

# THE NAVY

THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA



## NAVAL ELECTRONIC WARFARE WHAT'S IN A NAME? TELL IT TO THE LABS WOODEN LUGGERS: FRIEND OR FOE?



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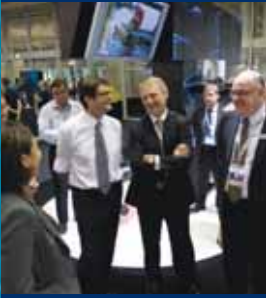
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# THE NAVY

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### Front cover:

The RFA LARGS BAY leaving Portsmouth Harbour for the last time, and/or as an RFA, before coming to Australia as the RAN's newest ship. (Gary Davies, Maritime Photographic, [www.maritimephotographic.co.uk](http://www.maritimephotographic.co.uk))

## SUCCESS HAS MANY FATHERS

In the January - March issue of *THE NAVY* this column suggested the RAN needed to investigate the purchase of the Royal Fleet Auxiliary (RFA) LARGS BAY. LARGS BAY is a very large amphibious warfare ship that was being decommissioned after only five years in service in order to help the UK pay its crippling debts under a previous Labour Government (sound familiar?). To quote:

*"With HMAS TOBRUK becoming increasingly unsustainable from costly obsolescence maintenance and the LPAs currently tied up unexpectedly for long overdue and urgent maintenance of their ageing systems, now may be the time for a rethink and rationalisation of the RAN's current amphibious capability.*

*"Decommissioning TOBRUK and/or one of the LPAs KANIMBLA or MANOORA now to purchase the UK's decommissioning Bay class would provide considerable savings in operating costs and maintenance and will free up personnel for transition training to the LHDs. All of which would enable a far timelier realisation of the Government's 2009 White Paper's strategy for the ADF's amphibious deployment and sustainment project, as well as a capability increase."*

When *THE NAVY* published that issue's editorial it was unaware that Navy had the same idea, coincidentally at the same time. In fact when that issue went to the printer before Christmas, Navy had already inspected the vessel with the ambition of acquiring her.

On 6 April, not long after the publication date of the following April - June issue of *THE NAVY*, the Defence Minister Stephen Smith announced that Australia had been successful in its bid to purchase LARGS BAY. Two other countries, Brazil and Chile, had placed a bid in the silent auction but Australia was ultimately successful with a £65 million (approximately AU\$100 million) offer.

So our magazine cannot claim success. Interestingly however, we believe our pushing the issue on several occasions during the last six months did influence the Minister's hand and thus helped Navy in its efforts. For example, on 31 January the News Agency AAP ran an article on our first editorial quoting our suggestion that the material state of the LPAs and TOBRUK warranted the purchase of LARGS BAY. The very next day the Minister announced the material state of MANOORA warranted her immediate decommissioning and that solutions were being sought, despite the Minister knowing this before Christmas. As we have noted, to distance himself from the issue he then issued a stinging public rebuke of Navy over its handling of the LPAs and TOBRUK.

Our April editorial criticised the Minister and his advisers for being short-sighted and somewhat disloyal to the members of the RAN. We suggested that praise not scorn should have been the media strategy. After all, the LPAs were over 40 years old. Navy's efforts to get them this far after subjecting them to very hard lives is a testament to the hard work and professionalism of the RAN to keep them going. That editorial then suggested that for the Minister to make amends he needed to secure LARGS BAY's acquisition. Five days after our issue 'hit the streets' he announced LARGS BAY would join the RAN by the end of the year.

So perhaps we are entitled to claim some credit for the magnificent addition that LARGS BAY will be to the RAN. After all, every little bit helps!

## AUSTRALIA'S DEFENCE IN TROUBLE

Over the last six months the Government appears to be putting party security before national security. At the last Federal Budget it reneged

on key White Paper promises on defence capability spending.

The first involves the Defence Strategic Reform process set up to save money and return it back into the Defence Capability Plan (DCP) to fund the 2009 Defence White Paper. However, the hard work by Defence and resulting savings are now being raided and counted as income in consolidated revenue towards the 2013 election year budget.

Secondly, the promised 3% in real growth of Defence's budget has also been broken. To quote the Editorial in the *AUSTRALIAN FINANCIAL REVIEW* on 23 May:

*"This year's budget made no mention of the 2009 White Paper pledge to increase real defence spending by 3% a year to 2017-21 and by 2.2% thereafter to 2030. Nor was the promised 2.5% fixed Defence budget indexation to 2030 mentioned."*

Further, deliberate slow decision making, euphemistically called "reprogramming", by the Minister and the National Security Committee of Cabinet on key major capabilities (with some contractor delays) resulted in an underspend during last financial year. While some of that underspend went to buy the RFA LARGS BAY and another C-17 transport aircraft, the balance went back to the government as revenue. However, it could have gone to easily acquired already in service capabilities like Phalanx close in weapons systems for the Anzacs, better electronic warfare equipment and torpedo defence systems to keep the Navy's ships safe in combat. All of which provide a force multiplier effect and thus a good return for the financial investment. Given the unexpected political benefits of an underspend and the Government's extremely poor financial position the Minister recently announced more unnecessary "reprogramming" which will have the effect of returning money to Labor's 2013 election year budget, but in the process seriously eroding our cutting edge military capabilities. Leading strategic analyst Professor Ross Babbage summed it up best when he said in *THE AUSTRALIAN* on 18 May:

*"The \$4.3 billion cuts to the defence budget announced last week will cripple Australia's capacity to cope with serious security crisis during the next quarter of a century."*

This is a very serious situation for Australia's security into the future. ■



The RN Type 12 frigate LOWESTOFT being sunk as a target on June 8 1986 by the submarine HMS CONQUEROR using a Tigerfish torpedo. The under spend from last financial year's Defence budget could have gone into simple off the shelf capability improvements such as torpedo self defence equipment for our Anzac class frigates. A small investment for big returns. (RN)

## THE "SKYPE AFFAIR"

Members of the League, in common with other Australians, were appalled at the behavior of the cadets involved in the "skype affair" at the Australian Defence Force Academy (ADFA). The actions of those cadets were utterly unacceptable.

A number of investigations and inquiries have now been set in motion. It is to be hoped that at the end of these processes those culpable will be dealt with appropriately.

It is the expectation of the League that due process will be observed and that all parties will receive equal and fair treatment.

The League has been concerned at the way in which the Defence Minister dealt with Commodore Kafer, the ADFA Commandant. In his various statements the Minister appeared to have judged the Commandant prior to any investigation or inquiry having been conducted.

Commodore Bruce Kafer AM CSC is a distinguished naval officer who has given many years service to his country. To have his reputation and his career damaged without a fair and proper hearing is unacceptable.

It is to be hoped that further commentary will await the findings of the inquiries the Minister has announced

## ANZAC DAY

Should Anzac Day be viewed as purely an army day? On Anzac Day this year I saw a number of TV news reports. In each one only army was mentioned. The battles recalled were all on land. Kokoda, Fromelles, Alamein etc. and Gallipoli of course, but only the fighting on the peninsula.

No one would wish to deny the vast contribution of the Australian Army in WWI, WWII, Korea, Malaya, Vietnam and almost all the conflicts in which Australia has been involved. In particular, the very heavy losses suffered on the Western Front during WWI can never be forgotten.

Anzac Day was first commemorated by the Australian Army in Egypt in 1916 on the first anniversary of the Gallipoli landing. Anzac Day was from the first an army occasion. Of course, the acronym ANZAC itself stands for Australian and New Zealand Army Corp.

However, Gallipoli was not the first action by the new Australian armed forces. It was not the first landing. Nor was it the place of our first casualties. These firsts can all be claimed by the Royal Australian Navy which attacked and occupied German colonies to our north. These actions took place in September 1914, some seven months before the Gallipoli landings.

Since those first actions of 1914 the Navy has been engaged worldwide, during the World Wars and in almost every other action in which the Australian forces have been involved.

None of the above is in any way meant to diminish all that the Australian army has accomplished. It is an outstanding record, which is being added to each day in Afghanistan.

The point is that the Navy and the Air Force too, should not be so comprehensively overlooked.

Given that Anzac Day is seemingly overwhelmingly viewed as an Army occasion, should Navy focus on another part of the calendar?

A variety of dates come to mind. July 11, the date of the proclamation of the RAN. The landings in the German colonies in September 1914. The sinking of the German cruiser EMDEN by HMAS SYDNEY in November 1914. The entry of the Australian Squadron into Sydney in October 1913.

No doubt readers can think of other dates that resonate in the history of the Royal Australian Navy. Should Navy put more emphasis on November 11, Remembrance Day, the other national day where we honour those who have served?

Of late there has been a good deal of discussion about how this might be resolved. It would be interesting to know what the readers of *THE NAVY* think. If you have any suggestions please send them to our Editor. ■

## FROM OUR READERS



### Dear Editor,

I was impressed with your article by the three wise admirals on Nuclear powered submarines (SSNs) for Australia in the last issue. It reminded me of what the UK's premier motoring writer and host of Top Gear wrote in one of his weekly columns in the UK; "There are two ways a truly civilised and advanced nation can be defined. One, it has a fleet of nuclear powered submarines, and two, it does not have the death penalty."

It seems an appropriate metric to use but sadly one which Australia does not measure up to. Particularly so long as our government is in bed with the anti-civilisation and inaccurately named Greens Party. However, they can live with this given their hypocrisy over of selling uranium but not willing to use it, despite its Green credentials.

The need for SSNs is obvious to those who have ever paused for a second's thought of our unique geography or who have ever seen a map of the world. We are an island nation with big distances to cover. Thus our subs need to be independent, fast and devastatingly powerful. An "underwater Prius" (to keep the motoring flavour) no matter what you do to it will never be considered devastating, except to our national budget.

I read recently that the USN has now got the acquisition cost of their newest Block III Virginia class SSNs down to US\$1.2 billion each. Of course that figure only constitutes the submarine and not the through life costs however, if you applied a figure of three times the acquisition cost for through life costs and then times that by the 12 boats our last White Paper said we need for undersea warfare

tasks you get a figure of US\$57.6 billion, or \$54.3 billion Australian dollars. This is only \$8 billion more than what the government has budgeted for the new 12 diesel electric submarines.

However, given the speed, endurance and payload of a modern SSN you wouldn't need 12. Eight would 'more than' suffice. Bringing the acquisition cost down to approx AU\$36 billion. Which just so happens to be the same amount they want to spend on the Collins replacement. It would also be easier to man eight boats than 12.

The tactical and strategic value of SSNs versus the underwater Prius is obvious, even to the Greens. And just think, we could then be considered "civilised" under Jeremy's metric. And I'd like that!

**Fred Mason (via e-mail)**

# NAVAL ELECTRONIC WARFARE

By Dr Roger Thornhill

**Mastery of Naval Electronic Warfare (EW) can be a force multiplier providing an asymmetric advantage over almost all adversaries. For small outlays in investment it can provide big returns in the battlespace when it is needed. However, it is usually underappreciated, underfunded and under resourced, such as in the RAN. Dr Roger Thornhill explains the basics of Naval EW and the impact it can have.**

Within the field of naval weapons and sensors, which become increasingly complex with their use of the developing technology - particularly in electronics and software - there is a clear and generally appreciated role for most of the principal elements. Guns, missiles and torpedoes are for attack and inflicting damage; radar and sonar are for detection; communications are for command and control; navigational aids help to determine position. But the role of EW is perhaps less well understood, though the term EW is familiar and the importance of EW in naval operations has now grown. What it actually is, and how it is carried out, has in the past been shrouded in secrecy and it is really only in recent years that some aspects of EW have become a subject for discussion.

In essence, EW is a practice of technical opportunism and expediency, exploiting weakness in an enemy's use of electronics for his weapons and sensors, and cleverly taking advantage of features of enemy

equipment design and/or his use of electronic equipment. EW has come about entirely through the ever increasing use of electronics in naval operations and it has proved to be very powerful in gaining tactical advantages.

It is however, unlike other naval weapons and sensors in that it is basically a reactive rather than a direct activity. It reacts to what the enemy does in the electro-magnetic spectrum with the equipment he is known to have and how he uses it. Pre-conflict intelligence is thus very important. Consequently, the nature of EW is quite different from the use of other weapons and sensors. EW has evolved into an element of naval operations, which is important and has now a structure and established practice of its own. It can also command some expenditure, which many navies chose not to spend big on. Instead looking at the more 'sexy' end of the weapons spectrum, particularly when budgets are tight.

Crewmen load a Mk-36 SROBC chaff launcher with a countermeasures rocket. The rocket carries the EW payload high and slightly away from the ship to either jam, confuse or seduce a radar seeker. (USN)





The USN Arleigh Burke class destroyer USS FARRAGUT. Centre of the picture mounted just below the bridge wing on the side of the ship is the mainstay of the USN's ESM equipment, the SLQ-32. Each ship's fit includes two receivers mounted on either beam. (USN)

Today, all navies use EW to some extent. In the major navies it is well established and plays a leading part in their conduct of operations at sea. Even in smaller and less sophisticated navies engaged in relatively simple operations there is advantage to be gained from the use and principles of EW. The defence equipment industries of the world provide a wide range of EW equipment ranging from simple and inexpensive devices to extremely sophisticated and expensive equipment, and all of this finds a ready market. Research and development activity in both Government and industry laboratories can be extensive, and the subject continues because it is self-generating. A new EW capability leads to compensating changes in design in weapon and sensors, which in turn lead to different EW equipment as a reaction. Leapfrog process in this manner continues with an increasing spiral of complexity and cost, and navies have available to them a continuing source of EW equipment with a wide range of performance and capability to use in their ships and submarines.

Essentially EW consists of three elements:

- Making use of enemy transmissions for own ship's benefit, known as Electronic Support Measures — ESM or Passive EW.
- Spoiling enemy transmissions for his ship's use, known as Electronic Countermeasures — ECM or Active EW.
- Preventing the enemy spoiling own ship's transmission, known as Electronic Counter-Countermeasures — ECCM.

## ESM - INTERCEPT

As a contribution to naval command and control, the interception of enemy transmissions can give two elements of important tactical information, warning and identity, provided the enemy transmits. While it is opportunistic, in that it depends upon a degree of enemy 'cooperation', the probability of achievement is high as radio and radar silence imposes serious tactical limitations on the enemy. With suitable intercept equipment having adequate sensitivity to receive microwave signals, aided at times by atmospheric conditions, a ship can obtain very long range warning, up to several hundred miles, by intercepting enemy radar transmissions. No other shipboard electromagnetic sensor can provide such long ranges and the earliest warning of an enemy presence is within the capability of EW.

Submarines with some part of their structure exposed rely strongly upon EW intercept equipment for a warning of search radars. The

interception range of airborne radar transmissions is greater than the radar range to the submarine, allowing it to submerge before detection. Currently, high end EW equipment, broad band and non-scanning, provide an intercept probability of 100 per cent against even short radar transmission and in this respect have proved to be tactically very effective against radars attempting to avoid detection though burst transmission modes. Against impending attacks by radar homing missiles, such as Exocet, the intercept equipment can indeed give the only warning as sea skimming missiles are below the cover of ship's radar. Warning of enemy airborne surveillance is also frequently given only by EW interception. Thus, the tactical benefits from radar intercept equipment can be enormous even though it is a passive sensor of opportunistic type. Similarly, the interception of communication signals can also confer significant tactical advantage, particularly, if the transmissions are not encrypted and can provide information from their message content.

EW interception will continue to succeed as a naval sensor mainly because ships and aircraft of all types are now so dependent upon electromagnetic waves for surveillance by radar, for weapon direction and guidance and for communication and data exchange in command and control. To impose electromagnetic silence for long would constitute a major tactical limitation. Thus, the balance of advantage in this aspect of EW lies with EW interception provided the intercept equipment is designed to be fool proof against simple anti-intercept measures, such as short transmissions. The basic design philosophy of current equipment provides for this and has proved its value in exercises and operations over the years.

## DIRECTION FINDING (DF)

From a tactical point of view, the interception of an enemy transmission is much more valuable if the direction of the signal is also obtained. All radar intercept equipment is provided with a DF capability and some of the lower frequency communication intercept equipment is also capable of direction finding. The great contribution made by HFDF (High Frequency DF) in the Battle of the Atlantic against German U-boats is well known and is probably the first significant tactical use of DF in naval warfare. Nowadays, more significance is attached to DF against radar signals. Current DF equipment uses multi-channel amplitude comparison techniques with fixed aerials giving 360 degrees coverage, which can be incorporated into or around the topmast structure of a ship and into a submarine mast. With very wide band frequency coverage and a response to virtually all polarisations of the intercepted signal, the DF accuracy cannot, fundamentally, be high and the bearing information is not used for weapon direction. But it is used as a valuable indicator in general, all-round surveillance and for correlation with other sensor information. It gives the direction of a threat to within a few degrees and allows attention to be focussed in the appropriate area. The DF contribution to command and control is, thus, not one of precision, but one of general clarification of the threat appreciation and of discrimination between different intercepts of the same type of signal.

