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THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

GROWTH IN STRENGTH THE HOBART CLASS AWD

THE GROUNDING OF HMS NOTTINGHAM (PART 1)

THE BATTLE FOR AUSTRALIA

HER MAJESTY'S RIGID AIRSHIP NUMBER 1

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THE MAGAZINE OF THE NAVY LEAGUE OF AUSTRALIA

Front cover: A The Spanish F-100 class ship ALVARO DE BAZAN arriving in Sydney Harbour. (Defence).

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LEGAL IMPLICATIONS FOR DEFENCE'S COST SAVING DRIVE??

Earlier in the year *The Canberra Times* published an article on the front page concerning a Widow's successful case against the UK Ministry of Defence (MoD) over her husband's death while serving in the RAF.

Navigator FLTLT Paul Pardoel, an Australian serving with the RAF, was killed in January 2005 when his 30 year old RAF C-130K Hercules was shot down by small arms fire over Iraq killing all 10 onboard.

While seemingly a straight forward loss to enemy action the widow of FLTLT Pardoel learned through a coronial inquest that a series of MoD bungles and negligence contributed heavily to the men's deaths.

UK Coroner David Masters found that the aircraft was shot down in flames by "insurgents or terrorists" after being hit in a wing fuel tank by small arms fire which, unlike most other Hercules, did not have a $15,000 retro-fitted explosion suppressant foam installed. The reason being the UK Military's hierarchy decided to ignore its own advice on fitting the foam to their Hercules fleet. This recommendation was actually categorised as "urgent" and dated back over two decades. The decision was made on the grounds of cost savings and priority. On learning this, the widow of FLTLT Pardoel said she felt the RAF had let her husband and his colleagues down and that their dedication to their job had not been reciprocated.

The coroner also said "In my opinion, never again should a scientific and legitimate recommendation on a safety issue either be ignored nor acted upon".

A major contributor to the aircraft's loss was that it was flying at ultra low level because its electronic warfare self protection kit, for protection against surface to air missiles at higher altitudes, was not working. Thus forcing them to fly at low level making them susceptible to small arms fire.

Both defects were known to the RAF which would normally make the aircraft, in the RAF's own doctrine, unable to serve effectively in warlike conditions.

After the UK Coroner handed down his findings the UK MoD's lawyers contacted FLTLT Pardoel's widow and informed her that it accepted responsibility for negligence in sending the crew to war in an aircraft that was not "fit for purpose". The admission of guilt paves the way for compensation by the families of the 10 that were killed.

Given the legal system's adherence to precedent, and similarities and links between English and Australian law, it potentially means that any service person killed in any service-owned capability that is deemed unfit for purpose due to missing equipment or defects leaves the government liable for damages through negligence claims. And rightly so. Being killed by an enemy is a regrettable part of the job. But being killed through negligence and penny-pinching by your own side is unacceptable and only aids the enemy.

Australia's last 'Defence White Paper' said that Defence has to find $2 billion worth of savings each year. If Defence can't find the magic figure then it may need to cut into capabilities. Projects in the area of Electronic Warfare (EW) upgrades usually seem to be the first cut as they are purely for wartime conditions and serve no real purpose in peace. However, on the modern battlefield, mastery of EW is crucial to success.

Another attractive way to save money is to buy new capabilities in a "fitted for but not with" state. It provides a baseline capability for peacetime tasks and training that service chiefs like and gives politicians their photo opportunity. When conflict eventuates at short notice "fitted for but not with" will be unable to meet the timelines required for deployment.

Thankfully Australia's 'fitted for but not with' policy on many capabilities was never tested in combat, for surely they would be 'unfit for purpose'. Had they been, then it is likely that death or injury arising from that enemy action combined with the platform's 'unfit for purpose' status would leave the way open for crippling compensation payouts for negligence. And that's not the way to save money.

FOURTH HOBART CLASS DESTROYER

Recently the German Government announced that it would build a third Berlin class support ship for its navy as part of its national economic stimulus package to combat the effects of the Global Finacial Crisis. This follows a similar announcement in France to build a third Mistral class LHD as part of its economic stimulus package (see *THE NAVY* Vol 71 No 3 p17).

Readers of *THE NAVY* will no doubt be aware that for some time the Navy League has been pressing for a fourth Hobart class destroyer on strategic grounds. Perhaps economic arguments may now make government more attentive given the European examples of naval shipbuilding to enhance the local economy.

A fourth AWD will certainly provide jobs and a measurable economic stimulus to the nation's economy, as the Anzac frigate project did in the 80s-90s. The question is will the Rudd Government see the same logic the rest of us can?

A Berlin class support ship of the German Navy. Germany has announced the building of a third Berlin class support ship as part of its economic stimulus package to fight the effects of the Global Financial Crisis.

KEEP WATCH

The 2009 Defence White Paper *Forces 2030* was welcomed by the Navy League. While there were some issues where we differed - the League still considers that the question of nuclear propulsion for submarines should be looked at - overall the proposals in the White Paper were supported by the League.

However, the proposals run to 2030. That is some nine or 10 elections away and probably two or three changes of government. Such a time frame is also likely to cover several economic cycles. At this early stage it would be unwise to assume that what is promised will over time be delivered. The real task for the League will now be to ensure that what is proposed in the White Paper is actually delivered.

It is perhaps relevant to consider what happened to the UK Strategic Defence Review White Paper of 1998. That Paper too was commissioned by a Government newly returned to office. It was generally acclaimed. It proposed much that was welcomed. In the event delays, cancellations and cuts have in just 11 years resulted in a much reduced Defence Force and in particular a diminished Royal Navy. This sorry example should serve as a warning that we in the Navy League of Australia must take nothing for granted and as our motto states, "Keep Watch".

THE COMMONWEALTH

At the end of July I had the pleasure of attending the 2009 King-Hall Naval History Conference. The conference was organised by the Sea Power Centre Australia and held at the Australian Defence Force Academy.

The theme of the conference was *The Commonwealth Navies - 100 Years of Cooperation*. The 100 years dated from the Imperial Naval Conference held in London in 1909. There were many excellent presentations from South Africa, Australia, the United Kingdom, New Zealand and Canada. There was also a most interesting address given by Dr Norman Friedman on "Protecting Sea Lanes in a Globalised World." Protecting the sea lanes of the world was of course an important task of the Commonwealth navies, long before the word globalised was in common use.

The Sea Power Centre is to be congratulated on arranging the Conference. There is always a great deal to be learnt from the lessons of history.

ANSWERING THE CALL

Following the closure of HMAS LONSDALE and its demolition in 1992 there is now no obvious naval presence in Melbourne. Indeed it is ironic that despite hosting the Navy`s largest establishment, naval visibility in Victoria is minimal. For most Victorians HMAS CERBERUS is out of sight and out of mind (HMAS CERBERUS is wonderfully active in its community, but it is 70 kilometres from Melbourne to Crib Point).

In January 2008 The Naval Heritage Foundation was incorporated. The main objective of the Foundation is to erect a seven and a half feet tall bronze statue facing the sea at Port Melbourne. The project is called 'Answering the Call'.

Port Melbourne was considered the appropriate site as it has had a long association with Navy, dating from the days of the nineteenth century Victorian colonial navy. During the Second World War many thousands of men and women joined the RAN at HMAS LONSDALE Port Melbourne. They all carried the prefix PM (for Port Melbourne) to their official number.

In June the Chief of Navy, in response to a request to support a fundraising event by RAN ships and establishments, replied " I am pleased to support the Naval Heritage Foundation of Australia Inc in the worthy cause of fundraising for their statue project 'Answering the Call'. This statue, to be erected in Port Melbourne, will honour and remember all those Naval personnel who served Australia in the past. This is a means by which we, as the men and women of the RAN today, can show our ongoing support for all those who went before us"

It is to be hoped that next year there will be erected at Port Melbourne a statue that will be both a reminder to the citizens of Melbourne of the Navy - and of all those who served in it.

FROM OUR READERS

Dear Sir,

Firstly may I say, as a long time reader and supporter of keeping the RAN and Naval matters in the public eye, congratulations on the continuing quality of your magazine.

Having read the latest edition two things came to mind, worth commenting on.

The Navy League has long supported the acquisition of Nuclear Submarines for the RAN. Around 25 years ago I wrote a letter to the Navy League opposing such a proposition.

Perhaps with time, now I can say that in the best interests of Australia's strategic position, it would seem that the acquisition of SSN's for the RAN should be given due consideration.

Maybe within the scope of the White Paper a force of four SSN's and six diesel/eclectic submarines should be considered. The biggest stumbling blocks to acquiring Nuclear Submarines would appear to be a Government reluctant to go down that path and the costs involved. The only obvious source for such vessels would seem to be from the USA. Would they be willing to allow us to operate such boats? Like all things that have to be sourced from the 'public purse', and with the wish lists from the three Services, I cannot see them being seriously considered by a Labor Government. The costs involved with developing such Submarines here in Australia would far exceed any Defence project to date.

Secondly I was most disappointed with the article *Maritime Will*, by Ludwig von Gress. It was preposterous, to say the least. It showed no real point nor direction save quoting from too numerous of sources to have much cohesion or at least have a valid point. The proposed acquisition of Cruise Missiles armed with Nuclear Warheads is ridiculous. Where would Australia get such technology, it is never going to be sold and it would take 20 - 30 years to design and deploy workable systems. Cruise Missiles indeed would only work as a deterrent on the international stage if you have an even bigger stick in which to back yourself up with.

One would only need to have a look at the current state of the Royal Navy to see that as much as they want certain warships, vessels, they too cannot afford to build and keep the Navy that they would like. The RAN can't go down the same track and allow big ticket items to deplete a balanced fleet. Alas, it would take a serious conflict in which to allow the services the funds in which they need.

An argument, no less that will continue to be debated for the foreseeable future.

Mark Buttsworth (via e-mail).

GROWTH IN STRENGTH: THE HOBART CLASS AWD

By Abraham Gubler

As the SEA 4000 Air Warfare Destroyer (AWD) project is currently transitioning from the planning, definition and design stage to the Phase 3 production stage it is timely to examine in detail the capability these ships will bring to the RAN. Abraham Gubler takes up the story.

While capable of a range of naval tasks the AWDs will have a high end area air warfare capability, generally defined as the ability to defend other ships within a distributed task group – up to 18-36 km (10-20 nm) away – from attack by aircraft and missiles. HMAS HOBART, the first AWD, is scheduled to commission in 2014 and will provide the RAN with the first 'best-in-world' standard surface combatant since the heavy cruisers HMA Ships AUSTRALIA and CANBERRA were commissioned in 1928. They will also plug the RAN's air warfare capability gap that has existed since the decommissioning of the last of the Perth class guided missile destroyer (DDG) in 2001 and the extreme schedule slippage to the upgrade of the Adelaide class guided missile frigates (FFG).

THE COURSE TO AEGIS

The 1992 Force Structure Review (FSR) outlined a plan to replace the three Perth class DDGs and the four American built Adelaide class FFGs (all then expected to retire between 1999 and 2012) with six additional Anzac class frigates customised for area air warfare. In 1995 Anzac class design authority Blohm + Voss (Australia), now Australian Marine Technologies (AMT), was contracted to provide detailed feasibility studies of such a ship. AMT examined fitting the Anzacs with the Raytheon SM-2 missile, the New Threat Upgrade (NTU) Mk-74 Mod 14/15 fire control system (FCS) with either the SPS-48F three dimensional radar (3D) and Raytheon SPS-49 long range two dimensional radar (2D); or just the SPS-49, relying on an illumination radar to scan the bearing from horizon to zenith to find the height of the target (a time consuming endeavour). They also studied fitting the lightweight version of the Lockheed Martin Aegis weapon system with SPY-1F phased array radars and sourced a comparative SPY-1F mast house solution from Gibbs & Cox.

Unsurprisingly neither solution was acceptable on the small Anzac hull as the weight margins available ensured that the level of area air warfare capability would not be 'en par' with those being introduced on contemporary vessels; like the more capable SPY-1D(V) radars and the BAE Systems SAMPSON (on the RN Type 45 destroyer). The lack of growth margin in the Anzac hull is again indicative of the problems of building a vessel for a budget derived limited specification – Tier II Patrol Frigates – and then trying to grow the specification to meet the need.

With the two Australian built Adelaide FFGs expecting a hull life

The Spanish Navy's F-100 ALVARO DE BAZAN leaving Fremantle. (Ian Johnson)

The Spanish Navy's F-100 ALVARO DE BAZAN. The Hobart class destroyer being built for the RAN is based closely on the Spanish ship. (Ian Johnson)

until 2019-21 the RAN launched a feasibility study for upgrading them in 1994. With the Anzac class not providing a useful base for a new air defence vessel and the RAN unwilling or unable to purchase second hand ships (like the golden opportunity presented by the USN's Kidd class destroyers) the SEA 1390 FFG Upgrade (FFG UP) became a life extension on the first four vessels (to 2013-2017) plus upgrade of all six. Central to this upgrade was the modernisation of the Mk-92 FCS to the NTU level with SM-2, though no 3D radar was planned. The $1.2 billion FFG UP contract was signed in 1999 with the first SM-2 capable ship planned for delivery in 2003 to replace the Perth class DDG. Subsequent events saw the schedule slip significantly and the project downsized to retain only the last four FFGs (the first two being decommissioned). Regrettably, the project is yet to deliver a fully completed warship.

A destroyer replacement project was established during the 1990s, SEA 1400, which over time became SEA 4000.

SEA 4000

Upgrading all the FFGs was supposed to provide a capability stop gap so the RAN could acquire a new world standard air defence vessel. With the success of the negotiations between the RAN and the USN for joint development of submarine combat systems and weapons, the Armaments Cooperative Program Memorandum of Understanding (MoU) signed in 2003, the RAN's leadership sought to replicate this arrangement in area air defence. A new MoU was proposed for Australian access to the USN's unique Cooperative Engagement Capability (CEC) that had been developed as part of the Aegis weapon system programme.

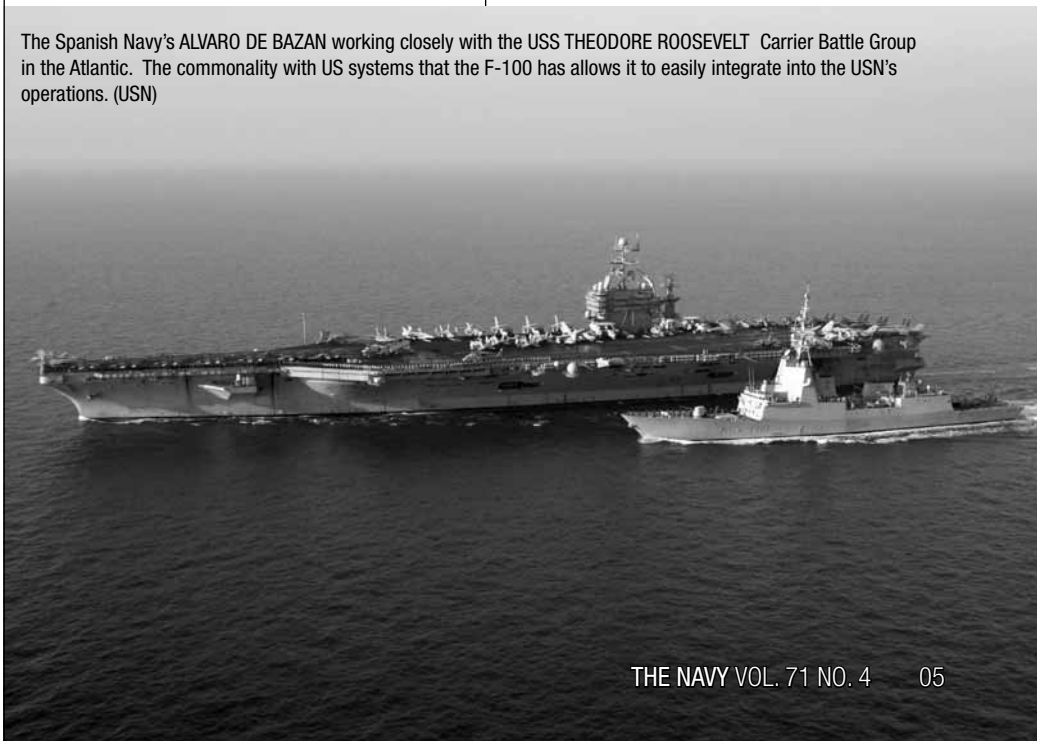
With approval from the Howard Government to progress the MoU for a CEC capability AWD solution the plan was then needlessly complicated. The RAN's original plan to just build an Arleigh Burke class DDGs in Australia was turned into a three year, six way contest to find essentially the same thing. The world's three established designers of Aegis destroyers, Gibbs & Cox, Navantia (then IZAR) and Blohm + Voss (their Sachsen class was originally designed for the option of Aegis) were funded to develop an "evolved" design concept to meet a specific Australian requirement.

