

THE NAVY

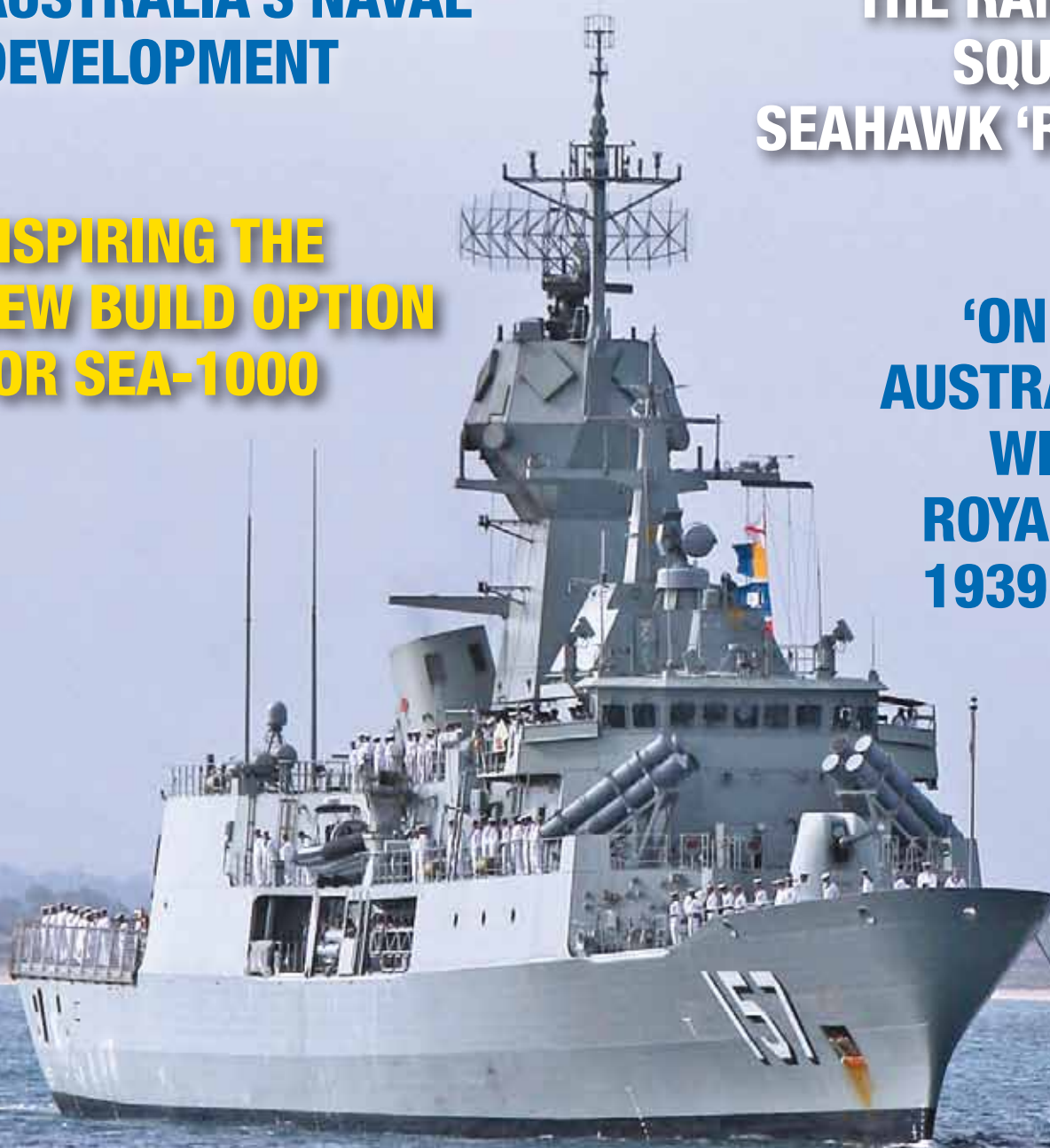
THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

**AUSTRALIA'S NAVAL
DEVELOPMENT**

**INSPIRING THE
NEW BUILD OPTION
FOR SEA-1000**

**THE RAN'S 725
SQUADRON
SEAHAWK 'ROMEO'**

**'ON LOAN':
AUSTRALIANS
WITH THE
ROYAL NAVY
1939 - 1941**



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07 AUSTRALIA'S NAVAL DEVELOPMENT

By VADM Ray Griggs, AO, CSC, RAN

11 THE RAN'S 725 SQUADRON SEAHAWK 'ROMEO'

22 INSPIRING THE NEW BUILD OPTION FOR SEA-1000

By Usman Ansari

26 'ON LOAN' - AUSTRALIANS WITH THE ROYAL NAVY 1939 - 1941

By CMDR Greg Swinden RAN

REGULAR FEATURES

- 02 From the Crow's Nest
- 04 From Our Readers
- 05 The President's Page
- 15 Flash Traffic
- 30 Product Review
- 32 League Policy Statement

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Front cover: The updated Anzac frigate HMAS PERTH with her CEAFAR and CEAMOUNT mast amidships. So far by all accounts the new radars are performing extremely well. (RAN)



THE FUTURE OF WAR AT SEA HAS ARRIVED

Despite the crippling economic sequestration bill ravaging the US Military, the USN recently successfully tested three new technologies that signify the beginning of a change in the future of naval warfare. However, not much has been said nor the implications fully understood by many.

The first of these was a new laser that has been tested at sea on board an existing Arleigh Burke class destroyer, and which will be deployed to the Persian Gulf next year.

The second test saw the first launch and touch and go of the X-47B unmanned combat aerial vehicle, or UCAV, from a Nimitz class aircraft carrier while underway at sea.

Lastly, the MQ-4C Triton, the USN version of the Global Hawk, Broad Area Maritime Surveillance (BAMS), flew for the first time.

So far, no nation has in development, developed or testing anything like these new technologies.

LASER WARFARE

During April the USN tested a new solid state electrically powered laser on board the Arleigh Burke class destroyer USS DEWEY. The laser used was a technology demonstrator built by the US Naval Sea Systems Command from commercial fibre solid state lasers, utilising a combination of methods developed at the US Naval Research Laboratory. The Laser Weapon Systems, or LaWS for short, can be directed onto targets from the radar track obtained from a Mk-15 Phalanx Close-In Weapon System or other targeting sources.

The system was tested at sea against an aerial target with footage from the destroyer's and the target's point of view posted onto YouTube. A split screen edit of the video shows each view simultaneously.

The video shows that four seconds after the laser is turned on the target starts to burn at the point it is focused. Six seconds later the aerial target is so damaged by the laser cutting through it, and being engulfed by fire, that it departs from controlled flight and crashes into the sea. An interesting observation from the aircraft is that once the laser is focused onto the target its optronics, i.e.

video cameras etc, are blinded by intense green light. This would render any enemy laser guided weapon inoperable during the engagement and potentially provides scalability between a dazzling laser and a killing one.

Of the 12 test shots done so far the laser currently has a 100% kill probability.

Although still in its early development stages and with hurdles such as power demands, highly manoeuvrable targets and poor weather conditions to overcome, it is a significant first step to a weapon with unlimited ammunition capability, and which costs US\$1 per shot and has a nearly instant time of flight.

The applications for the laser at sea will start with anti-aircraft/missile defence to small surface craft and later larger ships and potentially satellite and ballistic missiles.

As part of the weapon's development it will be deployed to the Persian Gulf next year, two years ahead of schedule, for use onboard the forward staging/command ship USS PONCE. The humid and hazy environmental conditions will prove challenging to the laser's effectiveness but will provide a wealth of information for further development of this ground breaking multi-mission, and potentially devastating, new naval weapon.

KILLER ROBOTS IN THE SKY

The second new technology involves the X-47B UCAV and its deployment to sea during May for flight testing aboard the USS GEORGE H. BUSH. A significant first milestone in naval aviation history for this capability. The most recent tests saw the UCAV launched from one of the ship's four catapults and then conduct a number of touch and goes, in preparation for arrested landings before the end of the year.

The X-47B is a tailless, strike fighter-sized, low-observable (i.e stealthy), unmanned aircraft under development by US firm Northrop Grumman as part of the USN's Unmanned Combat Air System Carrier Demonstration (UCAS-D) programme for use from USN aircraft carriers. Under a contract awarded in 2007, the company designed, produced and is currently flight testing two X-47B aircraft.

The X-47B first flew in 2011 and can fly at 40,000ft at high subsonic speeds. It has two internal weapons bays for a combined total of 2,000kgs of precision guided weapons. The C version of the X-47 is planned to be slightly larger and with nearly twice the weapons capacity load as the B version. All going to plan the X-47C should be the production version.

The two X-47B demonstrators built so far were planned to have a three-year test programme with 50 flight tests, culminating in sea trials in 2013. However, the aircraft performed so consistently that the preliminary tests stopped after 16 flights. Apart from carrier launches and recoveries, in-flight refuelling with a probe and drogue is also being tested.

The X-47B has a maximum unrefueled range of over 2,100 nautical miles (3,900 km), and an endurance of more than six hours. In November 2011, the USN announced that aerial refuelling equipment and software would be added to one of the prototype aircraft in 2014 for testing.

In 2012, Northrop Grumman tested a wearable



The Laser Weapon System (LaWS) temporarily installed aboard the guided-missile destroyer USS DEWEY (DDG 105) in San Diego. (USN)

The first X-47B catapult take off from the USS GEORGE H. BUSH. (USN)



remote control system, designed to allow ground crews to steer the X-47B while on the carrier deck. In May 2012, one of the test aircraft began high-intensity electromagnetic interference testing at Patuxent River, to test its compatibility with planned electronic warfare systems. In June 2012, the second test aircraft arrived at Patuxent River to begin a series of tests, including arrested landings and catapult launches, to validate the ability of the aircraft to conduct precision approaches to an aircraft carrier. The drone's first land-based catapult launch was conducted successfully on 29 November 2012.

On 26 November 2012, the X-47B began its carrier-based evaluation aboard the USS HARRY S. TRUMAN (CVN-75) at Naval Station Norfolk, Virginia. On 18 December 2012, the X-47B completed its first at-sea test phase. The system was remarked to have performed "outstandingly", having proved that it was compatible with the flight deck, hangar bays, and communication systems of an aircraft carrier. With deck testing completed, the X-47B demonstrator returned to NAS Patuxent River for

further tests. On May 4, 2013, the demonstrator successfully performed an arrested landing on a simulated carrier deck at NAS Patuxent River. Since then, as mentioned, it has been launched from an aircraft carrier at sea and conducted touch and goes on its deck.

While impressive in its own right, the thing that is most transformational about the X-47B is that it is more of a system than an aircraft. In traditional UCAV models each aircraft has a pilot sitting in some sort of control centre flying the aircraft. In the X-47's case the flying is done more by the aircraft itself than a pilot with the aircraft essentially given a mission to fly, and told when to do it. Numerous X-47's can also be used together as cooperative swarms and are merely told the target and sent on their own way to attack it. The system decides which UCAV attacks it based on all the variables such as location, weapon type, defences etc.

The effect of stealthy autonomous swarms of aircraft to a potential enemy could be devastating.

THE GOD'S EYE

The last of the historic moments for the future of naval war occurred on 22 May with the first flight of the Triton UAV, the USN's newest unmanned Intelligence, Surveillance and Reconnaissance (ISR) aircraft platform.

During the 80-minute flight in restricted airspace, the MQ-4C Triton UAV, controlled by ground-based Navy and Northrop Grumman personnel, reached 20,000 feet.

The MQ-4C Triton provides a fleet with a game-changing persistent maritime and littoral ISR data collection and dissemination capability. In fact, one could describe the Triton UAV as a low earth orbit satellite. One that can be re-tasked very easily reconfigured for

The X-47B on an aircraft lift at sea on a Nimitz class aircraft carrier being readied for further testing. Note the small size of the UCAV with the wings folded. This means many more can be onboard compared to manned aircraft. (USN)



the mission, i.e. surface surveillance and targeting to airborne early warning and anti-aircraft through systems such as CEC (Cooperative Engagement Capability).

The Triton will fly missions for at least 24 hours at altitudes greater than 50,000ft, allowing the system to monitor 2,000 nautical miles of ocean and littoral areas at a time. Navies have not had this sort of persistent surveillance capability since the airship was taken out of service.

The USN plans to base the MQ-4C Triton UAVs at five locations around the globe. Triton operators will disseminate data in real-time to fleet units to support surface warfare, intelligence operations, strike warfare and search and rescue.

CONCLUSION

These three events are remarkable given the current US Military budget, and will prove to be the future of naval warfare. The RAN should take

note. While the Triton is planned for RAAF use, other technologies such as the laser and X-47 UCAV are not.

Lasers will more easily find their way into the future fleet of ships, if Navy planners take into account the massive electrical requirements of the laser weapons. Spare generation capacity needs to be built in at the design stage. Navy's SEA 5000 future frigate is a perfect contender to be designed with this sort of weapon in mind for future use. Dare I say it is a case of having the ship fitted for but not with.

The UCAV however, is probably a bit too left field for Navy and ergo the ADF. While an LHD could be modified to use it the cost could be better spent on another purpose built ship for UCAVs to provide that organic air support so obviously missing from the ADF's capability.

A sobering question that needs to be answered is what happens if the bad guys get these sorts of technologies and field them? Which is not outside the realm of highly possible given the recent spate of computer hacking by a large state actor to our North. ■

Triton returning from her first test flight. (USN)



FROM OUR READERS



Dear Editor,

In your last fine issue of THE NAVY of Apr-Jun 2013 appears the second place Navy League 2012 essay competition covering 24 Sentai and the merchant raiders AIKOKU and HOKOKA MARU.

Readers may be interested to know of the remarkable battle between these two heavily-armed raiders and the Dutch tanker *Ondino* escorted by the corvette HMIS BENGAL (built here – a 12-pdr gun main armament).

The *Ondino* with a motley gun crew manning her 4-inch gun was credited with scoring several hits on the HOKOU MARU which blew up and sank (the BENGAL claimed it was her gunnery).

This was a remarkable engagement which earned AB Hammond, the gun captain, a DSM – richly deserved.

The *Ondino* was not badly hit (Captain killed) but received two torpedo hits. But the crew returned onboard and got the tanker back to Fremantle.

The full story is told on pages 193 to 197 of G. Herman Crill's "Royal Australian Navy 1942 – 1945" and I am sure would be of great interest to readers.

RADM Andrew Robertson AO, DSC, RAN (Rtd)
Sydney NSW

On 3 May the Federal Government released its Defence White Paper.

It is pleasing to note that in place of Asia or Asia Pacific the phrase Indo-Pacific is now being used. For too long discussion restricted our perspective to the Pacific and to that part of Asia touching that ocean. Australia is very definitely a two ocean nation and it is right that in discussing strategic issues we have an Indo-Pacific perspective.

The 2013 White Paper follows the 2009 version in proclaiming a maritime strategy. The Paper sets out Task One of the ADF's Principal Tasks and Australia's Military Strategy as being -

- Deter and defeat attacks on Australia
- Maritime Strategy
- Supporting Domestic Security, Emergency Response and Peacetime National Tasks

Many of the tasks listed under Tasks Two, Three and Four also involve or require a maritime element.

Under the heading Naval Forces the White Paper states that -

"Regional maritime security and unfettered access to key shipping routes are vital to Australia's trade interests."

"The delivery of future submarines and major surface combatants is an undertaking of significant strategic importance."

The League welcomes, as it did with the 2009 White Paper, the emphasis on maritime strategy. However, it is interesting to compare what the two White Papers set out as proposals for the Navy.

In 2009 the White Paper proposed three air warfare destroyers (AWD) with the possibility of a fourth; eight new larger frigates; twenty 2,000 tonne offshore combatant vessels, much larger and more capable than the vessels they will replace and importantly with the potential to embark helicopters or

UAVs; two new Landing Helicopter Dock amphibious ships, a large strategic sealift ship and six new heavy landing craft.

The 2013 White Paper programme is similar, but not the same. There are significant omissions or postponements.

Under the heading surface combatant there is no mention of a fourth AWD. In place of eight new frigates appears the statement - "Defence will continue to investigate options for Australia's future frigate to inform Government consideration in coming years". Sir Humphrey Appleby would have been proud to have written that sentence.

The frigates - number now unspecified - have not been rejected, but pushed out to some indeterminate time.

The 20 offshore combatant vessels of the 2009 Paper are not mentioned. Instead, under the heading Offshore Patrol Vessels, appears the statement "a modular multirole vessel remains a possible longer term capability outcome". Sir Humphrey again.

In the meantime the Government "will seek" to replace the current Armadale class patrol boats with a proven vessel to ensure that Defence can continue to provide a patrol capability. It is notable that the Paper uses the phrase "will seek". Nothing as definite as "will replace".

The major amphibious ship proposals of the 2009 Paper are confirmed. Indeed they are well on the way to being delivered. NUSHIP CANBERRA is being completed at Williamstown. The construction of the NUSHIP ADELAIDE is well under way in Spain.

The requirement for a large strategic sealift ship has been met with the acquisition of the former RFA LARGS BAY, now HMAS CHOULES.

The progress made with the amphibious ships is pleasing. But even in this area the 2013 White Paper has an omission. The six new heavy landing craft with improved ocean going capabilities of the 2009 Paper are simply

The Armadale class patrol boats have been worn out on asylum seeker duties and need replacing. The White Paper spoke about an off the shelf/proven design. Seen here is one of the most likely options, the Austal Cape class offshore patrol vessel, currently used by Australia's customs service. (Austal)



not mentioned. They seem to have disappeared without, in this instance, Sir Humphrey having anything to say.