More DF accuracy would be useful in correlating EW contacts with others from radar and this poses a difficult technical problem in relation to the very wide frequency band coverage of the EW equipment. This might only be solved by using a second stage of high accuracy, tunable, narrow band, DF equipment. Bi-static or triangulation with other receiver assets could help but would require the platforms to 'speak' electronically to each other, thus providing a means of counter detection.





Since the USN phased out the Mk-13 launcher, along with SM-1 anti-air missiles and rail launched Harpoon, the Oliver Hazard Perry class have undergone an EW re-birth and are now the EW specialist platforms for the USN. Seen here in the circle is the Sidekick ECM jammer. Above it, the SLQ-32 ESM receiver array. To the right rear of the SLQ-32 are two two-barrel Nulka expendable hovering rocket ECM jammer/decoy launchers. (USN)

## SIGNAL ANALYSIS

Probably the most important tactical information obtained from the interception of enemy signals is that relating to target identity, which comes from analysing the signal characteristics. The radio frequency, pulse width, pulse repetition rate and the aerial rotation rate of a radar signal constitute a form of signature to identify the radar when compared with intelligence information on enemy radar characteristics.

With the radar identified the ship or aircraft carrying it can be determined and so the threat posed may be assessed. No other means, apart from visual observation, of identifying a target are

available to the command in a ship and so this contribution of EW is of vital importance in many tactical situations. Techniques for the rapid and accurate measurement of radar signal characteristics have been developed to a considerable degree of sophistication together with software-aided methods of comparing these characteristics with a library of known radar parameters, even to the point of 'fingerprinting' individual transmitters for greater identification, such as the ship's name. The result of this analysis, either in the form of a positive or probable identification, is then associated with the bearing. It is available to the command as a valuable addition to the threat picture and perhaps also for correlation with contacts obtained by other means. The EW analysis equipment can also be programmed to recognise and give immediate warning of nominated, specific threat radars, which pose potential dangers that require a very quick reaction, such as Exocet.

## THE ROLE OF ECM

To appreciate what ECM (Electronic Counter Measures) are attempting to achieve by the use of a large and varied array of quite different devices, it is helpful to understand that only two main objectives are involved. One is to disrupt surveillance and communication, so that an enemy is unable to achieve, totally or partially, what he hopes to from his electronic information gathering sensors, such as surveillance radar, or from his radio communication, equipment, which serve his command and control requirements.

The other is to reduce the lethality of his weapons, guns and missiles, which depend on electronics for aiming, guidance or homing, by making some or all of his shots miss their ship targets. There are many ways in which these two objectives are pursued in the practice of ECM and a number of them will be discussed below. Frequently, there are complications, such as the effect of ECM, on own ship's weapons. These can involve considerable complexity in the precautions taken in using ECM.



Mounted on top of the periscope of HMS ASTUTE is an advanced ESM receiver. Submarines with some part of their structure exposed rely strongly upon EW intercept equipment for warning of approaching search radars. (BAE Systems)





An RAN S-70 Seahawk. The updated RAN Seahawks have new EW intercept systems for passive searching as well as for the aircraft's self protection. Four receivers are mounted in such a way as to cover 360 degrees. They can provide an extension of the ship's own EW capability. (Mark Schweikert)

## RADAR NOISE JAMMING

A transmission at the frequency of a radar modulated by noise has the well known effect of saturating the radar receiver and causing its display to be covered by a continuous noisy paint, which obscures targets the radar would otherwise see. Certainly, a surveillance radar is disrupted and confused in its operation by this action, but its loss is not total as the noise jammer identifies the presence of a warship, which might otherwise be doubtful. More seriously, the jamming signal can act as a homing beacon for missiles, with most anti-ship missiles today having a home-on-jam capability.

Against gunnery radars, when the shells have no homing ability, the effect of the noise jammer is to deny range information to the radar and seriously reduce or destroy the lethality of the gun, which needs accurate ranging. Naval gunfire is not a serious threat to ships in modern times. Missiles are, and the use of a noise jammer can be dangerous, since missiles do not need accurate ranging but they do need to select a warship target. Thus, on balance the noise jammer, which was really the first ECM device to be conceived, is too dangerous for ships and has been largely replaced by other more effective and more subtle devices.

The noise jammer in its original simple form is actually rather a blunt instrument, which, without some thought, can rebound on the user. Its prime contribution in denying range information to a radar is not an important requirement and its role in naval warfare is now not very significant. However, modern forms of noise jamming using pulses of noise in configuration with false target generators play a useful role in causing confusion.

## COMMUNICATION JAMMING

Communications jamming with a noise-modulated signal is quite different in its significance and potential. The message content of the enemy signal can be totally obscured and a definite advantage gained without incurring any potential risk to the jamming ship or shore base in the simplest cases. However, if a communication signal is jammed it cannot usually be read by the jamming ship. It could be tactically more valuable to read an enemy's signals than to stop him reading them, so this must be considered within the framework of command and control. If the enemy signal is encrypted, so that it cannot be read quickly or easily, then jamming can be more profitable and all that is given away is the presence of a jamming warship.

To avoid jamming, the enemy transmission could employ 'agility' — that is frequency hopping over quite a wide band. To jam this form of signal, either an agile jammer or a broad band jammer would be required. This introduces undesirable features of considerable cost in the jammer and the chance of it interfering with own ship's communications. So a decision, based on the balance of advantage must be made, as in most applications of EW. The stage has now been reached that, while communications jamming can be very effective, it is no longer a simple and inexpensive operation against modern frequency agile communications systems.

## ELECTRONIC FALSE TARGETS

It can be dangerous to employ simple, continuous noise jamming against a surveillance radar, with the main attendant

risk of providing a home-on-jam capability for missiles. It is possible to confuse the radar operator, who is trying to select a target for his missile, with a great number of false targets around the ship. These targets can be generated electronically and injected into the radar through its sidelobes as well as its main lobe. The appearance of these false targets on the radar display can be very realistic and the operator is certain to be confused to some extent. But he knows a warship target is there, somewhere, in the midst of all the painted targets and he can fire a missile.

Now, the radar in the eye of the missile will look for a target to lock to, and it will search the area in front of it. If the ship is within the search area of the missile it is most likely to be selected because the missile cannot lock onto an electronic false target. This is because they have no physical reality in space and they will disappear when the missile radar stops scanning and attempts to lock on. So, while the surveillance radar may be confused, there is not much prospect of a reduction in lethality of the missile.

These sophisticated and elegant electronic false target generators are quite expensive and unfortunately their real application is limited to confusion in radar surveillance. This may be useful in causing a short delay, while the radar operator decides what to do.



The Israeli C-Pearl ESM receiver with a Millimetre Wave (MMW) frequency receiver below. C-Pearl (minus the MMW set) is fitted to the RAN's four FFGs. C-Pearl is usually mounted on the highest point of the ship. The saw tooth arrangement below is to prevent the ship's own active radars from blanketing the receiver with 'noise' when operating.

He is exposed, while so doing, thus, allowing the ship more time to take defensive action and deploy decoys, but it is mainly a source of confusion for gaining a tactical advantage. Of course, if the missile uses infra-red homing,



The South Korean Navy SLQ-200 Sonata EW system. The horizontal radome is for ECM while the smaller radome atop is the EW receiver. The SLQ-200 system is fitted to the KDX-II destroyers.

actually selected by the missile, which the ship can know from the pattern of behaviour of the intercepted missile signal, it can deploy a decoy above or beside itself, which the missile will see as part of the ship echo. The ship then moves away from the decoy and the missiles stays locked to the bigger decoy; this is known as seduction. In all of these cases the attack lethality can be substantially reduced and the chance of the ship's survival increased in a very cost-effective manner.

## ECCM

EW is essentially a conflict between devices which 'attack' and deceive the electronic sensors used in naval weapons, and the features in design of these sensors, which make them less prone to, or immune from electronic interference and deception. A step taken by ESM and ECM designers creates a response from ECCM designers. In this escalating battle of electronic design much ingenuity, complexity and subtlety is employed to an increasing extent because the advantages to be gained can be very

the electronic false targets do not affect it at all. Thus, in theory, the electronic false target generator alone is not always of prime naval significance, mainly because it has only a limited potential for reducing missile lethality, which is the prime requirement of the ship being attacked.

Nevertheless, in practice, false target generators have proved to be a serious embarrassment to attackers launching missiles against ships and it seems that their tactical value is, currently, quite considerable. Commercial equipment combine false target generation with other jamming modes and collectively these are effective in reducing the lethality of attacks.

## BREAK-LOCK DEVICES

If a missile has locked on to a ship, it is possible by electronic means to break the lock in range and also, with some types of missile homing, to break the lock in angle as well. This is achieved by electronically creating in the missile's radar a strong false target greater than that of the ship and 'capturing' the lock. The false target is moved away in range or angle with the missile following, and then switched off. The missile is left without a target and is forced to search again. If there is a strong decoy target placed nearby, the missile has a high probability of locking on to this, provided it is a real physical object in space, and so missing the ship. This combination of a break lock device and decoys is effective in reducing lethality when

a ship has actually been selected as a target and a missile is homing to it.

It is rather more difficult to break lock in angle than in range, especially, if the missile is using a simultaneous lobing method of guidance for homing. If sequential-lobing, such as the well known conical scanning technique is used, a missile can be pulled off in angle. This is not so good as range break lock since the angle pull-off may result only in the missile reaching its target by a curved rather than a straight line.

## DECOYS

Decoys, real rather than false electronic targets, are by far the most potent form of ECM in providing protection to ships through reducing the lethality of missiles and causing them to miss. If a ship receives warning, including target identity, from its ESM equipment that a missile attack is imminent, its course of action is to lay down a pattern of decoys around itself. The attacking aircraft then sees a number of radar contacts in a group; these are all 'real' targets in that they provide a radar echo from a point in space and they are capable of being locked onto. If the aircraft selects any of the decoys for its missiles, and the missiles home to these, then dilution of the attack occurs because some or all of the missiles are wasted. If a missile is approaching the real ship and would acquire it, but is seeing also close to the ship a bigger decoy target, it will select the bigger target and is, thereby, distracted. If the real ship is



A Nulka hovering rocket decoy developed by Australia and the US. Nulka is fired from the ship and hovers away from the ship moving slightly towards the incoming missile. It can deploy either an EW or IR countermeasures payload

significant in both tactical and cost-effectiveness terms.

For obvious reasons ECCM is the most sensitive and secret aspect of EW because, to reveal the actual ECCM measures incorporated in the design of a weapon or sensor is to reveal its degree of vulnerability to ESM or ECM. From the point of view of

command and control, ECCM is really most important and the knowledge of the ECCM capability he has in his equipment will greatly influence the decisions of a commander in the way he uses his weapons and fights his ship.

Specific and quite complex anti-intercept, anti-jamming, anti-decoy and anti-radar measures are all used to achieve ECCM and some of these are incorporated into what is known as Stealth techniques to avoid detection by radar. Stealth is not strictly a form of ECCM but its operational objectives are similar in that it aims to overcome electronic detection.

## OPERATIONAL ASPECTS OF EW

Success in naval EW is not governed entirely by the type and performance of the equipment fitted in the ship, but is much influenced by how it is used tactically and by how the information it produces is interpreted. Thus, the professional naval and tactical skill of the Command in a ship is an important ingredient in EW success. The total EW function is a contribution of human expertise and equipment performance. For this reason a strong EW branch and training school within a navy is vital to take real advantage of the electro-magnetic spectrum. It is both and art and a science that needs constant

attention to retain the skills. For example, the types of questions which must be addressed by Naval Officers at sea are where, and for how long, to use emission control (EMCON) and refrain from using active sensors for detection and communication, and when to use ECM in addition to, or in place of defence weapons, such as guns and missiles. These questions, and others, are studied at Maritime Tactical Schools in many of the world's more sophisticated navies and involve some complex considerations of the relative advantages and disadvantages of the EW options in naval tactics.

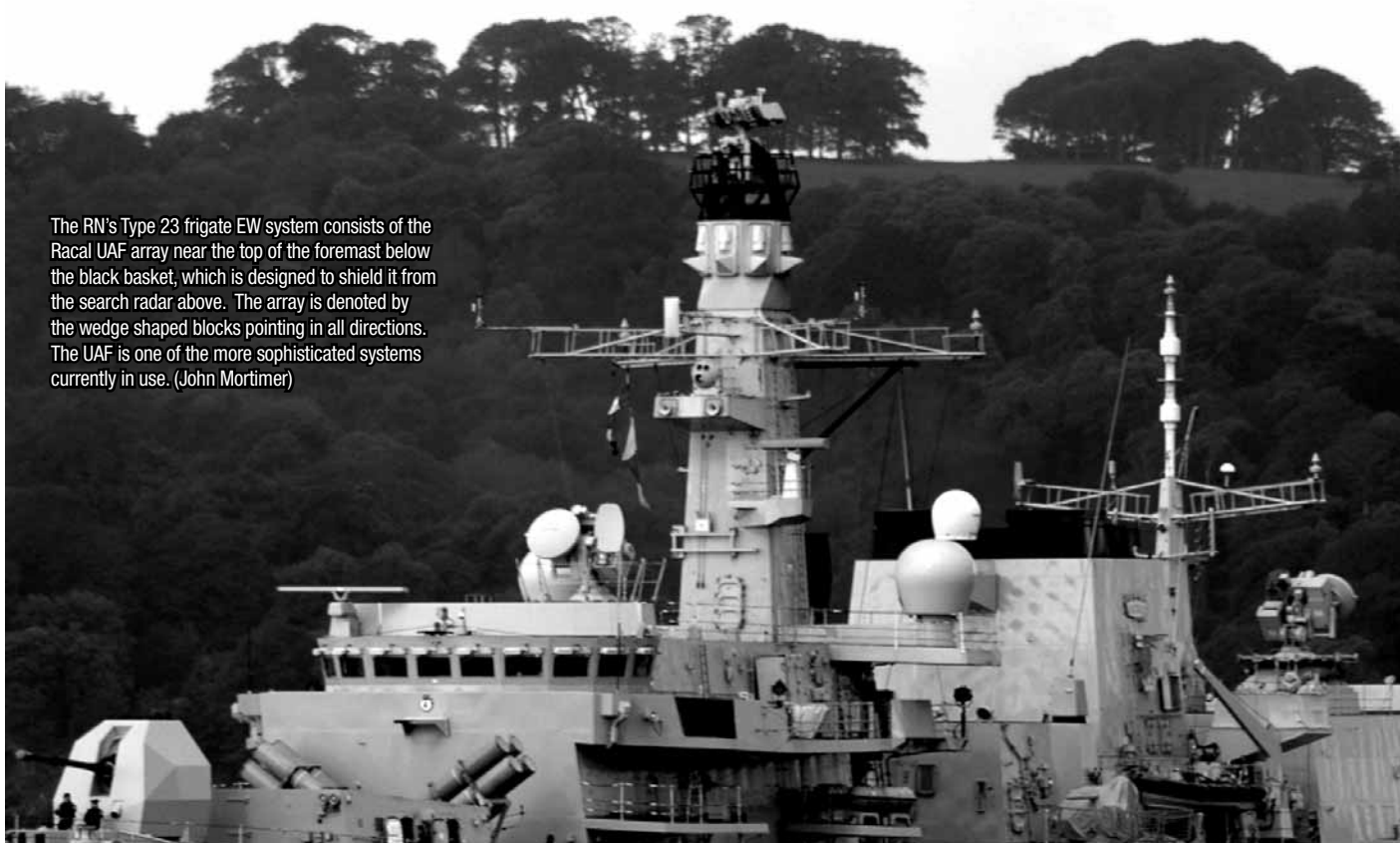
A ship proceeding silently, not using its active sensors, may not detect another ship or aircraft, which is also proceeding silently and so is not detected by ESM. A ship using its active sensors may give an advantage to an enemy using ESM alone. To use ECM measures and the ships own weapons may be a disadvantage since the ECM measures may adversely affect the ship's weapons and sensors. Radio transmissions can be intercepted by the enemy as well as the intended recipient. This opens communications channels that are not crypto-protected to eavesdropping, and other radio transmissions, such as radar to electronic analysis, which can reveal the signature of the radiating equipment and, thus, compromise the identity of the parent

ship or aircraft. Transmissions can also be D/F'd, which will disclose the position of the source.

The degree of risk and the range, at which such techniques can be used, will vary with frequency and power, but the dependence of modern naval forces on the use of communications and electronics for the development of full fighting potential exposes them to enemy use of EW, of which these activities are part. The intended policy for the control of electronic emissions, EMCON, is therefore a central feature of any operational plan. Because any restriction on radio or radar will reduce fighting efficiency in some measurement, the EMCON policy in force is a continuous concern of the command.