Gibbs & Cox were then downselected in August 2005 to develop a detailed Evolved AWD design as part of the emerging AWD Alliance which would compete for the build order against an Australianised Navantia F-100 chosen as best from amongst the existing off the shelf (OTS) designs. The AF-100 was selected by Government in June 2007 based on the near identical area air warfare performance between the Evolved AWD and the AF-100 combined with the reduced risk of building OTS. Of course as with the Anzac class experience, the smaller AF-100 would lack the growth margins of the Evolved AWD not to mention the original OTS plan of an Australian Arleigh Burke.

SHIELD FOR THE FLEET

The Aegis weapon system (named for a shield used by Greek gods) was first conceived in 1963 as the Advanced Surface Missile System (ASMS) and later contracted for development in 1969 to RCA (now part of Lockheed Martin). Aegis was developed to replace the deficiencies of mechanically rotating radars with manual plotting of targets given the increasing closing speed and lethality of aircraft and missiles. These new threats could swamp conventional ship defences, like those of the DDGs and FFGs, limited to the consecutive engagement of only two separate air targets. The new weapon system would combine the radar, FCS and the Combat Information Centre (CIC) into a single integrated picture.

The core of the system is the combination of the four high power SPY-1 phased array radars, 4 MW peak output compared to 1 MW of the Perth class's Hughes SPS-52 3D radar, and the computing hardware and software to process the radar information and other inputs into an easily understandable graphic representation, and even run the battle autonomously. The



The Spanish Navy's ALVARO DE BAZAN working closely with the USS THEODORE ROOSEVELT Carrier Battle Group in the Atlantic. The commonality with US systems that the F-100 has allows it to easily integrate into the USN's operations. (USN)

The 48 cell Mk-41 VLS of the F-100 class. The magazine size is considered small by many and begs the question if three AWDs will be enough for the ADF's warfighting requirements. (Ian Johnson)

electronic scanning of the phased array radars means the entire area around the ship can be constantly and continuously searched, unlike mechanically rotating arrays like the SPS-52 that rotate once every eight seconds.

Aegis is able to maintain a volume search at ranges well over 180 km (100 nmi) and maintain tracks on over 100 targets. Combined with the Mk-99 FCS and SM-2 missile the SPY-1 radar is able to provide mid-course guidance through an uplink to the missile's autopilot to enable the missile to get within such close proximity to the target that the target only requires illumination by the SPG-62 director for the final few seconds of the interception. This allows an Aegis combat ship to control multiple intercepts by staggering the terminal engagement, or time sharing the illuminator. Combined with the Mk-41 vertical launching system (VLS) the Aegis combat system is no longer limited by the reloading and training time of a mechanical missile launcher, like the Mk-13 of the DDG and FFG. Like the SPY-1 radar the limited number of moving parts in the VLS module provide high levels of reliability plus access to high volumes of fire, the only drawback being it cannot be reloaded at sea.

COOPERATIVE ENGAGEMENT CAPABILITY

The computer system behind Aegis has undergone significant change since first fielded in 1980 with 16 bit and 32 bit milspec processors (UYK-7s and 20s) and milspec software (CMS-2) as well as commercial OTS processers and software. An open architecture Aegis Baseline 7.1 (Phase II) combat system will equip the Hobart class. By using a scalable pool of commercial processors Aegis 7.1 will be able to leverage the rapid growth in capability and comparatively low cost of commercial computers for constant upgrade. Similarly using C++ and Java software will mean the Hobarts can have new features integrated into Aegis without relying on the dwindling pool of machine language programmers.

The computing power of the Aegis weapon system is used to not just operate and process the Hobarts own sensors but through the USG-2(V) transmission processor it can combine this tracking data with other off-ship participants; known as Cooperating Units (CU). The Cooperative Engagement Capability (CEC) uses identical algorithms to create a single air picture amongst all the participants sensors and then filter and transmit this picture back to the other CU's tactical displays. CEC does not share radar track but actual radar measurements benchmarked using GPS time and location information. The ship's own processors then use all this information to generate tracks.

For example, a Hobart class working with a SEA 1448 Anti-Ship Missile Defence (ASMD) upgraded Anzac class frigate and a RAAF Boeing 737 Wedgetail Airborne Early Warning & Control (AEW&C) aircraft will as CUs have a single air picture. This single air picture is the combination of the radar measurements from the Hobarts SPY-1D(V) and Northrop Grumman Norden SPQ-9B X-band horizon search radar; the Anzac's CEA Technologies CEAFAR active phased array radar and SPS-49(V)8; and the Wedgetail's airborne Northrop Grumman MESA electronically scanned array radar. The combination of arrays fused together will provide for large sensor footprints (fields of view), incredibly sensitive measurements and robust tracking. Also merged with the air picture by Aegis will be electronic support measures (ESM), infra red search and track (ISRT) and other sensor information from these platforms. It's hard to compare this level of fidelity to the legacy displays of a single rotating array on the Perth class DDG.

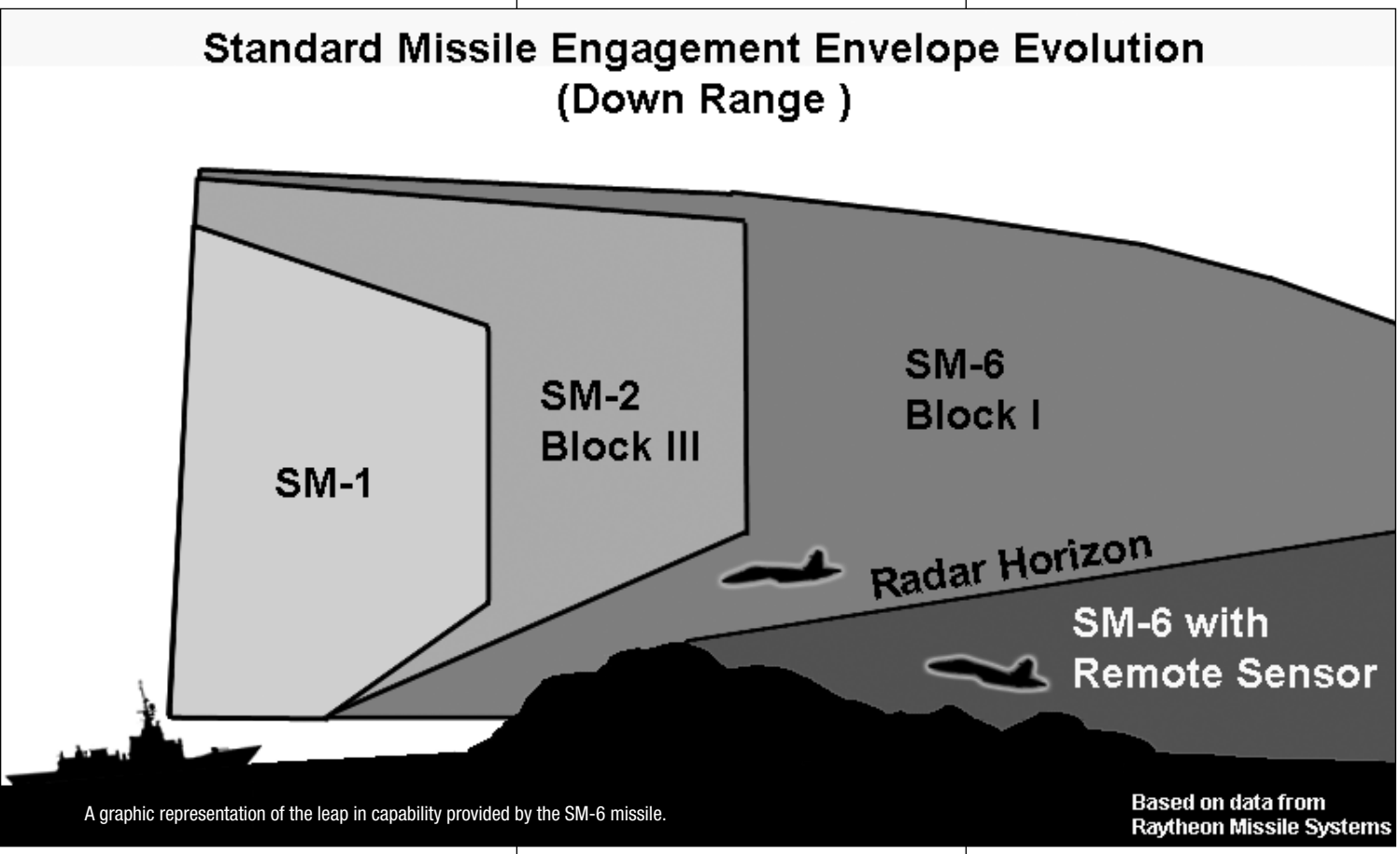
HOBARTS' WEAPONRY

Aegis also allows the Hobart class to utilise the FCS and weaponry of all CUs to engage targets based on need. A terminal target illuminator on an Anzac class could be used to designate a missile guided to the target by the Hobarts SPY-1D(V) and so on. Each Hobart will have 48 strike length cells in their VLS enabling them to carry missiles 6.3m (20' 7") in length, compared to the Anzac class VLS limit of eight 5.1 m (16' 8") long missiles. The standard load-out for the F-100's VLS in Spanish Armada service is 32 RIM-66M (SM-2) and 64 Raytheon RIM-162A Evolved Sea Sparrow Missiles (ESSMs) in quad packs per VLS cell. This load-out is likely to initially be replicated by the RAN in the

An SM-2 Blk IIIA anti-aircraft missile being test fired for the first time from the F-100's Mk-41 VLS. (USN)

Hobarts as it provides high volumes of fire for in close engagement to ensure the targets are within the "no-escape zone" of the ship, that is they can't turn and run outside the missile's maximum engagement range in the time it takes the missile to fly out to the target. SM-2 maximum engagement ranges are usually given as 74-167 km (40-90 nm) and ESSM as up to and over 50 km (27 nm) with the variations depending on the target's altitude, bearing and escape manoeuvre potential.

While the main focus of the AWD's capability is the missiles they will also be equipped with a balanced suite of other weapons and sensors including the BAE Systems Mk-45 Mod 4 127mm (5") gun with the long 62 calibre barrel. This will enable Naval Gunfire Support (NGS) missions at longer ranges than the 127mm guns on the Anzac class (24kms for the Anzacs and 42kms for the Hobarts with standard ammunition). The new gun can also fire extended range guided munitions through the gun, once they are ready for service. Eight canister launched Boeing RGM-84D Harpoon Block II missiles will provide strike against ships and can also strike fixed shore targets out to 140 km (75 nmi). Close in protection against air, surface and asymmetric threats will be provided by an aft facing Raytheon Mk-15 Phalanx Block IB 20mm Close In Weapon System (CIWS) and two Rafael Typhoon 25mm guns (mounted on each bridge wing). Decoys for anti-ship missiles will include four Terma Mk-137 130 mm launchers for chaff and flares and the BAE Systems Australia/ Raytheon Nulka hovering electronic seduction decoy system. The ships' ESM suite is yet to be decided with the RAN eager to apply the lessons learnt from the problematic C-PEARL ESM fit to the upgraded FFGs.



A graphic representation of the leap in capability provided by the SM-6 missile.

ANTI-SUBMARINE WARFARE CAPABILITY

The reach of the Aegis weapon system ends at the surface of the ocean but the Hobarts will be required to have a force Anti-Submarine Warfare (ASW) capability providing detection and tracking against threat submarines outside their torpedo range. British firm Ultra Electronics (formerly trading under the Dowty brand) was selected by the AWD Alliance to provide an open architecture underwater combat system based around a three workstation ASW control system, two separate sonar arrays and a single multi-sensor sonar processor. This system will also control the ship's torpedo launchers with six EuroTrop MU90 Impact 324mm lightweight ASW torpedos, torpedo decoys including Nixie towed arrays and potentially active seduction decoys like the Rafael/Ultra LESCUT that are fired by the chaff and flare launchers.

The bow array will operate at dual frequencies in the medium range (4 kHz and 6.5-8.1 kHz) and the slim but short line variable depth towed array in the low frequency range with two active arrays (1.8 khz and 3 kHz). Both bow and variable depth active transmissions can be received on the third array (a passive directional receiver) located on the towed system. This flexibility of active and passive frequencies and receive transmit orientations can provide for high levels of detection in complex waters.

As part of Ultra's offer the source code of the AWD sonar system will be provided to the Commonwealth, as well as tools and training. Because the system is open architecture this will enable rapid and accessible modification and upgrade. Including integrating the already developed Australian Network ASW (NASW) system using the DSTO Rapidly Inserted Panoramic Picture Exploitation Resource (RIPPER) tool which, much like Aegis CEC, can combine the sonar data from different platforms via radio communications or through water communications (TWC). NASW offers many of the advantages of CEC, which will go some way into mitigating the difficulty of obtaining multiple tracks on low noise submarines in complex waters.

The final ASW asset will be the ship's multi role naval helicopter flight. HOBART will probably go to sea with an existing RAN Sikorsky S-70B-2 Seahawk but will also be the first vessel to operate the AIR 9000 Phase 8 Future Naval Aviation Combat System. The centrepiece of this new acquisition will be a Seahawk replacement helicopter reconfigurable for ASW, anti-surface close and far and logistics support missions. The Naval Aviation community is also interested in acquiring a unmanned aerial system (UAS) to be controlled by the ship; though the single hangar space on the Hobarts would preclude basing of anything but the smallest UAS onboard in addition to the helicopter.

AIR WARFARE DESTROYER 2030

All of these systems, their crew and the means to move and sustain them at sea, will be integrated within the AF-100 ship design. While the F-100 draws much of its original design from the Arleigh Burke class, combined with some European technology, it is a much smaller ship, displacing only 5,800 tonnes compared to 9,200 tonnes of an Arleigh Burke Flight IIA and 8,100 tonnes of the unsuccessful Evolved AWD design. The F-100 had a considerable growth margin which has been extended in the AF-100 to a maximum displacement of 7,000 tonnes. However, much of this has already been consumed with additional systems over the F-100 baseline, leaving the AF-100 with a displacement of 6,250 tonnes.

The remaining margin of weight will need to incorporate life time improvements and a considerable capability upgrade announced under the recent *Joint Forces 2030* White Paper.

The Hobart class will receive two new weapons; the Raytheon RIM-174A SM-6 extended range air defence missile, and a long range strike capability, likely to be the 2,500 km (1,390 nm) range Raytheon RGM-109E Tomahawk Land Attack Missile (TLAM) Block IV now with loitering capability and in flight target reprogramming. Other likely life time capability improvements could include a tactical Ballistic Missile Defence (BMD) capability - though *Joint Forces 2030* was non-committal on this matter - a naval UAS and radar array upgrades.

While the weight increase of all these systems will be incremental over the current embarked weapons, fitting a useful magazine of SM-6 and TLAMs onboard the Hobart class will result in displacing the existing SM-2 and ESSM missiles. However, SM-6 will eventually provide a one for one replacement for SM-2 with the USN keen to standardise to the SM-6 and ESSM.

SM-6 replaces the legacy semi-active seeker of the SM-2 with the active homing seeker array (in some cases not requiring terminal illumination) from the AIM-120 AMRAAM air to air missile, enabling it to be fired at targets beyond line of sight from the firing platform in fire and forget mode. This enables it to engage targets over the horizon and behind terrain if an appropriate CU like a picket ship or AEW&C aircraft provides the targeting information. It can also be used in the semi-active homing mode as the SM-2 using the same interception process as detailed earlier.

A new longer ranged and more accurate ESSM is also being planned to replace the current ESSM. The ESSM –ER (Extended Range) will be fitted with a forward looking IR sensor to give it greater resistance to electronic countermeasures, dual mode interception capability and better explosive fuze settings for near miss engagements due to the high closing rates of supersonic anti-ship missiles. Its range will also be increased.

To provide an effective capability, at least 16-32 TLAMs will need to be available to each Hobart class. USN destroyers frequently sail with more than 45 TLAMs. Even displacing the ESSMs to another 16 VLS cells added to the aft of the ship, like the short length version of the Mk-41 SVLS or 32 dual pack Mk-48 lightweight VLS, would not provide enough of a useful magazine for SM-6, ESSM and TLAM. This may prove a weakness in the Hobarts service life and begs the question, is three actually enough?

Soon to be a common sight, an F-100 (in this case ALVARO DE BAZAN) leaving Sydney Harbour. (Chris Sattler)

THE GROUNDING OF HMS NOTTINGHAM (PART 1)

On 7 July 2002 the Royal Navy Type 42 destroyer HMS NOTTINGHAM struck Wolf Rock east of Lord Howe Island at night en route to New Zealand.

