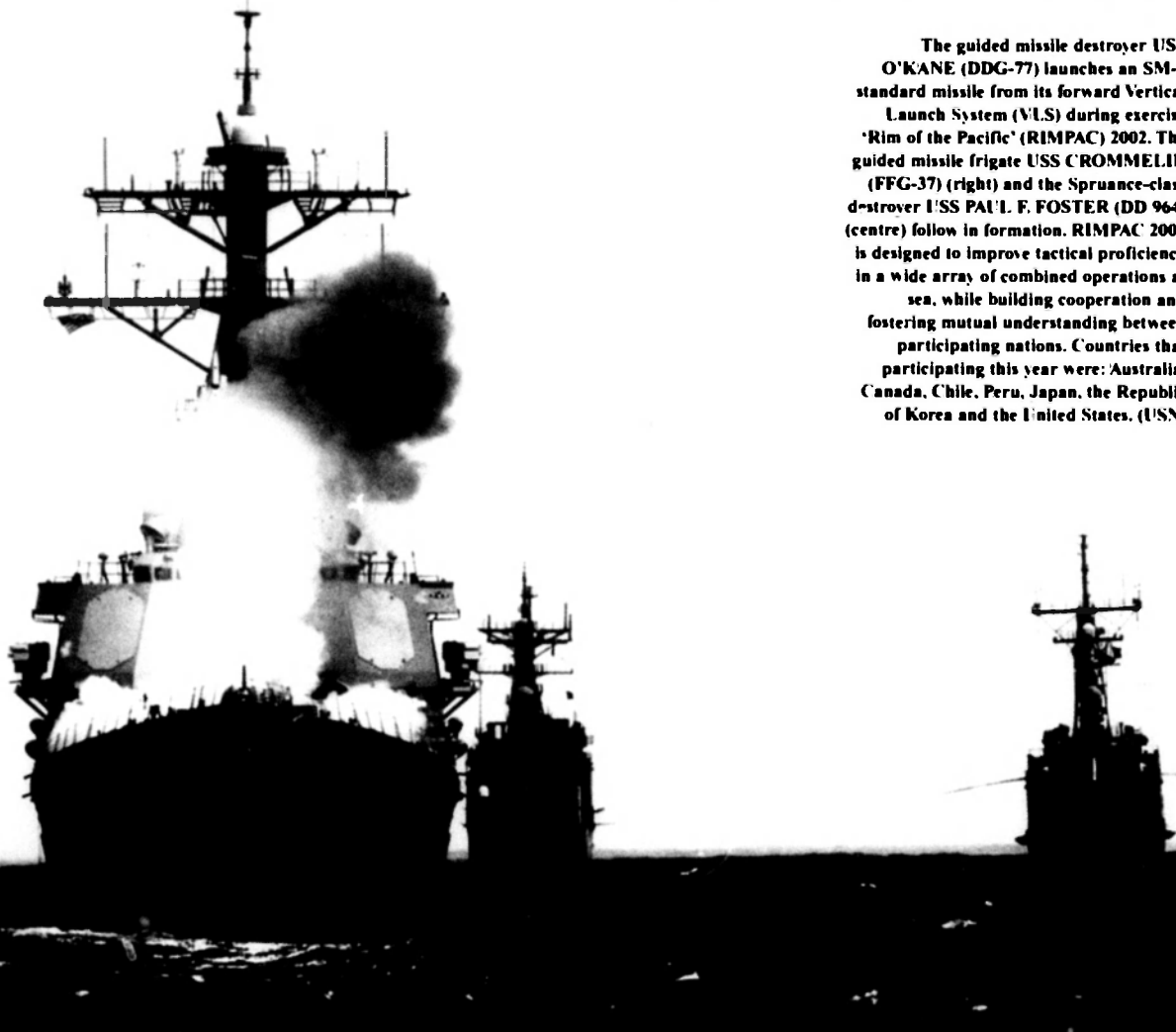
- Is concerned that the offensive and defensive capability of the RAN has decreased markedly in recent decades and that with the paying-off of the DDGs, the Fleet will lack air defence and have a reduced capability for support of ground forces.
- Advocates the very early acquisition of the new destroyers as foreshadowed in the Defence White Paper 2.
- Advocates the acquisition of long-range precision weapons to increase the present limited power projection, support and deterrent capability of the RAN.
- Advocates the acquisition of the GLOBAL HAWK unmanned surveillance aircraft primarily for offshore surveillance.
- Advocates the acquisition of sufficient Australian-built afloat support ships to support two naval task forces with such ships having design flexibility and commonality of build.
- Advocates the acquisition at an early date of integrated air power in the fleet to ensure that ADF deployments can be fully defended and supported from the sea.
- Advocates that all Australian warships should be equipped with some form of defence against missiles.
- Advocates that in any future submarine construction program all forms of propulsion be examined with a view to selecting the most advantageous operationally.
- Advocates the acquisition of an additional 2 or 3 updated Collins class submarines.
- Supports the maintenance and continuing development of the mine-counter measures force and a modern hydrographic/oceanographic capability.
- Supports the maintenance of an enlarged, flexible patrol boat fleet capable of operating in severe sea states.
- Advocates the retention in a Reserve Fleet of Naval vessels of potential value in defence emergency.
- Supports the maintenance of a strong Naval Reserve to help crew vessels and aircraft in reserve, or taken up for service, and for specialised tasks in time of defence emergency.
- Supports the maintenance of a strong Australian Navy Cadets organisation.

The League:

Calls for a bipartisan political approach to national defence with a commitment to a steady long-term build-up in our national defence capability including the required industrial infrastructure.