All of these questions, and others, have to be seen in the light of individual tactical situations and be weighed up accordingly; there are few simple rules, which govern all situations. Nevertheless, great tactical advantages can be, and are, obtained from EW when it is used correctly and skillfully. The net situation is that, to a large extent, EW can be as successful as the skill of the command and the performance of the equipment permit, and the contribution of the man can be as important as that of the machine. ■

The RN's Type 23 frigate EW system consists of the Racal UAF array near the top of the foremast below the black basket, which is designed to shield it from the search radar above. The array is denoted by the wedge shaped blocks pointing in all directions. The UAF is one of the more sophisticated systems currently in use. (John Mortimer)



# AWD, Hobart, MFU or DDGH – WHAT'S IN A NAME? <sup>(\*)</sup>

**The process for naming individual ships of the Royal Australian Navy (RAN) and the history behind some of our more famous ship names was described in the Seapower Centre's Semaphore 4 of 2007. However, the more prosaic method of identifying ships, by designation and/or pennant number - HMAS SYDNEY (IV) can be identified as F03 and HMAS BALIKPAPAN as L126 – is explained below.**

## A SHORT HISTORY OF SHIP DESIGNATORS

The system of pennant numbers in the Royal Navy (RN) began before World War I to distinguish ships of a similar class and thereby improve rapid recognition and visual communications. Initially a ship was distinguished by a single letter pennant signifying a flotilla or a particular type of vessel such as a red burgee for torpedo boats and the pennant 'H' for torpedo boat destroyers. Beneath each pennant was a unique number identifying the individual vessel. The allocation of pennant numbers was prepared within each fleet until the Navy Pennant List in 1910 standardised numbers across the RN. After World War II the RN further rationalised the system's letter designators resulting in R for aircraft carrier, D for destroyer, F for frigate, L for amphibious vessels, M for mine warfare vessels, etc.

The US Navy (USN) had in the meantime been developing its own system. In the 1890s, the USN began using a ship type and a one up numbering system. Hence USS INDIANA was referred to as Battleship No. 1 which was soon shortened to B-1. In 1920 the USN standardised its system and expanded it to include all US Coast Guard cutters. This system allocated two or three-letter class designators to each ship type, and retained the one up numbering system. The first aircraft carrier, USS LANGLEY, thus became CV1, while USS BAINBRIDGE, the first USN destroyer, became DD1 and the first submarine, USS HOLLAND, received the designation SS1.

The system endures, but the designations have evolved over time as new ship types incorporating advanced technologies have been commissioned. USS GEORGE H W BUSH, for example, is designated CVN-77, as she is both the 76th carrier planned since LANGLEY



The LPH HMAS TOBRUK.  
TOBRUK's hull number starts with the letter L denoting a landing ship and pennant number rather than a hull number. (RAN)





The USN Ticonderoga class cruiser USS SHILOH. The USN uses their own ship numbering system. Hull number 67 being the only identifier (USN)

intended for offensive use. They are further defined as submarines, principal surface combatants, patrol vessels, river/roadstead patrol vessels, mine warfare vessels, amphibious warfare vessels or coast guard. Non-combatants tend to be role-specific vessels, and may possess an armed or combat capability intended primarily for self-defence. They are further grouped as auxiliary, service and support, government-owned, merchant or recreational.

For each of these groups a system of two, three or four letter designators exists which defines a ship or submarine's category and principal role. In addition to the letter N, which as already noted signifies nuclear propulsion, other common suffixes include, G – a unit equipped with one or more force guided missile systems and H – a unit equipped with a helicopter, or capable of operating a helicopter or vertical or short take-off and landing aircraft.

A conventional submarine fitted with underwater to surface or surface to surface missiles is therefore designated a SSG, which is consequently the designation used for the RAN's Collins class submarines. The USN's submarine fleet on the other hand, consists not only of SSGNs (nuclear powered guided missile capable attack submarines) but also SSBNs (nuclear powered, ballistic missile submarines). The surface combatant designator which currently best applies to RAN vessels is FFGH, which is defined as:

*A surface combatant in size range of about 75-150 meters. Generally has lighter armament than a DD. Fitted with one or more force guided missile systems. Fitted with a flight deck with a primary mission of operating and maintaining helicopters.*

With their current and planned equipment fits, both the Anzac and Adelaide classes should therefore be included within this definition, notwithstanding their more commonly used simplified designators as FFH and FFG respectively.

Under the STANAG support craft and non-commissioned single purpose vessels within naval bases are also allocated designators. For example, Defence Maritime Service Wattle class stores lighters based in Sydney and Darwin are designated YE (lighter, ammunition), and the sail training vessel YOUNG ENDEAVOUR is designated as AXS (training ship sail (naval)).

and uses nuclear propulsion. Inconsistencies nevertheless arise due to changing roles and capabilities. Thus USS MITSCHER, although planned as DD927, commissioned in 1953 as DL (destroyer leader) 2, then was finally redesignated DDG (guided missile destroyer) 35 in 1968. Further gaps in the numbering system have occurred due to construction cancellations and building programs for other navies. Hence, having allocated DDG25- 27 to the three RAN Perth class DDGs, the USN did not use these designations in its own fleet. The Classifications of Naval Ships and Craft (SECNAVINST 5030.8) provides the latest iteration of all USN definitions.

## SHIP TYPE DESIGNATORS

Today, the RAN, like most Western navies, employs the NATO standard for describing and comparing the broad roles and capabilities of naval vessels. This system is contained in the NATO Standardization Agency publication *STANAG 1166 MAROPS (Edition 7) - Standard Ship Designator System*. STANAG 1166 is not publicly available, but reference publications such as Jane's Fighting Ships routinely adopt the NATO standard and provide similar information.

STANAG 1166 broadly groups both naval and non-naval vessels as either combatants or non-combatants. Combatants are vessels which possess some sort of inherent armed or combat capability primarily



The Spanish FFGH F-100 class frigate SPS ALMIRANTE JUAN DE BORBON. She carries the pennant number F-102 denoting a frigate. ( USN)

The RN DDGH Daring class destroyer HMS DARING with the pennant number D-32. (RN)



In addition to the standard designators, the prefix and suffix system further delineates the role, ownership or characteristics of a vessel. The prefix Z is most applicable to Australia and denotes a non-Defence but government owned vessel. The Australian Customs and Border Protection Service Bay class patrol vessels would be designated as ZPB and defined as a:

*Government owned coastal patrol unit intended for basically coastal guarding function. Includes any coastal patrol ship under 45 metres which cannot qualify as a PG in armament. May be unarmed.*

## AUSTRALIAN PENNANT NUMBERS

Pennant numbers are identification numbers painted prominently on most naval vessels. The RAN largely followed the RN system until 1964, and then fully adopted USN style pennant numbers in 1969. The RAN draws these numbers from a block allocation made in Annex B of the Call Sign Book for Ships (ACP113, Edition AH). These blocks of numbers are allocated by ship type and country. For example, the Anzac class are numbered 150-157 because the frigate hull numbers from 150 to 168 are allocated to Australia, as are 01-07, 20-23, 442-449 and 531-539. Similarly, the three new Hobart class destroyers have been allocated numbers from within Australia's destroyer block 38-42. The process is not entirely random, however, and to maintain a tangible connection with the previous DDGs HMAS HOBART (II) and HMAS BRISBANE (II), the decision has been made to again use 39 for HOBART (III), and 41 for BRISBANE (III). HMAS SYDNEY (V) has been allocated 42.

The allocation by both type and country explains why there can be duplication in hull numbers. Australia currently has patrol combatant 83 (HMAS ARMIDALE) and mine hunter 83 (HMAS HAWKESBURY) in commission simultaneously. There are a number of similar examples in our recent past including HMAS JERVIS BAY (I) and HMAS FREMANTLE (II) which both wore 203, and HMAS TOBRUK (II) and HMAS SWAN (II) which both wore 50.

With the notable absence of the US and Canada, other navies which use the ACP113 allocation include Belgium, Germany, Denmark, France, United Kingdom, Greece, Italy, Kenya, Malaysia, Netherlands, Norway, New Zealand, Poland, Portugal, Spain and Turkey. Each nation is responsible for the avoidance of visual call sign duplication, but such overlaps do still occur. Thus HMAS BENALLA, HMNZS KAHUA and the Spanish ship MARTIN POSADILLO all carry the pennant number A04.

## AWD, MFU AND OTHER TLA (THREE LETTER ACRONYMS)

The armed forces have always favoured acronyms as a form of linguistic shorthand, jargon which is often indecipherable to outsiders. This has led to a range of classifications for ships which are not covered by the STANAG, but which have found their way into common usage.

In the early stages of a defence project when the exact form of a ship is yet to be determined, a generic descriptor of its purpose suffices. The AWD was accordingly a ship highly capable in air warfare, while the 'modular, multi-role class' included in the 2009 Defence White Paper is currently known as the Offshore Combatant Vessel (OCV). The AWD project is set to deliver the Hobart class DDGH from 2014 and the OCV designator will become clearer as the project progresses.

DDGH – Destroyer, Helo Capable, Guided Missile – Major surface combatant in range of about 95 to 140 metres whole, general mission is to conduct operations with strike, ASW and amphibious forces, and to perform screening and convoy duties. Fitted with one or more force guided missile system. Fitted with a flight deck with a primary mission of operating and maintaining helicopters.

**STANAG 1166**

For many years, commissioned RAN ships have been defined as either MFU (major fleet units) 'a vessel such as an aircraft carrier, fleet replenishment vessel, destroyer tender, guided missile destroyer, guided missile frigate, destroyer escort, designated training ship, landing ships heavy, or hydrographic and oceanographic research vessel' or MWV (minor war vessel), 'a vessel such as mine countermeasures vessel, patrol boat, landing craft heavy, survey motor launch, or craft of opportunity'.

The terms MFU and MWV are of largely administrative significance. They allow for categorising levels of command, remuneration and career progression, structuring training continuums for both individual and collective training, and delegating financial responsibilities. The words minor and major are not intended to imply a hierarchy of operational 'usefulness' – all RAN units contribute to a balanced force which is able to undertake the full spectrum of operations in the maritime domain.

## CONCLUSION

Warships are among the most complex machines ever created by humans. Any sailor will know that individually they are quite distinct, yet commonalities of role, equipment and size lend themselves to a myriad of systems of taxonomy and classification. While attempts will always be made to impose order through a standard method of designation, class and hull number, the inherent complexity of the task will continue to impose limitations. In truth, mariners will always feel compelled to invent their own systems for their own purposes, and give their ship its own particular place in the wider scheme of things. ■

(\*) Publication: *Semaphore* - Issue 7, September 2010, Newsletter of the Sea Power Centre Australia.



## 01 NEW CHIEF OF NAVY

The Navy League welcomes the new Chief of Navy Vice Admiral Ray Griggs AM CSC RAN to the top job.

Vice Admiral Griggs was born in Homebush NSW in 1961. He joined the Adelaide Port Division of the Royal Australian Navy Reserve in 1978 as a radio operator and entered the Royal Australian Naval College at HMAS CRESWELL on a short service commission in 1979. During his seaman officer training he served in the aircraft carrier HMAS MELBOURNE and HMA ships YARRA and ADVANCE before spending 12 months loaned to the Royal Navy in HMS JERSEY to gain his Bridge Watchkeeping Certificate. In late 1981 he was posted to HMAS PERTH as a Bridge Watchkeeper and deployed to the North West Indian Ocean in support of Australia's independent presence in that region following the Soviet invasion of Afghanistan.

From 1983 to 1994 the then Lieutenant Griggs completed a series of postings as Navigating Officer of HMA Ships CESSNOCK, TORRENS, TOBRUK, JERVIS BAY and PERTH.

Ashore he has served in variety of roles including as the aide-de-camp to His Excellency the Governor of Tasmania, Sir James Plimsoll, AC, CBE, two postings in the Navy's officer career management directorate, Staff Officer (Navigation) to the Commander Australian Patrol Boat Forces and as Deputy Director Military Strategy and Director Future Warfare in the Australian Defence Headquarters. He completed specialist navigation training and graduated as a Principal Warfare Officer. In 2000 he conducted a major review into the RAN's readiness measurement system, MONICAR.

Between 1995-97 he served as commissioning Executive Officer of HMAS ANZAC helping to

bring the ANZAC class frigates into service. In October 2001 he assumed command of the ANZAC Class frigate HMAS ARUNTA and was immediately involved in border protection duties as part of Operation RELEX. ARUNTA then deployed to the Persian Gulf to enforce United Nations sanctions against Iraq and in support of the War on Terror. The ship was recognised for her efforts by being awarded the Duke of Gloucester's Cup for being the most operationally efficient ship in the RAN fleet for 2002.

In 2003 he was posted as the ANZAC class Capability Element Manager in Rockingham, Western Australia. In 2004 he studied at the National War College in Washington D.C. prior to assuming command of the Australian Amphibious Task Group in mid 2005. He was promoted to Commodore in February 2006 and appointed as the Deputy Maritime (Fleet) Commander until assuming the position of Director General Navy Strategic Policy and Futures in Navy Headquarters in September 2007. In February 2008 he was seconded to the Defence White Paper team where he led the development of the Force Structure Review that provided the force structure underpinning the 2009 White Paper. In early 2009 he attended the UK Higher Command and Staff Course and was subsequently promoted to Rear Admiral and appointed as Deputy Head Strategic Reform and Governance. In May 2010 he assumed the role of Deputy Chief of Joint Operations.

Vice Admiral Griggs was awarded the Conspicuous Service Cross in 1997, a Commendation for Distinguished Service in 2003 for his work in the Persian Gulf and appointed as a Member of the Order of Australia in 2009. He holds a Bachelor of Arts degree from the University of Queensland, a Master of Business Administration from the

National Graduate School of Management at the Australian National University and a Master of Science (National Security Strategy) from the National Defense University in Washington D.C. He is married and has a daughter and a son.

## 02 PURCHASE OF LARGS BAY

A joint team from Defence has conducted a sea-trial of the RFA LARGS BAY during a scheduled voyage from Portsmouth to Cornwall for refit.

The trial was conducted in two phases - a harbour phase (11-17 April) along side in Portsmouth followed by the at-sea phase (18-19 April).

Defence's final report on the sea-trial confirms that the ship is in good material state.

International shipping firm, Teekay Shipping Australia, thoroughly inspected the ship prior to the submission of Australia's bid and found that: "the ship presents very well, and from a technical point of view, there are no major defects."

Teekay was also engaged on the sea trial and have provided an updated report that confirms their previous assessment.

The Government has indicated that it will now give consideration to what modifications are necessary for Australian use of RFA LARGS BAY, with such work on the ship subject to Government approval. A tropicalisation modification will more than likely be top of the list followed by a helicopter hangar

The ship remains on track to arrive in Australia by the end of the year in time for it to be operational in Australia in early 2012.

The name of the ship is yet to be announced and is currently with the Minister for Defence Stephen Smith.

01

Rear Admiral Ray Griggs being 'made up' to Vice Admiral by CDF Air Chief Marshall Angus Houston and Mrs Griggs. (Defence)

02

The RFA LARGS BAY departing Portsmouth for Cornwall with a joint team from Defence embarked to conduct a sea-trial of the material state of the ship. (Mark Schweikert)





## AWD DELAYED 12 MONTHS

The Minister for Defence has announced the reallocation of construction work for the \$8 billion Air Warfare Destroyer (AWD) Project due to delays in production.

Construction of the AWDs involves 90 separate steel blocks being built at three shipyards in Adelaide (ASC), Melbourne (BAE Systems) and Newcastle (Forgacs). Three additional sonar block assemblies are being built in Spain and the United Kingdom.

The Melbourne BAE Systems shipyard is also building 14 steel blocks for the superstructure of two new 27,500 tonne Canberra class Landing Helicopter Dock ships (LHDs) due for delivery in 2014 and 2015.

Last year the project encountered difficulties in relation to engineering and construction of some of the first AWD hull blocks. To assist the AWD project schedule, earlier this year the AWD Alliance reallocated construction of nine steel blocks from BAE Systems in Melbourne to the Forgacs shipyard in Newcastle.

The Melbourne BAE Systems shipyard remains stretched, working on two major projects at the same time – steel blocks for the Air Warfare Destroyers and the superstructure and integration of the Landing Helicopter Dock Ships.

So during May BAE Systems presented the AWD Alliance with a plan to adjust its workload on the AWD Project.

The advice from the Alliance is that if no action is taken to relieve the pressure on the Melbourne BAE Systems shipyard the first ship would be two years late, approximately 25% over schedule.

The AWD Alliance (with the support of BAE Systems) therefore proposed to take the

following action:

- Up to 13 steel blocks will be reallocated among the three Australian shipyards in Adelaide, Melbourne and Newcastle – seven for advanced fit out and six for construction; and
- Up to five steel blocks will be reallocated to Navantia in Ferrol, Spain.

These changes involve the reallocation of blocks for the first two ships only and will be subject in the usual way to satisfactory commercial arrangements with the shipyards.

BAE will complete the structural steel and initial outfitting work on the seven steel blocks it is currently working on, as well as all its work on the 14 blocks for the superstructure of the Landing Helicopter Dock Ships and the integration work.

A decision on the reallocation of blocks, if any, on the third AWD will be made later in the project.