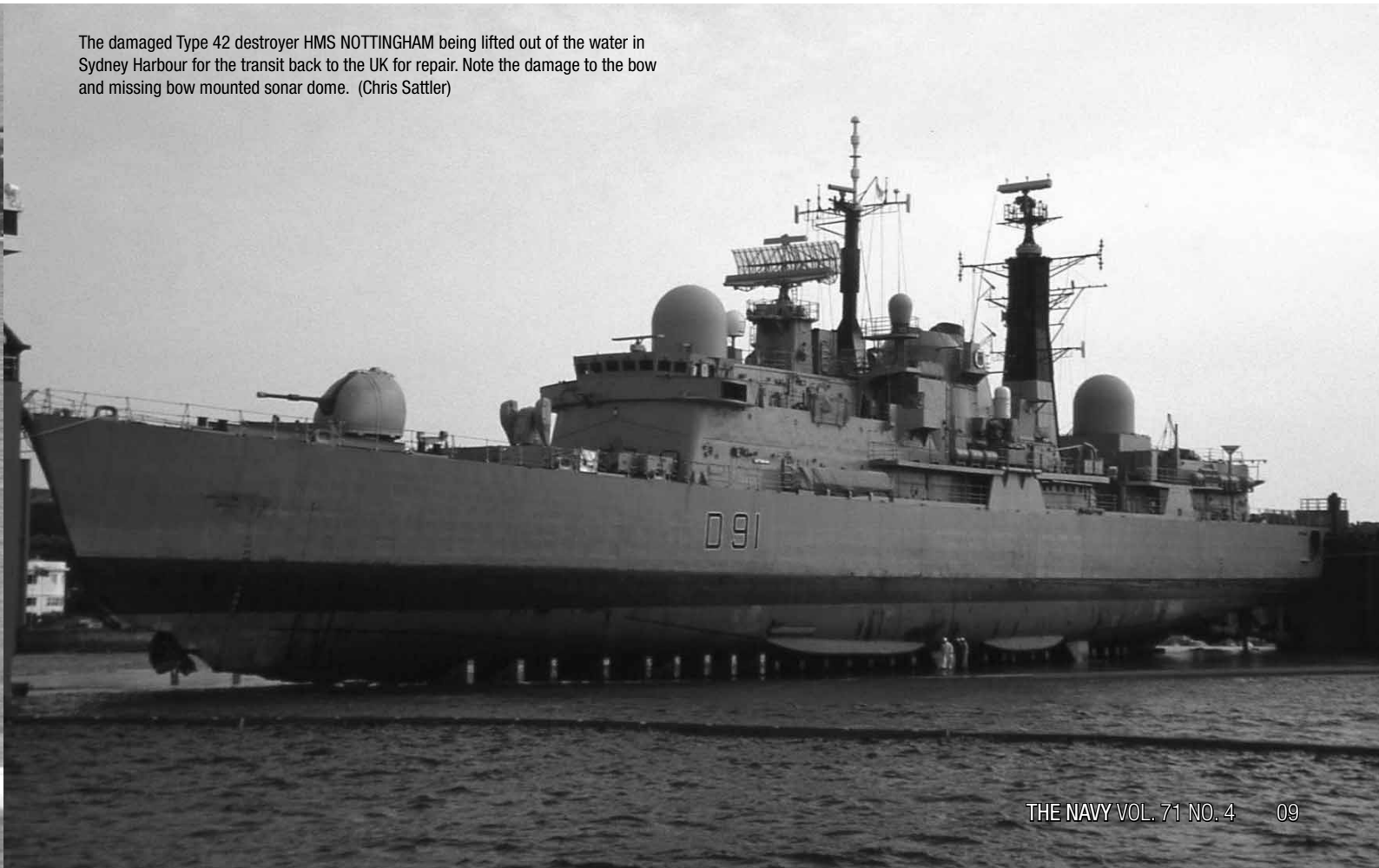
The rock is named after the *Wolf*, an ex-Royal Navy gun brig built in 1814, which was working as a whaling ship when on 6 August 1837 it struck an outer reef near Lord Howe Island. She escaped the reef and was thought to be undamaged, but the vessel sank in deep water about 10 miles off the island.

After NOTTINGHAM was stabilised through the efforts of her crew, with assistance from the RAN and RNZN, she was towed back to Australia for rudimentary repairs and deammunitioning, and later taken back to the UK on a ship lift vessel for final repairs.

On 7 July 2003, the anniversary of the grounding, NOTTINGHAM was refloated. In April 2004 she sailed again following the £39m repair and refit. The ship returned to duty in July 2004

Despite the £39M spent on her in 2004, in April 2008, she was placed in a state of "Extended Readiness" at Portsmouth. With her crew dispersed it is unlikely she will sail again before her planned decommissioning in 2010.

The following is a reproduction of the recently released Board Of Inquiry (BOI) report by the RN into the incident. The report was obtained under the UK's Freedom of Information act and has been published on the internet.



The damaged Type 42 destroyer HMS NOTTINGHAM being lifted out of the water in Sydney Harbour for the transit back to the UK for repair. Note the damage to the bow and missing bow mounted sonar dome. (Chris Sattler)

BOARD OF INQUIRY INTO THE GROUNDING OF HMS NOTTINGHAM OFF LORD HOWE ISLAND 7 JULY 2002

INTRODUCTION

1. A Board of Inquiry was convened aboard HMNZS ENDEAVOUR between 13-16 July 2002, to investigate the grounding of HMS NOTTINGHAM off Lord Howe Island. The inquiry was conducted with the full co-operation of the Commanding Officer and the Ship's Company of HMS NOTTINGHAM. The aim of the Board of Inquiry was to establish the causes and circumstances surrounding the grounding of HMS NOTTINGHAM on 7 July 2002, and to report on the matters pertaining to the subsequent action.

2. Timings in the report refer to ship's time. A time zone change was conducted at 071730K to 071830L July 2002.

3. Not Applicable.

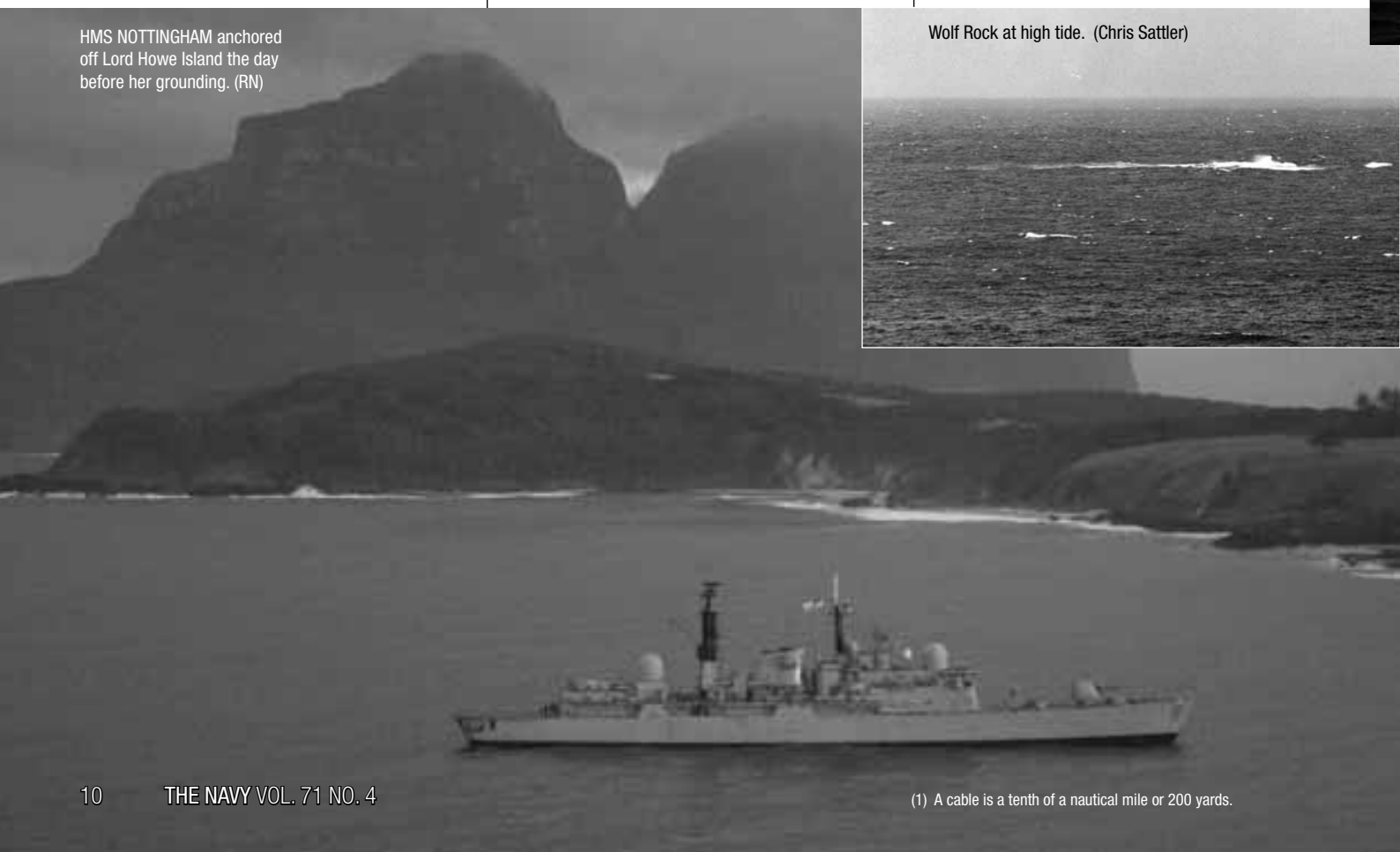
BACKGROUND

4. The Ship's Programme. The Ship had emerged from an extensive refit in September 2000 and spent the next six months conducting sea trials and Safety Readiness Checks, prior to conducting Basic Operational Sea Training (BOST) in April-May 2001. Whilst it has not been confirmed by the Board of Inquiry, it is possible that no external navigation Continuation Training would have been provided for the ship between May 01 and Dec 02. It is acknowledged that the ship had requested support from CMST (Captain Maritime Sea Training) in September 2002 but, it is understood, that this was rejected. After completing Joint Maritime course (JMC) in June that year, the ship deployed to Oman to take part in Exercise Argonaut 01/Saif Sarrea in August, returning to Portsmouth just before Christmas. After a maintenance period in the New Year, HMS NOTTINGHAM conducted a High Seas Firing and then sailed for her Far East Deployment in March 2002.

5. Far East Deployment. HMS NOTTINGHAM had sailed from Portsmouth on 18 March to undertake a nine month deployment to the Far East including involvement in the Five Powers Defence Arrangement Exercise, and was due to undertake high profile visits to Tokyo and Shanghai. The ship sailed from Cairns, Australia, on 4 July and was due to arrive in Wellington, New Zealand on 9 July.

6. Passage from Cairns to Wellington. The passage to Wellington had been planned by a Specialist Fleet Time (Warfare) Officer, and approved by the Commanding Officer two weeks previously. The intention was to transit the Great Barrier Reef, then anchor in the vicinity of Lord Howe Island on 7 July, in order to land members of the Ship's Company for recreation, and on an opportunity basis, meet members of the local community. At an unspecified time on the morning of 7 July, the Commanding Officer was informed that there was a requirement to land a casualty that day for onward move back to the UK. The ETA at Lord Howe Island was 1600K

7. **Lord Howe Island.** Lord Howe Island lies 420 nautical miles (nm) to the north east of Sydney and is the southern most of the outlying islands off the east coast of Australia. The island is 6nm long and 2nm at the widest point. There are a number of off lying features including Wolf Rock, a 350 yard by 200 yard partly submerged rock lying eight cables[1] to the east of the island. The summit of this feature is dome shaped and is reported to be 10 metres in diameter, and has a height of 1.2m above Mean High Water Springs (MHWS). MHWS for Lord Howe Island is 1.8 metres. The chart Aus 610 is a UK Hydrographic Office copy of an Australian chart, and is divided into four sections. The first section is a 1:150000 scale chart of the island and surrounding area, the second section is a 1:25000 scale chart showing the island in greater detail, and the third and fourth sections are 1:12500 scale showing the lagoon on the western side of the island. The third and fourth sections of the chart do not feature in this inquiry. Although exact survey details and methods of survey are not known, the chart has a diagram showing the positional accuracy and depth variation of the survey which gives an indication of its



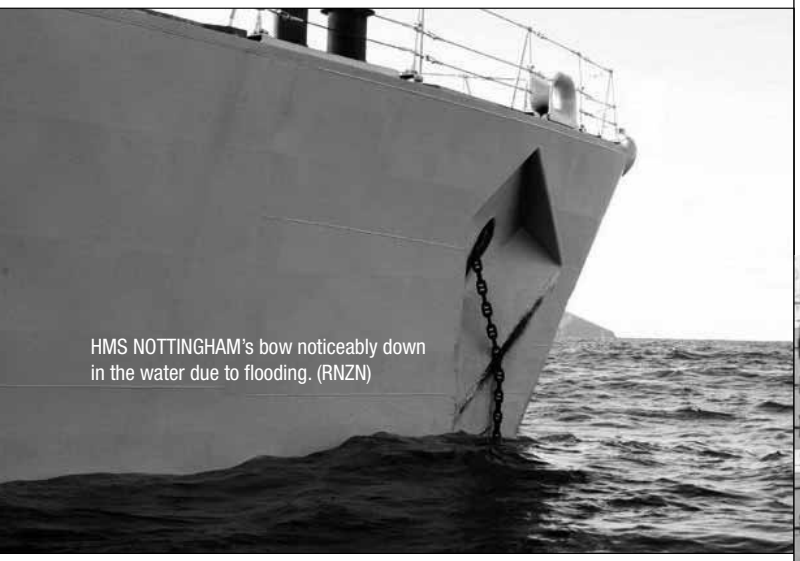
HMS NOTTINGHAM anchored off Lord Howe Island the day before her grounding. (RN)

Wolf Rock at high tide. (Chris Sattler)

(1) A cable is a tenth of a nautical mile or 200 yards.

accuracy. The area around Wolf Rock has a positional accuracy of+/- 500 metres, and a depth accuracy of two metres. In addition there is a note to say that depth anomalies may be expected. Positions on the chart are referred to Datum WGS 84 and Global Positioning System fixes may be plotted directly onto this chart.

8. **Material State.** Propulsion plant reliability had been satisfactory throughout the deployment. Whilst M2 diesel generator was out of action and subject to Operational Defect (OPDEF) and the port Tyne engine had suffered from 'hot starts'; there were no propulsion or steering defects which affected ship handling or propulsion power leading up to or during the incident. Electronic Navigation Aids were serviceable, although the Radar 1007 aerial was suffering from water ingress to the rotating joint, and was due to be repaired in Wellington on 11 July. During Standard Operator Checks (SOCs) on 24 June it was reported that the Echo Sounder 778 Bridge Unit (BU) had an intermittent fault when reading below 20 metres. No fault was found during the subsequent investigation carried out by the maintainer that day. It is concluded that whilst none of these defects contributed directly to the grounding, caution would have been appropriate when using the Echo Sounder 778 BU in depths of less than 20 metres. The Echo Sounder 778 was serviceable.



HMS NOTTINGHAM's bow noticeably down in the water due to flooding. (RNZN)

9. Change of Personnel. A number of key Bridge personnel had changed since OST the previous year, namely the Executive Officer, Navigating Officer and Officers of the Watch I, 2 and 3. Nevertheless, the ship had made the most of many opportunities to maintain its operational capability, and to integrate new personnel into the team. Specifically, a rigorous bridge training programme had been instituted although, as will be discussed later, the standard and supervision of the conduct of navigation was poor.

10. Not Applicable.

11. The records pertaining to the incident were in sufficiently good condition to allow an accurate re-construction of the incident to be made. In particular, the Wordsafe recorder, which records voice on the bridge and various internal and external circuits, proved to be particularly valuable, and provided much of the information gleaned by the Board.

NARRATIVE

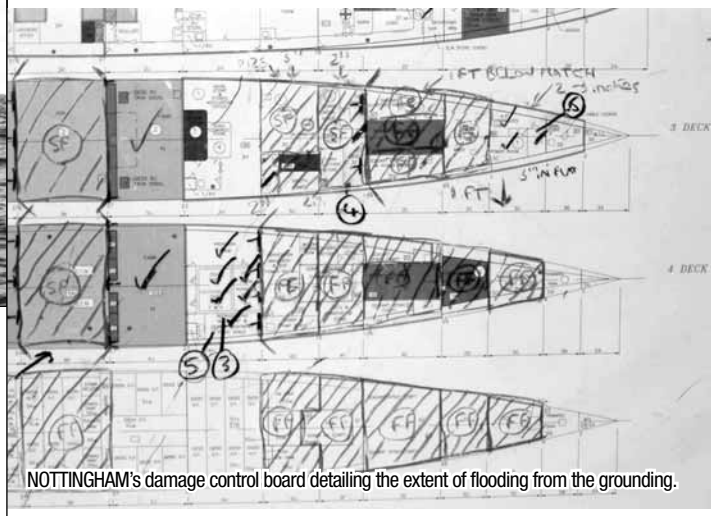
12. In order to give a full account of the events surrounding the grounding and subsequent recovery of HMS NOTTINGHAM, the narrative is divided into three parts. The first and most pertinent part to this Inquiry, deals with the circumstances leading up to the ship grounding at 2202:38L. In the second part, the aspects of Damage Control and Command decision making are described. Finally, the third part deals with the external assistance requested and received in the following 24 hours. (to follow in Vol 72 No 1 of *THE NAVY*).