The 2013 White Paper confirms that the Government is considering the options for the replacement of the replenishment ships HMAS SUCCESS and HMAS SIRIUS.

The Government remains committed to replacing the six Collins class with an expanded fleet of 12 conventional submarines. They are to be assembled in South Australia.

The Government has also taken the decision to suspend further investigation of off-the-shelf designs. Work will now focus on an evolved Collins or a new – presumably Australian – design. Meantime it has been determined that the life of the Collins class can be extended by seven years. This will mean that HMAS COLLINS, the first of the class, can run to 2031.

As is well known, the Navy League has for several years argued the case for nuclear propulsion. It is the view of the League that nuclear submarines offer, among other advantages, high speed, great endurance at high speed and longer time on patrol.

The White Paper response to the League and others who have argued for nuclear propulsion is contained in a sentence. “The Government has ruled out consideration of a nuclear powered submarine capability to replace the Collins class fleet”

The League nonetheless remains of the view that nuclear propulsion ought be considered.

The Federal General Election is set for 14 September. If the opinion polls are right there will be a change of Government. In that event it seems almost certain that in a year or so we will be discussing the 2014 White Paper. ■



A Collins class submarine on the surface. The project to replace the six Collins class with 12 new submarines will essentially be a developmental project based on incremental improvements and lessons learned from the current batch of submarines. (RAN)

AUSTRALIA'S NAVAL DEVELOPMENT

By VADM Ray Griggs, AO, CSC, RAN

The following is a speech by the Chief of Navy VADM Ray Griggs, AO, CSC, RAN, to the Australian Strategic Policy Institute – Lockheed Martin *White Ensign Dinner* during May 2013 and provides a very frank assessment on a number of topical issues facing Navy.



Chief of Navy Vice Admiral Ray Griggs AO, CSC, RAN. (Defence)



Dr David Stevens at the inaugural 'maritime school of strategic thought' seminar at the Sea Power Centre in Canberra. (Defence)

I am told the purpose of this speech is to describe Australia's naval development. This is a nice broad topic which means that I can pretty well talk about anything I want, which I will. As I approach the two year mark, I want to reflect a little on what the Navy has achieved over that period because collectively I think we have achieved a fair bit and, mercifully, you are not hearing quite as much about us in the same way that you were 18 months ago!

In terms of structuring this talk, I want to focus on the strategic drum I have been beating regarding the need for a maritime school of thought to underpin and support our maritime strategy. I would then like to highlight a couple of key issues which we have been dealing with.

At a national level, I have, over the last eight months or so, sought to draw clear links between the Navy and its role in the joint force and the Nation's security and prosperity. There is no more important issue of relevance for the Navy – it is our fundamental reason for being.

For too long, so much of Australian strategic thought has been almost exclusively locked in a rather binary discussion around the physical defence of the Australian continent or expeditionary warfare somewhere else in the world. These fundamentally land-centric approaches in my view lack relevance to our contemporary strategic circumstances and, as a result, increase strategic risk to Australia, because they fail to include in their calculus, Australia's critical

dependence on the sea for our security, prosperity and way of life.

Put simply, Australia's ability to have free access to the global maritime trading system is, in my view, our strategic economic centre of gravity. We may be able to dig up and extract, or raise and harvest, all manner of high quality resources; we may be able to produce exceptional components for globally distributed manufacturing processes; but if we cannot routinely, safely and predictably deliver them to market, then our prosperity is threatened.

And if we do not have access to the resources and manufactures we import, then our economy will be equally diminished. As an example, our dependence on petroleum imports and the consequences of disruption to its supply are not well understood for a subject so crucial to our economic health. I think we could say the same for the role trans-oceanic fibre-optic cables play in the operation of the internet on which we all depend.

Maintaining the global maritime trading system is of course not something we can do on our own; and when I say on our own, I mean as a Navy, an ADF or as a nation. It requires collaboration and cooperation across all maritime focused nations. It requires trust and transparency which of course are underpinned by confidence building in our key relationships built up over time.

This is why we actively engage in our region and beyond, a point made

clearly in the Defence White Paper released in May. Navies are good at this type of engagement; it is core business for us.

So I think we need to more fully develop a Maritime School of Strategic Thought; one which generates an understanding of the true extent and nature of Australia's national interests; one that acknowledges that they do not simply stop at our coastline or offshore facilities or end at the limits of our Exclusive Economic Zone. Our national interests reach out into the world's trading routes well beyond our immediate vicinity. That is one of the reasons we have HMAS NEWCASTLE enroute to the Middle East to participate in maritime security operations – the Navy's 55th individual ship deployment to the area since 1990 – because the safety of maritime trade through that region is crucial to Australia as well as to so many of our key trading partners and allies.

A Maritime School of Strategic Thought relevant to us needs to be Australian in nature. For so many people, their view of the maritime environment is defined by our close association with the UK or the US, the two dominant maritime forces of the last 200 years. We in the ADF have consistently not grappled with the issue of scale very well, either in articulating our force structure needs or in explaining to the public why our force structure looks like it does, is in the numbers it is and what limits this finite resource actually has. So scale needs to be put into perspective and we need to focus on those things that will make the most impact and carry the greatest strategic weight.

I think the 2013 Defence White Paper has picked up on and strongly

Naval Symposium (IONS) and I am looking forward to becoming the Chair of IONS early next year and taking its development forward. But beyond IONS there is little in place. We will continue to champion the development of the maritime school of thought so that we can deepen the intellectual underpinning for the evolution of the maritime strategy.

As I have said on numerous occasions, a maritime strategy is not about the Navy, it is inherently joint in a military sense and it is more broadly about having an integrated approach to the use of all elements of national power to ensure Australia's security and prosperity.

Turning to the Navy itself, there have been three key areas of focus for us over the last couple of years. These are, delivering on our capability contract with Government, being ready for the future capabilities coming on line and continuing with reform and cultural change. They have consumed, as you would expect, much of our organisational energy.

Ship availability was a key issue when I took over the job and it has occupied an immense amount of my time in the role. Of course the reason why it has is the fact that it is a Key Performance Indicator for Government.

There is no doubt that given the small numbers in some of our fleet sizes, Navy's task in reliably meeting our readiness requirements is a complex one. We have had some ups and downs since late 2011 but overwhelmingly we are headed in the right direction.

In Northern Australia our patrol boats have had a tough time doing a

HMAS NEWCASTLE leaving Sydney Harbour enroute to the Middle East to participate in maritime security operations – the Navy's 55th individual ship deployment to the area since 1990. (Defence)



states a number of the themes that I have been talking about. It provides a comprehensive coverage of the inherently maritime nature of our strategic circumstances.

Indeed the White Paper explores the powerful notion of the Indo-Pacific building on the discussion in the Asian Century White Paper and the National Security Strategy. It is an important construct when looking at our interests through the maritime lens.

A critical part of the answer to me in all of this is the need for maritime security architectures. In the Pacific we are reasonably well served through a range of formal and informal arrangements.

In the Indian Ocean however, a key strategic waterway for our continued prosperity, we are operating in what is essentially in a bit of a vacuum. The region has no formal security architecture and in my view sorely needs to have one. In a naval sense we are making small steps thanks to an Indian Navy initiative, the Indian Ocean

difficult job extremely well, but, they are more maintenance intensive than we would like. This is something we have been trying to fix through the Armidale Class Patrol Boat (ACPB) Remediation Program over the last 12 months and we have made progress on a number of key issues, but we still have more work to do. The only way forward is to keep the Team Armidale concept working and attack the issues jointly in conjunction with the Defence Material Organisation (DMO), Defence Maritime Systems (DMS) and other key industry stakeholders.

They are good boats and importantly though, through all of the challenges of the ACPB availability issue, we have carefully managed it so that it has not had an adverse impact on the operational effect required in OPERATION RESOLUTE.

Of course it is our people that make the key difference in this Operation; they have continued to make a significant difference under intense public scrutiny and we should all be very proud of them.

Turning to the topic of the moment, this year we have had three submarines running pretty much all year, including periods of all three at sea concurrently. Our Material Ready Day (MRD) achievement is up 40% compared to last financial year. This is important in the context of the Coles Review and for the additional training throughput it allows. This helps to ensure the long term sustainability of the fourth submarine crew and how it positions us to start to think about building to the fifth.

Available boat numbers will however fluctuate for a few years as we clear the remaining legacy issues in the rest of the fleet. Next year, for example, we will see a reduction from this year's achievement. It is critical to understand that this planned reduction, let me emphasise the word planned, is not misinterpreted. Our aim point in implementing the Coles Review recommendations is to reach a steady state in 2016/17. We now have achievable targets that will be met over the period through a clear and deliberate plan – a plan that all involved in must deliver on both individually and collectively as a submarine enterprise.

There continues to be much written about our submarines, much of it valid, but when people start passing judgment on the military utility of the boats I do tend to bristle. The simple fact with submarines is when it comes to their employment, if you are not intimately involved in their operations there is always going to be an unavoidable 'you don't know what you don't know factor.' I don't mean that in any disparaging way; I personally have learnt more in the last 3-4 years about submarines than in my entire career and I am still learning.

It is of course easy pickings to beat up on the Collins Class but

HMAS ANZAC and the Indian navy frigate INS TABR conducting a joint exercise in the Indian Ocean. The Indian Ocean is a key waterway to Australia's survival. (RAN)



perhaps, just every now and then, we should reflect on the significance in national terms of what was achieved in our very first submarine construction outing. We didn't wade in at the shallow end of the pool; we jumped in to the deep end to build the largest and most complex conventional boat in the world at that time.

Of course mistakes were made in an undertaking of this complexity, but they were not mistakes made by our tradesmen; there were poor equipment decisions, short-sighted logistic support concepts and a fundamental failure to implement adequate sustainment arrangements from the outset.

In the final analysis, however, these have left us with reliability not capability issues – an important distinction if you are trying to be rational in this debate.

These reliability issues are fixable and are being fixed, I know that fixing

them is crucial to the future submarine discussion and subsequent Government decision making about that project. Indeed, it is crucial to the future of the submarine service itself, we are all seized by that!

The key in the future submarine discussion is to ensure that we demonstrate we have learnt the lessons from this experience – the taxpayers rightly expect it. What I have learnt from visiting submarine building nations such as Spain, Sweden, the UK, South Korea and Japan is the way they have learnt from their experiences and that is through the importance they attach to incremental development of proven designs.

As I have said publically in the past, we have been operating some of the largest conventional submarines available for the last 50 years for very good reasons.

Those reasons are shaped by our strategic geography and the way we need to employ the submarine capability – neither of which has changed.

Before getting away from submarines I again want to publically applaud the men and women of the submarine force for the way they go about their business. It is not easy to be associated with a capability that is the subject of such incessantly negative and often ill-informed comment. I firmly believe we have turned a corner with nearly all the key indicators showing improvement over the last 12 months. The future will not be free of setbacks, let's be realistic, but we are on the up and to a large extent this is overwhelmingly due to the professionalism of the people involved and the additional investment that has been made.

So next time you line up to bag Collins spare a thought for all the men and women in the Navy, the DMO and in industry who are working incredibly hard to ensure this vital capability is as good as it is – and

Three Collins class submarines at sea together recently. (From bottom to top) HMA Submarines WALLER, DECHAINEUX and SHEEAN. (Defence)



as a number of people who are sitting here tonight who have hunted Collins submarines can tell you, it is good.

There are other parts of the Navy that are working incredibly hard as well; after all this period is one that I characterise as rebuilding the Navy. I think when the history of these years is written, what we did with the Rizzo and Coles Reviews will loom large. Implementation of the Rizzo review is effectively about Navy; rebuilding not only its engineering capacity but rebuilding what was a broken maintenance and sustainment system. The scale of what we are doing in Rizzo is still something that many people don't understand.

I believe we have returned technical integrity to its rightful place in the forefront of our thinking and more importantly to our daily actions and decision making. We are making much better risk based decisions, we are re-skilling our technical sailors.



NUSHIP CANBERRA, seen here fitting out at Williamstown dockyard in Melbourne, is an imposing sight across the local skyline. (Defence)

We have put sustainment and maintenance before operations; the Armidale remediation plan, which resulted in over 330 additional days assigned to maintenance, is the clearest example of that.

We have many more frequent discussions about design and operating intent; we hold ourselves and those that provide a service to us to account when that is required. Importantly, we are steadily regaining the 'fight to fix' outlook that I think we lost sight of at the height of the sustainment commercialisation phase.

At the heart of this rebuild is the phased implementation of the Seaworthiness Management System. Last week we had our first Seaworthiness Convocation where members of the Seaworthiness Board and the key Seaworthiness practitioners in Navy and the DMO gathered to talk through the operation of the Seaworthiness System. The Airworthiness System has had these convocations for a number of years and I felt this needed to be a natural extension of our system. Seaworthiness Management is still a nascent system but we have been able to leverage off the considerable experience our people have in airworthiness management; importantly it is gaining real traction across Navy and the DMO.

Turning briefly to new capability, I am sure many of you would now have seen LHD CANBERRA and the massively imposing sight it cuts across the Williamstown skyline. I am looking forward to seeing the ship at sea late this year for sea trials and getting our hands on it up in Sydney early next year for some extensive operational test and evaluation. It truly is a magnificent capability.

Equally important for all of us in the ADF is the developing joint amphibious architecture. Our concepts are maturing, our joint Command and Control (C2) construct is developing, particularly the reorientation of the Deployable Joint Force Headquarters in Brisbane around this capability.

We have completed our first phase of moving members of the Fleet Battle Staff from Sydney to Brisbane. This is something Navy resisted for far too long; my own view is that without the commitment to co-locate key elements of the battle staff we would not make the joint C2 construct we need a reality.

The level of collaborative effort across the ADF on the development of the amphibious capability is terrific, particularly how Army have embraced the opportunities that it presents. I think it augurs well but we should not doubt the complexity of the challenge we face.

We need to carefully manage expectations about what can be done and when. If we don't view this as a totally new capability and work at understanding what we can do with it, we will never exploit its full potential. To this end the US Navy and Marine Corps, the Spanish Armada and the Royal Navy and Royal Marines have provided us with first class assistance.

In other projects, we now have 49 aviators in the US under training in

A USN SH-60R (Romeo) landing aboard HMAS SYDNEY recently as part of her workups to join a USN Carrier Battle Group. The Romeo is "one hell of a combat aircraft". (RAN).



Florida, preparing for the arrival of our first Seahawk Romeo helicopters early next year. I was fortunate enough to fly in a United States Navy Romeo recently and I must say we have ourselves one hell of a combat aircraft. Our numbers in the US will build to around 112 next year to complete the training and gain experience with the aircraft before returning to Australia in 2015 as the new 725 Squadron.

We continue to make ground in the cultural change arena. The New Generation Navy (NGN) is entering its 5th year. Rightly or wrongly NGN had become almost exclusively associated with unacceptable behaviour. That was a critical early focus, but NGN was always about much more than that.

In February I launched the new strategy with three key areas of focus to encompass all the key aspects of our culture: firstly warfighting and seaworthiness culture (the connection between the two is of course fundamental and is intended to help people understand that interdependence); second is the culture of improvement and accountability that we need to have and thirdly what I would call the original NGN focus, the people centered, values based leadership that we need – remains a critical part of the program.

We are executing Defence's Pathway to Change program by leveraging off NGN's strong acceptance in Navy and delivering Pathway through NGN; the two are inextricably linked and mutually reinforcing programs.

In that vein I have recently appointed Strategic Indigenous and Strategic Islamic Advisers, to complement the Navy Strategic Women's Adviser, to give me a more complete view on key diversity issues and opportunities. These two new advisers are primarily to help me better understand some of the cultural issues that impact Navy's relationship with these important communities and of course to assist in ensuring that Navy genuinely has a culture that is inclusive and attractive to potential indigenous and Muslim recruits.

We of course still have some significant people challenges in Navy. The war for talent continues to rage and too many of our talented people leave before we would like them to, the training and experiences we provide them make them very attractive targets.

We can never compete in monetary terms, which is why things like our culture and the sense of belonging to a contemporary, purposeful and inclusive organisation are so important. Ultimately our cultural change program is as much about sustaining and enhancing our capability, as much as any equipment purchase is, and it deserves similar attention.

I remain very proud of what our people achieve on a daily basis, whether that is protecting our borders, contributing to a free and open maritime trading system, providing humanitarian assistance, honing their war fighting skills or operating ashore in Australia, Afghanistan, the UAE, Bahrain, the US, the UK, the Sinai or South Sudan, they are all collectively working hard on your behalf to ensure that we remain ready to execute Navy's mission - to fight and win at sea. ■

THE RAN'S 725 SQUADRON SEAHAWK 'ROMEO'

The RAN will begin taking delivery of the 24 Sikorsky MH-60R Seahawk 'Romeo' naval combat helicopters this year, replacing the current combat helicopter, the Seahawk S-70B-2 that has been in service since the early 1990s. The Romeo is a proven multi-mission platform already operating with the USN and, importantly, will bring a dipping sonar and air-to-surface missile capability back into the Fleet Air Arm (FAA).

In June 2011 the Minister for Defence announced that the Sikorsky SH-60R Seahawk Romeo had been successful in the bid to supply the RAN with new combat helicopters, under project AIR 9000 Phase 8. \$3billion is being spent on acquiring 24 USN configuration SH-60R Romeo helicopters under a FMS (Foreign Military Sales) agreement including spares, simulators weapons as well as new facilities at NAS Nowra.