It is hoped this action will reduce the schedule risk to both this project and to the LHD ships project.

The AWD Alliance has advised Defence that this action will reduce the delay of the completion of Ship 1 by up to 12 months, and of all three AWDs by up to 12 months.

It will also reduce the pressure on BAE Systems to complete the construction of the superstructure and the integration of Australia's two new LHD ships.

As a result of the delay Defence is currently planning for options to manage the transition from the current Adelaide class frigates to the AWDs taking into account the agreed reallocation of blocks.

## 03 SEAHAWK 'ROMEO' FOR NAVY

Minister for Defence Stephen Smith and Minister for Defence Materiel Jason Clare announced during June the acquisition of 24 MH-60R Seahawk 'Romeo' naval combat helicopters at a cost of over \$3 billion as part of AIR 9000 Phase 8. No explanation on why the decision was delayed has been forthcoming.

The 2009 Defence White Paper committed the Government to equipping naval warships with a new combat helicopter capable of conducting a range of maritime missions with advanced anti-submarine warfare capabilities and the ability to fire air-to-surface missiles.

The new helicopters will replace the Navy's current combat helicopter capability provided by 16 Seahawk S-70B-2 helicopters and will also provide a limited air to surface strike capability which was to have been provided by the cancelled Seasprite programme.

This decision follows a 15-month competitive acquisition process involving the Sikorsky-Lockheed Martin built MH-60R and the NATO Helicopter Industries NH-90 NFH assembled by Australian Aerospace at Brisbane airport.

This competitive process saw Sikorsky-Lockheed Martin's bid being cheaper for the number of airframes that could be acquired.

The Seahawk 'Romeo' is a proven capability currently operated by the United States Navy. The United States Navy has accepted around 100 'Romeos' which have accumulated 90,000 flying hours, including on operational deployments.

Interoperability with Australia's Alliance partner, the United States, is seen as a significant advantage of this helicopter however, questions remain over the neglect of the broad intent of project AIR 9000 which was designed to reduce

03

A USN SH-60R (Romeo) about to start up. The RAN will be acquiring 24 Romeos from the USN with Hellfire air-surface missiles, the Mk-54 ASW torpedo and with a dunking sonar. (USN).



4A





the different types of helicopter airframes in the ADF in order to save costs. The competing NH-90 NFH is over 60% common to the already acquired MRH-90 for Army.

The Seahawk 'Romeos' are considered military off-the-shelf and built by Sikorsky and Lockheed Martin and will be purchased through the Foreign Military Sales process from the US Navy. Meaning Australia has little to no influence in design changes for local conditions and integration into existing RAN systems.

Defence has signed a Letter of Agreement for the acquisition with the United States Government.

The first two helicopters will arrive from the US plant in mid-2014 for testing and evaluation with operations expected to commence in mid-2015.

Acquisition of 24 'Romeos' from the US means that Navy will have the capacity to provide at least eight warships with a combat helicopter at the same time, including ANZAC class frigates and the new Air Warfare Destroyers. The remainder will be based at HMAS ALBATROSS in Nowra, New South Wales, and will be in various stages of regular maintenance and training cycles.

They will be equipped with short range Hellfire air-to-surface missiles and the Mk-54 anti-submarine torpedo, which will be acquired as a new weapon system for the RAN for use on this aircraft.

The acquisition also brings a dunking sonar back into the fleet.

## 04 ATTACK HELICOPTERS CONDUCT OPERATIONS OVER LIBYA

Apache attack helicopters, flying from the RN LPH HMS OCEAN, conducted their first

operational sorties over Libya on 3 June as part of NATO's Operation UNIFIED PROTECTOR to protect civilians under United Nations Security Council Resolution 1973.

The mission was carefully co-ordinated with other allied air missions by NATO's air operations centre, based at Poggio in Italy, and in particular was planned alongside an operation by French Gazelle and Tiger helicopters from the assault ship TONNERRE.

Major General Nick Pope, the Chief of the Defence Staff's Strategic Communications Officer, said: "The Apaches were tasked with precision strikes against a regime radar installation and a military checkpoint, both located around Brega. Hellfire missiles and 30mm cannon were used to destroy the targets; the helicopters then returned safely to HMS OCEAN.

"In the same area, Royal Air Force ground attack aircraft destroyed another military installation, whilst a separate RAF mission successfully attacked two ammunition bunkers at the large Waddan depot in central Libya."

The UK Secretary of State for Defence, Dr Liam Fox, said: "This was the first operational mission flown by British Army Apaches at sea. Their deployment from HMS OCEAN demonstrates the flexibility of not just the aircraft, but also the Royal Navy's Response Force Task Group, held at very high readiness for contingency operations around the world.

"The attack helicopter is yet another potent and formidable aircraft type which has now been added to the NATO forces engaged on this operation. Those who are still supporting Colonel Gaddafi would do well to realise that the best way to remove themselves from danger is to understand that their future lies with the Libyan people, not a discredited regime."

The Commander of the Royal Navy's Response Force Task Group, Commodore James Kingwell, said: "The successful and safe operations by Apache attack helicopters required a first class performance by the sailors, soldiers and Royal Marines across the Royal Navy's Response Force Task Group [RFTG]. I am very proud of all of their work so far which yet again underlines the versatility of this force.

"The RFTG brings together a range of assets that, by operating from the sea, gives maximum flexibility to bring our military capabilities to bear wherever they are needed, at short notice, now and in the future. We remain ready for further operations."

The Apache attack helicopters are operated by crews from 656 Squadron, 4 Regiment Army Air Corps. OCEAN also has embarked a number of supporting Fleet Air Arm helicopters, including Sea King early warning aircraft.

HMS OCEAN is one of five Royal Navy ships that have been diverted from a long-planned exercise deployment (Cougar 11) to support the enforcement of UNSCR 1973, demonstrating the adaptability and flexibility of maritime forces.

The task force, known as the Response Force Task Group is led by HMS ALBION, which is equipped with excellent command and control facilities and a range of other capabilities. The ships are escorted by the Type 23 frigate HMS SUTHERLAND, and are supported by the Royal Fleet Auxiliary vessels WAVE KNIGHT (carrying fuel) and FORT ROSALIE (carrying ammunition and stores).

The RFTG had already proved the use of the attack helicopter in a maritime environment during its exercises in the Mediterranean, including the first test firing at sea by the UK of the Apache's advanced Hellfire missile.

04 A & B

**Image A:** A French Army Tiger attack helicopter at sea operating from the LHD TONNERRE.

**Image B:** British Army AgustaWestland/Boeing WAH-64D Apache AH.1 attack helicopters on the deck of the LPH HMS OCEAN readying for operations in Libya. (UK MoD)





Other Royal Navy vessels - HMS LIVERPOOL, HMS BROCKLESBY and the SSN HMS TRIUMPH - have previously played major roles in the operation to enforce UNSCR 1973, and remain fully engaged on this task.

As far as French naval operations off Libya are concerned, the aircraft carrier CHARLES DE GAULLE - whose embarked Rafale F3 and Super Etendard Modernisé aircraft have played a major role in the air strikes - is now receiving logistic support from US Navy C-2A Greyhound 'carrier onboard delivery' aircraft flying from Hyères in southern France.

The use of the fixed-wing Greyhounds means that personnel can be rotated and spare parts delivered to the carrier more quickly and more cheaply than by flying helicopters via Crete or Malta.

Meanwhile, NATO said on 7 June that 19 surface ships and submarines from 11 nations - Belgium, Canada, France, Greece, Italy, Netherlands, Romania, Spain, Turkey, UK and the US - were patrolling international waters in the central Mediterranean to enforce the UN arms embargo on Libya.

A total of 1,209 suspicious vessels had been hailed, with 76 boardings and eight denials conducted, since enforcement commenced at the end of March, according to NATO.

The UK Apache deployment to Libya was expected given that lack of strike carrier capability since the UK SDSR decommissioned HMS ARK ROYAL and its Harriers.

Apaches from HMS OCEAN, and Tigers from TONNERRE, are forming a sort of poor man's strike carrier. Much like operating Tiger Armed reconnaissance helicopters off Australia's new LHDs in some future conflict. Perhaps Australia's Army should take note.

## 05 UK RETIRES FINAL FRONTLINE LYNX HAS.3

The RN has retired the last of its Westland WG.13 Lynx HAS.3 maritime utility and anti-submarine warfare helicopters from frontline service.

The final HAS.3 helicopter - XZ693 - departed HMS OCEAN for its home base at Royal Naval Air Station (RNAS) Yeovilton in southern England on 28 March.

Having entered RN service in the late 1980s, the analogue HAS.3-variant Lynx has been replaced in fleet service by the largely digital Lynx HMA.8.

The aircraft will remain with the RN as a training asset and four helicopters will be operated by 702 Naval Air Squadron at RNAS Yeovilton for this purpose.

The latest Lynx variant - the AgustaWestland AW159 Wildcat - is currently in development as the Surface Combatant Maritime Rotorcraft (SCMR) and should be in RN service in 2015.

### MORE WOMEN FOR SUBMARINES

Minister for Defence Science and Personnel Warren Snowdon has cleared the way for more women to serve in Navy submarines by formally approving shared female and male accommodation on board every boat.

Mr Snowdon said the move, which was a recommendation of the previous Chief of Navy Vice Admiral Russ Crane, is a major step forward for women in the Australian Defence Force and has the full support of new Chief of Navy Vice Admiral Ray Griggs and his leadership team.

"This move will ensure that our female submariners access the same training and career-progression opportunities as their male crewmates.

"The Australian Government believes it is important that the nation's defence forces be representative of the community it serves and it's committed to ensuring that female military personnel have opportunities for career progression and development."

Women had been serving onboard Australian Navy submarines since 1998 but, until now, females had to sleep in female-only six-berth cabins.

A lack of dedicated bunk space on board has occasionally led to female submariners missing out on postings because of bunk limitations, which has, in turn, denied the submarine force qualified specialists.

These limitations have also meant that only two of our three operational submarines have been able to accommodate females.

Successful trials have already been conducted over several years across the submarine force with officers and senior sailors.

Strict rules apply to maintain the dignity and privacy of all involved.

Currently 44 of the Navy's 560 submariners are female, which equates to 7.8 per cent.

The first fully integrated junior sailor messes will begin in July 2011 on board all commissioned submarines.

Of the three services, Navy has the largest percentage of women serving in its ranks at 18 per cent.

"It should be pointed out that 97 percent of Navy positions, including combat-related positions, are already open to females, but this latest measure is a significant step in the right direction," Mr Snowdon said.

"At this stage, only clearance diving remains a restricted employment category."

**05** An RN Westland WG.13 Lynx HAS.3 maritime utility and anti-submarine warfare helicopter. The final HAS.3 helicopter - XZ693 (seen here) - departed HMS OCEAN for its home base at Royal Naval Air Station (RNAS) Yeovilton in southern England on 28 March. (RN)



## 06 PHILIPPINE NAVY PURCHASES US CUTTER

On 1 May 2011, the ex-US Coast Guard Hamilton class high endurance cutter, USCGC HAMILTON (WHEC-715), was re-commissioned into the Philippine Navy (PN) at Alameda, California. The cutter was procured in November 2010 for an estimated US\$24M.

The cutter will replace BRP RAJA HUMABON, a US-built Cannon-class destroyer escort launched in May 1943 and one of the world's oldest operational warships, as the PN's flagship.

The Philippine Navy's acquisition of the 46-year-old cutter may be influenced by increasing tensions with China along its maritime border and exclusive economic zone (EEZ). In recent months, tensions have grown after a Philippine oil exploration vessel said it had been confronted by Chinese patrol ships in disputed waters in the South China Sea.

According to Philippine General Mabanta, the ex-HAMILTON will serve as an inshore patrol vessel among the country's islands and is unlikely to venture out into blue water.

The Armed Forces of the Philippine's policy of procuring older hardware at budget prices may be a false economy in light of comments by USCG Commandant Admiral Robert Papp, who said high maintenance costs for the HAMILTON and other cutters in its class made their replacement a priority.

"In FY09 [Fiscal Year 2009] we spent 3.5 times our budgeted maintenance funds to keep our high-endurance cutters operational," Admiral Papp said in January. "Even so, we lost 569 patrol days to engineering casualties; that equates to an astounding one quarter of the total available patrol days. This is unacceptable."

Despite the news the PN is now considering

the procurement of two additional units of the class, USCGC DALLAS (WHEC-716) and the USCGC GALLATIN (WHEC-721), both scheduled for decommissioning by the end of 2011.

In early April 2011, President Aquino authorised up to US\$220M for the acquisition of equipment, some of which will probably be used for the additional cutters. If approved by the US government, the GALLATIN and DALLAS could be transferred by the end of 2012.

### RN TYPE 26 EVOLVING

Originally envisioned as a programme of three different hulls; the FSC-C1 high end Anti-Submarine Warfare (ASW) combatant; FSC-C2 low end stabilisation combatant and the FSC-C3 Ocean Capable Patrol Vessel; is now thought to be two with FSC-C1 and FSC-C2 merging into one hull. The single hull will satisfy the requirement of two programmes with a combatant of around 5,000 tons.

With the official joining of the two projects into a single 5,000-ton hull, the UK Ministry of Defence (MoD) is also actively pursuing international interest under the Global Combat Ship (GCS) partnership. The UK has already offered the Type 26 design to the following countries:

- Turkey for its TF-2000 class frigate.
- Brazil for its frigate replacement program.
- Australia for its ANZAC frigate replacement.
- New Zealand for its ANZAC frigate replacement.
- Canada for its Halifax class frigate replacement.

The UK Strategic Defence Security Review (SDSR) confirmed the Type 26 Programme of 13 hulls will replace the 13 Type 23 frigates from 2021. However, the 13 hulls are less than the 19 originally projected under the C-1 and C-2 Programmes. The reduction is partly

attributed to surface force reductions from 23 units to 19 under the SDSR of late 2010 as well as affordability issues concerning future construction.

Merging the requirements of the C-1 and C-2 into a single class solution enables the RN to lower the through life costs and capability management for the overall programme. The single class is also thought to enable the UK to offer an affordable combatant for export; which is good news for the UK's shipbuilding industry while at the same time increasing the economies of scale with additional hulls through international participation. It also allows foreign partners to help influence the specifications throughout the design phase.

Currently, BAE Systems is operating under a US\$205M contract for the four year assessment phase that was awarded in March 2010 and with completion expected in 2014. The first Type 26 is scheduled to enter service with the RN beginning in 2021.

### SM-2 UPGRADE CANCELLED

Press reporting and US defence budget documents for Fiscal Year (FY) FY 2012 indicate that the US Navy intends on cancelling upgrades to 239 SM-2 Standard Missiles in 2012.

The SM-2 has been the mainstay of the USN's long-range ship-based air defence system since the 1980s and has received various upgrades through the life of the missile. The latest (Block IIIB) upgrade was to extend the service through the Service Life Extension Program (SLEP) of the last 239 SM-2s through around 2030.

The procurement of new SM-2s ended with eight (8) All Up Rounds (AURs) being purchased in 2011 and a SLEP ending in 2011 assuming that the FY 2012 budget submission is

**06** The US Coast Guard (USCG) Hamilton class high endurance cutter, USCGC HAMILTON (WHEC-715) in USCG colours before re-commissioning into the Philippine Navy (PN). The cutter will replace BRP RAJA HUMABON, one of the world's oldest operational warships. (USCG)





approved by the US Congress and the President. The US Navy assessed the inventory of SM-2 Block III, IIIA and IIIB missiles is sufficient and characterised the termination as an "efficiency" in remarks made by RADM Mulloy (CNO N82). As the USN's surface combatant force grows from 84 ships this year, to 97 ships by 2020 SM-2 will remain in their magazines in greater numbers than SM-6.

The SM-6 Program of Record (POR) is for a total of 1,200 missiles, a fraction of the SM-2 inventory. SM-6 adds an outer layer of defence to the existing SM-2 capability. SM-6 is designed for the Naval Integrated Fire Control – Counter Air (NIFC-CA) missions and Beyond Line of Sight (BLOS) engagements while SM-2 engages targets within line of sight of the ship's illuminators only. SM-6 entered Demonstration Testing at sea last year aboard USS DEWEY (DDG-105) and is scheduled to enter full rate production in 2012. According to remarks made by RADM Frank Pandolfe (CNO N86) at the Surface Navy Association in January, the first SM-6 ship will be DDG-113.

## NEW RADAR GIVES MH-60R HELICOPTERS A SUB-HUNTING BOOST

A long-range search radar capable of detecting submarine periscopes is to be fitted in MH-60R maritime helicopters built for the US Navy from Fiscal Year 2013, according to the service's H-60 programme manager.

Telephonics' new AN/APS-153 radar will form part of the Automatic Radar Periscope Detection and Discrimination (ARPDD) system, replacing the AN/APS-147 multimode radar currently fitted in MH-60R aircraft.

Both radars have a similar form, fit and function but the APS-153 sensor uses enhanced discrimination software developed at the Naval

Air Warfare Center Weapons Division's China Lake facility.