PART ONE- EVENTS BEFORE THE GROUNDING LORD HOWE ISLAND ANCHORAGE

13. Planning. The Navigating Officer planned an anchorage in the vicinity of Ned's Beach on the north east side of Lord Howe Island, with a secondary anchorage off Middle Beach. Although there was sufficient time to plan the anchorage, there were serious omissions in the final plan. Specifically, there were no clearing bearings drawn on the chart in order to make an assessment of safe water, insufficient blind safety information, and no indication of tidal stream. Wolf Rock, situated 3nm south of the intended anchorage, had not been identified as a danger, despite the intention to pass this feature at 1.5nm later in the day. The rock had not been 'hatched off' by the Navigating Officer, nor had he constructed any method of keeping the ship safe from this danger. The requirements for preparing charts are contained in the Admiralty Manual of Navigation Volume 1.

14. Briefing. During the anchorage brief, the Commanding Officer approved the Navigator's plan and then discussed with the Navigator manning requirements and precautions to be taken. Despite the fact that the ship intended to anchor within three cables of land, and that there were off lying dangers with a positional accuracy of+/- 500 m, it was decided not to close up Special Sea Dutymen, but to anchor 'on the watch' instead. The Damage Control state was however increased to 3Y[(2)], and the Blind Pilotage Safety Officer (BPSO) was closed up 20 minutes before the Estimated Time of Arrival.

15. HMS NOTTINGHAM made landfall at 1400K and despite the poor chart preparations and inadequate precautions, anchored safely at 1534K.



NOTTINGHAM's damage control board detailing the extent of flooding from the grounding.

EVENTS WHILST AT ANCHOR

16. Whilst at anchor, a number of personnel transfers took place using both the seaboat and Lynx, and clocks were advanced at 1730K to 1830L. The Executive Officer proceeded ashore with the intent of returning before 1900L, to allow the ship to depart for Wellington at that time. The weather was fine, visibility good, wind 230/12-16 knots with a long swell running from the south. The swell was causing difficulties in operating the helicopter at anchor. At 1920L, some discussion took place between the Commanding Officer, Principal Warfare Officer and Officer Of the Watch about the possibility of weighing anchor to reduce the roll of the ship, after the Lynx had been waved off three times. On completion of this discussion, the ship shortened in to four shackles of cable, and main engines were started.

17. Alcohol. Alcohol played no part in the incident as is thus not applicable.

18. Commanding Officer's Brief to the Navigator. At 1941L, the Lynx finally managed to land on with the Executive Officer embarked. The

(2) Doors or hatches with a letter Y marked on them are to be kept closed. The Y doors are usually those on a ship in hazard areas (the front/back) and on larger ships in the passageways as well.

An image of the flooding in one of the engine rooms. The Gas Turbine housing is nearly under water.

An image showing the flooding inside the ship.

Commanding Officer then decided to proceed ashore. Before leaving the bridge he instructed the Navigator to "run a racetrack in here, and stay out to the east", and added that he would be back about 2100L. The Navigating Officer replied that he was happy with these instructions.

19. Commanding Officer's Brief to the Executive Officer. The Commanding Officer met the Executive Officer on his way to the hangar at about 1955L and informed him that he was now going ashore, and that the Executive Officer was to take conduct. A short brief took place in which the Commanding Officer instructed the Executive Officer to get under way and carry on down the navtrack, recovering the Lynx on route. These instructions are at variance with those given to the Navigator, 15 minutes before. The Commanding Officer did not clarify his requirements in the Sea Order Book or check the navigation plan on the chart. He did believe however, that in passing conduct to the Executive Officer, it was implicit that he intended for him to plan and execute the task of weighing anchor and joining the navtrack to Wellington, recovering the Lynx at the same time. The Commanding Officer departed in the Lynx at 2005L, while the Executive Officer made his way to the bridge to inform the Officer Of the Watch that he had conduct. Although he joined in February 2002, the Executive Officer had not yet completed his Platform Endorsement in a Type 42 Destroyer.

GETTING UNDER WAY

20. Discussion. After some discussion between the Executive Officer and the Navigator, it was agreed to weigh by 2100L, and proceed to the east to await the arrival of the Lynx. Although a plan of action was agreed verbally, no reference was made to the chart. The significance of poor navigation planning was now becoming significant. The navtrack passed within 1.5nm of Wolf Rock, which had not been identified as a hazard, and consequently no clearing bearings or clearing ranges had been constructed to keep the ship away from this danger. In addition, the position of Wolf Rock had not been registered into the Electronic Navigation Aids, Command System or Command Support System, as an added precaution.

21. Preparations for Getting Under Way. Despite being just 300 yards from the limiting danger line, neither Special Sea Dutymen, Tiller Flat personnel nor the Blind Pilotage Safety Officer[3] were closed up, nor was the echo sounder 778 switched on. The Navigating Officer had still not constructed clearing bearings around the anchorage, however he had put clearing ranges onto the radar, although these were not recorded on the chart. The ship remained in Damage Control State 3 condition Yankee. Shortening in commenced at 2040L and the anchor was reported aweigh at 2057L. The Navigator instructed the Officer Of the Watch to "run an east west racetrack in the vicinity of the anchorage", as he had been instructed to do by the Commanding Officer.

22. Conduct of Navigation. Before departing the anchorage, the Second Officer Of the Watch drew a track of 090 degrees away from the anchorage, towards where he believed the ship needed to proceed in order to join the track to Wellington. He asked the Officer Of the Watch for approval of his plan, which he agreed without reference to the chart. The Officer Of the Watch manoeuvred the ship out of Ned's Bay under the supervision of the Navigator and the Executive Officer. The Second Officer Of the Watch took a final radar fix at 2057L (not reported to the Officer of the Watch) which upon reconstruction, placed the ship 300 yards from the limiting danger line without any member of the navigating team knowing. Nevertheless, the ship departed Ned's Bay safely and proceeded down the racetrack at 12 knots. It was agreed that the flying operations would be conducted in Bridge Control, with the Principal Warfare Officer monitoring in the Operations Room.

CONDUCT OF NAVIGATION FROM ANCHORAGE TO GROUNDING

23. Execution of the Plan. At no time between getting under way at 2057L and the ship grounding at 2202:38L, did the Executive Officer or the Navigator refer to the chart or track, take a fix or ask for a fix to be reported to them. The Officer Of the Watch consulted the chart only once at 2144L, but at no time did he fix the ship himself or supervise the Second Officer of the Watch. No soundings were taken at any point. The Navigating Officer, content that the ship was safely clear of the anchorage, left the Bridge at 2112L to have dinner. The ship was informed at 2124L via VHF, that the Lynx would leave Lord Howe Island in 15 minutes time. The Executive Officer decided therefore, that the ship should proceed down the navtrack at 12 knots, as he had been instructed to do by the Commanding Officer during the hand over of conduct. The Lynx was then informed of the ship's position and intentions for recovery. At about that time, the ship reverted to State 3 condition X-ray and the Second Officer of the Watch changed charts onto the 1:150000 scale section. HMS NOTTINGHAM altered course to 140 degrees at 2125L, in order to regain the track for Wellington. The new course was not checked for hazards either visually, by the radar or on the chart. The Navigating Officer returned to the bridge at 2137L and noticed from the gyro tape repeat, that the ship had altered onto the navtrack to Wellington. He commented later during interview, that 'he was somewhat annoyed to find that he had not been consulted about the change of plan, from running an east/west racetrack, to proceeding down the navtrack'.

24. Recovering the Lynx and Commanding Officer. The Lynx estimated time of arrival was now passed as 2150L, and some discussion now took place between the Principal Warfare Officer and the Officer Of the Watch about a suitable flying course, given the wind direction and considerable swell. The Executive Officer suggested a course of 230

(3) Special Sea Dutymen and the others referred to are those who should be closed up when navigating in close or dangerous water or, for example, undertaking a RAS. They provide immediate cover, for example in the event of a steering gear breakdown.

Shoring up of bulkheads. Good training by the crew in ship survivability ultimately saved the ship from sinking.

degrees, which he believed would be a suitable flying course, and would leave Lord Howe Island safely on the starboard bow. The new course was checked on the 1:150000 scale chart by the Officer Of the Watch, and the ship altered course to 230 degrees at 2144L, modified to 235 degrees at 2149L. The implications of inadequate planning and chart preparations now came to the fore. Without any plan to navigate the ship away from the navtrack, HMS NOTTINGHAM was now 2nm away from a significant danger with no safety considerations or plan in place. The Lynx, with the Commanding Officer embarked, landed at 2153L, shutting down some two minutes later.

25. Planning to Stow the Helicopter. A number of important events now occurred at the same time. The Executive Officer, content that the Lynx had been safely recovered, asked the Navigating Officer his intentions for re-gaining the navtrack. He replied that he wished to get into the lee of the island, in order to stow the helicopter in the hangar, and suggested that a course of North West would achieve this. The Executive Officer agreed with this intention, and then left the Bridge to have a shower. The Principal Warfare Officer, content that flying had completed, left his position in the Operations Room; it was 2155L, and NOTTINGHAM was now just over a mile from Wolf rock.

26. Navigation Error. Without checking the new course by any means, the Navigator advised the Officer Of the Watch, to alter to the North West, initially suggesting a course of 350 degrees. This was modified to 320 degrees shortly afterwards and before the ship had completed its turn. During interview, the Officer Of the Watch stated that he assumed that the Navigating Officer was looking after the navigation and 'would watch his six', (i.e. to supervise the navigation while the Officer Of the Watch concentrated on the helicopter movement). As the ship steadied on the new course, it was decided to shut down the Starboard Tyne, and there followed a four minute discussion between the Navigator and the Officer Of the Watch concerning the correct procedure for shutting down engines. During this time, the Officer Of the Watch was distracted from his primary function of navigation and maintaining a proper lookout. Neither the Navigator nor the Officer of the Watch noticed that the Second Officer of the Watch had fixed the Ship at 2200L, in a position four cables South East of Wolf Rock, and heading directly towards it at 12 knots. This fix was initially plotted onto the 1:150000 scale chart, the Second Officer Of the Watch inadvertently drawing part of the fix over Wolf Rock completely obscuring it from view. The Second Officer Of the Watch did not report this fix and then proceeded to change onto the 1:25000 scale section of the chart.

27. The Grounding. The Officer Of the Watch was again distracted by a call from the Flight Deck asking permission to move the Lynx, which he approved. This was followed by a further call from the Machinery Control Room (MCR), requesting permission to shut down the port steering motor. Fully occupied with the safety of the helicopter, he closely monitored the pitch and roll gauges mounted on the side of the pelorus[4]. He stated later during interview, that he was "petrified of losing or damaging the Lynx". Now finally looking out the window at 2202L, he spotted a 'pale white glow on the water' some 100 yards on the starboard bow, and thinking it was moonlight, looked towards the sky out of the front bridge window. At the same moment, now just 20 seconds from impact, the Navigator finally saw white foam on the water, and immediately went to the chart to check the ship's position. Realising the ship was in immediate danger, he called to the Officer Of the Watch "come right mate", but just five seconds later at 2202:38L, the ship struck the western side of Wolf Rock.

28. The impact of the collision caused a sudden jolt in the ship and considerable damage to the starboard side. The Navigating Officer piped "Emergency Emergency, close all red openings" and ordered the Officer Of the Watch to come astern. The Commanding Officer arrived on the bridge within 30 seconds, with the Executive Officer closely behind him.

Part 2 of THE NAVY's series on the Grounding of HMS NOTTIGHAM will details the events immediately after the grounding, external assistance provide, damage control and the outcomes of the BOI.

HMS NOTTINGHAM anchored off Lord Howe Island a few days after the grounding awaiting further assistance from the RNZN. (RNZN)

(4) The pelorus is the self-levelling compass binnacle arrangement usually there are three on the bridge and also two more on the bridge wings.

01 ANAO AUDIT OF SEASPRITE PROJECT

In June the Australian National Audit Office (ANAO) released its Audit Report of the Super Seasprite Project.

The ANAO's report stated that the objectives of the audit were to identify issues contributing to the cancellation of the project to supply the required capability, and to highlight the project management lessons for current and future major Defence acquisitions.

The ANAO examined decisions taken at key points in the life of the Project to acquire the Super Seasprites, having regard to the information available within Defence and DMO (Defence Materiel Organisation) at the time these decisions were taken, and reviewed the extent to which the implementation of these decisions contributed to project outcomes. This analysis revealed that decision making occurred in an environment of significant tension between the objective of providing Navy with the required capability, the fundamental obligation to meet changed ADF airworthiness requirements, and the inherent difficulties in managing a complex aircraft acquisition and associated sustainment arrangements. For the Project to be successful, these tensions needed to be managed and resolved. In the event, they were not, with the following factors contributing to the unsatisfactory Project outcome:

- the risks associated with the Project were increased by the decision to incorporate extensive capability enhancements into a smaller helicopter than what could normally operate those enhancements;
- an adequate understanding of the significance of the risks associated with the acquisition of capability was not attained through the requirement definition and tender evaluation processes;
- inadequacies in cost estimation resulted in a significant shortfall in the approved Project budget which was addressed by reducing the number of helicopters acquired, other cost saving measures that placed the delivery of the desired capability to Navy at additional risk, and through significant expenditure funded from outside the Project budget;
- financial leverage available through the Prime Contract was ineffectively applied in the early stages of the Project, allowing a large proportion of the funds to be expended despite evidence of schedule slippage and burgeoning risk;
- the Project Office experienced ongoing difficulties in attracting and retaining appropriately qualified personnel which inhibited its capacity to manage a large and complex project;
- software and system development activities undertaken by sub-contractors to the Prime Contractor were critical to project success, but DMO had limited contractual capacity to resolve risks as they emerged;
- the decision to provisionally accept the Super Seasprites in an interim configuration did not deliver the desired outcomes, was poorly implemented and shifted much of the risk associated with the Project to DMO;
- Defence did not seek to amend the Prime Contract to reflect significant changes to ADF airworthiness management practices (brought about by the Sea King inquiry into the crash on the Indonesian island of Nias) creating a disparity between contractual and ADF certification requirements which Defence and DMO were ineffective in addressing; and
- poor contract management practices within Defence and DMO, over the life of the Project, contributed to ongoing contractual uncertainty.

The Government took the decision to cancel the Seasprite project in March 2008 given the ongoing difficulties the project was experiencing.

02 HMAS SYDNEY II LOSS REPORT RELEASED

The loss of HMAS SYDNEY II Commission of Inquiry Report was released by the Minister for Defence, Senator John Faulkner, in Canberra on 12 August.

"This report offers Australians confirmation of the circumstances surrounding the loss of HMAS SYDNEY II, and I thank the President of the Commission of Inquiry, Terence Cole, for his painstaking work," Senator Faulkner said.

The Chief of the Defence Force, Air Chief Marshal Angus Houston, AC, AFC said HMAS SYDENY II was lost with all hands on 19 November 1941, following an engagement with the German raider, HSK KORMORAN, off the Western Australian coast.

"For a long time our nation has struggled to understand how our greatest maritime disaster occurred. The unanswered questions have haunted the families of those brave sailors and airmen that never came home," Air Chief Marshal Houston said.

President of the Commission, the Honourable Terence Cole, AO, RFD, QC, said that the Inquiry's key findings confirm that "accounts provided by the HSK KORMORAN survivors of SYDNEY II's last movements and of the damage she sustained during the engagement with the German raider are correct."

When SYDNEY was lost, the Commanding Officer of HMAS SYDNEY II was performing his military duty in seeking to identify an unknown ship.

"The Commanding Officer of HMAS SYDNEY II was not expecting to encounter any merchant ship in the location where he encountered KORMORAN. That knowledge together with his knowledge of the possible presence of a German raider should have caused the sighted vessel to be treated as suspicious," Mr Cole said.

Another key finding is that there is now additional

01 A Super Seasprite flying off the coast of Jervis Bay during trials in RAN livery. Changing the ADF's airworthiness regulations halfway through the acquisition cycle of the Seasprite was one of the factors contributing to its cancellation in March 2008.