For the introduction into service of the Romeo the RAN has already deployed a number of people to the US to train with the USN on the helicopter. The RAN's 725 Squadron will also re-commission as the new Seahawk combat helicopter unit for the RAN.

THE ROMEO

The MH-60R Seahawk is a twin-engine medium lift utility helicopter configured for ASW (Anti-Submarine Warfare) operations. It is equipped

with a single four-bladed rotor and a single four-bladed tail rotor. The basic crew compliment for the RAN MH-60R is three; pilot, co-pilot/tactical operator, and a tactical/acoustic sensor operator. The MH-60R can also accommodate four additional passengers if required.

The MH-60R was designed to encompass all the mission responsibilities and system capabilities of both the USN SH-60B and SH-60F Seahawk helicopters. As such its responsibilities include ASW, Anti-Surface Warfare (ASuW), Anti-Ship Surveillance and Targeting (ASST), VRETREP (vertical replenishment), communications relay, CSAR (Combat Search And Rescue), and SOFS (special operations forces support.)

Externally, the MH-60R is very similar in appearance to the SH-60B. The Seahawk "Romeo" is equipped with a reward sliding and lockable door on the right side of the cargo compartment with an externally

A Sikorsky Seahawk Romeo. The RAN will take delivery of the first of 24 new Seahawk Romeo this year. (USN)



mounted 600-pound rescue hoist located above this door. As with the earlier Seahawks, the Romeo is equipped with a centrally mounted external cargo hook rated to 6,000 pounds. External weapons and auxiliary systems are mounted on a two pairs of weapon pylons mounted aft of the cargo/crew compartment.

The MH-60R utilises the same shortened and reinforced landing gear arrangement as the SH-60B and RAN S70-B2. In addition, like the SH-60B, the Romeo is RAST (Recovery, Assist, Secure, and Traversing) equipped, which enables the Seahawk to be recovered in sea state 5 (33 kt. winds, 13' swells, 6 degrees of pitch, 15 degrees of roll)



A Seahawk Romeo landing aboard a USN aircraft carrier armed with door mounted .50-calibre machine gun. The Seahawk Romeo is now the standard USN ASW aircraft to deploy on their aircraft carriers, replacing the Seahawk Foxtrot. (USN)

conditions. The Romeo is capable of in-flight refuelling in the hover, and for shipboard storage the Seahawk features an automated main rotor blade folding system and manually folding tailplane.

The MH-60R carries 25 sonobuoys which are ejected pneumatically from the left hand side of the helicopter.

The Romeo is equipped with a 360-degree surface search radar located in an enclosed fairing underneath the nose of the aircraft, between the front wheels.

A key difference between the RAN's existing Seahawks and the Romeo is the "glass cockpit" design. This system replaces most of the analog aircraft instruments with four active matrix liquid crystal colour displays and dual programmable operator keysets. The cockpit is also fully integrated with the aircraft's other weapon and self defence systems and sensors. In addition, the cockpit is fully Night Vision Goggle compatible, which will enable the aircrew to effectively operate the helicopter in low visibility conditions.

POWERPLANT

The MH-60R is equipped with two navalised General Electric T700-GE-401C variants rated to 1,800 shp. Internal fuel capacity totals 590 gallons (2,200 litres), and the helicopter can be equipped with two pylon mounted auxiliary tanks rated to 120 gallons (450 litres) each.

FLIGHT CHARACTERISTICS

The empty weight of the MH-60R is 13,648 pounds (which is approx 2,000 pounds heavier than the current RAN Seahawk), while the mission take off weight is 22,420 pounds (ASW), 21,650 pounds

(ASuW) and the maximum take off weight is 23,500 pounds.

The maximum level speed of the MH-60R is 136 knots (154 miles per hour) while the dash speed is 145 knots (164 miles per hour.)

ELECTRONICS

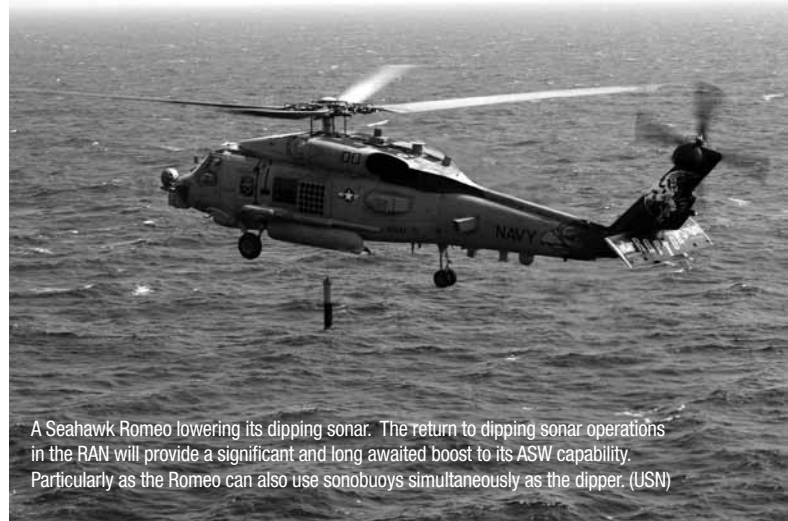
The main difference between the RAN's existing Seahawks and the Romeo is the electronics fit providing greater situational awareness for the crew.

The MH-60R is equipped with VHF-FM, UHF-FM, VHF-AM/FM, and SATCOM radios, as well as encrypted IFF recognition system and the LN-100G GPS/INS navigation system.

For ASW/ASuW operations, the MH-60R is equipped with an AN/APS-153(V) multimode surface search radar, mounted in an enclosed "button" fairing under the nose, which has 360 degrees of coverage. The radar is quite advanced and fully integrated into the cockpit and tactical systems. Radar operators can classify detected moving ship targets under night and restricted visibility using the radar's high resolution Inverse Synthetic Aperture Radar (ISAR) mode. This mode allows the MH-60R to operate outside of visual and lethal range of potential enemy anti-aircraft systems.

The modes the radar can operate in include:

- Long and Short Range Search,
- Inverse Synthetic Aperture Radar (ISAR) Imaging,
- Small Target/Periscope Detection,
- Short Range Search and Rescue,



A Seahawk Romeo lowering its dipping sonar. The return to dipping sonar operations in the RAN will provide a significant and long awaited boost to its ASW capability. Particularly as the Romeo can also use sonobuoys simultaneously as the dipper. (USN)

- Navigation, and
- Identification Friend or Foe (IFF) Interrogator.

Most importantly, the Romeo is equipped with the AN/AQS-22 airborne low frequency dipping sonar linked to an AN/UYS-2A Enhanced Modular Signal Processor for processing acoustical data from the sonar and sonobuoys. This return to a dipping sonar is very important for the RAN's ASW capability. It is said a diesel electric submarine that has been found by a dipping sonar equipped helicopter has no escape.

The AN/AQS-22 is the only in-service dipping sonar with multifrequency operation enabling it to adapt its performance to varying environmental conditions. With a rapid search rate, the AN/AQS-22 identifies and neutralises threats sooner, enabling it to cover a larger area. The AN/AQS-22 also permits a longer detection range

over a wider area, reducing the number of helicopters required to perform active ASW screening.

The sonar itself has hydrophones with a frequency range from 1.2 to 5.6 khz, it weighs 43 kg and is attached to a 775-metre long cable. The entire system weighs 260 kg and can also cooperate with sonobouys.

For visual target acquisition and tracking, the MH-60R is equipped with an AN/AAS-44 Infrared Laser Designation/Ranging/Tracking ball pod that is used for targeting the AGM-114M Hellfire missile.

For self defence the Romeo is equipped with an AN/ALQ-210 Electronic



A USN Seahawk Romeo at sea armed with eight Hellfire M air-surface missiles. (USN)

Support Measures (ESM) system to provide 360 degree electronic radar warning and an AN/ALQ-144 infrared countermeasures system in addition to the already fitted AN/ALE-39 chaff/flare dispenser.

The AN/ALQ-144 consists of a heated Silicon Carbide block that radiates a large amount of infra-red energy, it is surrounded by a large cylindrical mechanical shutter, that modulates the infra-red output, producing a pulsing pattern. Early IR guided missiles used a rotating reticle in their seeker heads to see the target's heat signature, however, when a target was not on the seeker's centerline it would detect the pulse of the ALQ-144 as the reticle swept over the target. When the target was on the seeker's centerline, the sensor would produce a signal to the operator stating it was OK to fire. This signal was required by the early missiles to produce a "lock on" that would allow a launch.

The ALQ-144 produces a pattern of pulses that is approximately synchronized with the rotation rate of these reticles. Before launch this would prevent the missile actually locking onto the target, preventing the operator from firing the missile. After launch this would cause the missile to think that the target was off to one side, and cause the missile to steer away from the aircraft carrying the ALQ-144.

The introduction of rosette and "staring" scanning techniques in second generation IR missiles did reduce the effectiveness of the ALQ-144 however, recent upgrades have restored the effectiveness of the jammers.

The ALQ-144's distinctive appearance has earned it the nicknames "disco light" or "disco ball".

The MH-60R is equipped with four external hardpoints for eight AGM-114M Hellfire missiles and two Mk-54 ASW torpedoes. The aircraft can employ a door mounted 7.62mm or .50 calibre machine gun.

The AGM-114 Hellfire is an air-to-surface missile (ASM) developed primarily for anti-armor use. It does however, have multi-mission, multi-target precision-strike capabilities via a number of new variants. The Hellfire missile is the primary 100lb-class air-to-ground precision weapon for the US armed forces and many other nations and is considered a proven tactical missile system, as it has been used in combat since the mid-1980s. The M version being used by the RAN's Romeos has a 9kg blast fragmentation/incendiary warhead instead of the anti-tank variety. It has a range of 8kms and uses a semi-active laser homing seeker, requiring the helicopter to constantly 'laze' the target to achieve accuracy.

Regrettably, the Hellfire M cannot be considered a true anti-ship weapon as its range and warhead are both inadequate for the task. However, this is where the parent ship's Harpoon missiles would come into play via the Romeo's excellent ability to provide over the horizon targeting data

The Mk-54 ASW torpedo used by the Seahawk Romeo was co-developed by US company Raytheon and the USN under the USN's Lightweight Hybrid Torpedo programme in response to perceived problems with the extant Mk-50 and Mk-46 torpedoes (the latter being used by the RAN on its current Seahawks and AP-3C Orion ASW aircraft).

The Mk-50, having been developed to counter very high performance nuclear submarines such as the Soviet Alfa class, was seen as too expensive to use against relatively slow conventional submarines.

The older Mk-46, designed for open-ocean use, performed poorly in the littoral/shallow water areas, where the USN envisioned itself likely to operate in the future.

Thus the Mk-54 was created for better performance in shallow water by combining the homing and warhead portions of the Mk-50, the proven propulsion unit of the Mk-46 and with some additional commercial off-the-shelf (COTS) technology to further reduce costs.

The Mk-54 will enter ADF use through the Seahawk Romeo project and later the RAAF's new P-8 maritime patrol aircraft, replacing the AP-3C Orion. There are currently no plans to fit it to the surface fleet in place of the recently acquired MU-90, nor reciprocal plans to fit the MU-90 to the Romeo or P-8 aircraft

USERS

Currently the USN, RAN and the Danish Navy are users of the Seahawk Romeo with at least three other countries currently assessing it against their requirements.

Through the RAN's FMS arrangement with the USN its Romeos will be on the same update and refresh path as the USN's aircraft. This will see them remain at the forefront of ASW technology (assuming the USN doesn't suffer a decline in its efforts towards ASW). It may also mean systems such as the radar could be upgraded at a later date with LPI (Low Probability of Intercept) technology, enabling the Romeo to use its radar without it being detected by ships, submarines or other aircraft.

ARMAMENT

725 SQUADRON RE-COMMISSIONING FOR

ROMEO(*)

The Romeos will be based at HMAS ALBATROSS, the Naval Air Station (NAS) in Nowra, and will embark for operations in the Anzac class frigates (FFH), and new Hobart class destroyers (DDG). The first two helicopters will arrive in December 2013.

The Romeos will be operated by 725 Squadron, which is due to re-commission in early 2015. The squadron first formed in the RAN more than 50 years ago, and has a history in the Royal Navy stretching back to 27 August 1943. Originally formed as a fleet requirements unit, 725 Squadron's aircraft and operations varied considerably before moving to Cornwall to become an air target-towing unit in August 1945. The squadron was disbanded in December that year.

The Squadron re-commissioned at NAS Nowra as a RAN fleet requirements and communications unit on 13 January 1958. Under the command of Lieutenant Commander John Brown, RAN, the Squadron flew a variety of aircraft including the Douglas C-47A Dakota, Auster J5-G Autocar, Hawker Sea Fury Mark IIs, Fairey Firefly AS-5s and Fairey Gannet AS1s. De Havilland Sea Venom FAW Mk 53s were acquired later. In May 1959, the Squadron's role altered to ASW training.

The Squadron suffered its only fatality on 28 December 1959 when Sub Lieutenant Leon Mauritz's Gannet aircraft crashed while attempting to land at NAS Nowra. The Gannet's unusual twin-engine configuration, driving two counter-rotating propellers located one behind the other, enabled the Gannet to fly with only one engine engaged in order to conserve fuel and extend endurance, however, both engines had to be engaged when taking-off or landing. Mauritz was attempting a single-engine landing with tragic consequences.

Part of 725 Squadron's responsibilities included providing air interception practice for seamen officers undertaking warfare training at HMAS WATSON. The Squadron also assigned air assets to ships working up at sea off nearby Jervis Bay. This role included tasks such as radar and communications calibration exercises through to mock attacks with multiple aircraft. Early in 1958, the squadron's Sea Venoms also began towing targets for air-to-air live firing practice together with the Sea Furies and Fireflies. The Sea Venoms could tow a target at speeds of up to 250 knots (over 460 kph) whereas the Sea Furies and Fireflies could only manage 140 knots (about 260 kph).

The Squadron de-commissioned on 31 May 1961 and was absorbed into 724 Squadron. However, it recommissioned the following year, when the RAN began acquiring its first ASW combat helicopters, the Westland Wessex 31A. Eventually 10 Wessex helicopters equipped 725 Squadron, and it used these to deliver ASW training and support to 817 Squadron, the FAA's front-line Wessex operator. On 10 February 1964 at 2056 hours, the aircraft carrier HMAS MELBOURNE collided with the destroyer HMAS VOYAGER in one of the most tragic accidents in Australian naval history. The disaster resulted in the loss of 82 lives, all from VOYAGER. 725 Squadron participated in search and rescue efforts in the aftermath of the collision. Later the Squadron embarked in the former aircraft carrier HMAS SYDNEY throughout the 1960s, providing rotary wing anti-submarine support during her many troop transport voyages to Vietnam, a responsibility it shared with 817 Squadron. In its ASW role, the Wessex was equipped with dipping sonar and an offensive armament of torpedoes and depth charges. In the operational area, the normal routine was to have one Wessex



Two Seahawk Romeo passing the Arleigh Burke Flight IIA class destroyer USS STERETT. The Romeo will provide the USN, and ergo the RAN, with a much improved at sea maritime combat helicopter capability. (USN)

screening the ship, while another was fully armed and prepared on deck. Shortly afterwards, the RAN's FAA squadrons adopted US Navy prefixes and 725 Squadron became HT725 Squadron indicating that it was classed as a rotary-wing training unit.

The FAA became embroiled in industrial unrest in July 1974 when the Storeman and Packers Union blackbanned the RAN resulting in fuel shortages and flying restrictions. This became an increasingly serious and even life-threatening issue the following month, when heavy rain and flooding inundated the Nowra area. All the FAA's resources, including 725 Squadron, were called upon for disaster relief operations. The fuel shortage, however, rapidly increased concerns about how long intensive rescue efforts could be continued. Eventually commonsense prevailed and the Union delivered the necessary supplies, allowing personnel from NAS Nowra to rescue some 352 people. On 27 December 1975, 725 Squadron de-commissioned following a very successful history of both training and operations.

The re-commissioning of 725 Squadron will see the return of a squadron with a proud tradition of training RAN aircrew. The Squadron will thereafter play an important part in implementing the roll out of the new Seahawk Romeo helicopters which will in turn dramatically expand the RAN's embarked aviation capability. ■

(*) RAN Seapower Centre Semaphore: By Petar Djokovic December 2012



01 ARK ROYAL LEAVES UK FOR LAST TIME

The Invincible class aircraft carrier, ARK ROYAL, which was formally decommissioned in 2011, has left the UK for the last time and taken to Turkey where it will be dismantled by ship recycling firm Lysal for scrap.

People lined the harbour walls at Portsmouth Harbour in the UK to catch a final glimpse of the warship as it left its home.

In a gesture of final respects a flotilla of small boats sailed with ARK ROYAL as it was pulled by tug boats from the harbour. The tugs sounded their horns which echoed off the harbour walls as the crowds, some waving flags, stood in silence as the huge ship sailed past for the last time.

The 22,000 tonne carrier was sold as part of a £2.9 million deal following the crippling 2010 Strategic Defence Review which led to the ship facing the axe five years early and the Harrier GR-9 fleet being sold for spares to the USMC.