Captain Dean Peters, who manages the H-60 programme, said the APS-153 radar will be supplied for new-build aircraft from 2013 while older Romeos – as the type is sometimes known – will have their APS-147 upgraded to 153 standard when they become due for overhaul.

Raytheon's third-generation AN/AAS-44C forward-looking infrared sensor is also being upgraded to AAS-44C(V) standard with a long-range automatic tracking capability.

Because the MH-60R's mission suite creates an integrated picture of surface and subsurface activity, including real-time over-the-horizon, the helicopter can be used as a command-and-control aircraft. "We have not even scratched the surface of what is possible, using the Romeo in this role," Capt Peters said.

Offensive capability is being enhanced with an additional four Hellfire missiles now that the starboard pylon has passed structural qualifications. The USN is set to take delivery of its 100th Romeo in mid-June.

## 07 FILM 'DESTROYER' TO RE-EDIT HMS COVENTRY SINKING

The sinking of HMS COVENTRY in the Falklands War is to be made into a full-length cinema film to coincide with the 30th anniversary of the tragedy, reports the Portsmouth and Coventry press in the UK.

Nineteen men lost their lives when the Portsmouth-based destroyer was attacked by Argentine aircraft on May 25, 1982.

Director Tom Shankland has started work to make a film called "Destroyer" about the warship. The movie will be based on the memoirs of COVENTRY's captain in the Falklands, Captain David Hart Dyke, who published his book *'Four*

*Weeks in May'* in May in 2007.

Captain Hart Dyke, of Hambledon, said: 'It's at an early stage of development. It's hoped they can start filming next year but it is early days.

'It's based on the book, which is a personal story that has caught people's imaginations and has been very widely read and commented on. I still get letters today about it from people, so that must be the reason it's been picked up by a film-maker.'

Captain Hart Dyke, a former Commander of the Royal Yacht BRITANNIA, added: 'I would be delighted if it comes off but I'm strictly neutral about the whole thing. It's just one account from one ship.

"There were many ships altogether in the Falklands all doing wonderful things but it seems my story is the one that has been picked up".

The movie is being made by Warp. Films, and is the firm behind Chris Morris' Bafta award-winning *Four Lions* which was released in 2009.

The film will be written and directed by Tom Shankland, who made horror film *'The Children'* in 2009.

Warp Films said it will consult veterans from HMS COVENTRY to make sure the film is accurate.

Robin Gutch, who is producing *'Destroyer'*, said: "The project is developing, with the intention of shooting next year. We chose to base it on the book by David Hart Dyke as it is a very strong but concise story about the mission of one ship at the Falklands.

"We want to retell the story from the eyes of one captain at the Falklands".

In related news it was reported that a cross of nails recovered from the wreck of HMS COVENTRY is to take pride of place in the Royal

07

An image of HMS COVENTRY taken from the bridge of HMS BROADSWORD as two Argentine bombs detonate below the waterline on the port side.

08

A Mk-15 Block 1B Phalanx CIWS. The Block 1B upgrades will be used for close-in ship self-defence against air and surface threats onboard the UK's naval combatants and auxiliaries.





Navy's newest warship.

The poignant symbol will hang outside the captain's cabin on HMS DIAMOND, a £1bn destroyer affiliated to the city of Coventry.

It was presented by Capt David Hart-Dyke at DIAMOND's 'christening' ceremony in Portsmouth.

He said: "It's a big moment for DIAMOND. If they ever find themselves in a difficult fighting situation in the future they will always be aware of their predecessors and the story of HMS COVENTRY.

"It's a strong link to have. It's about tradition and keeping up the standards we are very proud of in the navy."

The cross was made from the remains of Coventry Cathedral and sank with HMS COVENTRY off the Falkland Islands in May, 1982.

It was retrieved by divers and sailed with the replacement HMS COVENTRY from 1986 to 2003, when it was taken back by the cathedral. DIAMOND is the third of six new Type 45 destroyers.

## 08 UK PHALANX BEING UPGRADED

The US Defense Security Cooperation Agency notified Congress during April of a possible Foreign Military Sale to the Government of the United Kingdom. The sale involves Ordnance Alteration Kits for conversion and upgrades of Mk-15 Phalanx Close-In Weapon System (CIWS) and associated equipment, parts, training and logistical support for an estimated cost of US\$137 million (or roughly a third of the price for the Australia Government's digital TV set top box handout).

The UK has requested the sale of 20 Block 1A

to Block 1B Baseline 2 configuration Ordnance Alteration Kits and 16 Block 1B Baseline 1 to Baseline 2 Ordnance Alteration Kits for conversion and upgrades of Mk-15 Phalanx Close-In Weapon System (CIWS), spare and repair parts, support equipment, personnel training and training equipment, publications and technical documentation, software support, U.S. Government and contractor engineering, technical, and logistics support services, and all other related elements of program support.

The Mk-15 Phalanx CIWS overhauls/upgrades will be used for close-in ship self-defence against air and surface threats onboard the UK's naval combatants and auxiliaries. The Mk-15 Phalanx CIWS Block 1B Baseline 2 upgrades will provide enhanced electro-optical and radiofrequency close-in detection, tracking and engagement capabilities over the UK's existing Mk-15 Phalanx systems, while improving CIWS supportability, maintainability and interoperability with US systems.

## BAE SYSTEMS SELECTED TO DEMONSTRATE TACTICAL LASER SYSTEM FOR USN

BAE Systems has received a contract valued at US\$2.8 million from the USN to demonstrate a Tactical Laser System (TLS) that can be integrated with existing USN gun mounts.

The TLS couples a solid-state high-energy laser with the weapons module to provide extremely precise targeting and counter-material disabling effects. The system also provides the ability to deliver scalable effects by varying the level of laser energy required, depending on the target and mission objectives.

"The Tactical Laser System provides a 21st century-directed energy weapon system with speed-of-light precision effects against surface threats," said Mark Signorelli, vice president and

general manager of Weapon Systems for BAE Systems.

"The TLS is revolutionary because it combines kinetic and directed energy weapons capability," said Signorelli. "Our approach is an effective and affordable solution for the customer, because this system can be integrated into existing shipboard mounts."

BAE Systems intends to collaborate with Boeing Directed Energy Systems, located in Albuquerque New Mexico for the development of the Tactical Laser System.

## 09 CTOL JSF TESTING

The USN's F-35 flight test aircraft CF-1 has conducted initial test on the TC-7 catapult at Naval Air Station Patuxent River on March 22. CF-1 completed functional checks and performed the first test hookup of the F-35C to the catapult. The test team also investigated an issue discovered during a preliminary fit check with the launch bar where it did not lower far enough to engage flight deck hardware for the catapult hook up. That test resulted in an improvement made to the launch bar so it will have a greater range of motion. The overall ship compatibility test phase, including catapult launches, is scheduled to begin towards the end of this year. Shipboard testing of the F-35C aboard a Nimitz class aircraft carrier is scheduled to take place in 2013. The F-35C Navy variant and F-35B Marine Corps variant are currently undergoing test and evaluation at NAS Patuxent River in preparation for eventual delivery to the US fleet.

## CANADIAN SURFACE COMBATANT PROJECT DEFINITION PHASE TO BEGIN IN 2011

The Royal Canadian Navy's (RCN) Canadian Surface Combatant (CSC) Programme may

09 The USN's F-35 flight test aircraft CF-1 conducting initial catapult tests at Naval Air Station Patuxent River on March 22.





award a project definition phase to industry by the end of 2011. The CSC Programme is expected to deliver 15 surface combatants to replace the three Iroquois class destroyers and the 12 Halifax class frigates at a cost of US\$15.4B to US\$20.5B.

The first three units (Flight 1) will replace the three Iroquois destroyers beginning in 2021 and will be oriented toward anti-air warfare (AAW) and command and control. The twelve follow-on units will replace the Halifax class and will be general purpose combatants and should begin entering service around 2025 with project completion in 2035. These vessels will be built in Canada at one of five yards that have been selected for construction of major surface vessels under the government's new National Shipbuilding Procurement Strategy (NSPS) that was approved in June 2010.

Under the strategy, two of the five yards preapproved for large surface construction (Peter Kiewit Infrastructure, Irving Shipbuilding, Davie Yards, Seaway Marine & Industrial and Vancouver Shipyards) will be down-selected and the government will then negotiate with both yards with one yard being selected as builder for all future naval combatants over 1,000 tons and the other non-combatants over 1,000 tons. Separate negotiations and contracts will awarded separately for individual programs such as CSC.

Similar to the UK's joining of the FSC-C1 and FSC-C2, the RCN is also taking the same route by utilising a single hull in order to reduce costs with modularity being the answer in regards to building different variants. In regards to designs, the RCN will consider modern designs such as the Dutch De Zeven Provinciën class, the Franco-Italian FREMM, German F 124, the Spanish Alvaro De Bazan and the UK's Type Global Combat Ship (GCS) design.

With the project definition phase beginning in 2011, a design should be selected by 2013 with a construction RfP released to the designated builder of large combatants by 2014. In order to have the first unit in service by 2021, the construction contract should be in place by 2016.

## 10 US\$1.2 BILLION FOR SECOND FY11 VIRGINIA-CLASS SSN

The USN has released US\$1.2 billion for the construction of the 14th Virginia-class submarine, SSN-787, to General Dynamics Electric Boat, a wholly owned subsidiary of General Dynamics. This award marks the beginning of production of two submarines per year on the Virginia-class programme.

The release of the funding allows procurement of long lead-time components that will support the planned official construction start later this year on the as-yet-unnamed submarine at Electric Boat and its teammate, Huntington Ingalls Industries in Newport News, Va.

"Today represents the culmination of an extraordinary effort by the Virginia-class team," said John D. Holmader, Electric Boat's vice president for the Virginia Programme. "From the engineers and designers who reduced the cost of the Virginia Class, to the shipbuilders who have delivered the submarines ahead of schedule and under budget, to the vendors who worked with us on cost-containment strategies, and of course the USN, which has managed the programme now recognised as a model for Pentagon procurement, this has truly been a collective effort."

"Reducing the cost of Virginia Class ships to the point where the Navy can afford to acquire two ships per year has demanded an intense process of continuous improvement," Holmader said.

"Our task now is to ensure that we demonstrate additional improvement on each ship so taxpayers get the best possible return on the nation's investment in submarines."

The Virginia class is the first USN warship designed from the keel up for the full range of mission requirements in the post-Cold War era. Optimised for maximum technological and operational flexibility, these submarines play a key role in the US's defence with their stealth, firepower and unlimited endurance.

Virginia-class submarines displace 7,800 tons, with a hull length of 377 feet and a diameter of 34 feet. They are capable of speeds in excess of 30 knots and can dive to a depth greater than 800 feet, while carrying Mk-48 advanced capability torpedoes, Tomahawk land attack missiles and unmanned underwater vehicles.

## 11 USN NAMES NEXT AIRCRAFT CARRIER USS JOHN F. KENNEDY

Secretary of the US Navy Ray Mabus announced on May 29th the next Gerald R. Ford-class aircraft carrier will be named the USS JOHN F. KENNEDY.

The selection JOHN F. KENNEDY, designated CVN-79, honours the 35th President of the United States and pays tribute to his service in the Navy, in the government, and to the nation.

"President John F. Kennedy exemplified the meaning of service, not just to country, but service to all humanity," said Mabus. "I am honoured to have the opportunity to name the next aircraft carrier after this great Sailor and inspirational leader, and to keep the rich tradition and history of USS JOHN F. KENNEDY sailing in the U.S. Fleet."

Born in Brookline, Mass., May 29, 1917, Kennedy graduated from Harvard in 1940, and entered the Navy in October 1941.

**10** The nuclear powered attack submarine USS VIRGINIA on the slip before being launched. With the cost of each boat coming down to US\$1.2 billion it makes the proposed cost of AU\$36 billion for 12 diesel-electric submarines for the RAN an excessive waste of money. If the RAN went down the Virginia route then less than 12 boats would be required thus saving even more money. (USN)



During World War II, Kennedy took command of PT-109 at Tulagi Island in the Solomons, with a mission to intercept Japanese ships attempting to resupply their barges in New Georgia. In the early morning hours of Aug. 2, 1943, Kennedy's ship was inadvertently struck by an enemy ship and split in half. During the course of the next six days, Kennedy led his crew members to safety and an eventual rescue. Kennedy received the Navy and Marine Corps Medal for the rescue of his crew and a Purple Heart for injuries he sustained when his ship was struck.

After his military service, Kennedy became a congressman representing the Boston area, he was elected to the Senate in 1953, and in 1961 became the youngest person to be elected president.

One previous ship, USS JOHN F. KENNEDY, CV-67, was named in his honour and was decommissioned in 2007, after nearly 40 years of distinguished service, including Operation Desert Storm.

## 12 NEW RN ICE SHIP PROTECTOR FORMALLY NAMED IN PORTSMOUTH

On a suitably glorious First of June, the newest addition to the Royal Navy family received her official name – ten days after sailing into Portsmouth with it emblazoned on her hull and superstructure.

That did not stop naval traditions being upheld with a formal ceremony in Portsmouth Naval Base and the immortal words: "I name this ship PROTECTOR. May God bless her and all who sail in her."

Those words came from the mouth of Beverly Mathews, the wife of Vice Admiral Andrew Mathews (the UK MOD's Chief of Materiel – Fleet) and now the sponsor of HMS PROTECTOR.

And following those famous words an equally famous maritime tradition: the smashing of a bottle of champagne against PROTECTOR's (red and very large) side.

The 5,000-tonne ship will serve as an interim icebreaker and Antarctic patrol/survey ship while the Navy considers the long-term fate of HMS ENDURANCE, the ship which has performed the role for the past 20 years.

She's been out of action since nearly sinking in late 2008 and although the survey vessel HMS SCOTT has filled in for her during the past two Austral winters, she's not ideal for Antarctic waters – hence the three-year loan of the Norwegian MV Polarbjørn (Polar Bear), now renamed PROTECTOR, upholding the name of the Royal Navy ship which headed to the frozen continent nearly 50 years ago.

The formal bestowing of the name was carried out in the presence of the entire ship's company, whose Guard of Honour was inspected by Mrs Mathews, with the ship blessed by the Chaplain of the Fleet, the Ven Scott Brown.

The ship was later commissioned on June 23.

PROTECTOR will spend the Northern summer and early autumn undergoing maintenance, equipment fits and training before heading south in November to carry out her inaugural survey mission.

## GERMANY TO SELL SIXTH DOLPHIN SUBMARINE TO ISRAEL

Germany has agreed terms for the sale of a sixth Type 800 Dolphin-class diesel-electric attack submarine – the third with air-independent propulsion system – to Israel.

There is no information at this stage on whether Germany had offered to discount the cost of the submarine – likely to be around US\$700 million – as it has in previous sales to Israel.

Israeli Prime Minister Benjamin Netanyahu and Defence Minister Ehud Barak pushed for the purchase of the sixth boat in recent talks with German officials in Berlin and Tel Aviv. The deal was approved in late April 2011 by the Israeli Security Cabinet.

The Israel Navy's Flotilla 7 already operates three 1,900-ton (submerged) Dolphin-class diesel-electric attack submarines, which were commissioned in 1999 and 2000. Another two boats – hulls four and five – are under construction in Germany by ThyssenKrupp Marine Systems (TKMS); the first of these is expected to be delivered to the navy in 2012 and the second in 2013.

The Batch II boats feature a 10 m hull extension to accommodate a fuel cell air-independent propulsion (AIP) system for enhanced submerged endurance. Israel ordered the pair from Howaldtswerke-Deutsche Werft and Thyssen Nordseewerke (now TKMS) following its war with Hezbollah in Lebanon in 2006.

Israel requested a sixth submarine in 2010 but the Berlin government balked when Tel Aviv asked Germany to underwrite part of the cost, as it had in the past. Under the contract signed in 2006, Israel is paying two-thirds of the cost of the Batch II boats and Germany is funding the remaining third of the project, estimated to cost a total EUR1 billion (US\$1.4 billion).

Based on the Type 212A design, the Dolphin-class boats are equipped with 10 bow torpedo tubes; four are 650 mm in diameter and reportedly capable of housing swimmer delivery vehicles. The remaining six tubes are 533 mm in diameter to accommodate heavyweight torpedoes or anti-ship missiles.

11 The next Gerald R. Ford-class aircraft carrier will be named the USS JOHN F. KENNEDY CVN-79 to honour the 35th President of the United States. (USN)

12 The 5,000-tonne icebreaker, and soon to be Antarctic patrol/survey ship, the Norwegian MV Polarbjørn (Polar Bear) arriving at Portsmouth to be renamed PROTECTOR. (RN)





## 13 HMS LIVERPOOL FIRES ON GADDAFI FORCES

During NATO's operation off Libya in May the Royal Navy Type 42 Batch 2 destroyer HMS LIVERPOOL silenced a Libyan shore battery which had opened fire on the ship and its helicopter.