While recognising current economic problems and 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 guided missile destroyer USS O'KANE (DDG-77) launches an SM-2 standard missile from its forward Vertical Launch System (VLS) during exercise 'Rim of the Pacific' (RIMPAC) 2002. The guided missile frigate USS CROMMELIN (FFG-37) (right) and the Spruance-class destroyer USS PAUL F. FOSTER (DD 964) (centre) follow in formation. RIMPAC 2002 is designed to improve tactical proficiency in a wide array of combined operations at sea, while building cooperation and fostering mutual understanding between participating nations. Countries that participating this year were: Australia, Canada, Chile, Peru, Japan, the Republic of Korea and the United States. (USN)



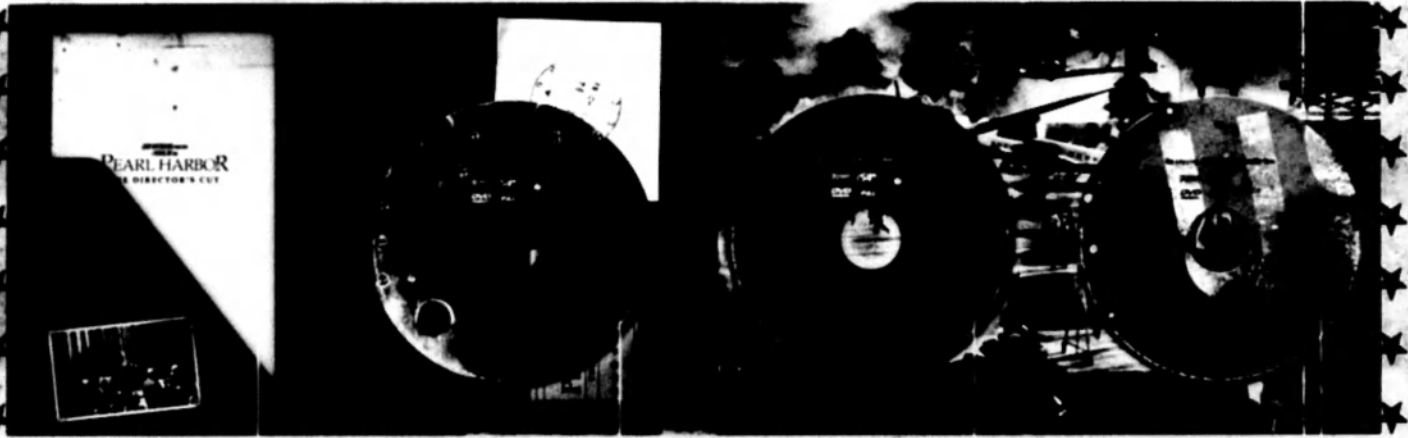
NUSHIP STUART on sea trials off Melbourne (Tenix)

A JERRY BRUCKHEIMER PRODUCTION  
A MICHAEL BAY FILM

# PEARL HARBOR

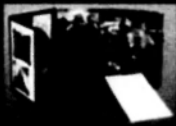
THE DIRECTOR'S CUT 

The most extensive exploration of movie making ever presented.



This comprehensive, historically driven booklet contains insights, as well as informative introductions, into the wealth of material found in this groundbreaking DVD.

Franklin D. Roosevelt's address to congress December 8, 1941



Pearl Harbor: The Director's Cut Movie  
60 NEW ACTION scenes complete the film as never before.  
Dolby 5.1 Digital Surround Sound. Widescreen (2.35:1) - enhanced for 16x9 televisions.  
3 selectable audio commentaries:  
(1) Director Michael Bay and Jeanine Basinger (2) Jerry Bruckheimer, Alec Baldwin, Ben Affleck and Josh Hartnett (3) Cinematographer John Schwartzman, Production Designer Nigel Phelps and Costume Designer Michael Kaplan.

Hours of outstanding special features exploring the historic event and the making of the film  
10 x production diaries (1) Airfield Attack (2) Baja Gimbal (3) Battleship Row (4) Dorie Miller (5) DUD Bomb (6) Mechanics Row (7) Nurse Straling (8) Sandbag Shunt (9) Doolittle Raid (10) Arizona Dive  
Exhaustively detailed interactive timeline documentary tracing the culture clashes and political struggles which gave rise to the Japanese attack.  
Super 8mm montage by creative advisor Mark Palansky  
History recollection interview with Nurse Ruth Erickson.  
Faith Hill music video.  
One Hour Over Tokyo "History Channel" documentary.

Multi-angle, multi audio interactive attack sequence - look in incredible detail at the creation and production of the film's most exciting sequence from 4-camera and 6-audio angles  
*Deconstruction Destruction* - a conversation about visual effects with Michael Bay and Eric Brevig  
*Animatic Attack* - scene concepts from Michael Bay  
*Boot Camp* - segments of the actor's preparation.  
*Still Galleries* - never-before-seen photos from the set.

★ 3 disc DVD ★ over 12 hours ★ 60 new  
of outstanding action scenes  
special features



Also  
Available

The 6 hottest Jerry Bruckheimer action titles in a special collectible packaged box set. Limited release. Available only while stocks last.

BIG W

DVD JONES e

GAME STOP

Harvey Norman

HMV

ALCANTARA

MEGAMART

MYER

POUR

SANITY

Target.

Target.

Target.

AVAILABLE AT THESE AND OTHER LEADING DVD RETAILERS



# **PLEASE NOTE**

**THIS MATERIAL  
WAS FILMED AT  
A REDUCTION  
RATIO OF 23.5x**

**SOME PAGES MAY CONTAIN  
POOR PRINT, TIGHT BINDING,  
FLAWS AND OTHER  
DEFECTS WHICH APPEAR  
ON THE FILM**