The decision to scrap the Harrier GR-9 and ARK ROYAL has left the UK without a fully-functioning fixed wing aircraft carrier capability for nearly 10 years until the next generation of carriers, the Queens, come into service.

ARK ROYAL was named and launched by the Queen Mother in 1981 and commissioned in 1985. Her decommissioning ceremony was held in March 2011 which paid tribute to her 26 years of active service with the RN.

Alternative plans to save ARK ROYAL from the breaker's yard included turning it into a diving wreck, a floating casino off Hong Kong, a heliport for London and a nightclub and school in China. All were rejected by the

UK Ministry of Defence as "not feasible or appropriate".

02 INDIAN NAVY COMMISSIONS FIRST MIG-29 SQUADRON

The Indian Navy (IN) has inducted its first squadron of 16 MiG-29K ('Fulcrum D') carrier-based fighter aircraft on 11 May, 2013, which coincided with the 60th anniversary of the formation of India's Fleet Air Arm.

Inaugurating the 303 Black Panthers squadron at Indian Naval Air Station (INS) Hansa in Goa, Defence Minister AK Antony said the government would extend its "full support to brave the challenges the IN faces as it was vital in protecting India's security and economic interests".

The fighters, including four twin-seat MiG-29KUB trainers, will begin operating off VIKRAMADITYA (ex- ADMIRAL GORSHKOV) once the refurbished Kiev-class carrier is delivered, hopefully by the end of 2013.

A further 29 MiG-29K/KUBs ordered in 2010 for US\$1.2 billion will enter service by 2015-16 to operate off the 40,000-tonne Indigenous Aircraft Carrier-1 (IAC-1) which is under construction at Cochin Shipyard in southern India.

IAC-1, expected to be named VIKRANT, will be launched on 12 August. The programme is over two years late following delays in acquiring gear boxes and generators. It is expected to be commissioned by 2017-18, around five years behind schedule.

UK NAO REPORT HIGHLIGHTS FLAWED CARRIER DECISION-MAKING

The UK government's decision in 2010 to switch the UK's future carrier strike capability

from the short takeoff and vertical landing (STOVL) variant of the Lockheed Martin F-35 Lightning II Joint Strike Fighter (JSF) over to the carrier variant (CV) aircraft "was based on immature data and a number of flawed assumptions", according to a UK National Audit Office (NAO) report.

It ultimately cost the taxpayer GBP74 million (AS\$113 million) in written-off costs as the decision was reversed less than two years later, the report, released on 10 May, has concluded.

The 2012 Reversion Decision explored the financial and operational consequences of reversing the decision to switch from the STOVL F-35B to the CV F-35C, in terms of the aircraft, and fitting at least one of the two Queen Elizabeth (QE) - class aircraft carriers with the required catapults and arrestor gear.

In examining the government's May 2012 decision to reverse its earlier plan to go with the F-35C, the NAO looked at three key issues: How the UK Ministry of Defence (MoD) worked to understand the implications of the October 2010 decision to procure the F-35C - the Conversion Development Phase; the robustness and completeness of the information given to decision-makers; and the risks to achieving the benefits anticipated by reverting to the STOVL F-35B.

The NAO report criticised the Conversion Development Phase for not involving commercial and industrial partners in the process as, had it done so, it would have known that the F-35C-based carrier strike capability could not be delivered until 2023 at the earliest (three years later than with the F-35B), and that, contrary to expectations, there would be limitations placed on the UK's future interoperability with its allies.

01 The Invincible class aircraft carrier, ARK ROYAL leaving Portsmouth Harbour for the last time. (UK MoD)





In addition to this, the MoD's own cost estimates of equipping the QE carrier with the required equipment, such as the Electromagnetic Aircraft Launch System (EMALS), had soared from GBP800 million in late 2010 to GBP2 billion in early 2012.

When examining the second issue, the NAO found that, although the MoD's understanding of the differences between the F-35B and F-35C-based carrier strike options was greater in May 2012 than it had been in October 2010, there were still a number of uncertainties resulting from the earlier termination of STOVL carrier studies. The report also revealed that the MoD's estimate on the STOVL carrier option being GBP1.2 billion cheaper than the CV variant (inclusive of aircraft and ships) would shrink to GBP600 million over 30 years due to the higher procurement and operating costs of the F-35B.

Regarding the risks of the switch, although the NAO makes no judgment call on the operational merits of the F-35B and F-35C - a matter for the military - it does note that, as well as allowing for an earlier reinstatement of the UK's carrier strike capability, the decision to revert back to the STOVL F-35B provides the option for the Royal Navy to field the second of its two QE-class carriers, rather than the one that would have been possible with the F-35C. A decision on this is expected in the Strategic Defence and Security Review (SDSR) in 2015.

RAN LHD TRAINING FACILITY OPENED

In anticipation of the arrival of the RAN's new Canberra class LHDs, the Minister for Defence Materiel Dr Mike Kelly on 24 April opened the LHD ship training facility at Mascot in New South Wales.

Over the next two-and-a-half years the new facility will provide training to Australian Defence Force (ADF) personnel in the safe operation and maintenance of the LHD ships. The facility has the potential for follow-on training and through life support training and to manage and conduct other future training for the ADF.

This facility will train over 700 ADF personnel to safely operate and maintain the LHDs in anticipation of acceptance by Navy of Australia's first LHD NUSHIP CANBERRA in early 2014 and the acceptance of NUSHIP ADELAIDE the following year.

FIRST AIR WARFARE DESTROYER MAST DELIVERED

The 22 metre-high mast for the first of the RAN's Air Warfare Destroyers (AWDs) was delivered to the Air Warfare Destroyer Alliance facility in Adelaide during early April. The five-storey high mast was delivered by barge from local company, MG Engineering.

The mast is one of the most defining features of the destroyers and will house significant elements of the Aegis weapon system, including the navigation radar and the SPQ-9B horizon-search radar.

The equipment incorporated into the mast structure will enable the destroyers to search and track targets immediately above the sea surface, such as low-flying aircraft, unmanned aerial vehicles and missiles.

The first mast was transported by barge down the Port River in a horizontal position and then unloaded in a logistical effort taking about three hours.

Further work will now be carried out on the mast by the AWD Alliance at the Common User Facility adjacent to the ASC shipyard,

prior to being consolidated onto the first destroyer.

The AWD Alliance, made up of the Defence Materiel Organisation (DMO), lead shipbuilder ASC and mission systems integrator Raytheon Australia, is responsible for delivering the ships to the RAN.

Building the AWDs involves the construction of 90 separate steel blocks - 30 for each ship - as well as three additional sonar blocks.

US CONGRESS REJECTS SURPLUS USN FRIGATES FOR TURKEY

A congressional procedural hitch has prevented the sale of surplus USN FFGs to Turkey.

US Officials said Congress failed to approve a Turkish request for two USN frigates in 2012. They said legislation introduced in and passed by the House did not reach the Senate amid a heavy domestic schedule.

The Greek lobby in Congress has opposed the frigate deal with Turkey but it is unknown if this has influenced events. It cited that Ankara has warned of deploying its Navy to stop energy projects by Israel and the Republic of Cyprus.

"There wasn't enough time for the Senate to approve the bill before the end of the legislative term," an official said.

Under the bill, the Turkish Navy would have received two surplus guided missile frigates for free. The vessels were identified as USS HALYBURTON and USS THACH, retired from USN service.

The surplus navy legislation bill was introduced by Rep. Ileana Ros-Lehtinen, chairwoman of the House Middle East and North Africa subcommittee on Dec. 11,



2012. Twenty days later, the House approved the bill, four days before the end of the congressional term on Jan. 3, 2013.

Officials said the administration of President Barack Obama has urged Congress to approve the frigates for Turkey. They said the legislation would again be introduced in the House sometime this year.

03 RUSSIA TO HIDE SUBMARINES' NAME

The Russian Navy has announced that it will reintroduce Soviet practice and make it more complicated to identify its submarines sailing on the surface.

Since the end of the Cold War the practice of placing huge and highly visible markings at the front on the submarines' towers has been "making it too easy to figure out which of them is sailing or not" so believes the High Command of the Russian Navy. Now, an order has been given to paint over the emblems and numbers on the submarine hulls.

"The main task of a submarine sailing on combat duty is to remain unnoticed from the enemies' anti-submarine forces and the identification signs are too visible," said a navy source speaking to a Russian newspaper

All Russian submarines have different a coat of arms with the name on the sign in front of the tower easily showing which submarine it is. Removing the emblems is the same practice that the Soviet navy used for their submarines in the Cold War area in the 80s.

In fact, rather than being out of touch with the rest of the world, most submarines follow the practice of having no distinguishing markings between boats.

SAN TO RETURN TO DURBAN'S SALISBURY ISLAND

In April the South African Navy (SAN) announced that the Salisbury Island naval base in Durban harbour is to be re-opened, 12 years after it was closed in a massive downscaling of the SAN owing to government cost-cutting.

The move has come about by a startling admission by the navy that it is unable to protect the coastline or patrol international waters because of problems in the dockyard in Simon's Town

At a media briefing in Simons Town during April, chief of the navy, Vice-Admiral Refiloe Mudimu, said the Durban base was urgently needed to fight piracy along the east coast of Africa.

Navy ships taking part in anti-piracy operations in the Mozambique Channel and up the east coast needed a base from which to operate.

Asked when the base would be ready, Mudimu said it was needed "yesterday" but did not put an actual date on its completion.

Admiral Kasaval Naidoo, who is spearheading the process, said pirate activity meant resources had to be moved around.

"We were forced into a situation where we had to down- scale. The situation hasn't changed but the threats have changed and we need to upscale to a base so we can increase our presence," he said.

Mudimu said the base would have a maritime squadron.

More than likely three vessels would be based at Salisbury Island, each with 48 members.

Salisbury Island currently falls under the

Department of Public Works with the army occupying much of the old navy accommodation.

During the media briefing Chief Director Maritime Strategy Hanno Teuteberg was asked about the current state of the SAN and said:

"One of the SAN's four frigates was operational. The SAS AMATOLA was in operation but the other three SAS SPIOENKOP, ISANDLWANA and MENDI were undergoing maintenance.

"Out of eight patrol ships only three were available. The SAS GALESHWE, UMDLOTI and UMZIMKULU were operational but the other five were being refitted or maintenance was being done.

"Out of four submarines, only one was operational. The SAS CHARLOTTE MAXEKE was available but work was being done on the other three.

04 RAN SUPER SEASPRITES FOR RNZN

On 18 April US Helicopter company Kaman Corp. announced that the New Zealand Cabinet had authorised the New Zealand Ministry of Defence (MoD) to enter into an approximately US\$120 million contract with Kaman Aerospace Corporation for the purchase of ten SH-2G(I) Super Seasprite aircraft, spare parts, a full mission flight simulator, and related logistics support. The aircraft are the returned helicopters from the RAN's SEA 1411 Super Seasprite project. Under the terms of the termination contract Kaman took the Super Seasprites back to the US for on sale to another country, with Australia receiving a commission on the sale. The I designation in SH-2G(I) stands

03 A Russian Oscar class SSGN on the surface with a prominent crest/emblem on the sail identifying her. (RAF)





for International version.

The aircraft are expected to be delivered over an approximately three year period with revenue recognition beginning in FY13/14.

Neal J. Keating, Chairman of the Board, President and Chief Executive Officer of Kaman said, "We are very pleased to have reached this milestone with the Government of New Zealand. Kaman has had a longstanding relationship with the New Zealand Defence Force based on the success they have experienced flying the Kaman Super Seasprite since 2001. This success led to their interest in our SH-2G(I), the latest variant of the aircraft and one of the most technologically advanced helicopters in the world today. We expect to transition the aircraft into their fleet over the next three years and to continue to support them for many years to come. This contract represents an important step forward for Kaman and we welcome the opportunity to continue supporting the operational needs of the New Zealand Defence Force."

The SH-2G(I) Super Seasprite is an advanced integrated maritime weapon system. The SH-2G Super Seasprite is a proven day/night/all-weather multi-mission helicopter. Originally designed to meet the exacting requirements of the USN, the SH-2G Super Seasprite has the highest power-to-weight ratio of any maritime helicopter, assuring a safe return-to-ship capability even in single-engine flight conditions. Its robust design, outstanding stability, and excellent reliability have been proven through more than 1.5 million flight hours. The SH-2G is a fully integrated, multi-mission maritime weapon system designed to fulfil anti-submarine warfare (ASW), anti-surface warfare (ASuW), over the horizon

targeting, surveillance, troop transport, vertical replenishment, search and rescue, and utility missions. It is the largest, most powerful small ship helicopter in use today. In addition to the Royal New Zealand Navy, the SH-2G Super Seasprite is operated by the Egyptian Air Force and the Polish Navy.

FIRST BOEING P-8I MARITIME PATROL AIRCRAFT ARRIVES IN INDIA

The first Boeing P-8I long-range maritime reconnaissance and anti-submarine warfare aircraft for India arrived on 15 May, on schedule, at Indian Naval Station Rajali. The P-8I is one of eight aircraft Boeing is building for India as part of a contract awarded in 2009.

Based on the Boeing Next-Generation 737 commercial airplane, the P-8I is the Indian Navy variant of the P-8A Poseidon that Boeing is developing for the USN and RAAF. The P-8I incorporates not only Indian-unique design features, but also Indian-built subsystems that are tailored to the country's maritime patrol requirements.

05 NAMING CEREMONY FOR "U36"

One of the most modern non-nuclear submarines in the world was named during April at the shipyard of ThyssenKrupp Marine Systems GmbH, a company of ThyssenKrupp Industrial Solutions AG, in Germany, under the name of "U36". The naming marks another important milestone in the ongoing shipbuilding programme for the German Navy.

U36 is the second boat of the second batch of HDW 212A class submarines destined for operation in the German Navy. The German

town of Plauen has assumed sponsorship for U36.

The contract to deliver a second batch of two HDW 212A class submarines was signed on 22nd September 2006 in Koblenz with the German Office for Military Technology and Procurement/BWB (now the German Office for Equipment, Information Technology and Employment of the Bundeswehr/BAAINBW). The submarine building is taking place at the shipyards of ThyssenKrupp Marine Systems in Kiel and Emden Werft- und Dockbetriebe in Emden.

The two additional units will be largely identical to their sister ships from the first batch. They are equipped with the HDW air-independent fuel cell propulsion system which reportedly has already given excellent results in operations with the boats of the first batch.

The German Navy submarine U32 gave renewed proof of this in April 2013. On the way to participate in naval exercises in the USA the boat produced a new record for non-nuclear submarines with 18 days in submerged transit without snorkelling.

To meet changes in operational scenarios and to take constant technological advances into account, a number of modifications have been made in the second batch:

- Integration of a communications system for Network Centric Warfare
- Installation of an integrated Sonar and Command and Weapon Control System
- Installation of a superficial lateral antenna sonar
- Replacement of one periscope by a non-hull penetrating optronics mast
- Installation of a hoistable mast with

04

A Super Seasprite in RAN colours. The former RAN Super Seasprites, cancelled by the current Labor Government when it came to power, have been bought by New Zealand for a song. (RAN)

05

A Type 212A class submarine, U31, on the surface. (HDW)



towable antenna-bearing buoy to enable communication from the deep submerged submarine

- Integration of a lock system for Special Operation Forces, and
- Tropicalisation to enable world-wide operations.

06 C295 MPA LAUNCHES MARTE MISSILE

Airbus Military and MBDA have successfully demonstrated the release of an instrumented Marte MK2/S anti-ship inert missile installed under the wing of the C295 maritime patrol aircraft. This flight was the last of a series of trials performed in a joint Airbus Military – MBDA collaboration to validate the aerodynamic integration of Marte on C295, its handling qualities and performance tests.

The installation of weapons under the wings provides new operational capabilities to the C295 MPA allowing the aircraft to perform new missions demanded by customers. In the anti-submarine warfare (ASW) role, the C295 is already in-service carrying the MK-46 torpedo.

The Marte Mk2/S is already integrated on the AW-101 and the NFH (Naval NH90) helicopters in service with the Italian Navy and integration activities for the Marte ER on the Eurofighter Typhoon are currently underway.

The MBDA Marte MK2/S missile is a fire-and-forget, all-weather, medium-range sea-skimming anti-ship weapon system, equipped with inertial mid-course guidance and radar homing terminal guidance, and capable of destroying small vessels and heavily damaging major vessels. The missile

has a weight of 310kgs and is 3.85 m long.

07 USN AWARDS HIGH ALTITUDE ANTI-SUBMARINE WEAPON CONTRACT

Boeing has won a contract to supply precision wing kits to the USN for its Mk-54 ASW torpedos. The new technology allows an ASW aircraft to remain at high altitude to conserve fuel and potentially remain outside the range of mast mounted short range anti-aircraft missiles, and deliver torpedoes safely and accurately to the sea surface to allow the torpedo to attack a target submarine. Dropping from high altitude without a precision wing kit would see great inaccuracies and high terminal velocities that would destroy the torpedo on impact with the sea surface.

Through a recently awarded US\$19.2 million contract, Boeing will design and build the High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC). The system will leverage combat-proven technologies from Boeing's Joint Direct Attack Munition (JDAM) and Small Diameter Bomb (SDB) so it can be launched from high altitudes and far from targets.

"A new era in anti-submarine warfare is about to begin," said James Dodd, vice president of Boeing Weapons & Missile Systems. "The capability HAAWC gives USN sub-hunters is unparalleled compared with what is available today."

Adapting current JDAM and SDB technologies will also reduce development risk and cost for the Navy.