Whilst engaged on surveillance operations off the Libyan coast, the Type 42 destroyer was tasked, along with two other NATO warships, to intercept small, high-speed inflatable craft spotted approaching the port of Misurata; similar boats have previously been used by the regime to attempt to mine the harbour.

A Libyan artillery battery on the coast fired an inaccurate salvo of rockets at HMS LIVERPOOL whereupon she immediately returned fire with her 4.5-inch (114mm) gun, silencing the shore-based aggressors. As a result of the prompt action by HMS LIVERPOOL and her fellow NATO vessels, Colonel Gaddafi's boats were forced to abandon their operation.

HMS LIVERPOOL was able to stay farther offshore than the other NATO vessels because her main 4.5-inch gun had a longer range.

CO of LIVERPOOL, Commander Williams, described how the events had unfolded: "We had a couple of contacts moving down the coast. The other two ships went in to investigate, and we sent up our helicopter in support," he said. "Then [the helicopter and NATO warships] started getting fired on by the [Libyan] vessels and from the shore, and it all got dramatic from there."

As her helicopter avoided gunfire, HMS LIVERPOOL fired an opening salvo and manoeuvred into position to take on the shore battery: "The arms fire started coming out to sea from the shore, and we could see that it was medium to heavy calibre," said Commander

Williams. "Once we were under fire we knew we had to defend ourselves, so we targeted the 4.5-inch gun and fired at the shore target.

"It was sufficient to allow us to move away from danger without any casualties. It took us about 20 or 30 minutes to bring it to an end."

## 14 PRESERVING THE SEA KING

Minister for Defence Materiel Jason Clare has announced that Sea King Shark 07 would be preserved at the Museum of Flight, HMAS ALBATROSS, given the significant role the Sea King has played in Naval Aviation over the last 36 years.

"The Sea King has served our nation well over the last 36 years and it is fitting that an example of this Navy work horse is preserved here in Nowra," Mr Clare said.

"Nowra was chosen to receive the Sea King helicopter because it has been the home base for the Navy's Sea King operations with 817 Squadron since 1974.

"Sea King Shark 07 was chosen because it has the most operational history of all the Sea King helicopters, having served in the Middle East and East Timor.

"The Sea Kings are known as the workhorse of the Navy, large enough to pick up loads heavier than a Land Rover. They have flown in excess of 60,000 hours in a range of operations both at home and abroad."

The permanent display of a Sea King in the Museum will also honour the nine Defence personnel who perished when Sea King Shark 02 crashed on the Indonesian island of Nias on 2 April 2005. They were in Indonesia to provide humanitarian assistance to the Indonesian people in the aftermath of the 2005 earthquake. The community in Nowra was hit hard by

the Nias disaster as four of the nine Defence personnel were members of the 817 Squadron based at Nowra.

"Sea King Shark 07 will be a permanent memorial to the seven young men and two young women we lost that day.

"Not only does Australia owe them a great debt, so to do the Indonesian people.

The aircraft has also come to the assistance of many Australians.

In 1994 the Sea Kings were involved in one of the largest fire fighting efforts in Australia's history. The aircraft used water buckets to fight fires raging near Grafton, Gosford, Bulahdelah, and Sydney's western suburbs.

The Sea Kings have also been used for rescue operations at sea.

In 1998, two of the helicopters were involved in rescuing yacht crews in disastrous weather conditions during the 1998 Sydney to Hobart Yacht Race.

One of the Sea Kings' last operations was to South West Queensland to provide response and recovery efforts during the Queensland floods.

As recently as 17 May they were involved in the dramatic rescue of a climber on Lord Howe Island.

A Sea King helicopter will also be offered for display at the Australian War Memorial in recognition of the Sea King's role in combat operations in Timor and the Middle East.

Sea King helicopters will be withdrawn from service in December 2011.

The remaining aircraft and associated support equipment will be offered for sale by tender. Announcements regarding the tender and sale will be made in the coming months. ■

**13** The Type 42 Batch 2 destroyer HMS LIVERPOOL. LIVERPOOL was able to use her main gun to return fire on a Libyan shore battery that had opened fire on NATO naval forces. (RN)

**14** Sea King Shark 07 flying over the flood affected areas of Kempsey in 2001. (RAN)







## TELL IT TO THE LABS

### AUSTRALIA'S KEY ROLE IN THE GLOBAL MARITIME PARTNERSHIP: CHALLENGES AND OPPORTUNITIES

By Captain George Galdorisi (USN-Retired), Dr. Stephanie Hsieh (United States Navy Space and Naval Warfare Systems Center Pacific) and Dr. Darren Sutton (Maritime Operations Division, Defence Science and Technology Organization)

Australia occupies a strategically important position in the Pacific Rim – the most vibrant area on the globe – and is a vital member of a number of regional and international bodies charged with protecting and preserving freedom of the seas. As a mid-level maritime power, Australia is dependent on the Royal Australian Navy (RAN) to protect and preserve freedom on the high seas, often in concert with other like-minded navies.

The RAN bears a special responsibility for carrying out this mandate. One important characteristic of Australia as well as of many other Pacific Rim nations are their vast coastlines, and the specific challenges and opportunities those coasts create. For naval forces and maritime communities at large, this geographic reality creates mutual imperatives to operate together at the regional – and often larger – level in a robust Global Maritime Partnership (GMP). This is because none of the challenges confronting the dozens of nations of the Pacific Rim can be addressed adequately by one government – or one navy – alone, and no single Pacific Rim nation can fully embrace the tremendous opportunities afforded by the proximity of the world's greatest ocean.

Australia's Navy is "out in front" in recognising these imperatives. For example, in his March 2009 U.S. Naval Institute *Proceedings* article, "The Commanders Respond," Australia's then Chief of Navy, Vice Admiral R.H. Crane, noted, "Australia's continued reliance on the maritime environment will dominate our thinking." He also outlined

the major future acquisitions the Royal Australian Navy (RAN) will make in air-warfare destroyers and amphibious assault ships, which will help safeguard Australia's maritime interests.<sup>1</sup>

Later that year, in his remarks at the 19th Biennial International Seapower Symposium in Newport, Rhode Island, the U.S. Navy Chief of Naval Operations, Admiral Gary Roughead, echoed this reliance on the maritime environment. In addressing the mutual interests in these unique challenges and opportunities to the delegates of the 100+ nations represented at the September 2009 event, he noted:

At this largest gathering of naval leaders in history, we here today represent our countries' efforts not only to defend our respective maritime interests and our shores, but also to secure the global maritime commons at a time of great challenge. The stakes are massive: our activities – individually and in partnership – are vital to the future generations.<sup>2</sup>

### THE IMPORTANCE OF NAVIES WORKING TOGETHER TO PROTECT THE GLOBAL COMMONS

The Royal Australian Navy has an enviable record of cooperation with like-minded navies that extend back to its formation. This tradition of cooperation and coordination has enabled the RAN to operate with other navies nearly seamlessly for a century including two world-wide conflagrations where the RAN demonstrated – often in cooperation



Regular exercises allow navies to practise their ability to communicate at sea and thus operate together. Here the Armidale class patrol boat (closest to camera) HMAS MAITLAND and the Anzac class frigate (far right) HMAS TOOWOOMBA operate with the Singaporean corvette VENGEANCE and the Japanese destroyer SAMIDARE off Darwin. (RAN)

with other Commonwealth and allied navies such as the United States – the ability to achieve complete mastery of the sea that enabled the defeat of the enemy and hastened the end of both wars.

Today, globalisation and the presence of a new generation of threats on the high seas, the littorals, and the near-shore land areas, demands even closer cooperation between and among the RAN and other navies it seeks to partner with. But like globalisation, rapid advances in technology – especially the command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) technologies – that link these navies together, present a challenge that must be reckoned with if these navies seek to achieve the interoperability necessary to operate together seamlessly at sea in peace and at war.

But this strong degree of maritime cooperation must be maintained in spite of these challenges. And that cooperation is crucial in peace as well as in war – perhaps more so.

The RAN's ability to communicate and exchange information with coalition partners is not only vital from a warfighting perspective, but is also integral to a wide array of humanitarian missions around the Pacific Rim. The tsunami relief efforts in December 2004 – and a wide range of subsequent natural disasters around the Pacific Rim – dramatically brought home the need for effective coalition communications *and* networking. Undoubtedly such operations will continue, perhaps become the norm in the future.

The rich maritime traditions shared by the RAN and the navies it will most likely partner with suggest that policy or doctrinal differences that might impede seamless interoperability between and among these navies can be overcome. What is less certain is whether the technological challenges of linking navies that all pursue different paths for technology development, insertion, and refresh can be successfully dealt with. The challenges facing these navies in working together at sea – especially over the last decade – suggest these technical issues have yet to be successfully dealt with.

When asked what single event was most helpful in developing the theory of relativity, Albert Einstein is reported to have answered, "Figuring out how to think about the problem." In his keynote address at the fifth biennial 'King Hall' Naval History Conference, Professor Nicholas Rodger of Exeter University identified just what these navies must "think about" when he noted, "Most think that bigger, faster, and more is best when talking about providing technology to naval forces. But this is not always the case. What matters is not how

much you communicate, but rather getting the right information to the right people at the right time."<sup>3</sup>

## CHALLENGES TO EFFECTIVE NAVAL COMMUNICATIONS AND NETWORKING AT SEA

Getting the right information to the right people has become a key focus of the RAN as its future force projections point to the need for greater coalition interoperability. This future reliance on C4ISR technologies to enable interoperability is noted in the Australian Defence Force (ADF) *Future Maritime Operating Concept – 2025: Maritime Force Projection and Control*:

The effectiveness of the maritime force can be improved through information and decision superiority [quantity and speed]...C2 systems must be able to deliver superior battlespace awareness and management through decision speed and quality thus controlling operational tempo...The maritime force must also develop a high level of interoperability with likely coalition maritime forces...<sup>4</sup>

In many ways the rapid advance of technology over the years has made it possible for advanced navies such as the RAN to work towards greater interoperability with partner nations. However, as naval networks have emerged as the primary means of communications within its own forces, RAN and other similarly networked navies may find it challenging to achieve interoperability with other navies. This is because navies around the world have different rates of C4ISR technology development and insertion.

Today, with the Australian Defence Force on the brink of what is arguably the most substantial naval investment and upgrades in more than a generation, the RAN has an opportunity to achieve its future goal that is stated in *Plan Blue*: "The Future Navy must be able to exchange C2 and targeting information within a joint and coalition environment. The Future Navy must possess the Command, Control, Communications, Computers (C4) capabilities required to maintain interoperability with coalition forces in the future."<sup>5</sup>

Can Australia, the Australian Defence Force, and, most specifically, the Royal Australian Navy ensure the RAN spearheads global maritime partnering through effective C4ISR technology insertion among partner nations and can the right technology be brought to bear to meet the often daunting challenges of coalition interoperability? We believe that it can if the RAN looks to its Defence Laboratories.

HMAS DARWIN with the South Korean destroyer ROKS CHOI YOUNG. Getting interoperability issues right during peacetime means better warfighting potential for coalition partners. (RAN)





Getting the right information to the right people at the right time is the key to coalition interoperability at sea. (RAN)

## TELL IT TO THE LABS – AN AUSCANNZUKUS EXAMPLE

“The DSTO mission covers the full spectrum of science and technology support for Defence...The DSTO will continue a significant portion of research into forward-looking enabling technologies such as hypersonics, computer security, electro-optics and smart materials which impact future Defence capability.”<sup>6</sup>

*Defending Australia in the Asia Pacific Century: Force 2030*

“We will win – or lose – the next series of wars  
in our nation’s laboratories.”<sup>7</sup>

Admiral James Stavridis “Deconstructing War”

*U.S. Naval Institute Proceedings* December 2005

These two quotes, from the Defence White Paper and from a U.S. Navy Admiral who understands the work that goes on at the laboratory level, underscore where we think much of today’s momentum – and promise – of enabling the RAN and its likely coalition partner navies to operate together to form a global maritime partnership and operate together on the global commons is located.

For the RAN and partner navies – especially when working with the U.S. Navy – the technical challenges to effectively network at sea are not trivial. Specifically, when working with a 21st Century FORCEnet-centric U.S. Navy and attempting to leverage the enormous capital investment the U.S. Navy is making in FORCEnet, the challenge is twofold: quantifying the operational effectiveness of a coalition force networked via U.S. Navy infrastructure provided by FORCEnet, versus the operational effectiveness of a coalition force less-robustly networked, and finding a way for likely coalition partners to co-evolve maritime networking systems in a way that enables maximum networking among partner ships and other platforms.

The issue of co-evolution is an important one because for the RAN and other Commonwealth navies determined to work with other – often smaller – navies as global maritime *partners*, a cooperative arrangement regarding technology development is crucial. And this implies early and frequent cooperation and collaboration at the grass-roots level by scientists and engineers working in laboratories of Commonwealth navies as well as those of other prospective global maritime partners to come up with technical solutions for challenging networking problems.

Government defence laboratories in the Commonwealth nations and in the United States are ideally positioned to lead the effort to co-evolve C4ISR capabilities that will enable their navies to effectively network at sea. There are many reasons why these defence laboratories should lead this important effort.

First and foremost is wealth of talent in these laboratories. Government defence professionals have been at the forefront of developing *today’s* C4ISR systems and thus have the talent and the pedigree to lead this effort in the future. Second, these government defence laboratories are not motivated by profit margins or meeting stockholder expectations, so they serve as “honest brokers” in tailoring solutions to the navies they support. This is especially important in developing, fielding and supporting C4ISR systems, which must be “platform agnostic.”

The mandate for government defence laboratories to lead the development of C4ISR capabilities for their respective navies and help co-evolve these systems for the five AUSCANNZUKUS nations (Australia, Canada, New Zealand, United Kingdom and United States) is strong in each of these nations, and raises the bar for what these laboratories are expected to accomplish. For example, in a discussion involving Defence science and technology and DSTO specifically, *Defending Australia in the Asia Pacific Century: Force 2030* notes:

HMAS STUART operating with the US Nimitz class carrier USS EISENHOWER. Being able to link into and operate with a USN Carrier Battle Group is regarded as the ‘holy grail’ of naval interoperability. The RAN is one of the few navies in the world able to do so. (RAN)



This allows Australia to work with these nations [the five AUSCANNZUKUS nations] across a broad spectrum of defence science and technology issues, to explore potential technological opportunities at significantly less cost to Australia, and to benefit from tests and trials using a range of methods and environmental conditions where the cost would be otherwise prohibitive.<sup>8</sup>

## WORKING TOGETHER AT THE LABORATORY LEVEL – THE TECHNICAL COOPERATION PROGRAM

The Defence White Paper, *Defending Australia in the Asia Pacific Century: Force 2030*, also notes; “Our prime multilateral science and technology relationship is through The Technical Cooperation Program with the United States, United Kingdom, Canada and New Zealand.” But while it has been around in various forms for almost half a century, The Technical Cooperation Program (TTCP) is not universally well known, even by naval professionals in the RAN and the four other AUSCANNZUKUS nations that comprise TTCP. Importantly, while tackling common naval C4ISR challenges in other fora is certainly *possible*, the extant TTCP organisation and infrastructure provides a ready-made medium that makes success in these multinational collaborative endeavours *probable*.

TTCP is a method for defence science and technology collaboration between Australia, Canada, New Zealand, the United Kingdom, and the United States. It is the largest collaborative defence science and technology activity in the world. The statistics alone give some indication of the scope of this effort: five nations involved; 11 technology and systems groups formed; 80 technical panels and action groups running; 170 organisations involved; and 1200 scientists and engineers directly accessed. By any measure, TTCP is a broad-based effort that tremendously facilitates science and technology cooperation among the five member nations.

Our first-person experience in our five-nation TTCP effort, first with an Action Group that was brought together to examine “Network-Centric Maritime Warfare” and subsequently with a successor Action Group charged to examine “FORCEnet Implications for Coalitions,” tells us that the lab-to-lab effort is crucial to addressing navy-to-navy C4ISR challenges. This is because it provides the ideal forum for exploring opportunities for mutual cooperation and coordination of national efforts to procure largely compatible C4ISR systems for navies that will work together in a Global Maritime Partnership.

While a full report of these two teams efforts is well beyond the scope of a single article, the detailed analysis and modelling and simulation that was conducted showed that when navies working together on the global commons are able to communicate and network (that is, nearly seamlessly exchange significant amounts of data and maintain a common operational picture) their effectiveness increases dramatically. While this is intuitively obvious, the data obtained is extraordinarily important, here is why.

While many speak to the importance of C4ISR systems and coalition interoperability and all agree this is a “good thing,” nations and navies have not yet made substantial investments in this area.



The TTCP logo. (DSTO)

For a host of reasons, coalition interoperability does not fit neatly into any requirements “bin” for Commonwealth navies, for the U.S. Navy, or for other likely coalition partner navies. It does not fly, float, or operate beneath the seas. It does not strike the enemy from afar like cruise missiles. It does not enhance readiness like spare parts or training. It just does not always have the requisite degree of high-level advocacy.