02 (From Left to Right) Chief of Navy, Vice Admiral Russ Crane, AM, CSM, RAN; President of the Commission, the Honourable Terence Cole, AO, RFD, QC, and Minister for Defence, Senator John Faulkner, in Canberra on 12 August for the report into SYDNEY II's loss (Defence)

compelling evidence to support the conclusion that the body recovered from Christmas Island in 1941 is that of a member of HMAS SYDNEY II's ship's company.

Mr Cole further concluded that "each of the many frauds, theories and speculations reported to the Inquiry were thoroughly investigated and none were found to have any substance whatsoever."

Chief of Navy, Vice Admiral Russ Crane, AM, CSM, RAN encouraged those with an interest in HMAS SYDNEY II to read the report and reflected that the loss of HMAS SYDNEY II needs to be viewed in context of the times.

"An appreciation of the training, tactics and procedures of the time and the particular circumstances of the day in question, including the fact that merchant vessels frequently did not properly respond to queries by warships, must be taken into account to help understand why HMAS SYDNEY II approached so close to HSK KORMORAN," Vice Admiral Crane said.

The Commission was appointed in May 2008 to inquire into and report upon circumstances associated with the loss of HMAS SYDNEY II and consequent loss of life and related subsequent events.

TASMANIAN COMPANY WINS AWD WORK

Greg Combet, Minister for Defence, Personnel, Materiel and Science, congratulated Tasmanian company Taylor Bros Slipway and Engineering on winning a contract worth more than $25 million with the Air Warfare Destroyer project.

Mr Combet said Taylor Bros, an icon in Tasmania's shipbuilding industry, would deliver a range of accommodation products to the Hobart class AWDs including cabin and sanitary modules, on-board furniture and galley, pantry and scullery equipment.

Taylor Bros were established in 1936 and has a long and successful history of working with both domestic and international marine-based industries. It has won this contract in a highly competitive tender process.

Australian industry content in the contract is valued at about 70 per cent.

The success of a Tasmanian company brings to four the number of Australian states contributing in a major way to the AWD project.

"Construction of the ships' blocks which will make up the three air warfare destroyers will take place in Victoria, NSW and South Australia with the ships then being assembled at Osborne in South Australia. This demonstrates the national importance of the AWD project," Mr Combet said.

The contract for Taylor Brothers will create 20 new jobs.

In a separate announcement, Mr Combet also said that the AWD Alliance had signed a contract for the provision of what will be Australia's biggest crane.

"The crane with a capacity of more than 900 tonnes will be supplied by Manitowoc Crane Group Australia at a cost in the region of $14 million. At ASC's shipyard in Adelaide the crane will be used to assemble the ships bringing together the blocks which will make up the AWDs. The blocks will measure up to 18 metres wide and weigh up to 250 tonnes.

"These two announcements show that the AWD project remains on track to deliver the first AWD in 2014," Mr Combet said.

03 SEAHAWK UPGRADE DOWNGRADED

The new 2009 Defence Capability Plan (DCP) has dramatically reduced the scope of the upgrade for the RAN's S-70B Seahawk naval helicopters under the Project AIR 9000 Phase 3 upgrade programme.

Released by Defence on 1 July, the DCP has cut expenditure on AIR 9000 Phase 3 from nearly $1billion to less than $300m.

The upgrade programme has now been renamed the Seahawk Capability Assurance Programme (SCAP) 1 and 2. DCP09 states that the project is now focused on "maximising the number of aircraft available for operations" until the aircraft's withdrawal from service in 2018.

SCAP 1 will update tactical display units, engine control units, the automatic flight control system and identification friend-or-foe transponders. SCAP1 has completed first pass approval and initial operating capability (IOC) is expected from 2010-12.

SCAP 2 will address obsolescence issues relating to the Seahawk's main mission computer and display generator unit.

The Seahawks are currently coming out of another upgrade which saw a FLIR (Forward Looking Infra-Red) optronic sensor fitted to the nose of the aircraft as well as electronic warfare self protection equipment to decoy anti-aircraft missiles.

04 TYPE 42 BATCH 3 DESTROYERS FOR SALE

The UK Ministry of Defence's Disposal Service Authority (DSA) has announced its intention to appoint a prime contractor to plan the government-to-government sale of the RN's four Type 42 Batch 3 destroyers following their withdrawal from service.

The four Type 42 Batch 3 ships were commissioned into the RN between 1982 and 1985. They are 'stretched' variants of the original Type 42 design, their hull having been lengthened by 16 m to improve speed and sea-keeping.

HMS MANCHESTER, HMS GLOUSTER, HMS YORK and HMS ENDINBURGH will be progressively retired from service between early 2011 and mid-2013. The ships, which are equipped with the GWS30 Sea Dart area air defence missile system, are being replaced in RN service by the Type 45 Daring class destroyers.

The DSA is commencing marketing activities ahead of the ships' decommissioning. Initial

03 Three pre-updated Seahawks in formation off Jervis Bay, NSW. The new 2009 Defence Capability Plan (DCP) has dramatically reduced the scope of the upgrade for the Seahawk. The upgrade will only concentrate on keeping them airworthy until replaced. (RAN)

04 The Type 42 Batch 3 destroyer HMS MANCHESTER at sea. The ships will be sold on as general-purpose platforms with the Sea Dart system removed before sale. One potential buy is said to be Pakistan (RN)

discussions have already been conducted with Pakistan, which is seeking second-hand ships to bolster its surface fleet.

It is understood that the ships will be sold on as general-purpose platforms with the GWS30 Sea Dart system removed before sale: the system is approaching obsolescence and increasingly difficult to support, while the missile war stock itself is approaching the end of its service life.

In a solicitation released on 16 July, the DSA states: "At the point at which the ships are passed to the DSA, all maritime certification will have expired and some essential equipments and weapon systems will require replacing. A significant amount of regeneration activity will thus be required with potentially some design and conversion activity associated with the replacement systems that will be removed either for security reasons or through obsolescence and which will render the ships capable of undertaking a general purpose warship role."

It further adds that the prime contractor will work alongside the DSA to support international marketing activities, undertake design study work to develop enhancements for the general purpose role, work to negotiate a sales agreement and lead a programme of ship reactivation/regeneration, according to the capability and configuration agreed with the customer. The last task will include the selection and management of all subcontractors, including contracting with original equipment manufacturers for proprietary work.

Interested parties had been given until 21 August to register their interest and prequalify for the receipt of a forthcoming invitation to tender. At present no details of any bidders have been made public.

Potential bidders have been advised that the costs associated with transporting the ships from the decommissioning site - currently intended to be Portsmouth naval base - to the bidders' nominated facility and the cost of establishing and maintaining a DSA project management team at that facility are intended to be included as elements of the contract award criteria.

PACIFIC PATROL BOAT UPGRADE

The latest in a series of Australian-sponsored Pacific Patrol Boat refits has been completed and the refurbished vessel handed-back to the Kingdom of Tonga at a ceremony at the Rosshaven Marine Shipyard in Townsville QLD on 4 September.

Representing the Department of Defence, Air Commodore Tony Jones handed over the newly refitted Pacific Patrol Boat VOEA NEIAFU to the High Commissioner of the Kingdom of Tonga, His Royal Highness the Crown Prince Tupouto'a Lavaka.

The handover ceremony included an opening prayer and blessing of the ship, a parade by the Ship's crew and the signing of an official Certificate of Completion by the General Manager of Rosshaven Marine Mr Christopher Helps, Air Commodore Jones and His Royal Highness the Crown Prince.

Under Australia's Defence Cooperation Program - sponsored and funded by Defence's International Policy Division - 22 Pacific Patrol Boats (PPB) were built and gifted to 12 Pacific nations between 1987 and 1997. The 31.5 metre PPBs are built to a commercial standard and are used by Pacific nations for maritime surveillance and response, in particular fisheries patrols.

Each PPB will undergo a six-month life extension refit that will see the repair and refurbishment of key systems to allow a further 15 years operation, bringing the total operational life of the boats to 30 years.

The refit program includes repairs to ageing hulls and superstructures, structural modifications to improve and strengthen the hull, improvements in refrigeration and air conditioning systems, engine, generator and gearbox overhauls and installation of advanced navigation systems.

Since 2003, twelve PPBs have completed life extension refits in North Queensland. All refits for the remaining PPBs are scheduled for completion by the end 2012.

Tonga has three PPBs – VOEA NEIAFU, VOEA SAVEA and VOEA PANGAI. Patrol Boat VOEA PANGAI will commence its refit in mid-September 2009.

05 ROYAL NAVY'S CARRIERS BEGIN CONSTRUCTION

Construction has begun on the RN's new aircraft carriers, their largest ever warships, with Her Royal Highness The Princess Royal performing the initial steel-cutting for the first of the ships on 7 July.

The steel-cutting ceremony took place at BVT Surface Fleet's shipyard in Govan.

The Queen Elizabeth (QE) class carriers, together with the Joint Strike Fighter aircraft and the brand new Type 45 destroyers, will form the cornerstone of Britain's future ability to jointly project airpower worldwide from land or sea at a time and place of the UK's choosing.

Then First Sea Lord Admiral Sir Jonathon Band said: "The QE Class, together with the supporting aircraft forming the Carrier Strike, represent a step change in Defence's capability, enabling Britain to deliver airpower from the sea wherever and whenever it is required. This strategic effect, influence and, where necessary, direct action will give us an unprecedented range of options to deal with the challenges of an uncertain world at a time and place of our choosing.

"These ships are not just spare airfields, they are an instrument of national power: the 'big stick' which can be waved by the Government in areas of strategic interest to influence, coerce and deter."

05 A computer generated image of 'The Queens".

06 A USN E-2D Advanced Hawkeye during testing. (USN)

FIREPOWER BOOST FOR TYPE 23S

The RN Type 23 frigate HMS WESTMINSTER is set to get a major boost to her firepower in a £11M refit at Devonport.

Babcock have began work on the refit that will see the Type 23 frigate become the first in the class to receive both a major update to the Seawolf self-defence missile system and the new command system that controls the weapons at the same time.

Minister for Defence Equipment and Support, Quentin Davies, said: "We work closely with industry to equip our Armed Forces and this refit will boost several of HMS WESTMINSTER's systems and making her the most advanced frigate in the fleet.

"The Seawolf update that is being rolled out across the Type 23s is designed to combat the increasing threat of faster, lower flying and more manoeuvrable missiles today and also to guard against future advances. The system can now track an object the size of a cricket ball at twice the speed of sound from over 20 miles away and launch two counter missiles."

The new 'brain' of the ship's weapons systems, called DNA(2), is also being installed as part of a class-wide programme upgrade across the Type 23 Frigate Force to help ensure that operational capability can be sustained and optimised for the future.

Then Director of Ships at Defence Equipment and Support, Rear Admiral Bob Love (now First Sea Lord), said: "The updated command system is designed to sustain the world-class operational capability of the Royal Navy's Type 23 frigates as technology moves forward. Exploiting off-the-shelf computing technology as appropriate, the system will be easier and more cost effective to maintain through life and shares many technological and operational features with that on the Type 45 Destroyers now entering service. This commonality will deliver further support efficiencies and minimize the need for Royal Navy personnel to retrain across ship classes during their careers."

06 ADVANCED HAWKEYE PROGRAM REACHES MILESTONE C

The USN's E-2D Advanced Hawkeye program received approval to begin low-rate initial production on June 11.

US Under Secretary of Defense for Acquisition, Technology and Logistics, Ashton Carter, signed the Acquisition Decision Memorandum that delivered the decision following a Milestone C review for which the programme underwent a system design verification and demonstration during developmental testing.

The decision comes after the E-2D's completion of an operational assessment last year to verify the aircraft's systems capability, suitability and design will be fully responsive to the future needs of the carrier air strike group.

Under the E-2D's low-initial rate production, the USN will procure two aircraft each in fiscal year 2009 and 2010. The program of record indicates the Navy will purchase 75 total aircraft.

CHILE TO RECEIVE US OILER

A decommissioned Henry J Kaiser-class fleet oiler formerly operated by US Military Sealift Command (MSC) is being regenerated for transfer to the Chilean Navy.

The 40,900-ton ex-USNS ANDREW J HIGGINS (T-AO 190) is expected to be renamed ALMIRANTE MONTT and replace the 1960s-vintage replenishment ship ARAUCANO in Chilean service.

Construction of the first Kaiser-class vessels at the Avondale yard in Louisiana (now owned by Northrop Grumman) in the 1980s was delayed by design problems, excessive vibration at high speeds and other issues. Laid down in November 1985 and launched in January 1987, fourth-of-class ANDREW J HIGGINS was delivered to MSC in October of that year but decommissioned early in May 1996.

In common with most ships in the 16-strong class, it is a single-hulled vessel capable of carrying 180,000 barrels of fuel oil or aviation fuel. Three of the later ships (T-AOs 201, 203 and 204) were built with double hulls to comply with the requirements of the 1990 Oil Pollution Act, increasing their full load displacement to 41,225 tons but reducing their cargo capacity by 17 per cent. Fourteen of the ships remain in MSC service.

JAPAN LAUNCHES SECOND HELICOPTER CARRIER

The second of two 197m-long through-deck helicopter carriers for the Japan Maritime Self-Defense Force (JMSDF) was launched on 21 August at IHI Marine United's Yokohama shipyard.

The Hyuga-class ship, ISE, is scheduled to commission in March 2011, two years after first-of-class, JS HYUGA, formally joined the Japanese fleet.

Described within the JMSDF as helicopter-capable destroyers, the 18,000-ton vessels are intended primarily for anti-submarine warfare missions with an embarked air wing comprising up to 10 SH-60K Seahawk helicopters.

HYUGA and ISE will replace the capability provided by the two 5,000-ton Haruna-class destroyers, now decommissioned, each of which could accommodate three Seahawk helicopters.

INDIAN NAVY SEA HARRIER SHORTAGE

The Indian Navy (IN) is facing a serious shortage of aircraft capable of operating from its aircraft carrier, INS VIRAAT, which is about to re-enter service following a refit.

The loss of a Sea Harrier on 21 August has reduced the IN Sea Harrier fleet to just eight, with three twin-seat Sea Harrier T Mk-60s, out of an original 30 purchased in 1984.

Most of the aircraft have been lost in accidents,

07 The USN's first X-47B Unmanned Combat Air System (UCAS) for aircraft carrier launches, recoveries and at-sea operations under the UCAS Carrier Demonstration (UCAS-D) program seen here during a series of static and dynamic proof load tests to validate the design and structural integrity. (Northrop Grumman)

in which eight pilots have died. This includes one fatality in the most recent incident, which occurred when a Sea Harrier on a routine sortie crashed into the Arabian Sea off the western Goa coast. The cause of the crash is unknown.

The remaining 11 single-seat and twin-seat Sea Harriers are completing a limited upgrade under an US$973 million programme that will keep them in service until around 2020.

This includes replacing their original Blue Fox radars with Israel's Elta EL/M-2032 multimode fire-control radar, as well as integrating Rafael's Derby beyond-visual-range air-to-air missile. Making them quite formidable air superiority fighters.

An offer of four Sea Harrier airframes from BAE Systems, which the IN could cannibalise in order to keep its fleet operational, remains under consideration.

In 2006 the IN declined the UK offer of eight second-hand Sea Harrier FA.2 fighters following differences over price and the exclusion of radar and other components the IN wanted.

The IN had planned on retiring VIRAAT and the Sea Harrier fleet by 2009-10 but was forced into retaining and retrofitting both following delays in the delivery of their replacements: INS VIKRAMADITYA (ex- ADMIRAL GORSHKOV), a 44,750-ton Russian Kiev-class aircraft carrier; and its air arm of 16 MiG-29Ks.

AEGIS BALLISTIC MISSILE DEFENCE PROGRESSING WELL

Lockheed Martin installed the latest evolution of the Aegis Ballistic Missile Defence (BMD) System – which includes a new ballistic missile defence signal processor, Aegis BSP – on the cruiser USS LAKE ERIE (CG-70). Over the next year, USS LAKE ERIE will complete a series of tests, leading up to full certification of the system upgrade by the USN in early 2011.

The Aegis BMD 4.0.1 system represents the next incremental capability upgrade that has been the hallmark of Aegis and its "build a little, test a little, learn a lot" systems engineering philosophy. The upgrade's new Aegis BSP processor improves the system's ability to detect, track and target complex ballistic missiles and their associated countermeasures. The addition of BMD 4.0.1 also integrates the new Standard Missile-3 Block IB missile in late 2010.

While USS LAKE ERIE begins advanced testing with Aegis BMD 4.0.1 to support 2011 certification timeline, the other USN Aegis BMD-capable ships are now installing the recently-certified Aegis BMD 3.6.1 version that adds the capability to defeat short-range ballistic missiles as they re-enter the atmosphere in their final (terminal) stage of flight to the existing exo-atmospheric capability. The ongoing develop-test-field process provides incremental enhancements that continue to build on each other and move new capability to the fleet faster. Three additional US East Coast-based Aegis-equipped ships also will receive Aegis BMD 3.6.1 to perform ballistic missile defence by early 2010.