08 EIGHTH AND FINAL RN FRIGATE UPGRADED WITH SONAR 2087

Following an extensive refit, HMS PORTLAND has become the final Royal Navy Type 23 frigate to be fitted with Thales UK's Sonar 2087, a towed array sonar system that enables warships to hunt submarines at considerable distances and locate them beyond the range from which they can launch an attack. PORTLAND has now returned to service, with a re-dedication ceremony on 21 March.

The 12-month multi-million pound refit in Rosyth Royal Dockyard of PORTLAND's sensors, weapons and systems completes a successful joint program between industry and the UK's Ministry of Defence (MOD) to ensure the upgraded ships are now the most advanced of their kind in service.

The Royal Navy has described how the combination of a Type 23 frigate fitted with Thales's Sonar 2087 and a Merlin helicopter equipped with the Thales FLASH dipping sonar makes the class the "most potent anti-submarine warfare platform of any navy at sea today".

Eight of the Royal Navy's fleet of Type 23 frigates have now been upgraded for use as submarine hunters. The other seven upgraded ships are WESTMINSTER, NORTHUMBERLAND, RICHMOND, SOMERSET, SUTHERLAND, KENT and ST ALBANS.

Sonar 2087 is a low-frequency sonar with both active and passive sonar arrays. The system is manufactured at Thales sites in the UK (Cheadle Heath in Manchester and Templecombe in Somerset) and France (Brest).

06

An Airbus Military C295 with an inert Marte MK2/S anti-ship missile installed under the wing for testing. (Airbus Military)





BLUE ANGELS 2013 PERFORMANCES CUT

As a result of the US Government's Sequestration finance act the USN has cancelled the remaining 2013 performances of its Flight Demonstration Squadron, the Blue Angels.

The squadron will continue to train to maintain flying proficiency until further notice at its home station in Pensacola, Fla.

Recognizing budget realities, current US Defense policy states that outreach events can only be supported with local assets at no cost to the government.

This is one of many steps the Navy is taking to ensure resources are in place to support forces operating forward now and those training to relieve them.

The USN believes there is value in demonstrating the professionalism and capabilities of its Navy and Marine Corps Naval Aviation team, thus inspiring future generations of sailors and Marines. The USN said that it intends to continue aerial demonstrations in the future as the budget situation permits.

SLQ-32 UPGRADE

The USN has awarded Lockheed Martin a US\$57 million contract to upgrade the fleet's electronic warfare defences against anti-ship missile threats.

Under this low-rate production contract for Block 2 of the Navy's Surface Electronic Warfare Improvement Programme (SEWIP), Lockheed Martin will upgrade the AN/SLQ-32(V)2 system found on all US aircraft carriers, cruisers, destroyers and other warships with key capabilities to determine if the electronic sensors of potential foes are stalking the ship.

"The SEWIP Block 2 upgrade will ensure the AN/SLQ-32 system continues to outpace the threat and establishes a framework to easily install future upgrades," said Joe Ottaviano, SEWIP programme director for Lockheed Martin Mission Systems and Training. "The system is the first sensor to be fully compliant with the Navy's Product Line Architecture strategy, which facilitates the rapid introduction of new technology into the fleet. By using commercial-off-the-shelf components, we provide additional cost savings and ease of maintenance for sailors."

Block 2 is the latest in an evolutionary succession of improvement "blocks" the USN is pursuing for its shipboard electronic warfare system, which will incrementally add new defensive technologies and functional capabilities. The USN competitively awarded Lockheed Martin a contract in 2009 to develop SEWIP Block 2 and the company recently completed successful integration and test activities for two engineering development models.

Work on the SEWIP programme will be performed at the company's Syracuse, N.Y. facility, which houses a new electronic warfare system test facility.

In January 2012, Lockheed Martin teamed with Raytheon Company, the original developer of the AN/SLQ-32, to pursue the Navy's competitive SEWIP Block 3 programme, which will upgrade the system's electronic attack electronic warfare capabilities. The team demonstrated its potential Block 3 solution at last summer's multi-national Rim of the Pacific naval exercises. A formal Navy request for Block 3 proposals is anticipated later this year.

09 DDG-51 MULTIYEAR PROCUREMENT CONTRACT AWARDED

The USN has awarded two contracts for the DDG-51 class of destroyers for fiscal years (FY) 2013-2017 multiyear procurement (MYP).

General Dynamics Bath Iron Works (BIW) is being awarded a US\$2,843,385,450 fixed-price incentive firm target (FPIF) contract for the design and construction of four DDG-51 class ships, one in FY 2013 and one each in FY 2015-2017. This award also includes a contract option for a fifth ship.

Huntington Ingalls Industries (HII) is being awarded a \$3,331,476,001 fixed-price-incentive firm target (FPIF) contract for the design and construction of five DDG-51 class ships, one each in FY 2013-2017.

These multiyear procurement awards are for a total of nine ships, with an option for a tenth ship. The USN's objective is to procure the tenth ship as part of the planned FY 2013-2017 MYP. The Navy will work with Congress to resolve funding shortfalls resulting from sequestration reductions before contracting for the 10th ship.

"These contract awards represent great value to the taxpayer and will ensure our warfighters have the ships and systems they need to prevail in any situation," said Secretary of the US Navy Ray Mabus. "By leveraging competition in the DDG-51 class shipbuilding programme, these shipbuilders will continue their proud histories in delivering these highly capable ships to the fleet while meeting critical operational requirements for integrated air and missile defence capability."

A competitive allocation strategy used in the DDG-51 class shipbuilding programme

07

A mock-up of the Mk-54 ASW torpedo and the Boeing wing kit. (Boeing)

08

The Variable Depth Sonar 2087 fitted to HMS PORTLAND. (Thales)



since 1996, known as profit related to offers, or PRO, uses FPIF contracts to ensure reasonable prices while maintaining the industrial base. US Congressional approval for the use of MYP contracts facilitated program budget savings of more than US\$1.5 billion while enabling the shipbuilders and equipment manufacturers to more efficiently plan future workloads.

The destroyers are being procured in a Flight IIA configuration, relying on a stable and mature infrastructure while increasing the ship's air and missile defence capabilities through spiral upgrades to the weapons and sensor suites.

The USN plans to introduce the first DDG-51 Flight III on the second ship in FY 2016. Once Flight III requirements are approved, the new baseline will be implemented as an engineering change proposal. It is anticipated that the Flight III design will replace the Aegis AN/SPY-1D radar with the Air and Missile Defence Radar (AMDR) and provide for more electrical power and cooling capacity, providing the next generation of integrated air and missile defence and joint battle space awareness.

10 MINNESOTA DELIVERED ON BUDGET AND AHEAD OF SCHEDULE

US firm Huntington Ingalls Industries has announced that the company's Newport News Shipbuilding (NNS) division delivered the submarine MINNESOTA (SSN 783) to the U.S. Navy on 6 June 2013. The boat, the last of the Block II Virginia-class submarines, has been delivered nearly 11 months ahead of schedule.

Construction of MINNESOTA began in February 2008, with the keel authenticated

in May 2011. The 10th Virginia-class submarine, named to honour residents of Minnesota and their continued support of the U.S. military, was christened Oct. 27, 2012. MINNESOTA's commissioning date has been scheduled by the Secretary of the US Navy for Sept. 7.

"This is a success story of the teamwork between the crew and shipbuilder," said Cmdr. John Fancher, MINNESOTA's commanding officer. "The team reached the finish line together with quality craftsmanship by the shipbuilder, coupled with a crew that was given the opportunity to train as necessary to operate the submarine to its fullest extent during the combined trials. Words fail to fully describe how proud I am of the entire crew when I think of how far we have come since starting this journey over 30 months ago. They have achieved every goal that has been set in front of them and done it exceptionally well."

PASSING OF RADM DAVID GUY HOLTHOUSE AO RAN (RTD)

The Navy League of Australia regrets to inform its members of the passing of its Senior Vice President Rear Admiral David Guy Holthouse on Friday, 31 May 2013.

RADM Holthouse joined the RAN in January 1950 as a 13 year old Cadet Midshipman. A marine engineer, he completed much of his training in the United Kingdom in 1950s and 1960s, including training in nuclear reactor engineering with the UK Atomic Energy Authority. He saw sea service in HM Ships TRIUMPH, GLORY, RATTLESNAKE and EAGLE, in HM Submarine ANCHORITE, and in HMA SHIPS MELBOURNE, ANZAC (II), QUEENBOROUGH, SYDNEY (III), HOBART (II) and SUPPLY.

RADM Holthouse saw active service in Vietnam in 1968 during which his ship, HMAS HOBART was badly damaged by friendly fire and he was subsequently awarded a Naval Board Commendation for his service during this incident.

RADM Holthouse's key appointments included Naval Attaché Washington, Naval Adviser Ottawa, Commanding Officer of HMA Ships WARATAH and NIRIMBA, Director of Naval Officers' postings, and Fleet Marine Engineering Officer.

Promoted to Commodore in 1981 and to Rear Admiral in 1986, RADM Holthouse's Flag appointments included Chief of Naval Engineering, Chief of Naval Logistics and Chief Naval Engineer, Chief of Naval Personnel and Naval Support Commander.

RADM Holthouse was appointed an Officer in the Order of Australia in 1991 for service as the Assistant Chief of Naval Staff (Logistics) and he retired from fulltime Naval Service in 1993. ■

09

The USN Arleigh Burke Flight IIA class destroyer USS JASON DUNHAM (DDG-109). The USN has signed a fixed price contract for nine more DDG-51 Flight IIA class destroyers. (USN)

10

PCU MINNESOTA (SSN-783), the last of the Block II Virginia-class submarines, delivered on 6 June 2013, nearly 11 months ahead of schedule. (USN)



INSPIRING THE NEW BUILD OPTION FOR SEA-1000

By Usman Ansari

With variations of existing off the shelf designs now removed for the SEA-1000 programme, Usman Ansari examines how concepts currently available may still provide inspiration and a benchmark for the RAN's future submarine.

Incremental progress continues to be made on the SEA-1000 programme to replace the current Collins class submarines. However, with only two options remaining and the timeframe in which a decision must be taken narrowing, Australian designers may well draw inspiration from existing concepts, or new technologies or proposed design solutions aimed at overcoming issues such as the extended endurance required by Australian submarines, and/or the mission profiles they are expected to carry out.

Debate surrounding choices for the SEA-1000 submarines has touched upon whether the design will meet all requirements laid out for the new boats without need for compromise in some areas, and to what extent domestic industry will benefit. For example, the nuclear power option that would solve range, endurance, and transit time to area of operation concerns is still ruled out on political grounds, and concerns it would not provide work for domestic industry, (though a part-building nuclear submarines has been suggested). Considerable pain was endured to develop such industrial capacity and it is unrealistic to allow it to atrophy. Solving the problems of the Collins class submarines has resulted in not only a very skilled knowledge

base and quite accomplished design chain, but also some very capable subsystems that can be integrated into the new submarines. Integration of subsystems matured in a previous class of submarine has proved to be a very successful development model for the Japanese and has enabled the evolution of subsystems to maintain pace with the latest technology. The current Soryu class submarine is roughly in the displacement category of the SEA-1000 specifications, but once speculated design co-operation between Australia and Japan on a future design now seems to have been discounted. Nevertheless, the Japanese evolutionary approach to subsystem development and integration is something that would very much favour the 'Evolved Collins' option, and an evolution of the Collins design that would maximise the involvement of local industry is therefore a very real prospect. When taking defence cuts into consideration this also becomes perhaps the most likely option purely due to its expected greater affordability. It would also perhaps be easier for domestic industry to produce as they would be more familiar with many aspects of the design, which could perhaps more easily be adapted to meet any additional requirements than a new and/or foreign design. That



HMAS FARNCOMB alongside. The 2013 Defence White Paper has rejected existing off the shelf designs and will instead build on the knowledge already acquired from building the Collins class in Australia. (RAN)



A computer generated image of the German HDW Type-216 class SSK design. The 216 was designed by HDW with the RAN's SEA-1000 project in mind and is an open ocean long range submarine with Special Forces and cruise missile capability. (HDW)

Australia and Sweden signed an agreement in May covering Australia's ability to use Sweden's submarine and design intellectual property in connection with an evolved Collins option, could also mean this option is increasingly likely.

The Collins class submarines have however, suffered much negative press (not all of it deserved) due to a string of widely publicised problems. They have also been used as a political football in many cases by both principal political parties, through which much of the next generation submarine debate has arguably been framed. Despite the considerable capabilities of the Collins boats when fully operational, the desire to start afresh with totally new design, more able to take advantage of the latest developments in technology, may be more appealing. A greater

designers of a new submarine or at least be taken as a benchmark with which they could potentially be measured. One such design that was previously linked with the SEA-1000 programme is the HDW Type-216.

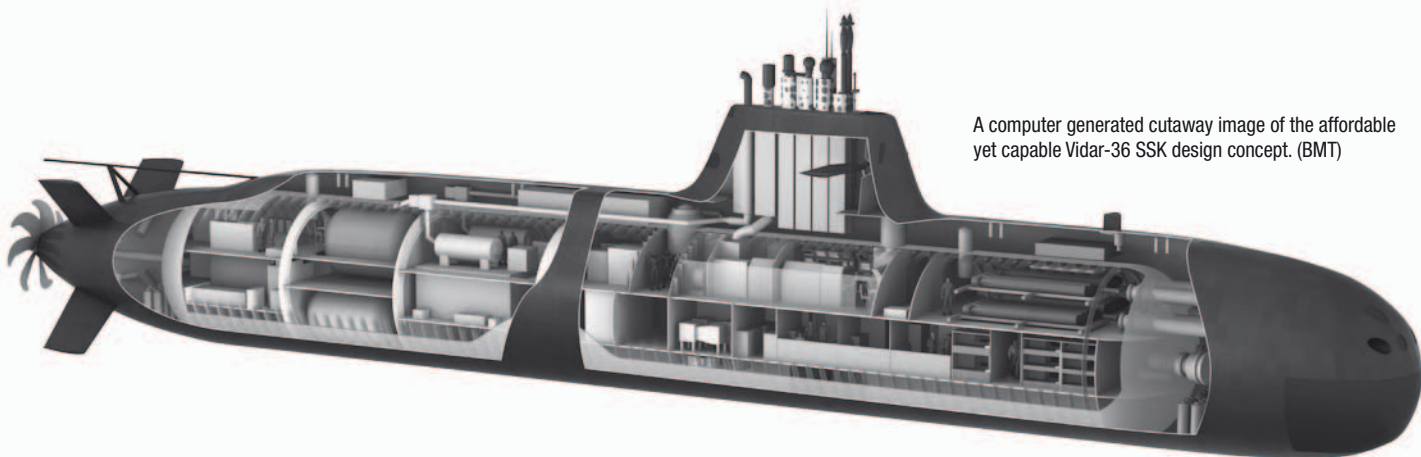
At present the Type-216 is little more than a paper design (albeit based on proven technology and experience with the successful Type-214). According to HDW, "The HDW class 216 Submarine is a long-range multi-mission two-deck fuel cell submarine with exceptional endurance. It features two pressure-tight compartments, high crew comfort levels and an extremely flexible payload for weapons and mission-orientated exchangeable equipment enhanced by the innovative Vertical Multi-Purpose Lock (VMPL)." As well as being aimed as an option for the SEA-1000 programme, the Type-216

an extra 21 mission dependant/related personnel to be embarked. Total endurance is claimed to be up to 80 days, with a range of at least 10,400 nautical miles at ten knots.

There is however, a difference between range and endurance, with the former a figure essentially measuring distance that can be travelled, and the latter really determining if the submarine has the capability to transit long distances to its patrol area and then have the ability to stay and carry out its mission.

Considerable automation allows a small crew on a very large boat by conventional submarine standards, but the greater room for stores and higher degree of crew comfort means they should still be capable of undertaking patrols at the claimed maximum endurance figure.