For coalition interoperability to find a higher level of “advocacy,” professionals at all levels will need to do more to demonstrate the return on investment – ROI – for the funds each nation spends on enhancing coalition interoperability. Armed with even some basic data demonstrating the enhanced operational effectiveness – across a spectrum of operations – that robust coalition networking delivers, acquisition officials procuring the “kit” for their militaries will be more inclined to invest in systems that enable this networking between and among coalition partners.

While the results of these two three-year-long efforts represent the work of only two action groups and a few dozen professionals among the over 1200 scientists and engineers in the TTCP community, it is groundbreaking work that demonstrates that the laboratory communities in the five AUSCANNZUKUS nations are well-positioned to take the RAN and the navies it partners with into a new era of coalition interoperability.

## THE RAN LOOKS TO THE FUTURE

As the RAN takes a leadership role in securing the global commons as part of the nascent Global Maritime Partnership, the work Australia’s DSTO laboratories do in the TTCP forum will remain crucial to ensure that when the RAN and other navies partner at sea, this partnership will have the requisite interoperability to succeed across the spectrum of conflict from peace to war.

And while the TTCP community embodies just the five AUSCANNZUKUS nations, this laboratory-to-laboratory cooperation can easily be extrapolated to other groups of nations and navies working together to make the oceans safe for peaceful purposes. As a nation at the nexus of so many important activities throughout the Pacific Rim, Australia is well-positioned – and indeed, counted on – to lead such efforts. As the Defence White Paper makes clear – DSTO is up to the challenge. ■

1 “The Commander’s Respond,” *U.S. Naval Institute Proceedings*, March 2009.

2 Admiral Gary Roughead, *Remarks at the 19th Biennial International Seapower Symposium*, Newport, Rhode Island, October 17, 2009.

3 *Proceedings of the 2007 King Hall Naval History Conference*, accessed at: [www.navy.gov.au/spc/](http://www.navy.gov.au/spc/).

4 The Australian Defence Force (ADF) *Future Maritime Operating Concept – 2025: Maritime Force Projection and Control*, pp. 15-16 (Canberra, Australia, Australian Government, Department of Defense, 2009). This unclassified version of the Future Maritime Operating

Concept (FMOC), cosigned by the Australian Chief of Defence Force and Chief of Navy, represents the vision for how the RAN will operate in the year 2025 and provides a window on what technological capabilities this navy must possess.

5 *Plan Blue 2006* (Canberra, Australia, Australian Government, Department of Defense, 2006), pp. 16-17.

6 *Defending Australia in the Asia Pacific Century: Force 2030*

7 James Stavridis, “Deconstructing War,” *U.S. Naval Institute Proceedings*, December 2005.

8 *Defending Australia in the Asia Pacific Century: Force 2030*, p. 136.



## WOODEN LUGGERS: FRIEND OR FOE?

By Peter Ingman

**In this 3rd place 2010 Navy League of Australia Non-Professional Essay Competition entry, the author, Peter Ingman, examines the use of Pearling Luggers in and around the top end of Australia during WW II.**



The Lugger  
HMAS ST FRANCIS.  
(Northern Territory Library)

During WWII, the Japanese made wide use of small, wooden 'sampan' type vessels and anything similar that could be acquired from civilian owners in the territories they had conquered. These shallow-draft vessels were highly versatile in the reef-strewn and poorly charted waters of South East Asia. They were robust and easily adopted for military use transporting troops, conducting patrol duties and generally maintaining communications between far flung outposts were among their duties. Typically, these were either mistaken for native craft or seen as not worthy targets for Allied submarines – an expensive spread of torpedoes was a poor return for such a target even if the torpedoes would run shallow enough to hit the wooden vessel. Similarly, the natural buoyancy of wooden craft made them hard to sink by aircraft with rifle-calibre machine guns (as was the case early in the war).

Perhaps the best known example of the employment of such vessels was during the Malayan campaign when in December 1941 the British decided to abandon the island of Penang to the enemy - despite the preparation of fortifications the British decided not to expose the civilian population to the horrors of modern warfare. While this was a seemingly noble gesture, the British – perhaps still suffering from colonial overconfidence and despite wartime conditions they were still respecting private property – left a large fleet of Penang-based civilian fishing vessels afloat. Within weeks the Japanese were using these vessels to leap-frog British positions on the west coast of Malaya and add an unexpected and highly successful amphibious element to the campaign. The Japanese were masters of such tactics after years of 'brown water' riverine warfare in China during the 1930s.

Within the Greater East Asian Co-Prosperity Sphere such vessels were quickly put to military use. Many Allied aircraft claims of vessels sunk or attacked were found to be unsubstantiated in the post-war accounting for such matters. No doubt many of the vessels attacked or sunk were in fact these wooden sampans – which would remain largely unnamed or unaccounted for in any formal maritime register.

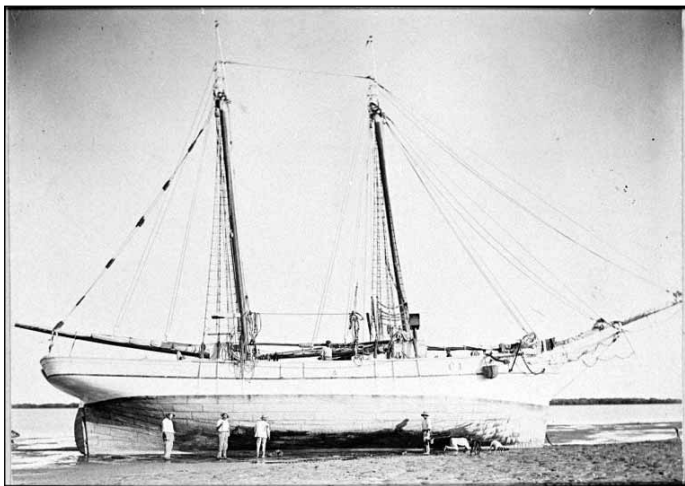
Perhaps the most famous of such vessels was the *Krait*. This was captured by the Allies early in the war and brought to Australia. Later it sailed via enemy waters disguised as a seemingly harmless native vessel. In fact it carried Special Forces personnel who famously raided Singapore Harbour and sunk or disabled multiple merchant ships with limpet mines.

During the late 1930s significant fleets of Japanese luggers would routinely visit northern Australian waters. This created increasing concerns in Australian political circles in terms of the "yellow peril". Probably most of these vessels were in Australian waters for commercial reasons. However the situation was complicated by the fact that for many years Broome had been exempt from the White Australia Policy in order to employ Japanese pearl divers. Many families of Japanese origin settled in Broome and the northwest to work not only as divers but also as deckhands and even lugger masters. Soon after the Pacific War broke out several hundred persons of Japanese origin were rounded up in Broome, Darwin and other centres and sent to internment camps in southern Australia. Their assets were seized – including some pearling luggers. The pearling luggers were a heterogeneous collection of vessels generally described as twin masted schooners and often boasting a small diesel engine in combination with sail power.

There was something in the order of well over 100 active Australian based luggers in late 1941 (and even greater numbers of wooden fishing vessels and those used for trading in the islands). Most of the luggers were based in Broome, but other major centres included Darwin and Thursday Island. Quite distinct from this fleet were the Japanese luggers based in Palau which arrived in northern Australian waters on a seasonal basis and which were supported by increasingly large 'mother ships', reducing the need for shore visits. Such fleets were of increasing concern during the late 1930s, but little was done aside from the NT Government acquiring a few patrol vessels to operate from Darwin. During this period the Japanese made a serious attempt to develop an iron ore mine in the Kimberleys at Yampi Sound. Despite some real initial investment by the Japanese, the partly xenophobic Australian government eventually forbade such an investment – even though similar Japanese-controlled mines were operating in neighbouring territories such as New Caledonia.

The net result was increasing concern about the role of Japanese vessels in northern Australian waters. Were they legitimate commercial operators or did they have a more sinister purpose? The reality is probably a combination of both. Undoubtedly Japanese lugger masters were debriefed by Japanese Naval Intelligence on return to Palau at the end of each season. Quasi-commercial trading voyages by supposedly civilian craft (owned by Japanese companies) have been well documented elsewhere – such as in New Ireland and Portuguese Timor. The amount of goods traded – a few trinkets in exchange for a few sacks of copra or coffee – was obviously not commercially viable. But the voyages continued. Clearly intelligence gathering – or the





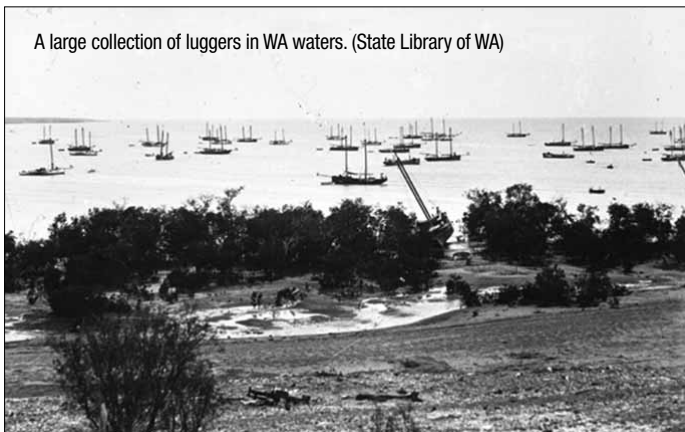
Given the massive tidal range in northern Australia, it was initially hoped that the luggers could take on goods from merchant ships and then beach when the tide went out to unload. But given the shape of their hulls, the lugger decks rested in the mud at almost 45 degrees when the tide went out.

expansion of Japanese influence generally - was the primary purpose for these larger vessels.

The situation changed somewhat when Australia went to war with Germany in 1939, and began to prepare for a global maritime war. During 1940-41 a network of coastal "Advanced Operating Bases" was developed which were spaced within a few hundred miles of each other on the edge of the Australian continent. Initially used by Avro Ansons, by 1941 regular coastal patrols were flown across northern Australia by vastly more capable and modern Lockheed Hudsons, based in Darwin. For example, a regular patrol was flown from Darwin to Broome, using a handful of bases in between for refuelling. A key reason for the patrols was to keep watch on the activities of the Japanese luggers.

Single-engine Wirraways were based in Darwin and operated from advanced bases such as Wyndham and Drysdale in the far north of W.A. It is possible that the Japanese lugger masters, on return to Palau in August 1941, reported the presence of "modern fighters" at locations such as Wyndham (equating the relatively modern-looking monoplane Wirraways as "fighters"). Certainly when the Japanese subsequently attacked that base they spent much ammunition strafing adjacent scrubland in the assumption that fighters were hidden there.

Despite the darkening of relations between the powers, it is of interest that as late as the end of October 1941, direct from Palau, a Japanese pearling 'mother ship' *Kokoku Maru* (543t) was permitted to enter Darwin harbour for provisions. She departed about a week later supposedly for "pearling grounds". Then almost a month later, on 21st November, the *Kotohira Maru No. 1* (a lugger / schooner of 39t) was allowed into Darwin Harbour to enable the treatment of the injured Captain of *Kokoku Maru* on humanitarian grounds. *Kotohira Maru No. 1*



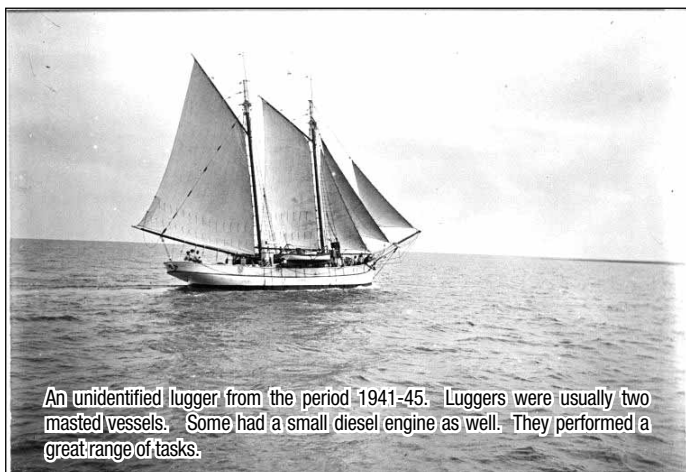
A large collection of luggers in WA waters. (State Library of WA)

departed Darwin on 1st December 1941. This is suspicious as the Japanese lugger fleet was supposed to have been laid up in Palau at the time (indeed, pearling was becoming increasingly uneconomic anyway at this time). It has never been proven if these voyages had intelligence gathering functions – but the timing is certainly suspect.

After the Pacific War began on 7th December 1941 one of the first tasks of the Australian Forces was for RAAF Catalinas to round up a few Japanese luggers off Thursday Island and direct them back to port for impoundment. Meanwhile, a few days later, four luggers named *Mars*, *Mavie*, *Medic* & *Plover* were found hidden off Bathurst Island. Given their Australian owner had Japanese origins all were impounded and brought back into Darwin Harbour. Lacking small craft, the RAN realised the best of the luggers were large enough to be stable machine-gun platforms and / or picket vessels. Some were requisitioned and given stationary observation positions within Darwin Harbour. Soon the limited wharfage facilities and increased shipping traffic forced these boats into use as intra-harbour lighters and despatch craft. *Mavie* – presumably the best of these boats – was commissioned as HMAS MAVIE as an auxiliary patrol craft.

Meanwhile the vast northwest region had been abandoned by the Army. Save a few men with rifles of the Volunteer Defence Corps, it was completely undefended and the sole policy was one of "scorched earth". An ex-lugger master with experience in the northwest, Lt "Beau" Davis, RANR, was flown up to Broome in early February 1942 with an order to evacuate the 80-odd luggers based in the northwest. Initially, it was hoped to move most of the fleet to Darwin for use as lighters (where the US were developing a major base) while others could sail to the major RN base at Trincomalee, Ceylon. Given the massive tidal range in northern Australia, it was hoped that the luggers could take on goods from merchant ships in Darwin Harbour and then beach near the shore when the tide went out and the cargo could be offloaded. This theory lasted about two weeks until someone in Naval HQ realised that given the shape of their hulls, the lugger decks rested in the mud at almost 45 degrees when the tide went out and hence were clearly unsuitable for this purpose! Further, given the lack of both Japanese and European masters (the former had been interned, most of the latter had evacuated south or joined the services), none of the crews had any confidence in sailing either north of Broome or across the ocean to Ceylon. Indeed, following the Darwin raid on 19th February and the subsequent attack on the WA supply ship *Koolama*, the crews refused to sail north at all. As an interim measure, Davis was able to sign on crews with the limited objective of first taking the vessels a few hundred miles south to Port Hedland. This was agreed to, while less seaworthy vessels were burnt on the beaches by Army engineers – it was feared even these could be an asset to the enemy (e.g. even without engines they could be towed by other vessels). Some dated back to pre-1900 while most had been built during the pearling boom years of circa WWI or just beforehand. While virtually all were configured as two masted schooners, almost none were identical and many were modified to such an extent that they had little in common with their formal description in the WA Shipping Registers. Virtually all were listed as being between 10-20 tons .

With the background of the Java aerial evacuation through Broome, and the devastating attack there on 3rd March, Davis worked all hours to prepare the Asian crews for the voyage south while also getting each lugger seaworthy (all had just been laid up for the six-month off-season). Davis' main weapon was an open cheque-book from the Navy. He promised everyone would be "looked after" and compensated properly in due course. There was some real panic and urgency at this time. After all, the head of the Allied Air Forces, General Brett, USAAF, reported to Washington that he expected the northwest to be occupied within weeks. As one of the few "cool heads" to remain in Broome,



An unidentified lugger from the period 1941-45. Luggers were usually two masted vessels. Some had a small diesel engine as well. They performed a great range of tasks.

Davis even found time to help train the local Volunteer Defence Force.

Unfortunately, because of the urgency involved, several of the luggers ran into severe cyclonic conditions near Port Hedland and were driven ashore. They were subsequently repaired and directed south to Fremantle, although many crews were without navigational aids of any kind and there were many delays. At the same time winter was approaching and the vessels were not designed for southern seas. So there were more losses to bad weather further south. Altogether, about half of the 80 luggers were destroyed by accidents or by intentional burning. Famously, HMAS MAVIE was sunk during the first Japanese air raid on Darwin on 19th February – the sole lugger to be lost to direct enemy action.

Aside from this, the naval and military use of the surviving luggers is less well known. Darwin had served as a base for the US Asiatic Fleet in January, and hence the desperate need for small vessels in that harbour. But the Americans soon left Darwin for ports in Java to be closer to the action, although temporarily (the remnants soon withdrawing south to Fremantle). When Java surrendered in early March, the strategic value of Darwin decreased significantly and it effectively became a small-ship base. The handful of luggers in good condition were commissioned and equipped with radios and Vickers and/or Lewis machine guns<sup>1</sup>. Others were laid up in the harbour for the duration of the war. The best of these luggers served as permanent observation / guard-ship platforms in Darwin Harbour positioned for the maximum sweep of their Vickers guns – complimenting Army machine-gun equipped observation posts on the shoreline. For a brief period, before radar was operational, at least two luggers were sent out to sea as picket boats to report incoming air-raids, but faulty equipment made these missions only partly successful – in addition it was agreed that the luggers were unsuitable for true “blue water” operations.