CHINESE DEVELOP SPECIAL "KILL WEAPON" TO DESTROY US AIRCRAFT CARRIERS SAYS US NAVAL INSTITUTE

With tensions already rising due to the Chinese Navy becoming more aggressive in asserting its territorial claims in the South China Sea, the USN seems to have yet another reason to be deeply concerned.

After years of conjecture, details have begun to emerge of a "kill weapon" developed by the Chinese to target and destroy US aircraft carriers.

A recent report, first posted on a Chinese blog, provides a description of an anti-ship ballistic missile (ASBM) that can strike carriers and other US vessels at a range of 2,000km.

The range of the modified Dong Feng 21 missile is significant in that it covers the areas that are likely hot zones for future confrontations between US and Chinese surface forces.

The size of the missile enables it to carry a warhead big enough to inflict significant damage on a large vessel, potentially providing the Chinese the capability of destroying a US supercarrier in one strike.

Because the missile employs a complex guidance system, low radar signature and a manoeuvrability that makes its flight path unpredictable, the odds that it can evade tracking systems to reach its target are increased. It is estimated that the missile can travel at Mach 10 and reach its maximum range of 2,000km in less than 12 minutes.

Supporting the missile is a network of satellites, radar and unmanned aerial vehicles that can locate US ships and then guide the weapon, enabling it to hit moving targets.

While the ASBM has been a topic of discussion within national defence circles for quite some time, the fact that information is now coming from Chinese sources indicates that the weapon system is operational. The Chinese rarely mention weapons projects unless they are well beyond the test stages.

If operational as is believed, the system marks the first time a ballistic missile has been successfully developed to attack vessels at sea. Ships currently have no defence against a ballistic missile attack on themselves.

Along with the Chinese naval build-up, US Navy officials appear to view the development of the anti-ship ballistic missile as a tangible threat.

After spending the last decade placing an emphasis on building a fleet that could operate in shallow waters near coastlines, the USN seems to have quickly changed its strategy over the past several months to focus on improving the capabilities of its deep sea fleet and developing anti-ballistic defences.

As analyst Raymond Pritchett notes in a post on the US Naval Institute blog.

08 The USN's first trimaran littoral combat ship, INDEPENDANCE (LCS-2), undergoing builder's trials to test the vessel's propulsion, communications, navigation and core mission systems. (USN)

09 A former USN UH-3H Sea King helicopter being loaded onto the amphibious dock landing ship USS OAK HILL (LSD-51) for delivery to Puerto Belgrano in Argentina. (USN)

"The Navy's reaction is telling, because it essentially equals a radical change in direction based on information that has created a panic inside the bubble. For a major military service to panic due to a new weapon system, clearly a mission kill weapon system, either suggests the threat is legitimate or the leadership of the Navy is legitimately unqualified. There really aren't many gray spaces in evaluating the reaction by the Navy…the data tends to support the legitimacy of the threat."

1,000TH VERTICAL LAUNCHED ASROC PRODUCED

US Naval Sea Systems Command (NAVSEA) recognised the 1,000th vertical launch anti-submarine rocket (VLA) (ASROC) missile produced on June 30 during a ceremony at Lockheed Martin Integrated Systems, Inc., in Akron, Ohio.

The VLA ASROC is a missile designed to deliver either a Mk-46 Mod 5 (ASW) or a new Mk-54 torpedo to an entry point in the water. It is carried by USN Aegis-equipped cruisers and destroyers.

"The VLA missile has been deployed on our surface ships since 1992," said Rear Adm. Tom Wears, undersea weapons programme manager. "It provides an all-weather, 360-degree quick-reaction antisubmarine capability."

07 X-47B TESTED FOR CARRIER OPERATIONS

US company Northrop Grumman recently completed a series of static and dynamic proof load tests to validate the design and structural integrity of the USN's first X-47B Unmanned Combat Air System (UCAS) for aircraft carrier launches, recoveries and at-sea operations under the UCAS Carrier Demonstration (UCAS-D) programme.

"Arrested landings, catapult launches, high winds, pitching deck, subsonic speeds, you name it - the operating environment of the carrier air wing is unforgiving," said Scott Winship, vice president and programme manager of the Navy UCAS programme for Northrop Grumman Aerospace Systems sector. "The X-47B was built for these conditions, and as the results of the rigorous proof test show, the design of the aircraft is structurally sound for all aspects of carrier operations."

Conducted over a two-month period with US NAVAIR involvement and oversight, the first X-47B underwent a series of progressive structural, functional proof and calibration tests to verify the integrity of all flight control surfaces, major structural load paths, main landing gear structure and tailhook assembly.

According to Northrop Grumman's air vehicle integrated product team lead, Tom Soard, "Past experience in the Navy shows these tests are the only way to verify the design and the tools used to estimate the load paths. This test proved that our latest finite element models are indeed very accurate. The results match our predictions very well." To conduct the tests, over 200 electro-hydraulic assemblies were attached to the major components of the X-47B. Pressure was applied to simulate aircraft flight conditions. Each test condition was reviewed and the results approved by the X-47B airframe team before the next series of tests were initiated. Reported results confirm that the X-47B meets the design requirements outlined by the US Navy for a jet-powered, fighter-sized aircraft to demonstrate autonomous launches and recoveries from a carrier.

The X-47B aircraft, now designated with Navy Bureau Number 168063, will undergo engine integration and taxi tests through the fall in preparation for first flight and carrier trials. The second aircraft is currently being assembled and will begin proof load tests later this year.

08 LCS-2 UNDERGOES BUILDER'S TRIALS

The USN's first trimaran littoral combat ship INDEPENDANCE (LCS-2) is undergoing builder's trials to test the vessel's propulsion, communications, navigation and core mission systems. The LCS-2 is a 418 ft aluminium trimaran with good seakeeping and aviation capability as a result of its long, sleek central hull and smaller side hulls. This innovative warship was designed and built by Austal on behalf of the General Dynamics Littoral Combat Ship team.

SM-3 ACHIEVES 15TH HIT-TO-KILL INTERCEPT

An SM-3 anti-ballistic missile missile recently destroyed a short-range ballistic missile target in space on July 30. The test marked the 15th hit-to-kill intercept for SM-3 and the 19th missile intercept of the Aegis Ballistic Missile Defence programme.

The target ballistic missile was launched from the USN's Pacific Missile Range on Kauai while the crew of the guided missile destroyer USS HOPPER (DDG-70) fired the SM-3.

SM-3 is being developed as part of the Missile Defence Agency's sea-based Aegis Ballistic Missile Defence System. The missiles are deployed on US Aegis cruisers and destroyers and Japanese destroyers to defend against short- to intermediate-range ballistic missile threats in the ascent and midcourse phases of flight. Raytheon also is developing the kinetic warhead for SM-3.

SM-6 COMPLETES KEY DEVELOPMENTAL TEST

Raytheon's Standard Missile-6 (SM-6) has completed tests which validate the extended-range anti-air warfare missile's airframe and autopilot performance.

By performing a series of preprogrammed manoeuvres, the SM-6 missile was pushed to the limits of its performance, allowing the USN to gather vital simulation validation data.

"The technology that was proven in this test will provide the USN with the weapon system it needs for outer and area defence to defeat current and future missile threats," said Louis Moncada, Raytheon Missile Systems' director of the SM-6 programme. "This control test vehicle launch is

10 Malaysia's first submarine, the Scorpene class SSK KD TUNKU ABDUL RAHMAN, leaving Toulon, France in July, 2009.

the fourth test of the SM-6 following two guided test vehicle launches in 2008 and the recent advanced area defence interceptor test in May."

SM-6 takes full advantage of the legacy Standard Missile airframe and propulsion elements, while incorporating advanced signal processing and guidance control capabilities of Raytheon's Advanced Medium-Range Air-to-Air Missile. This merger of these two proven technologies allows SM-6 to use both active and semiactive modes.

09 SEA KINGS DELIVERED TO ARGENTINA

Two former USN UH-3H Sea King helicopters have been delivered to Argentina through the USN International Programs Office Foreign Military Sales programme, and the Naval Air Systems Command.

They are being flown by the 2nd Naval Helicopter Squadron based at the 'Comandante Espora' Naval Air Base near Bahia Blanca, Argentina.

The two helicopters were loaded onto the amphibious dock landing ship USS OAK HILL (LSD-51) which got underway on June 3rd for South America to take part in U.S. Fourth Fleet's Southern Partnership Station and U.S. Marine Corps Forces South exercise Southern Exchange, a multinational joint exercise with several South American countries, including Argentina. The now-Argentine helicopters rode the ship in what's known as an Opportune Lift, or OPLIFT, and arrived at Argentina's Puerto Belgrano June 26.

The Argentine Navy was forced to procure 'new' Sea King helicopters after three were lost during a fire on board the the icebreaker ALMIRANTE IRIZAR in April 2007.

The two recently transferred UH-3H helicopters are part of a package of six, four of which will become operational, while the other two will be used for spare parts. Naval Air Systems Command arranged for the helicopters to be pulled from storage and refurbished through a commercial contractor, while the US Navy International Programmes Office served as the liaison with Argentina, and processed the necessary paperwork to allow the helicopters to be exported.

10 MALAYSIA'S FIRST SUBMARINE ARRIVES HOME

Malaysia's first submarine, KD TUNKU ABDUL RAHMAN, left Toulon, France in July, 2009, and arrived in Malaysia during September

The submarine stoped at Lumut and Port Kelang for a few days before continuing the journey to Sepanggar naval base in Sabah. En route to Malaysia, the submarine transited the major ports of Jeddah, Djibouti and Cochin.

The Scorpene submarine project started when Malaysia signed a deal to purchase two submarines in 2002.

11 FRENCH MISTRAL LHDS FOR RUSSIA?

Russia is planning on signing a contractual agreement with France on the purchase of a Mistral class amphibious assault ship, the chief of the Russian General Staff said recently.

"We are planning to reach an agreement [with France] this year on the production and the purchase of a Mistral class vessel," Gen. Nikolai Makarov told a news conference in the Mongolian capital, Ulan Bator.

"We are negotiating the purchase of one ship at present, and later planning to acquire 3-4 ships [of the same class] to be jointly built in Russia," the General said.

A Mistral class ship is capable of transporting and deploying 16 helicopters, four landing craft, up to 70 vehicles including 13 main battle tanks, and 450 soldiers. The vessel is equipped with a 69-bed hospital and could be used as an amphibious command ship.

Makarov did not disclose the amount of the deal, but a high-ranking Russian source close to the negotiations said the ship could be worth between 300 and 400 million euros. The purchase, if successful, would be the first large-scale arms import deal concluded by Russia since the collapse of the Soviet Union.

Russia first expressed an interest in bilateral cooperation with France in naval equipment and technology in 2008, when Navy Chief Adm. Vladimir Vysotsky visited the Euronaval 2008 arms show in France.

The Admiral said at the time that the Russian Navy was interested in "joint research and also direct purchases of French naval equipment."

According to other military sources, the possibility of buying a Mistral class amphibious assault ship was discussed at the naval show in St. Petersburg in June this year.

Russia's current weapons procurement program through 2015 does not envision construction or purchases of large combat ships, so the possible acquisition of a French Mistral class ship is most likely to happen under the new programme for the years up to 2020, which is still in the development.

12 YURY DOLGORUKY COMPLETES FIRST ROUND OF SEA TRIALS

Russia's newest Borey class strategic nuclear submarine, YURY DOLGORUKY, has completed the first round of sea trials.

Sea trials of the submarine, which is expected to be armed with new Bulava sea-based ballistic missiles, started on June 24 in the White Sea.

"A team of workers and submariners has successfully completed the set tasks," Sevmash general director Nikolai Kalistratov said.

He added that the YURY DOLGORUKY would still have to pass a number of sea trials later this year to test equipment and performance levels.

The vessel is 170 metres (580 feet) long, has a hull diameter of 13 metres (42 feet), a crew of 107, including 55 officers, a maximum depth of 450 metres (about 1,500 feet) and a submerged speed of about 29 knots. It can carry up to 16 ballistic missiles and torpedoes.

11 The French LHD MISTRAL. In a surprise move Russia is said to be planning on signing a contractual agreement with France on the purchase of a Mistral LHD.

12 Russia's newest Borey class strategic nuclear submarine, the YURY DOLGORUKY on sea trials.

Two other Borey class nuclear submarines, ALEXANDER NEVSKY and VLADIMIR MONOMAKH, are currently under construction at the Sevmash plant and are expected to be completed in 2009 and 2011. Russia is planning to build eight of these submarines by 2015.

According to Russian Navy officials, fourth-generation Borey class nuclear-powered submarines will form the core of Russia's fleet of modern strategic submarines, and will be deployed with Russia's Northern and Pacific fleets.

However, the missile that will arm the new SSBN is still running into trouble. A scheduled test on July 15 of the new Bulava submarine-launched ballistic missile (SLBM) resulted in a failure.

"The missile self-destructed after a malfunction of the first stage," the Russian Defence Ministry's press service said recently.

The missile was fired from the Typhoon class SSBN, DMITRY DONSKOI, a strategic nuclear-powered submarine in the White Sea, off Russia's northwest coast.

"A naval commission will investigate the cause of the missile's self-destruction," the ministry said.

Six of the 11 test launches of the Bulava have ended in failure. The launches were temporarily suspended and the missile components were tested in the labs after a series of previous failures.

Russia's Defence Ministry has said that it had planned to conduct up to five Bulava tests in 2009 and put the SLBM into service by the end of this year.

The Bulava (SS-NX-30) SLBM carries up to 10 MIRV (Multiple Independent Re-Entry Vehicle) warheads and has a range of over 8,000 kilometres (5,000 miles). The three-stage ballistic missile is designed for deployment on Borey-class Project 955 nuclear-powered submarines.

The Russian military expects the Bulava, along with Topol-M land-based ballistic missiles, to become the core of Russia's nuclear triad in the not too distant future.

KAZAN SSN LAID DOWN

Construction of a second Project 885 Yasen (Graney) class nuclear-powered multipurpose attack submarine started in July at the Sevmash shipyard in northern Russia.

The submarine KAZAN will feature more advanced equipment than the first vessel in the series, the SEVERODVINSK, which was laid down in 1992 and is scheduled to join the Russian Navy in 2010 or early 2011 after a long delay for financial reasons.

The submarine's armament will include 24 cruise missiles, comprising either the 3M51 Alfa SLCM, the SS-NX-26 Oniks SLCM or the SS-N-21 Granat/Sampson SLCM. It will have eight torpedo tubes as well as mines and anti-ship missiles such as SS-N-16 Stallion.

13 SANKT PETERSBURG TRIALS TO COMPLETE IN 2009

The Russian Defence Ministry has announced that sea trials of a new diesel Lada-class submarine will be completed this year.

"The Navy will complete trials of the Lada-class submarine equipped with new sonar systems in 2009," said Maj. Gen. Alexander Shevchenko, in charge of the Russian Armed Forces' armaments maintenance and support.

The first Lada-class is expected to enter service with the Russian Navy in 2010.

The construction of the sub began in 1997 at St. Petersburg's Admiralty Shipyards. Two other submarines of the same class - KRONSHTADT and SEVASTOPOL - are being built by the company.

The Russian Navy is planning to have a total of eight Lada-class submarines in the future.

NEW ZEALAND PURCHASES MORE SEASPRITES

Over the next four months the Royal New Zealand Air Force (RNZAF) will take delivery of four Mitsubishi MU-2F fixed-wing aircraft and six additional Kaman SH-2F Seasprite helicopters. The Air Force has been looking into revitalising its aging training aids at RNZAF Ground Training Wing (GTW) Woodbourne near Blenheim to ensure its current and upgraded aviation fleet can meet the needs of New Zealand into the future.

"This is an exciting time for the Air Force to move our maintenance training capability onto aircraft systems and airframes that are more akin to our current aircraft types, but also creating the training capacity and skill sets for our new aircraft capabilities and systems we will receive in the near-future," said the Deputy Chief of Air Force, Air Commodore Gavin Howse.

All four Mitsubishi MU-2Fs have flown into Woodbourne from Texas, USA

The six Kaman SH-2F Seasprite helicopters have been in storage in the Arizona desert for 14 years and are due to be shipped to New Zealand late 2009.

The aircraft will be used by the GTW for technical trade training. They will replace the aging de Havilland Devon aircraft and Bell 47 Sioux helicopters which have served their purpose but are no longer relevant training aids as the Air Force undergoes modernisation across all fleets. They allow future Air Force Avionics and Aircraft technicians to learn their trades on aircraft more relevant to the Air Force's modernised fleet.