A high degree of modularity has also been factored into the design (including a modular multi-purpose mast) allowing it be optimised for specific missions. Some of these modular multi-purpose features are found inside the pressure hull such as a multi-purpose mission room that can be re-roled depending on the missions undertaken, and also under casing facilities, such as space for additional equipment needed for special operations. Furthermore swimmer delivery vehicles or unmanned underwater vehicles are also



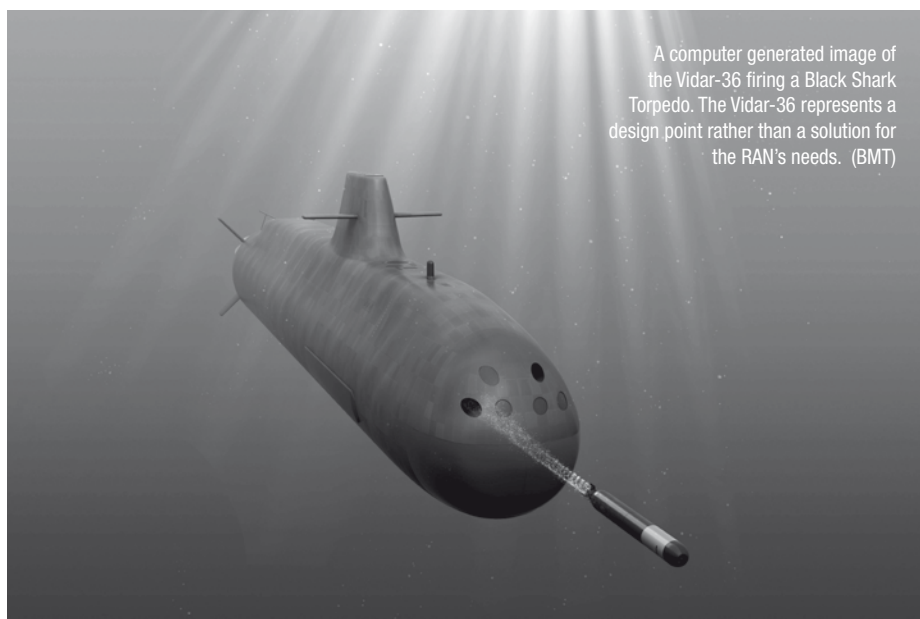
A computer generated cutaway image of the affordable yet capable Vidar-36 SSK design concept. (BMT)

element of future growth potential is perhaps especially important considering the boats are to serve into the 2070s. Arguments for a wholly new design therefore are equally valid, (albeit tempered by concerns the timeframe for commissioning the lead submarine of the new class could lead to a possible, if not likely, 'submarine gap'). Though options for an off the shelf design, and an off the shelf design with modifications to suit Australia's requirements, have now been discounted (leaving an evolution of the Collins submarine, and a wholly new design as those remaining), existing concepts may yet inspire the

was also promoted as potentially meeting the requirements of countries like Canada and India that may desire an ocean-going long range, long endurance SSK. From the available data, the Type-216 is a near 4,000 tonne (surfaced) double-hull submarine that is approximately 89metres long, with a pressure hull constructed of ferromagnetic steel. It is equipped with a proton exchange membrane (PEM) AIP system (as used or similar to that used on the Type-212A and Type-214 submarines) giving a claimed sustained underwater endurance of four weeks. It has a crew of 33, with space for

claimed to be able to be embarked. Some of these features have hitherto been found only on far larger nuclear attack submarines, some of which are converted ballistic missile boats. These features, combined with high discretion rates believed to be above the Type-214, therefore ensure that such a large submarine has an enhanced capability of successfully operating in a hostile environment, especially a littoral environment, where such an extensive capability to support special operations will be of considerable importance.

A flexible weapon load can also be carried.



A computer generated image of the Vidar-36 firing a Black Shark Torpedo. The Vidar-36 represents a design point rather than a solution for the RAN's needs. (BMT)

Six torpedo tubes are complemented by up to three multi-purpose vertical locks (which can be used to fire land attack cruise missiles), and a flexible weapon storage area with space for 18 further missiles or torpedoes. By all means therefore, even at a brief glance, the Type-216 is very capable. It closely suits Australia's requirements for a SEA-1000 submarine able to carry out ASW, ASuW, ISR tasks, extensively support special operations, and carry land attack cruise missiles.

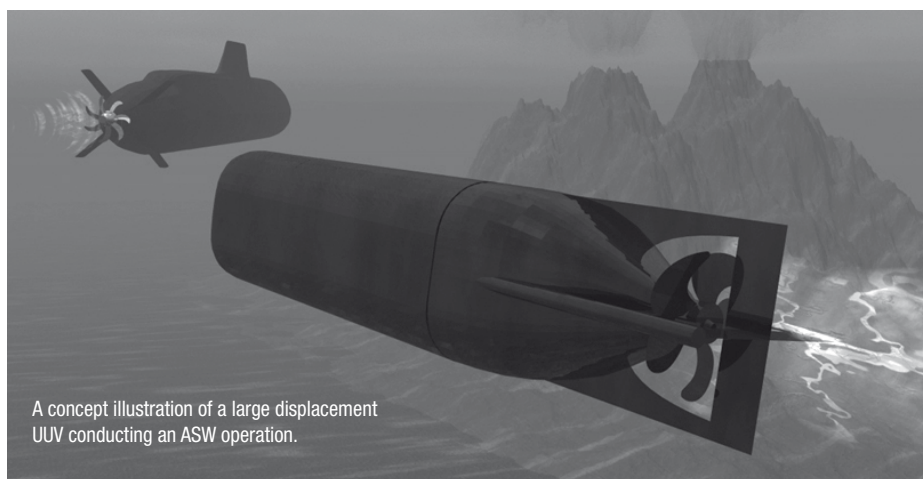
The Type-216 was pre-dated by a similar concept by BMT Defence Services, which unveiled its affordable but very capable Vidar-36 in 2008 as an example of a design that could prove to be a starting point for a solution to customers with requirements like Australia's or similar. According to BMT Defence's Senior Naval Engineer, Tim Hardy, the "Vidar-36 should be viewed as a design point rather than a design solution. We are smart enough to recognise that client needs vary and a single design solution is unlikely to help expose all the cost-capability trades of interest to them." Though it is not therefore offered as a off the shelf solution as such, and it is likely to be updated as technology and mission requirements evolve, it has characteristics that would be of interest to a SEA-1000 design team. It is claimed to have a four week underwater endurance, an extendable 9,000 nautical mile range, advanced sonar suite, highly modular design (including a reconfigurable weapons room capable for torpedoes and various types of missiles, plus a reconfigurable mast system able to be fitted with the latest net centric communications equipment perhaps eventually allowing for submerged communication if such advances in technology mature), the ability to launch

and recover unmanned underwater vehicles, and a dry deck to support special operations. Consequently, it is well suited to carry out a range of ISR, land attack, and special operations support tasks as well as the more generally envisaged ASuW role.

The Vidar-36 therefore naturally shares many of the characteristics of the Type-216, but differs primarily in being a single hull design (like the Collins), and has a liquid oxygen/reformed methanol fuel cell AIP module offered as an option (with other AIP technologies available per customer request) that can extend underwater endurance by two to three weeks, not as a standard feature. AIP systems have almost become a standard feature in contemporary conventional submarines due to the considerably increased underwater endurance and improved discretion rate they bring. However, alongside the rapid development of submarine and associated technology, the general increase in battery capabilities in particular is noteworthy, and with the increased investments being made in research and development, revolutionary

improvements are likely in the future. This is to such an extent that battery technology deemed advanced by contemporary standards could be dated and surpassed as early as the end of the decade. South Korea is investing in lithium ion batteries for submarine use, (initially in their Chang Bogo developments of the Type-209/1200 boats) in an effort to more than double the battery power and therefore endurance of its subs. Whether this delivers the desired results is yet uncertain as there have been notable problems with lithium ion batteries. However, some submarines currently relying on AIP systems for increased indiscretion rates may in future only require their batteries be replaced by more modern types to give comparable performance capabilities presently achieved through use of AIP. Added use of AIP systems will then give a very considerable increase in underwater endurance bringing conventional submarines a step closer to the performance of nuclear powered submarines, albeit still limited.

BMT Defence recognises an off the shelf solution may not fully meet any customer's requirements leading to requirements being traded or modifications made, and has striven to understand all options examined from every angle, or how the "most stretching requirements", could affect a design. An example of this is the possibility of exploring the use of manned and autonomous off-board systems. Studies by BMT Defence on potential configurations of submarine concepts to host these vehicles resulted in a surface optimised SSK, a sub-surface optimised SSK, and an SSN that were markedly different from the traditional submarine form and led to the introduction of the term Ship Submersible Host (SSH). This could be of considerable interest to the SEA-1000 programme as it would trade off the large size required for a high endurance submarine, with the need to carry out special operations, intelligence gathering, and reconnaissance operations. Smaller



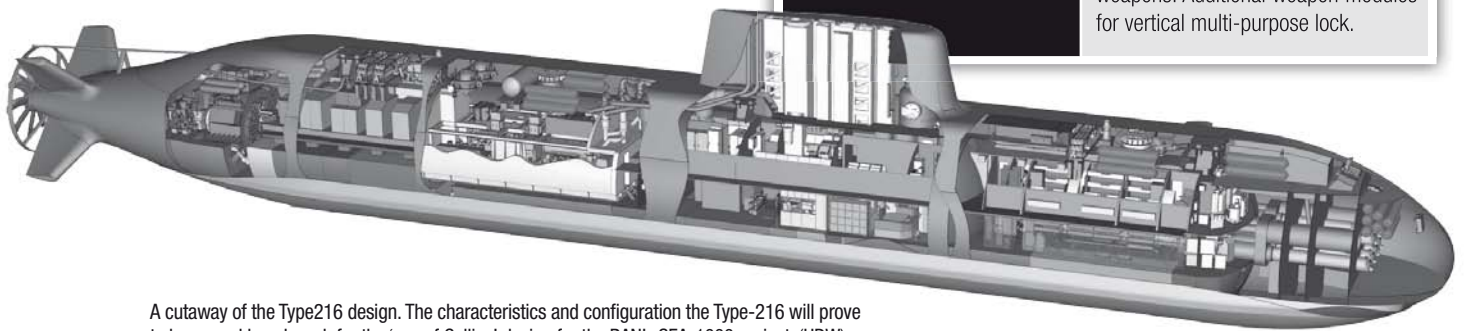
A concept illustration of a large displacement UUV conducting an ASW operation.

vehicles detached from the host submarine would offer considerably greater discretion ratios when operating in a littoral environment, or perhaps considerably increase the operational footprint of a single submarine. Unmanned underwater vehicles, based on existing torpedo designs, or similar, will likely form the first such generation of these types of UUVs, but larger more capable types able to be operated from a dedicated platform such as a SSH clearly have a bright future.

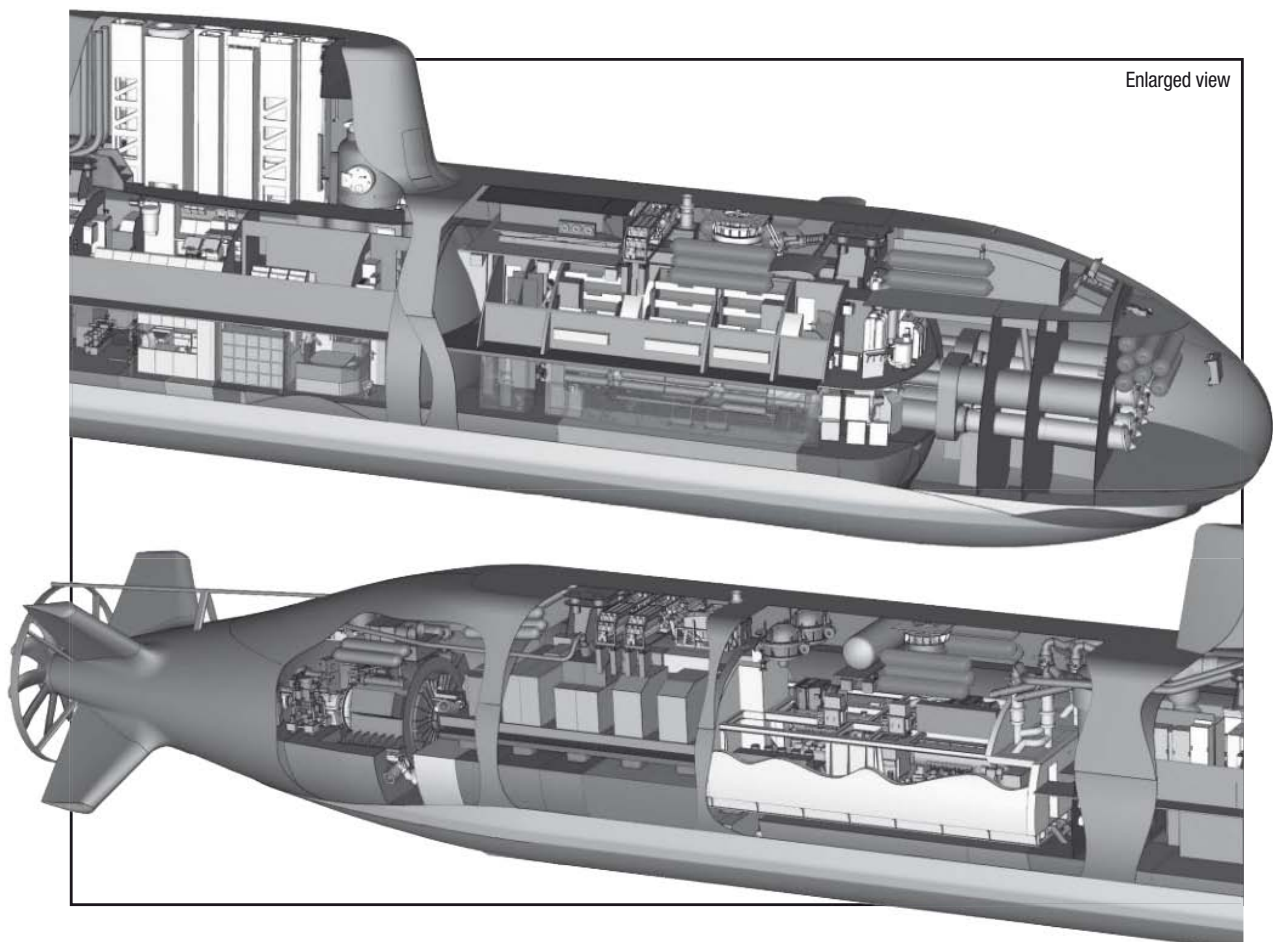
Even though the choice of direction for the SEA-1000 programme has been narrowed down to two options, it is still uncertain as to what form the Collins class replacement submarines will take. However, the advanced traditional, and the more radical concepts being proposed by companies such as BMT Defence and HDW could still influence the option for a new design. Whether this new design will be a radical departure from the traditional submarine form in appearance or capabilities though, may depend as much on technological developments as well as the required role and influence of the likely operational environment the new submarines are set to operate in as much as choices made by decision makers on whether taking such risks are acceptable. ■

TYPE 216 GENERAL DATA

Length o.a. approx:	89 m
Height incl. sail approx:	15 m
Pressure hull diameter approx:	8 m
Surface displacement approx:	4,000 t
Complement:	33 (+21)
Pressure hull:	Ferromagnetic steel
Weapon tubes:	6: Flexible storage area for 18 reserve weapons. Additional weapon modules for vertical multi-purpose lock.



A cutaway of the Type216 design. The characteristics and configuration the Type-216 will prove to be a good benchmark for the 'son of Collins' design for the RAN's SEA-1000 project. (HDW)





'ON LOAN'- AUSTRALIANS WITH THE ROYAL NAVY 1939 - 1941

By Greg Swinden

Greg Swinden examines the role Australians played in the early stages of World War II in the Royal Navy in this his third place entry for Navy League of Australia essay competition of 2012.

By the time the 2nd AIF fought its first battle, at the Libyan town of Bardia on 3-5 January 1941, the Royal Australian Navy had already been tested in battle several times in the Mediterranean; at the battles of Calabria (9 July 1940), Cape Spada (19 July 1940) and the Strait of Otranto (12 November 1940). There were also actions fought at Berbera in British Somaliland (August 1940) and Dakar in West Africa (23-25 September 1940). But even before these actions members of the RAN were fighting and dying in some of the earliest actions at sea of the war. For hundreds of Australia's naval officers and sailors the war was not fought in Australian ships. These Australians were the men 'on loan' to the Royal Navy and their war started on 3 September 1939 and did not end until the ink had dried on the Japanese surrender documents at Tokyo Bay some six years later.