When most of the “Broome” luggers reached Geraldton or Fremantle virtually all found military employment – underlining how these vessels could have been equally useful if theoretically captured by the enemy. Aside from a few of the lesser vessels laid-up upstream from Fremantle on the Swan River, all three services had demand for these robust vessels. This was in early 1942, sometime before the arguably more suitable Fairmiles and HDMLs emerged in large quantities.

Perhaps most fascinatingly, two of the best luggers, HEATHER and MYRTLE OLGA were armed with multiple machine guns and based at Port Hedland under Lt Davis, forming a RAN “Northwest Patrol”. These two ships literally formed the “frontline” of the northwest against any possible Japanese incursion from nearby Timor. West of Darwin, they were pretty much the sole Allied presence, spending much of their time liaising with local Aboriginal communities in the hope of building relationships and receiving reports of possible Japanese landings or

coast watching stations. The latter was thought quite possible given the enormity of unoccupied land (even the Yampi Sound mining town had been abandoned in early 1942) and aside from these luggers the old Asiatic Fleet armed yacht USS LANIKAI (150t; 1 x 3-pdr; 2 x 0.30 cal MG; famous as starring in the pre-war movie Hurricane) departed Fremantle in early April to spend almost three months searching the northwest for possible Japanese coast watching stations.

Although not classified as a “lugger”, the Army employed the ketch *Aroetta*, which arrived in Darwin in late January. After being fitted out it departed on 12th February for Arnhem Land under the command of anthropologist Squadron Leader Thompson. Equipped with rifles and a Vickers MG, the vessel toured the Gulf Country to gain support from isolated Aboriginal settlements. A similar lonely lugger was the *Teresita Moa*, which was attached to the isolated Drysdale Mission. It seems this vessel was exempted from the scorched earth policy and helped keep the mission supplied – despite being unarmed and facing everyday risk of air attack. Among other duties, this vessel helped in the rescue of the Koolama survivors. One advantage of such vessels was their ease of being hidden during the day in shallow creeks and under foliage. In this fashion, a handful of similar Dutch vessels arrived from the NEI carrying various escapees from the Japanese over coming weeks.

Meanwhile, to the south of WA, the employment of the survivors of the lugger fleet was both diverse and extensive. The employment of luggers by the RAN is well documented. Some were used by the Naval Auxiliary Patrol from minor ports such as Geraldton and Bunbury. Several found employment as Boom Defence Vessels in Fremantle, while others were used for sundry purposes such as training, carrying torpedoes and a single vessel served as the dive boat for HMAS LEEUWIN naval base (ironically the sole lugger known to support diving operations, the original purpose of the pearling industry lugger fleet).

The use of luggers by the other services is less well documented. At least one was used by the RAAF base at Geraldton to support an observation base offshore. A small fleet served with the Army and formed the Army Ferry Service between Fremantle and Rottnest Island. At the latter location were important coastal defence fortifications and a sizeable Army garrison. Perhaps more interestingly, the Australian War Memorial possesses a series of photographs showing nine luggers supporting an amphibious training operation in the Abrolhos Islands, off the W.A. coast near Geraldton, in late 1942. Thus the Australian Army, at least in the west, was not afraid to experiment with the same successful tactics as the enemy. Of course by this time General Gordon Bennett was responsible for the defence of W.A., and he had witnessed the Japanese tactics first hand during the Malayan campaign.

No doubt the Thursday Island based luggers found similar employment, as well as other island-based trading vessels that arrived in North Queensland at this time, fleeing the enemy. A major user was the US Army Small Ships Section, part of the US Army Services of Supply (SWPA), which is described by one source as having scoured “every port between Adelaide and Cairns” for suitable vessels.

Indeed, the numbers of such craft involved in the Papuan area possibly exceeded those used in the West. The emphasis on Darwin and WA based vessels in this essay simply reflects the authors’ better knowledge of these areas. In addition, a small number of lugger-type vessels were transferred to the Dutch military forces based in Australia.

Thus while the use of small civilian wooden craft for military purposes is perhaps remembered as a typical Japanese tactic, throughout the war the Allies repeated the practice in the SWPA to a similar extent and with similar efficiency and usefulness.

<sup>1</sup> e.g. HMAS ST FRANCIS (Ex-Mission Lugger); HMAS IBIS, HMAS ARTHUR ROSE, HMAS RED BILL & HMAS SULITUAN.

# DISPATCH: HMAS MANOORA RETIRED

After 17 years of dedicated service, the Royal Australian Navy's amphibious transport ship, HMAS MANOORA, was decommissioned at her homeport of Garden Island, in Sydney, on 27 May 2011.

HMAS MANOORA commissioned in the Royal Australian Navy on 25 November 1994.

MANOORA was one of two former United States Navy, Tank Landing Ships purchased by the RAN to bolster its amphibious capability.

Between 1995 and 1999, MANOORA underwent an extensive modernisation in Sydney and Newcastle to convert the vessel to a Landing Platform Amphibious (LPA). Work included extensive hull-preservation work, asbestos removal, installation of an electronic propulsion control system, the fitting of a 70-tonne crane, an engineering and sensor upgrade, installation of a modern medical facility, a new communications centre and modifications to the helicopter hangar.

After the refit she could embark two LCM-8 landing craft on the bow; either four Black Hawk or three Sea King helicopters; she had 955 square metres of useable tank deck space and had a complement of 23 naval Officers, 2 army Officers, 197 sailors, 18 soldiers and 400 embarked forces.

In January 2000, MANOORA joined the fleet, beginning a commission in the RAN that would see her actively participate in National and coalition operations which spanned from the Western Pacific to the Middle East.

The first of these was as guard ship during Operation GOLD during which she provided security for the Sydney 2000 Olympic Games.

In May 2003, MANOORA sailed for the MEAO in support of Operation FALCONER, the Australian Defence Forces' (ADF) contribution to the war in Iraq. She entered the MEAO on 3 June where she provided additional sealift capacity in theatre and began back-loading ADF equipment and stores to Australia. She returned to Australia on 28 June.

In July 2003, MANOORA deployed from Townsville to the Solomon Islands in support of Operation ANODE, the ADFs' contribution to the Regional Assistance Mission to the Solomon Islands. MANOORA entered the AO on 24 July where she provided logistic and air support for the Maritime Task Group throughout the deployment and transported the rebel leader, Harold Keke, to Honiara following his arrest. MANOORA departed the AO on 29 October 2003.

Between May and August 2010, MANOORA remained alongside in Sydney undergoing maintenance before sailing in September for work ups and participation in Exercise HAMEL in Queensland waters. There she visited Brisbane before taking part in commemorative services associated with the discovery of the wreck of the Australian Hospital Ship Centaur. The results of the LPA Seaworthiness Board then necessitated her return to Sydney and the commencement of a Chief of Navy directed Operational Pause.

In February 2011, the Minister for Defence announced the early decommissioning of MANOORA. ■

MANOORA's crew march off and away from their ship in the background for the last time. (RAN)



## BOOKS

### Diving Stations:

#### The Story of Captain George Hunt DSO, DSC, RN

By Peter Dornan,

Pen & Sword Maritime, Barnsley, UK, 2010

ISBN-13: 978-1848843219

192 pages hard cover

Reviewed by John Jeremy

In 1945 the Admiralty selected two submarine officers to have their portrait painted for the Imperial War Museum. One was Lieutenant L. W. A. Bennington, commanding officer of HMS TALLY HO — the other was Lieutenant Commander George Hunt. Bennington's exploits in TALLY HO are quite well known — those of George Hunt and his ship's company in ULTOR are less so but stand out amongst the achievements of Royal Navy submariners during World War II.

Born in Scotland, Hunt spent his early years in Uganda before being educated in Glasgow. He joined the Royal Navy Reserve at the age of 13 and joined HMS CONWAY as an officer cadet. In the years before the war he experienced life in the merchant marine and the Royal Navy before becoming a permanent officer in the RN at the age of 21 when he volunteered for service in submarines. His first appointment was to the small U-class submarine HMS UNITY, operating in the North Sea. In April 1940 the Norwegian merchant ship *Alte Jarl* collided with Unity, slicing her open and sinking the submarine rapidly. For his actions during the sinking Hunt was Mentioned in Dispatches, the first of many awards he was to receive during the war.

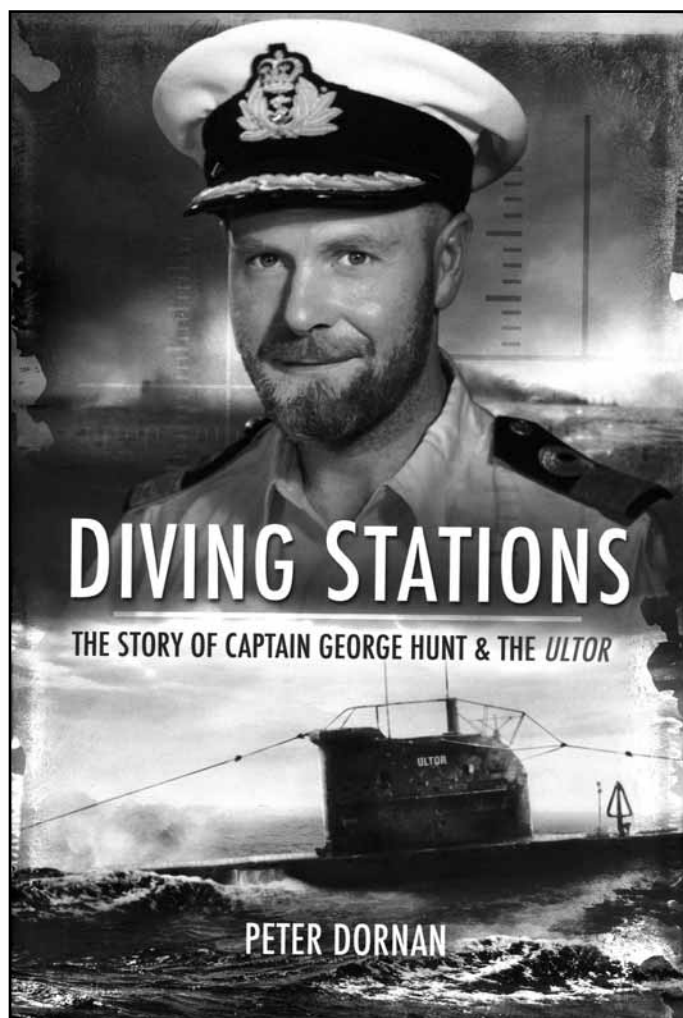
Hunt was soon back at sea and in April 1941 was appointed First Lieutenant of HMS PROTEUS, operating in the Mediterranean. In March 1942 he returned to the UK to undertake the Commanding Officers' Qualifying Course. His first command was the submarine HMS H33. H50 followed, mainly employed in training and short patrols close to Britain.

It was not long before Hunt was appointed to command one of the U-class submarines then building at Barrow in Furness. These submarines displaced only about 500 tons, carried eight torpedoes and had a range of only 500 miles. Hunt's submarine was commissioned as HMS ULTOR for service in the Mediterranean.

HMS ULTOR had a very active war until her return home in September 1944. During her fifteen patrols she sank 20 enemy vessels by torpedo and eight by gunfire. Another four ships were damaged. Fifty percent of the torpedoes fired scored hits. The Admiralty summarised ULTOR's achievements in the following words: "It is quite clear ... that not only Lieutenant Hunt, but his officers and the whole of his ship's company have achieved and maintained a degree of efficiency which reflects the highest credit on all of them. Lieutenant Hunt's own performance ... must entitle him to be classed with our front-rank Submarine commanding Officers."

For his service in PROTEUS Hunt received the DSC and in ULTOR a bar to the DSC, Mention in Dispatches, and Distinguished Service Order and Bar.

After the war George Hunt continued his naval service which included time in the aircraft carriers TRIUMPH and THESEUS and command of HMS AMBUSH and HMS BIGBURY BAY, in the latter role as Senior Naval Officer West Indies. In 1958 Captain Hunt became Chief Staff Officer to the Flag Officer Submarines and in 1960 moved to Bath as Director of



Naval Equipment. He retired from the RN in 1963 at the age of 46 and, with his wife Phoebe and their daughter, emigrated to Australia, finally settling in Brisbane where Hunt joined the staff of the shipbuilder Evans Deakin. In 1965 he took a position with the British High commission, finally retiring in 1976.

Now in his nineties, George Hunt still lives in Queensland maintaining an interest in submarines as Patron of the Queensland Branch of the Submarines Association of Australia.

Peter Dornan, for many years a physiotherapist working mainly in sports medicine, has written a number of books including three on military subjects. Diving Stations is a most readable account of George Hunt's life and achievements, although some readers might feel that the accounts of HMS ULTOR's exploits are a bit matter of fact and lack some of the tension and excitement which must have been felt by her young crew. Perhaps this is inevitable when the story is being told so long after the event. Diving Stations should be read by all interested in submarine warfare. ■

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 the 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 future reintegration of New Zealand as a full partner.
- Urges close relationships with regional powers and particularly with the nearer ASEAN countries, PNG and South Pacific Island States.
- Advocates the acquisition of the most modern armaments, surveillance systems and sensors to ensure that the Australian Defence Force (ADF) maintains some technological advantages over forces in our general area.
- Advocates a significant deterrent element in the ADF capable of powerful retaliation at considerable distances from Australia.
- Believes the ADF must be capable of protecting essential shipping both coastally and at considerable distances from Australia.
- Endorses the control of Coastal Surveillance by 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 support the ADF and to ensure the carriage of essential cargoes to and from Australia in time of conflict.

**As to the RAN, the League,** while noting the important peacetime naval tasks including border protection, flag-showing/diplomacy, disaster relief, maritime rescue, hydrography and aid to the civil power:

- Supports the concept of a Navy capable of effective action in war off both East and West coasts simultaneously and advocates a gradual build up of the Fleet and its afloat support ships to ensure that, in conjunction with the RAAF, this can be achieved against any force which could be deployed in our general area.
- Believes that the level of both the offensive and defensive capability of the RAN should be increased and welcomes the Government's decisions to acquire 12 new Future Submarines; to continue building the 3 Air Warfare Destroyers (AWDs) and the two landing ships (LHDs); and to acquire 8 new Future Frigates, a large Strategic Sealift Ship, 20 Offshore Combatant Vessels, 24 Naval Combatant Helicopters, and 6 Heavy Landing Craft.

- Noting the deterrent value and the huge operational advantages of nuclear-powered submarines in most threat situations, recommends that the future force include nuclear-powered vessels.
- Noting the considerable increase in foreign maritime power now taking place in our general area, advocates increasing the order for Air Warfare Destroyers to at least 4 vessels.
- Welcomes the decisions to increase the strength and capabilities of the Army and Air Force and to greatly improve the weaponry, and the intelligence, surveillance, reconnaissance, cyberspace, and electronic warfare capabilities of the ADF.
- Advocates that a proportion of the projected new F35 fighters for the ADF be of the short-takeoff and vertical-landing (STOVL) version to enable operation from small airfields and suitable ships in order to support overseas deployments where access to secure major airfields may not be available.
- Advocates that all warships be equipped with some form of defence against missiles.
- Supports the development of Australia's defence industry, including strong research and design organisations capable of constructing and maintaining all needed types of warships and support vessels and advocates a continuous naval ship-building programme.
- Advocates the retention in a Reserve Fleet of Naval vessels of potential value in defence emergency.
- Supports a strong Naval Reserve to help crew vessels and aircraft and for specialised tasks in time of defence emergency.
- Supports a strong Australian Navy Cadets organisation.
- Advocates improving conditions of service to overcome the repeating problem of recruiting and retaining naval personnel.

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



INVINCIBLE (and at one stage the future HMAS AUSTRALIA) seen here being towed from Portsmouth Harbour in the UK for a Turkish breakers yard after 25 years of service. Ironically, when the UK needed an aircraft carrier in the Mediterranean for operations against Libya INVINCIBLE was there being towed past the area of NATO operations towards Turkey for scrap. (Dr David Stevens)



The Anti-Ship Missile Defence upgraded Anzac frigate HMAS PERTH sporting here new main mast with search and target designation active phased array radars. The ship is due to undergo more tests of this ground breaking Australian designed technology to prove the concept and technology during this year. (Chris Sattler)



## THE NAVY LEAGUE OF AUSTRALIA FIFTH ANNUAL MARITIME AFFAIRS ESSAY COMPETITION 2011

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

### TOPICS

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

### CATEGORIES

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

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

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

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

### PRIZES

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

### DEADLINE

15 September 2011

Prize-winners announced in the January-March 2012 issue of *THE NAVY*.

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

**Navy League Essay Competition**  
**Box 1719 GPO, SYDNEY NSW 2001**

or emailed to [editorthenavy@hotmail.com](mailto:editorthenavy@hotmail.com).

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

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