The Commanding Officer of GTW, Wing Commander Nigel Sainsbury said, "The delivery of these aircraft not only sees the successful and early achievement of another initiative within the RNZAF Strategic Plan, but consolidates GTW's reputation as a 'First Class' provider of Aeronautical Training for the RNZAF, allowing future training to be aligned with the rest of the Aviation Industry in New Zealand."

13 Russia's newest SSK, SANKT PETERSBURG. The Russian Navy is planning to have a total of eight Lada-class submarines in the future.

HMAS SYDNEY II – THE FINAL INQUIRY?

At the time these comments are prepared the writer has not had an opportunity to read the Cole report on the loss of the cruiser SYDNEY (II) and her complement in November 1941 and over 50 years have passed since he first read an account of SYDNEY's (II) engagement with the German raider KORMORAN off the coast of Western Australia. The account was in ROYAL AUSTRALIAN NAVY 1939-42, first volume of the naval series in "Australia in the War of 1939-45" published in 1957. Another 40 years passed before he read the 1999 report of Parliament's Joint Standing Committee of Foreign Affairs, Defence and Trade on the loss of the cruiser.

From media reports of the latest (Cole) inquiry it would seem the 1957 account of the events leading up to the meeting of the two ships, the action that followed, and the aftermath was substantially correct: Of major importance was the Coles Inquiry's conclusion, after interviewing surviving KORMORAN crew members in Germany, that the original German accounts of the events on 19 November 1941 were generally correct.

It should be said that the author of the two RAN at war volumes, Hermon Gill, was well equipped for the task. He became a journalist and writer on maritime affairs after service as a deck officer in the British Merchant Service. As a member of the RANVR he spent most of the war as an Intelligence Officer in the navy's Intelligence Division. Chosen to write the formal history after the war Gill had access to a wide range of documents including minutes of the War Cabinet and Advisory War Council, the Admiralty and Naval Board, letter of proceedings, Allied and enemy papers etc.

The later (1997-9) Parliamentary inquiry's Terms of Reference enabled an examination of the numerous claims, rumors and theories that had emerged over the years, as well as the possibility of finding the wrecks of SYDNEY and KORMORAN and other aspects of the engagement. While the claims could not be substantiated, a further controversy was anticipated and this indeed happened. A search for the two ships was recommended and eight years later they were found.

In all the circumstances the inquiry conducted by Commissioner Terence Cole and his team was necessary; it is to be hoped the conclusions reached will end the speculation that has surrounded the WW II SYDNEY-KORMORAN action. Vital aspects of the engagement, in particular the events leading to SYDNEY's ultimate destruction will for ever remain unknown – there is no-one to provide SYDNEY's (II) side of the story. Captain Burnett and his men should be left in peace with the many other's whose grave is the sea.

MILITARY JUSTICE

It is surprising to say the least that it has taken two years to decide the Defence Force Military Court lacks authority; nevertheless despite the way some media outlets described the situation the ADF has not become an undisciplined mob.

Is it possible that our lawmakers have placed so many regulations, rules and restrictions on the citizenry that they have become confused and lost track of the consequence of their activities?

MILITARY EXERCISES

The writer has noted proposals to include China in the military exercises that regularly take place between Australia and the United States and other countries, the object being to improve the relationship with China in a wider area.

"War Games" between various countries take place in Europe and many other parts of the world including Australia's area, no doubt to improve efficiency and possibly in some cases to keep an eye on one another. If India and the two Koreas became a part of the local jointness even more harmony might follow. Who Knows?

NOTICE IS HEREBY GIVEN THAT THE

ANNUAL GENERAL MEETING
OF THE NAVY LEAGUE OF AUSTRALIA

will be held at the Brassey Hotel, Belmore Gardens, Barton ACT **FRIDAY 30 OCTOBER 2009 AT 8.00PM**

BUSINESS

1 To confirm the Minutes of the Annual General Meeting held in Canberra on Friday 31 October 2008

2 To receive the report of the Federal Council, and to consider matters arising

3 To receive the financial statements of the year ended 30 June 2009

4 To elect Office Bearers for the 2009-2010 years as follows:
- Federal President
- Federal Vice-President
- Additional Vice-Presidents (3)

Nominations for these positions are to be lodged with the Honorary Secretary prior to the commencement of the meeting.

5 **GENERAL BUSINESS:**
- To deal with any matter notified in writing to the Honorary Secretary by 20 October 2009

ALL MEMBERS ARE WELCOME TO ATTEND

By order of the Federal Council

Philip Corboy
Honorary Federal Secretary

PO Box 128
Clayfield QLD 4011

Tel 1300 739 681
Fax 1300 739 682

'THE BATTLE FOR AUSTRALIA'

A Different Perspective

By RADM Andrew Robertson AO, DSC, RAN (Rtd) | Federal Vice-President Navy League of Australia

On 19 June 2008 The Governor-General of Australia issued a proclamation to declare the first Wednesday in September each year as Battle for Australia Day in recognition of all those who served in defence of Australia in 1942 and 1943. The first Wednesday in September was chosen as it represents the first defeat of Japanese forces on land in the Battle of Milne Bay. However, RADM Andrew Robertson argues that the 'Battle for Australia' was more maritime in nature.

At the height of the Cold War, Admiral Gorschkov, the father of the then mighty Soviet Fleet, was reported to have made an interesting observation: "Australia is the centre of the world's oceans."

As the 'Battle for Australia Day' approaches it would seem appropriate to ponder on this remark and to look at the realities of some of the strategic aspects of both WW I and WW II—the only conflicts affecting directly the survival of our country as a free, independent democracy.

Last year there was considerable prominence given to the 'Battle for Australia'. This seemed largely to concentrate on the New Guinea campaign, the air attacks on Darwin and other towns, and the submarine attack on Sydney.

But was this an accurate or objective analysis of the reality and the major factors involved in the defence of this nation against the background of the overall world situation? Some would argue that there is a different perspective to be considered.

It is often forgotten that in both world wars success depended fundamentally on allied control of the main ocean lines of communication, for otherwise it would not have been possible for Britain to survive or the might of the British Empire and the United States and other allies to have been marshalled and deployed for the great land campaigns.

One enemy strategy was to try to sever these sea lines of communication by a massive naval and air offensive using submarines, surface raiders (both disguised- heavily-armed merchant ships and warships) mines, and, in WW II, aircraft. Losses at sea in both world wars were huge, but the combination of naval and air action, the holding of vital bases, and the great effort put into ship-building, and aircraft and innovative equipment production, enabled the allies to win at sea and the armies and air forces to be deployed for the war-winning land campaigns.

In our area in WW II, despite the best efforts of our small naval and air forces no less than 30 merchant ships were sunk around our coasts and approaches, with the loss of 645 seamen. These losses caused great concern and much damage to the war effort.

The tragic loss of HMAS SYDNEY in 1941 with all 645 men (more than our losses of all servicemen in the Korean or Vietnam Wars, or

The Leander class cruiser HMAS PERTH leaving Sydney. PERTH was sunk in company with the US cruiser USS HOUSTON while attacking a Japanese amphibious task force off the Sunda Strait in March 1942. (RAN Seapower Centre)

One of the three Japanese midget submarines that attacked Sydney Harbour is seen here being hoisted from the bottom of the Harbour.

on the terrible Kokoda Track) often overshadows the great importance to the maritime war of the SYDNEY's destruction of the German raider KORMORAN, for the KORMORAN had already sunk 11 merchant ships and carried 400 mines ready for laying numerous minefields around our coasts.

The attack on Darwin by naval aircraft from four Japanese aircraft-carriers – the same carriers, under the same admiral, which had attacked Pearl Harbor – was mainly directed at shipping and maritime facilities such as fuel tanks and airfields. Similarly the Japanese submarine attack on Sydney Harbour was an attack on ships, as was the subsequent submarine campaign off the NSW coast.

And in this largely maritime Battle for Australia where does the New Guinea campaign fit in?

Psychology in war is of the greatest importance. For instance the ghastly defeats of Gallipoli and Dunkirk were turned into national symbols for unity and the will to win, whereas other very successful actions received little public recognition or historical emphasis, and are thus largely unknown.

The magnificent performance of our soldiers on the Kokoda Track under appalling conditions is seared in the nation's memory. It was of great psychological importance and uplifted spirits, but its strategic importance in the defence of Australia, compared with other important events, is questionable. Had the Japanese taken Port Moresby it would have been a considerable setback for the allies, especially the loss of the most important air bases, and a blow to morale. However it would have been of little use to the Japanese as an effective base unless they controlled the Coral Sea, for it would not have been possible to 'hump' the fuel, bombs, ammunition, and supplies needed through the mud and mountains of the Owen Stanley ranges and along the Kokoda Track.

It is arguable that the first defeat of the Japanese at the eastern tip of New Guinea at Milne Bay and the superb performance of our army and air force in holding that bay was of considerably greater strategic value, for had the Japanese won that battle they would have been able to control one of the major entrances into the Coral Sea. As it was, Milne Bay was developed into a major base for the subsequent seizure of islands and the campaign up the New Guinea coast and eventually to the Philippines.

The allied victory was only possible through control of the Coral Sea, for without the safe passage of shipping none of these campaigns would have been possible and the east coast of Australia would have open to attack by the Japanese Fleet.

And what were the keys to controlling the Coral Sea?

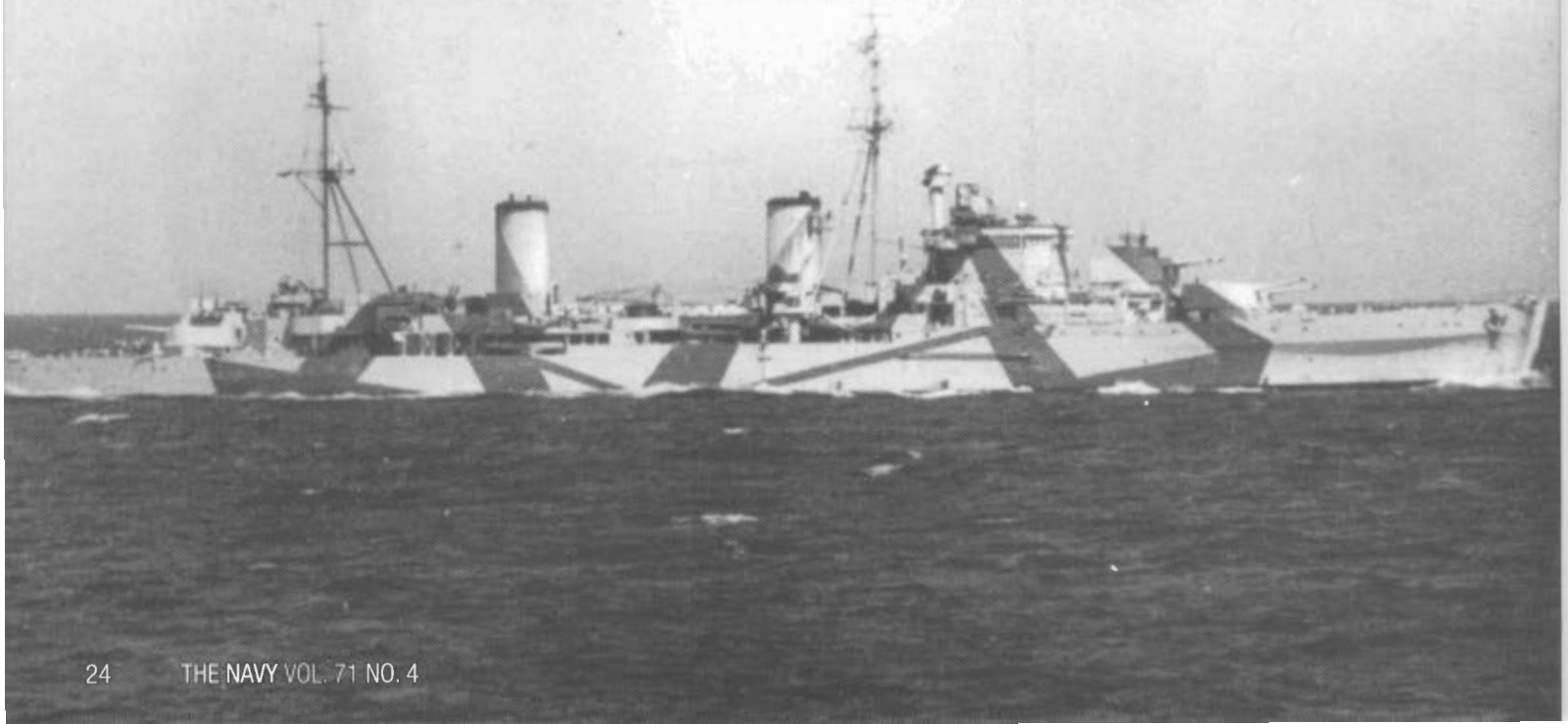
In his official report to the Secretary of the U.S. Navy on the war in the Pacific, Fleet Admiral Ernest King, the Commander in Chief United States Fleet and Chief of Naval Operations stated:

> "From the outset of war, it had been evident that the protection of our lines of communications to Australia and New Zealand represented a "must". With the advance of the Japanese in that direction, it was therefore necessary to plan and execute operations that would stop them."

Early in April 1942 the Japanese had overrun the island of Tulagi in the Solomon Islands and been attacked by American carrier aircraft. This was followed by the Battle of the Coral Sea, the historic first occasion of a battle between aircraft –carriers (mobile airfields) in history, when the opposing fleets never sighted one another. The powerful American carriers operated against the main Japanese carrier force while a combined task force of Australian and American cruisers and destroyers under the command of Rear Admiral Crace of the Royal Navy, (an Australian), was despatched south of New Guinea, to block a Japanese invasion fleet heading for Port Moresby.

The Americans lost the world's largest carrier-- USS LEXINGTON,-- a destroyer, and a tanker. The carrier USS YORKTOWN was damaged. The Japanese lost the small carrier SHOHO while the powerful carrier

The Leander class cruiser HMAS HOBART. HOBART saw extensive service in the Battle for Australia surviving numerous massed air attacks and a torpedoing. (RAN Seapower Centre)



Colonel Andrew Britsschgi USAF Defence Attache (left) and Vice Admiral Russ Crane AM, CSM, Chief of Navy (right) after laying a Wreath at the Australian-American War Memorial at Russell Offices in Canberra during the 2009 commemorative service for the Battle of the Coral Sea. (Defence)

SHOKAKU was badly damaged. The Australian/American task force, including the cruisers HMAS AUSTRALIA and HOBART, was attacked by Japanese aircraft, (and then by US Army aircraft from Queensland), but no ships were hit and the route to Port Moresby remained barred.

While suffering heavier losses, it was a strategic victory for the allies, for the Japanese were forced to withdraw and never again attempted to enter the Coral Sea in force. This not only enabled the defence of New Guinea but removed the possibility of a Japanese assault on our east coast.

In July the Japanese began advancing in New Guinea and also landed troops and labourers on Guadalcanal Island in the Solomons where they began the construction of an airfield. As the operation of land-based planes from that island would have immediately imperilled US control of the New Hebrides (Vanuatu) and New Caledonia, and thus communications to Australia, the Americans had to eject them.

The Americans threw huge naval forces into the area. Great losses were suffered by both sides in a year-long struggle which included ten major naval engagements, some of the greatest battles of the war. During WW II the US Navy lost four of it's largest aircraft-carriers. Three of these were lost in the Solomons area. They lost 10 cruisers worldwide of which no less than eight were sunk in the Solomons. Nearly 6,000 sailors and 2,000 marines were killed – more men than Australia lost in the whole New Guinea campaign. We owe a huge debt to the USN for our security in WW II.

The Japanese lost a similar number of major warships as the Americans (about 30), including two aircraft carriers and two battleships and their famous ADMIRAL YAMAMOTO.

Australian losses there were the heavy cruiser HMAS CANBERRA and heavy damage to the cruiser HMAS HOBART, which was torpedoed.

The victory of the USN, with some help from our navy, including the brave and invaluable coastwatchers, and our air force, in the Coral Sea and the Solomons ensured the safety of Australia and it's development as a major base. Together with the Battle of Midway and the most successful U.S. and British submarine campaigns, it so weakened the Japanese fleet that the allies could move steadily to the offensive and eventually drive to the very shores of Japan.

It is to be hoped that this perspective will receive some attention as the nation remembers "The Battle for Australia".

As to the future, geography to a large extent controls the possibilities for military strategy, and doesn't change. Both world wars would seem to hold major lessons in this regard. From 1788 until1942, as an island, albeit a large one, we depended on the control of the oceans by Britain's Royal Navy, under whose shield we were able to explore, develop and unite as one nation. Since 1942 we have depended largely on the might of the United States and particularly it's most powerful navy.