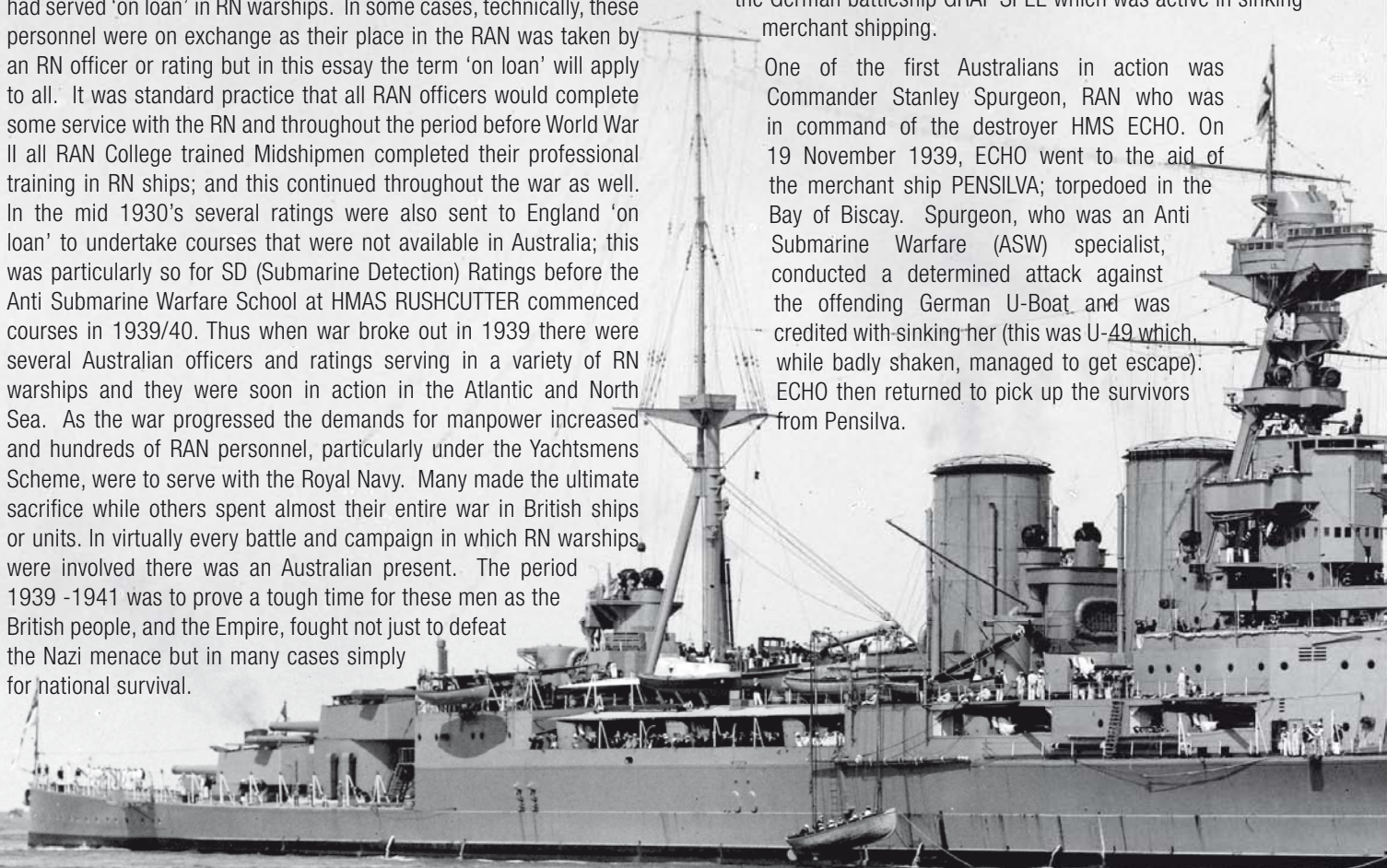
Since the creation of the RAN in 1911, Australian officers and ratings had served 'on loan' in RN warships. In some cases, technically, these personnel were on exchange as their place in the RAN was taken by an RN officer or rating but in this essay the term 'on loan' will apply to all. It was standard practice that all RAN officers would complete some service with the RN and throughout the period before World War II all RAN College trained Midshipmen completed their professional training in RN ships; and this continued throughout the war as well. In the mid 1930's several ratings were also sent to England 'on loan' to undertake courses that were not available in Australia; this was particularly so for SD (Submarine Detection) Ratings before the Anti Submarine Warfare School at HMAS RUSHCUTTER commenced courses in 1939/40. Thus when war broke out in 1939 there were several Australian officers and ratings serving in a variety of RN warships and they were soon in action in the Atlantic and North Sea. As the war progressed the demands for manpower increased and hundreds of RAN personnel, particularly under the Yachtsmens Scheme, were to serve with the Royal Navy. Many made the ultimate sacrifice while others spent almost their entire war in British ships or units. In virtually every battle and campaign in which RN warships were involved there was an Australian present. The period 1939 -1941 was to prove a tough time for these men as the British people, and the Empire, fought not just to defeat the Nazi menace but in many cases simply for national survival.

THE EARLY CAMPAIGNS (1939-40)

At the outbreak of war the ships of the Royal Navy quickly became embroiled in the Battle of the Atlantic against German U-Boats. The U-Boat campaign started on 3 September 1939 when the liner SS *ATHENIA* was sunk by U-30 in the Western Approaches to the English Channel. Within weeks the aircraft carrier HMS *COURAGEOUS* and the battleship HMS *ROYAL OAK* had also been sunk. Lieutenant Commander Frederick Cook, RAN was serving in *ROYAL OAK* when she was sunk and was one of 370 survivors from a crew of 1230 men.

Cook was then appointed as second in command of the cruiser HMS *CURLEW* and was soon on convoy escort duties in the North Sea. In the South Atlantic Captain George Moore, RAN was in command of the cruiser HMS *DAUNTLESS* conducting patrols and searching for the German battleship *GRAF SPEE* which was active in sinking merchant shipping.

One of the first Australians in action was Commander Stanley Spurgeon, RAN who was in command of the destroyer HMS *ECHO*. On 19 November 1939, *ECHO* went to the aid of the merchant ship *PENSILVA*; torpedoed in the Bay of Biscay. Spurgeon, who was an Anti Submarine Warfare (ASW) specialist, conducted a determined attack against the offending German U-Boat and was credited with sinking her (this was U-49 which, while badly shaken, managed to get escape). *ECHO* then returned to pick up the survivors from *Pensilva*.



For this action Spurgeon was awarded the Distinguished Service Order (DSO), gazetted on 23 December 1939, which became the first decoration awarded to an Australian during the war.

The Royal Navy was short of trained ASW qualified officers and ratings so an offer in late 1939 to loan 100 qualified personnel was quickly accepted and they were soon on their way to the Northern Hemisphere. By 1941, one in every ten ASW specialists in RN ships was an Australian.

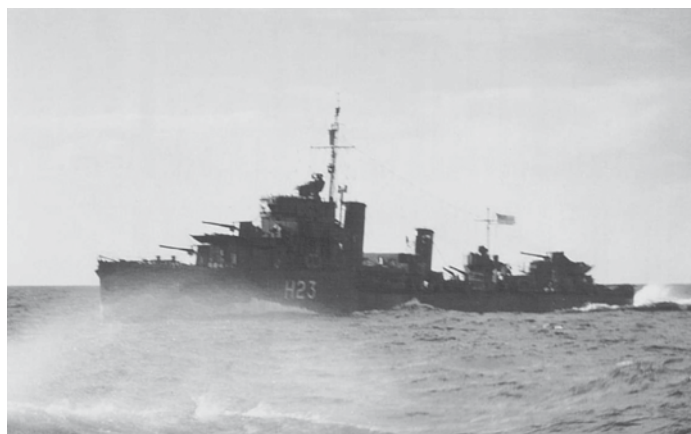
This period of the war is often called the 'Phoney War, due to a lack of fighting on land, but at sea the fighting only intensified. On 8 April 1940 the destroyer HMS GLOWWORM was sunk off the coast of Norway by the German cruiser HIPPER. In a desperate and one sided fight GLOWWORM engaged her much larger opponent and succeeded in ramming the cruiser before she was sunk. Only 31 of her complement of 149 were saved. Amongst those killed were two Australians; Engineer Lieutenant Commander James MacLeod, RAN from Warrnambool and Able Seaman (Submarine Detector) Ronald Bampton from Lithgow. GLOWWORM's Commanding Officer, Lieutenant Commander Roope was later awarded a Posthumous Victoria Cross.

NORWAY AND THE LOW COUNTRIES

German troops began landing in Norway on 8/9 April 1940 and the Royal Navy was heavily committed to the campaign escorting Allied troopships to Norway and trying to prevent German re-enforcements being brought in by sea. On 9 April the Submarine HMS TRUANT spotted the German light cruiser KARLSRUHE, off Kristiansand, and fired two torpedoes at her. Both struck and the cruiser was disabled. When the cruiser could not get under way she was abandoned and sunk by a German torpedo boat. Australian Petty Officer Augustus Fisher, serving in TRUANT, was awarded a Distinguished Service Medal (DSM) 'in recognition of daring, endurance and resource in the conduct of hazardous and successful operations against the enemy whilst serving in HM Submarine TRUANT'.

The campaign in Norway in April – June 1940 saw more Australian involvement. Two Australians were present at the fighting around Namsos in central Norway. Sub Lieutenant Thomas Lees, RANVR, serving in the destroyer HMS ARAB, was awarded the DSO for bravery and leadership during constant enemy air attacks; a rare award for an officer of junior rank. Lieutenant Commander Otto Becher, serving in the cruiser HMS DEVONSHIRE, was awarded the Distinguished Service Cross (DSC) for his work during the evacuation of Allied troops from Namsos in early May 1940. On 26 May 1940, HMS CURLEW, with Lieutenant Commander Frederick Cook, RAN onboard was sunk by German bombers off Narvik. This was the second time that Cook had been sunk in six months!

The German invasion of Norway, however, could not be halted and by early June the decision had been made to evacuate all Allied forces. The aircraft carrier HMS GLORIOUS was dispatched to



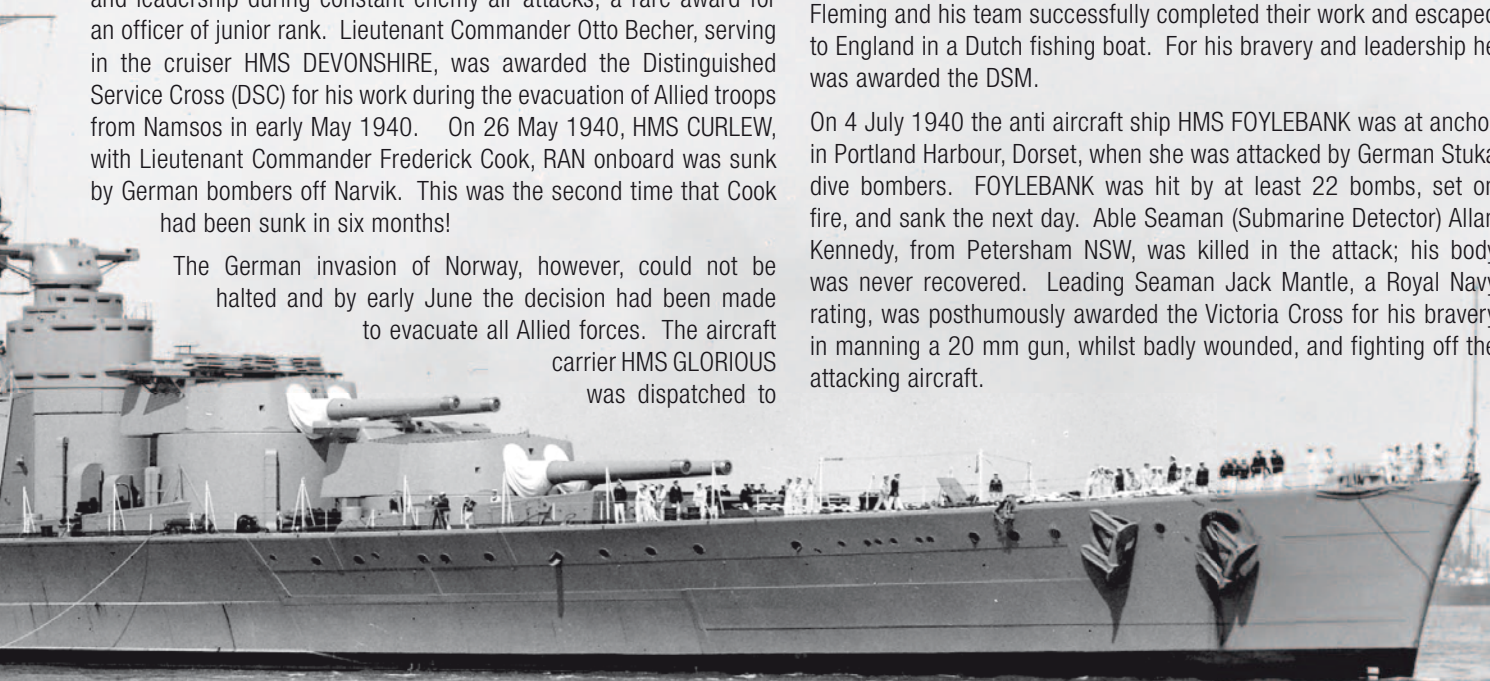
One of the first Australians in action was Commander Stanley Spurgeon, RAN who was in command of the destroyer HMS ECHO (seen here).

evacuate a squadron of RAF Hurricane fighters rather than destroy them. The British fighters safely landed on the carrier, despite the aircrew having no experience in doing so, but on 8 June the carrier and her escorting destroyers were spotted by the German battle cruisers SCHARNHORST and GNEISENAU. GLORIOUS and one of the destroyers was sunk in the ensuing action. Among the dead was Lieutenant Commander Lindsay Royston, RAN who was serving in GLORIOUS.

Allied fortunes continued to wane. During mid May Commander Herbert Buchanan, RAN, in command of the destroyer HMS VALENTINE, operated off the Dutch/Belgian coast. On 15 May his ship was badly damaged by enemy air attack, in the River Scheldt, and was beached in order to allow his crew the best chance of escape. Buchanan was then given command of the destroyer HMS VANITY which was involved in the evacuation of troops from the beaches at Dunkirk in June. He was later awarded a DSO and a Mention in Despatches for his bravery and leadership.

Petty Officer Ronald Fleming was attached to the shore depot HMS PEMBROKE, at Chatham, for a demolitions course in 1939. In May 1940 he was given command of a team of RN ratings and was sent across to Holland to destroy the port facilities at Amsterdam and IJmuiden thus preventing their use by the advancing Germans. Fleming and his team successfully completed their work and escaped to England in a Dutch fishing boat. For his bravery and leadership he was awarded the DSM.

On 4 July 1940 the anti aircraft ship HMS FOYLEBANK was at anchor in Portland Harbour, Dorset, when she was attacked by German Stuka dive bombers. FOYLEBANK was hit by at least 22 bombs, set on fire, and sank the next day. Able Seaman (Submarine Detector) Allan Kennedy, from Petersham NSW, was killed in the attack; his body was never recovered. Leading Seaman Jack Mantle, a Royal Navy rating, was posthumously awarded the Victoria Cross for his bravery in manning a 20 mm gun, whilst badly wounded, and fighting off the attacking aircraft.



HMS HOOD. HMS HOOD was lost with 1419 lives. Among the dead were four Australian Ordinary Seaman of the Yachtmens Scheme; David Hall, George Hall (not related), John Shannon and Ian Startup.



HMS RODNEY. Lieutenant Commander Galfrey Gatacre, (later DSC), RAN was the navigator in the battle-cruiser HMS RODNEY, in late May 1941, as she hunted the German pocket battleship BISMARCK.

THE DOMINION YACHTSMAN SCHEME

In June 1940 the British Admiralty contacted the various Dominion navy's and requested that efforts be made to identify and recruit suitable men with yachting experience for service with the Royal Navy. This became known as the Dominion Yachtsman Scheme and followed a similar scheme created earlier by the RN. The concept was to recruit 'gentlemen' who had yachting experience into the Navy who could then become officers to man the increasing number of British warships, especially convoy escorts, then being built. The concept was that if a man had offshore yachting experience then he had basic mariner skills and as this was an expensive sport that he naturally came from the upper level of the socio-economic spectrum – hence he was a 'gentleman'.

The scheme divided applicants into two streams. Stream A were men aged between 30 and 40 who had mariner skills, and who met the physical fitness standards required of an Executive (Seaman) branch officer. These men were recruited as Sub-Lieutenants and after basic training in Australia were dispatched to England for further training at HMS KING ALFRED, the 'Hostilities Only' RN Reserve Officer Training Establishment at Hove (near Brighton). Following completion of training here they were sent to sea for 'on the job training'.

Scheme B was for men aged between 20 and 30 who had some mariner skills but also the academic ability to become officers. These men were enlisted, as Ordinary Seaman, and were then sent to England to complete a period of training at HMS COLLINGWOOD, located in Hampshire, followed by sea service before being assessed as suitable, or not, for commissioning as an officer.

One of the few books written about the life of an Australian 'on loan' to the RN is Frederick Holt's *A Banker all at Sea* (published 1983). Holt joined the RAN in April 1941, as an Ordinary Seaman, and was soon identified as possessing 'potential as an Officer'. In June 1941 he was loaned to the RN and spent nine months in the Atlantic and Indian Ocean in the destroyer HMS PANTHER. After officer candidate training at HMS KING ALFRED, in 1942, he was commissioned as a Sub Lieutenant and joined the destroyer HMS INTREPID. His ship was involved in escorting convoys to Murmansk, Russia and was later sunk by enemy bombers in the Mediterranean in late 1943.

Holt then joined the destroyer HMS TERPSICHOE which saw service in the Mediterranean where Holt was Mentioned in Dispatches for his work as the Anti - Submarine control. Lieutenant Holt, RANVR finally joined an Australian ship in April 1945, some four years after

joining the RAN, when he was posted as the First Lieutenant in HMAS GASCOYNE. He was demobilised from the RAN in March 1946 having barely served in Australian ships at all.

MINE AND BOMB DISPOSAL

Some of the first men of the Yachtsmen Scheme to arrive in Britain were those who had volunteered for Special Duties Ashore in the Rendering Mines Safe Section. Among these volunteers were men who were to become some of the most highly decorated RAN personnel of the war including John Mould (George Cross and George Medal), George Gosse (George Cross), Howard Reid (George Medal and Bar), James Kessack (George Medal) and Leon Goldsworthy (George Cross, Distinguished Service Cross and George Medal).

They arrived in England in late 1940 and after basic training at King Alfred, and the torpedo school (HMS VERNON), were sent out to deal with German mines that had washed ashore, or had been accidentally dropped on land near harbours and ports). It was to prove to be very dangerous work and on 28 April 1941, while attempting to de-fuse a mine at Southport (Lancashire) Lieutenant James Kessack was killed when the mine exploded.

By early 1941 well over 300 hundred RAN Reserve officers and ratings had left Australia under the Yachtsmen Scheme and were now serving 'on loan' with the Royal Navy. The Phoney War was well and truly over and the fight for the survival of Britain and her Empire was well and truly 'game on'.

THE BATTLE OF THE ATLANTIC (1939 – 41)

The campaign in the Atlantic started on the first day of the war and soon the convoy system was implemented and Australian officers and ratings found themselves operating in the Atlantic in a variety of ships combating not only German U-Boats but surface ships as well.

Lieutenant Commander Galfrey Gatacre, RAN was the navigator in the battle-cruiser HMS RODNEY, in late May 1941, as she hunted the German pocket battleship BISMARCK. Only a few days before on 24 May, BISMARCK had sunk the British battle-cruiser HMS HOOD



Unidentified RAN Yachtsmen Scheme ratings at HMS COLLINGWOOD. (RAN Seapower Centre)

with the loss of 1419 lives. Among the dead were four Australian Ordinary Seaman of the Yachtsmen Scheme; David Hall, George Hall (not related), John Shannon and Ian Startup. On 27 May Rodney was involved in the destruction of BISMARCK and Gatacre was awarded a DSC.

Lieutenant Ian Boucat, RANVR was in command of a vessel much smaller than a battle-cruiser. His ship was the ASW Trawler *Lady Shirley* and on 4 October 1941 she sank U-111 in the north Atlantic and he was also awarded the DSC. Five weeks later the trawler was sunk by a U-Boat with the loss of all hands.



RAN loan personnel at HMS COLLINGWOOD – three of these were lost with HMS HOOD. (RAN Seapower Centre)

The losses amongst the convoy escorts continued to mount. The destroyer HMS BROADWATER was sunk by a U-Boat south of Ireland on 18 October 1941 and Able Seaman George Morris from Ryde was killed. Three days later HMS GLADIOLUS was sunk and Lieutenant Stanley Gifford, RANVR from Hobart lost his life. Then on 27 October the destroyer HMS COSSACK, famous for rescuing merchant seaman from the German prison ship *Altmark* in 1940, was sunk. Amongst her dead were Lieutenant William Wheeler, RAN from Narrabri and Ordinary Seaman Fred Howell from Homebush.

THE MEDITERRANEAN (1940 – 41)

The fighting in the Mediterranean in 1940-41 was particularly hard and some of the most bitter fighting was during the evacuation of Commonwealth troops from Greece and Crete in April – May 1941. Several RN ships were sunk, while attempting to evacuate the soldiers, and more Australian sailors were amongst those killed.

The destroyer HMS DIAMOND was sunk by German aircraft on 27 April 1941 some 20 miles east of Cape Maleas, Greece with the loss of almost her entire crew including 21 year old Able Seaman Bryan Tompson from Manly. On 21 May the destroyer HMS JUNO was sunk, by Italian bombers, in the Kaso Strait south of Crete; again with heavy loss of life including Ordinary Seaman Robert Furness of Paddington, NSW.

A little over a week later the destroyer HMS HEReward was operating near Heraklion, Crete when she was sunk by German Stuka dive bombers. 76 of her crew, including Ordinary Seaman Anthony Rowe from Vacluse, NSW were killed and the 89 survivors were picked up by Italian Motor Torpedo Boats and became Prisoners of War. These included Ordinary Seamen Christopher Harris and Neil Quinsey. Both men were liberated from an Italian POW camp in mid 1943 after the invasion of Italy.

The destroyer HMS KASHMIR was also sunk off Crete on 23 May 1941. Serving in KASHMIR was Ordinary Seaman (later Lieutenant) Ian Rhodes. Rhodes was born in New Zealand and had emigrated to Australia in the 1930's. For his bravery during the sinking of KASHMIR, he was awarded the Conspicuous Gallantry Medal (CGM); the only time this medal has been awarded to an Australian sailor. The citation read:

For outstanding gallantry, fortitude and resolution during the Battle of Crete. After HMS KASHMIR had been hit amidships by a bomb and was sinking, the after part was machine gunned at short range by a JU-87 bomber. Ordinary Seaman Rhodes was a gunlayer of the Port Oerlikon which was at that time going under water. In spite of the fact that the ship was sinking rapidly, he climbed up to the Starboard Oerlikon and opened fire on the aircraft, which was hit and crashed a few cables away.

In late December 1941 an incident occurred in the western Mediterranean that cost the lives of three more Australians serving on loan with the RN. On the night of 18/19 December the cruiser HMS NEPTUNE, in company with two other cruisers, AURORA and PENELOPE, was dispatched to intercept an enemy convoy bound for Tripoli. NEPTUNE sailed into a newly laid Italian minefield and struck two mines. The other cruisers also struck mines. While reversing out of the minefield, NEPTUNE struck a third mine, which destroyed her propellers and left her dead in the water. AURORA and PENELOPE were unable to render assistance due to their damage.

The destroyers HM Ships KANDAHAR and LIVELY were sent into the minefield to attempt to tow NEPTUNE out. KANDAHAR then struck a mine and began drifting. NEPTUNE signalled for LIVELY to keep clear. KANDAHAR was later abandoned and torpedoed by the destroyer JAGUAR to prevent her falling into enemy hands. NEPTUNE then hit a fourth mine and quickly capsized. Only 30 seamen, out of her complement of 767, initially survived the sinking, but five days later when their lifeboat was picked up by an Italian torpedo boat there was only one man still alive.

Among the dead from NEPTUNE were Ordinary Seamen Keith Campbell from St Peters, NSW and Alexander Kemp from Ebor. 18 year old Midshipman Lyster Tatham, from Sydney, was serving in KANDAHAR. He was given command of the destroyers' whaler to take the tow line across to NEPTUNE. After KANDAHAR was sunk the ships whaler was found; bullet riddled and awash. No sign of her crew was ever found.

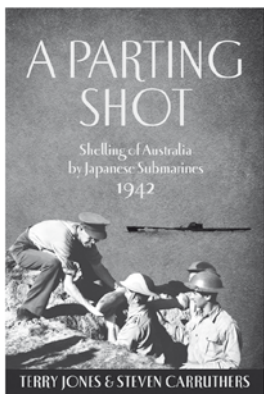
THE END OF 1941

The close of 1941 revealed the British Empires fortunes at its lowest ebb. U-Boats were gaining the upper hand in the Battle of the Atlantic and the Royal Navy in the Mediterranean was licking its wounds after months of hard fighting. Japan had entered the war on 8 December 1941 with attacks at Pearl Harbor, the Philippines, Hong Kong and Malaya. Only two days later the battleship HMS PRINCE OF WALES and battle-cruiser HMS REPULSE were sunk off the east coast of Malaya by Japanese aircraft. Amongst those onboard REPULSE were five Australian Midshipmen. Four survived the sinking, but Midshipman Robert Davies was killed while manning an Oerlikon gun as the ship sank. He was subsequently awarded a posthumous Mention in Despatches.

Skill and valour alone was not enough to turn the tide of war. The Royal Navy would need more ships and men and the RAN was to play its part in the bitter months ahead with both. Soon more RAN personnel would find themselves 'on loan' to the RN. ■



RAN Yachtsman scheme photo (includes Shannon lost in HOOD). (RAN Seapower Centre)



A Parting Shot Shelling of Australia by Japanese Submarines 1942

By Terry Jones & Steven Carruthers

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RRP: \$34.95 paperback

Pages: 320, many colour and B&W images

ISBN: 978 0 9775063 4 7

Also available as an E-Book

In the early morning hours of 8 June 1942, residents of Sydney and Newcastle were abruptly awoken by gunfire from Japanese submarine raiders lurking off the NSW coast. The bombardments followed air raids on northern Australia and a midget submarine attack on Sydney Harbour a week earlier.

A Parting Shot traces the story of the Japanese submarine shelling of the two cities—a story that until now, has not been fully told. Although casualties and damage were slight, the bombardments fuelled the real fear of an impending Japanese invasion.

Revealing for the first time the contents of the bomb disposal squad war diary, the authors painstakingly reconstruct events that occurred in both cities, including the search for, recovery and disposal of unexploded shells.

In recounting this legendary tale, the authors also examine Australia's east coast defences, the activities of the National Emergency Service, and the management and communications structures that were implemented during the early stages of the Pacific War. To put it all into context, they offer a Japanese perspective to the story through

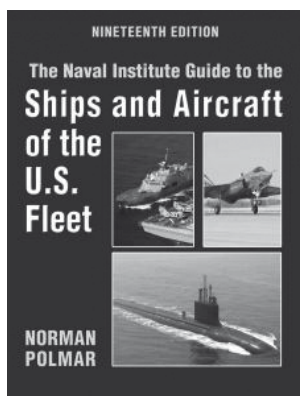
a critical account of Japan's submarine operations, not only off the east coast of Australia, but also along America's west coast and in the Pacific and Indian oceans.

Why then did the Japanese launch submarine operations in Australian waters when they had no intention of invading? Were the bombardments revenge attacks following the Japanese defeat in the Coral Sea? What were the Japanese targets in Sydney and Newcastle? Were all the unexploded shells recovered? The authors answer these and other long-standing questions, dispelling many rumours and urban myths surrounding the Japanese submarine attacks.

A Parting Shot is more than an account of a significant event in Australia's wartime history—it is a landmark story about good luck, tragedy and courage.

The book has many illustrations in colour and B&W with maps and is a very comprehensive account of an important chapter in Australia's wartime history

This book is a must for any Australian maritime history library or historian's collection.



The Naval Institute Guide to the Ships and Aircraft of the U.S. Fleet

By Norman Polmar

Naval Institute Press

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Pages: 676

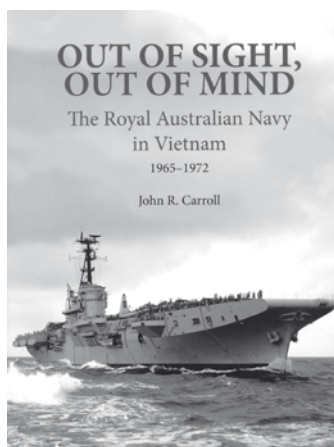
19th Edition

This updated, 19th edition of *The Naval Institute Guide to the Ships and Aircraft of the U.S. Fleet* meets the high expectations and exacting standards of those who rely on this volume to stay informed and to make related policy, force level, technological and weapons decisions related to the U.S. Navy.

Packed with comprehensive information and amazing up-to-date photographs, line drawings, and useful appendixes, this timely volume describes the US Navy, Marine Corps, and Coast Guard during a period of intensive transformation while engaged in combat operations. In describing the US Navy's ships and aircraft, extensive coverage is given to the new littoral combat ships (LCS), joint high-speed vessels (JHSV), DD-21 Zumwalt destroyers, Gerald R. Ford-class aircraft

carriers, and other new ships as well as developments in shipboard ballistic missile defence. At the same time, the convoluted path in surface combatant construction is deciphered, while the belated decision to cancel the Marine expeditionary fighting vehicle (EFV) is explained. Also addressed in detail is the new F-35 series Joint Strike Fighter (JSF) and other aviation programmes. Similarly addressed are Navy personnel, Marine Corps issues, Coast Guard forces, marine mammals, unmanned underwater and aerial vehicles, and other aspects of US naval forces.

The book is, and in its 19th iteration continues to be, an invaluable reference guide to the US Navy.



Out of Sight, Out of Mind The Royal Australian Navy in Vietnam 1965 - 1972

By John Carroll

Foreword by VADM Ian Knox AC, RAN (Rtd)

Rosenberg Publishers

Pages: 216, 285 x 210 mm, 50 photos

ISBN: 9781922013491,

\$29.95, Paperback

This excellent new book highlights and analyses the vital part played by the Vang Tau Ferry HMAS SYDNEY and other units of the RAN in the support of Australian land based forces during the Vietnam War.

Some of the many points covered in the book include the decision by the then Federal Government to exclude the crew from benefits and entitlements, and to those who served in JEPARIT and BOONAROO and the warships that escorted them into the war zone, due to a perception of a lack of enemy threat..A flawed decision made on the basis of fallacious information. It was the cause of much bitterness. While SYDNEY and her escort were at anchor well within AK-47 range, not only were they vulnerable to an enemy well versed in unconventional guerrilla warfare, but all who served in these ships were also exposed to highly toxic herbicides used to defoliate the nearby landscape. The chemical residue of this defoliating procedure flowed into the surrounding rivers and streams. Due to the processes used in those times for the production of potable water on ships, the dioxins contained in the distillate were enriched, thereby making them much more potent and deadly.

.....

Out of Sight, Out of Mind identifies and dispels various myths which have developed around the importance of sea transport and logistical support, and argues for a new appreciation of the service of the 13,000 members of the RAN who participated in this vitally important task. Many of the illustrations were taken by then serving military personnel, which gives them an immediacy and poignancy lacking in official photographs.

The book also has many line drawings of the RAN ships involved in the war and is a very well researched account of the RAN's vital role in the war. Well worth a read!

The Navy League is intent upon keeping before the Australian people the fact that we are a maritime nation and that a strong Navy and capable maritime industry are indispensable elements of our national wellbeing and vital to the freedom of Australia. The League seeks to promote Defence self reliance by actively supporting defence manufacturing, and the shipping and transport industries.

The strategic background to Australia's security is changing and in some respects has become less certain. The League believes that Australia should pursue the capability to defend itself, paying particular attention to maritime defence. Through geographical necessity Australia's prosperity, strength, and safety depend to a great extent upon the security of the surrounding seas and island areas, and on unrestricted seaborne trade.

The Navy League:

- Believes Australia can be defended against attack by other than a major maritime power and that the prime requirement of our defence is an evident ability to control the sea and air space around us and to contribute to defending essential lines of sea and air communication with our allies.
- Supports a continuing strong alliance with the US.
- Supports close relationships with New Zealand, PNG and the South Pacific Island States
- Supports close relationships with ASEAN, Japan, South Korea, India and China.
- Advocates the acquisition of the most capable modern armaments, surveillance systems and sensors to ensure that the ADF maintains technological advantage over forces in our general area.
- Advocates a significant deterrent element in ADF capability enabling powerful retaliation at significant distances from our shores.
- Believes the ADF must be capable of protecting commercial shipping both within Australian waters and beyond, recognising that this means in conjunction with allies and economic partners.
- Endorses the control of coastal surveillance by the ADF, and the development of the capability for the patrol and surveillance of all of Australia's ocean areas, its island territories and the Southern Ocean.
- Welcomes Government initiatives concerning the recovery of an Australian commercial fleet capable of supporting the ADF and the carriage of essential cargoes to and from Australia in times of conflict.
- ship, 20 offshore combatant ships, 6 heavy landing craft and substantial numbers of naval combatant and ASW helicopters.
- Strongly supports the acquisition of large, long range and endurance, fast submarines and, noting the deterrent value and huge operational advantages of nuclear powered submarines and their value in training our anti-submarine forces, urges the continued consideration of nuclear power as an option for those vessels.
- In order to mitigate any industry capability gap following the completion of the AWD program, recommends bringing forward the start date of the planned future frigate (Anzac replacement) program, recognising the much enhanced capability projected for these ships.
- Urges that decisions to enhance the strength and capabilities of the Army and Air Force and to greatly improve the weaponry, and the intelligence, surveillance, reconnaissance, cyberspace and electronic warfare capabilities of the ADF be implemented.
- Notes the potential combat effectiveness of the STOVL version of the JSF and supports further examination of its application within the ADF.
- Supports the development of Australia's defence industry, including strong research and design organisations capable of the construction and maintenance of all warships and support vessels in the Navy's order of battle, and recognises the fundamental importance of a stable and continuous shipbuilding program for the retention of design and building skills and the avoidance of costly start up overheads.
- Supports the efforts by Navy to rebuild the engineering capability to ensure the effective maintenance and sustainability of the fleet.
- Advocates the retention in preservation (maintained reserve) of operationally capable ships that are required to be paid off for resource or other economic reasons.
- Supports a strong Naval Reserve and Australian Navy Cadets organisation.
- Advocates a strong focus on conditions of service as an effective means of combating recruitment and retention difficulties.

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

- Supports the concept of a Navy capable of effective action in war off both the east and west coasts simultaneously and advocates a gradual build-up of the fleet and its afloat support elements to ensure that, in conjunction with the RAAF, this can be sustained against any force which could be deployed in our general area.
- Believes that the level of both the offensive and defensive capabilities of the RAN should be increased and is concerned to see that the substantial surface and sub-surface capability enhancements contained in the 2009 Defence White Paper should survive the forthcoming 2013 review of Defence capability; in particular a substantially strengthened submarine force, 3 Air Warfare Destroyers (AWDs), 2 landing ships (LHDs), 8 new frigates (Anzac class replacements), a large strategic sealift
- Calls for a bipartisan political approach to national defence with a commitment to a steady long-term build-up in Australia's defence capability including the required industrial infrastructure.
- While recognising budgetary constraints believes that, given leadership by successive governments, Australia can defend itself in the longer term, within acceptable financial, economic and manpower parameters.

The League:



The Nimitz class aircraft carrier USS JOHN C. STENNIS (CVN-74) and the French Horizon class destroyer FS CHEVALIER PAUL on joint manoeuvres at sea. (USN)

The Type 42 Batch 3 destroyer (foreground) HMS EDINBURGH (the last of the Type 42 class of destroyers) entering Portsmouth Harbour for the last time flying her decommissioning pennant with the new Type 45 destroyer HMS DEFENDER to her stern. Note the size difference in the two ships despite the fact the Type 42 is closer to the camera than the newer Type 45. (Gary Davies/Maritime Photographic, www.maritimephotographic.co.uk)





THE NAVY LEAGUE OF AUSTRALIA SIXTH ANNUAL MARITIME AFFAIRS ESSAY COMPETITION 2013

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

TOPICS

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

CATEGORIES

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

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

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

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

PRIZES

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

DEADLINE

20 September 2013

Prize-winners announced in the January-March 2014 issue of *THE NAVY*.

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

Navy League Essay Competition
Box 1719 GPO, SYDNEY NSW 2001

or emailed to editorthenavy@hotmail.com.

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

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