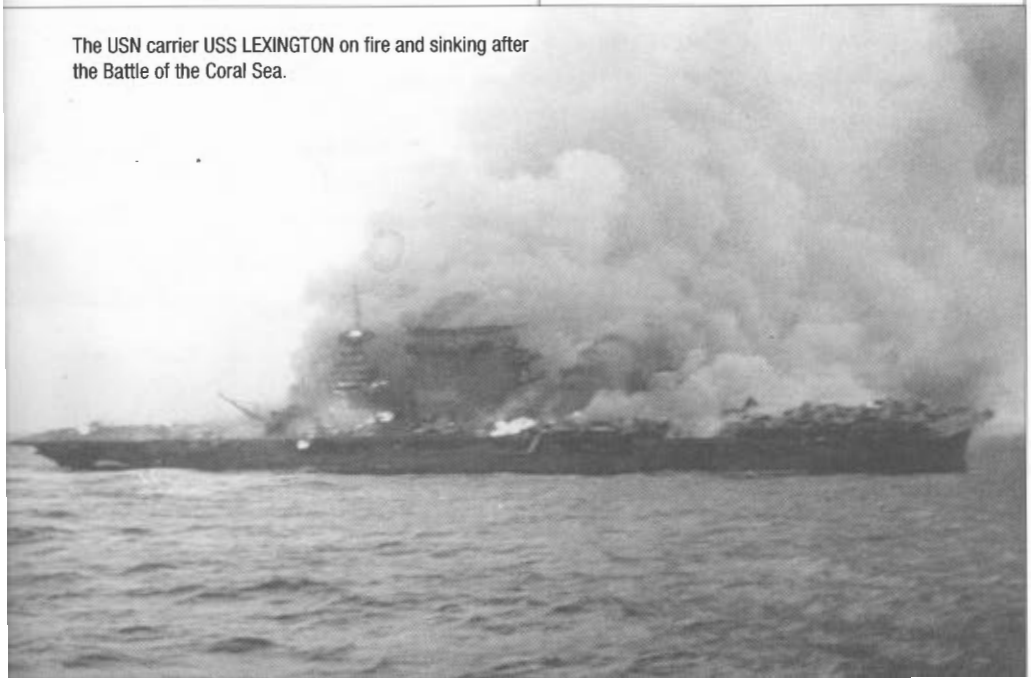
But the world is changing. Within a few decades the U.S. may no longer be the only super-power. Wars still take place, there are many areas of tension, and there is now a major increase of military power in Asia, particularly maritime. While clearly today emphasis must be on our contributions overseas in Iraq, Afghanistan, and other hot spots, many would caution that, as a sparsely-populated nation at the centre of the world's ocean's, we should now build up our maritime capability, in all it's elements, as part of our national insurance.

In the meantime, perhaps still of relevance and interest to a modern island nation, over 95% of whose people live within missile range of the sea, is the famous Greek historian Thucidides's report of the speech of the officials of the island of Corcyra (Corfu) to the Athenians in 433B.C:

> "And then it is quite a different matter for you if you reject alliance with a naval power than if you do the same thing with a land power. Your aim, no doubt, should be, if it were possible, to prevent anyone else having a navy at all: the next best thing is to have on your side the strongest navy that there is."

Today many would argue that for islands, though technology has altered weapons, tactics, and capabilities, little needs changing in this philosophy---except to add "an air force."

The USN carrier USS LEXINGTON on fire and sinking after the Battle of the Coral Sea.



HIS MAJESTY'S RIGID AIRSHIP NUMBER 1

THE ROYAL NAVY'S FIRST AIRCRAFT PROJECT

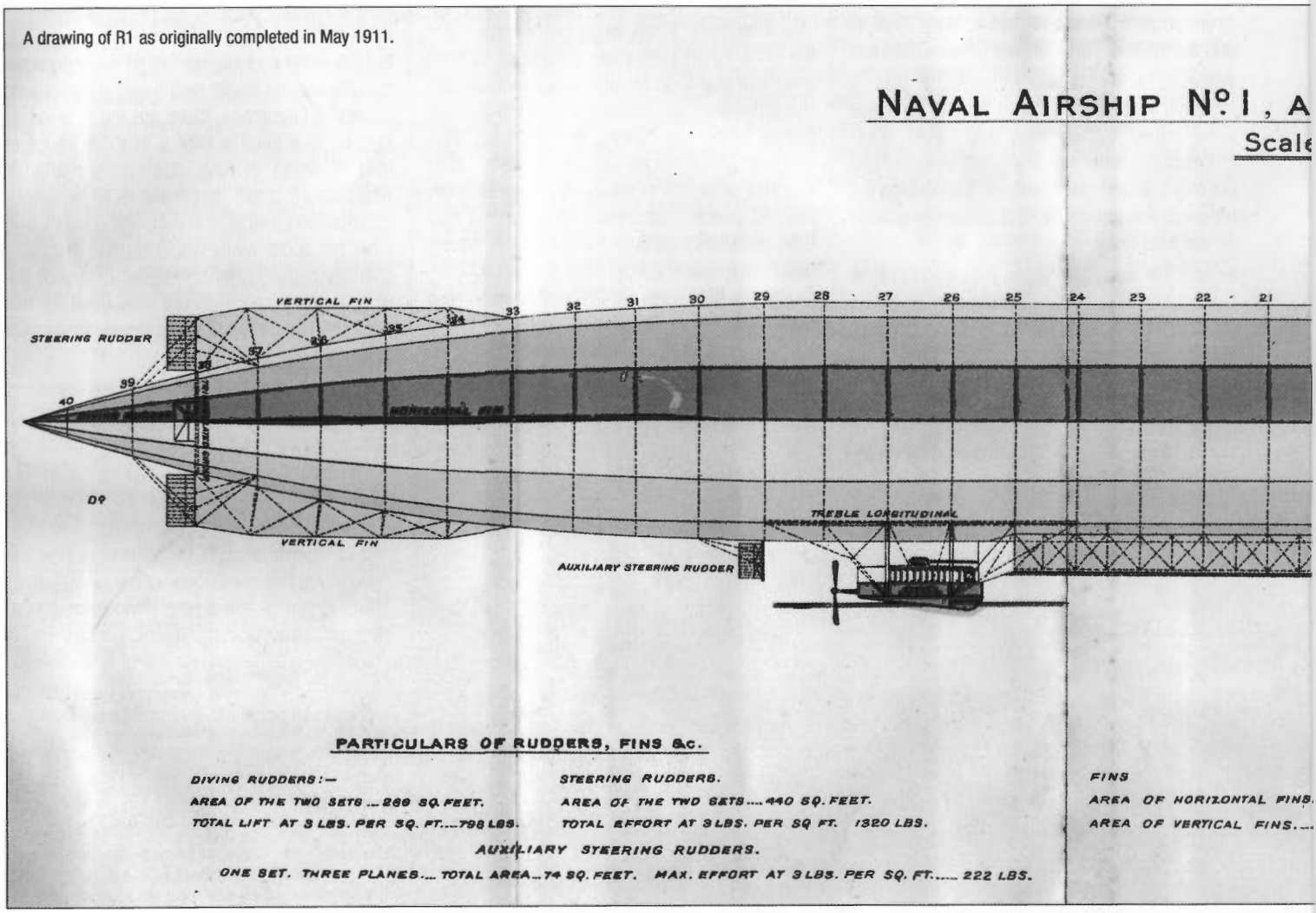
By Commander David Hobbs, MBE, RN (Rtd)

The RN's first air project wasn't a fixed-wing aircraft but a rigid hull airship, the R1. Although somewhat of a disappointment, many lessons were learnt that made the project worthwhile, sometimes failure is an option. Former Aerospace Journalist of the year and RN Fleet Air Arm Museum Curator CDR David Hobbs looks at the RN's first air project.

On 21 July 1908 Captain R.H.S Bacon, the Director of Naval Ordnance (DNO), RN, and the man responsible for the procurement of the Royal Navy's new weapons, submitted a Memorandum to Admiral Sir John Fisher, the First Sea Lord. In it he recommended the addition of a Naval Air Assistant to the Admiralty Staff, that permission be sought from the War Office for naval officers to consult the Superintendent of Ballooning at Farnborough and that a rigid airship should be ordered from Vickers. The latter was a firm which had a contract to produce all the Royal Navy's submarines and with which Bacon had worked closely when he was Inspecting Captain of Submarines. Colonel Capper the Army's Superintendent of Ballooning had, in April, described rigid airships as a "certainty capable of early fulfilment" able to cover a distance of "3,000 miles while continuously airborne at 40 mph". There is evidence that Bacon's memorandum merely formalised a plan that already had the tacit approval of the Board since Admiralty acceptance was immediate and Admiral Fisher wrote to the Prime Minister, Mr Asquith, only three days later on 23 July. In this letter he outlined the Navy's plan to use rigid airships for reconnaissance, a role carried out until then by cruisers which cost ten times as much to build. Treasury approval in principle for the funding to build a rigid airship was given on 4 August 1908 and on 14 August Vickers were approached and asked to forward a tender as soon as they could obtain sufficient data for a design.

Events over the next few weeks moved slightly less rapidly with the formation of a Sub-Committee on Aerial Navigation by the Committee of Imperial Defence (CID). It met for the first time on 28 January 1909 and was tasked to report on the danger from foreign developments in

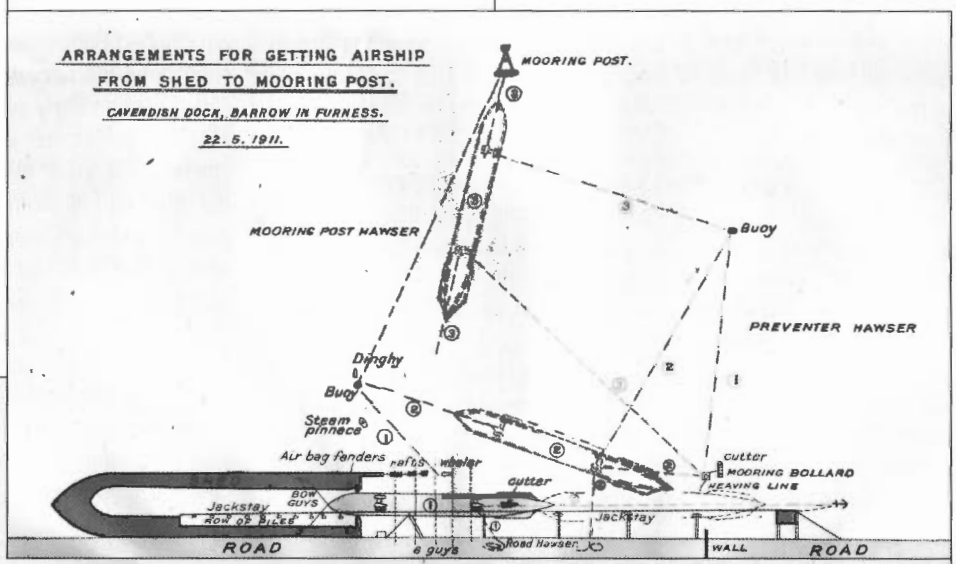
A drawing of R1 as originally completed in May 1911.



aerial navigation, the advantages of adopting it for British naval and military use and to recommend what funding should be allocated to projects. The sub-committee heard intelligence reports that the German Navy was likely to acquire rigid airships because the Zeppelin Company built them in floating sheds, they had been seen flying over water and naval officers had been seen in the factory. It endorsed the use of airships for scouting and reconnaissance noting that they were cheap compared with destroyers and cruisers. For the first time, the 'price-tag' of £35,000 appeared and was compared favourably with £80,000 for a destroyer and £400,000 for a small cruiser. A lookout on the bridge of a warship could expect to see an enemy vessel at 18 to 20nm, an observer in the car of an airship 1,500 feet above that warship could see an enemy at 80nm. Moreover, the airship could remain airborne for a number of hours, could carry a large enough crew to operate in watches and could carry a wireless transmitter able to exchange information with the fleet. Air reconnaissance would allow a blockading fleet to know what an enemy was doing in harbour and warn of impending attacks by torpedo boats and, possibly, submarines.

A similar role had been attempted by tethered balloons with some success at Santiago de Cuba in 1898 and Port Arthur in 1904/5. The sub-committee recommended that the full CID endorse the allocation of £35,000 to the Admiralty for the construction of a rigid airship and that the Army's experimental programme at Farnborough should have its budget increased from £2,000 to £10,000 in the coming financial year. The full CID met on 25 February 1909 and accepted the recommendations without comment.

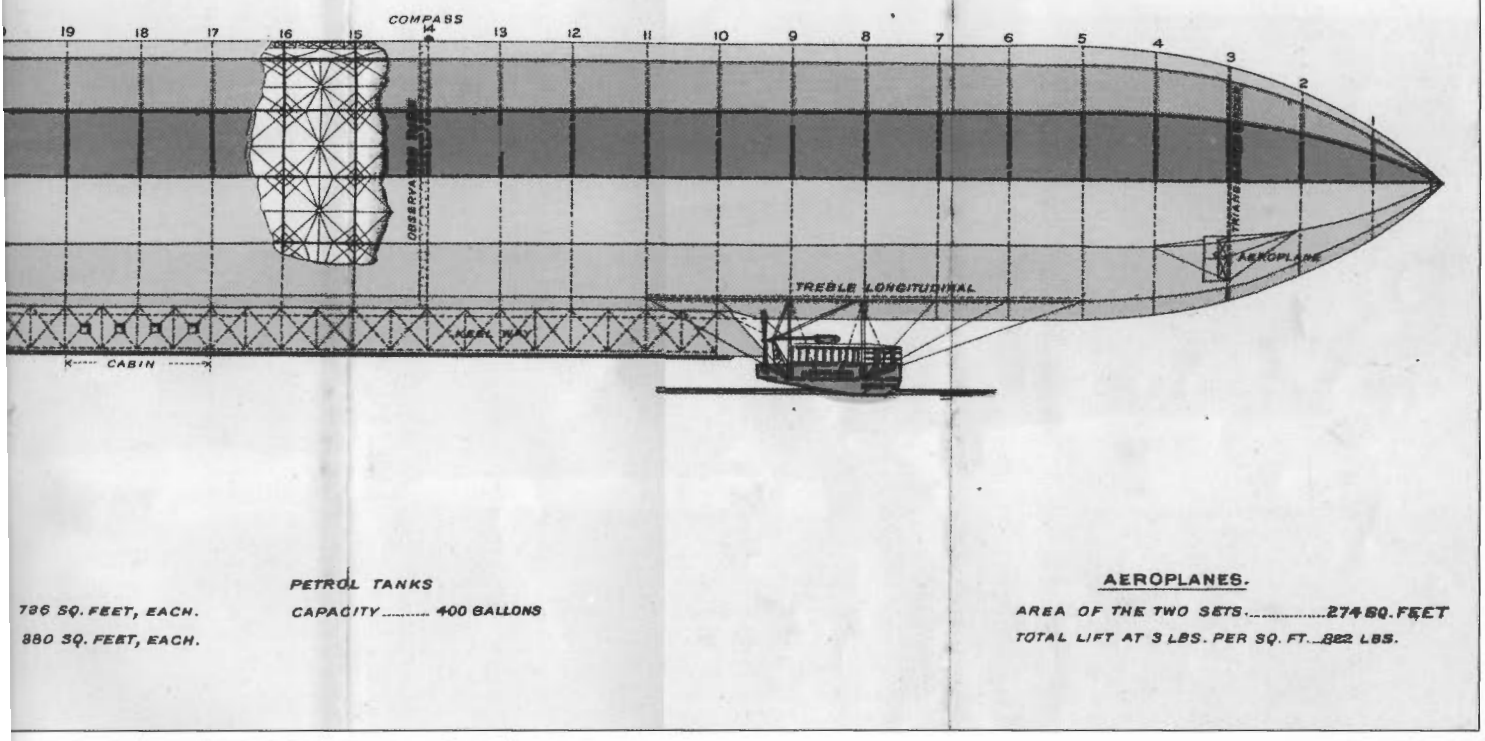
This was as well since two days earlier, on 23 February 1909, the Treasury had approved the inclusion of £35,000 in the 1909/10 Naval Estimates for the construction of an airship. The Admiralty wrote immediately to Vickers offering them £30,000 for the completed article. Vickers replied in April with a quotation of £28,000 for the ship exclusive of gas bags and outer covering. They also offered to erect a suitable construction shed at no cost to the crown and, in return, asked for a ten-year monopoly on airship construction for the Royal Navy under a contract like that already in place for submarines. On 7 May 1909 the Admiralty agreed and a contract was given for the construction of HM Rigid Airship Number 1. No plans were announced to build other sheds although the cruiser HERMIONE was taken in hand for conversion into an airship support vessel with a hydrogen manufacturing plant and accommodation for the crews and maintainers.



Hauling R1 out of its shed was a complicated evolution and Capt Sueter produced this diagram to show precisely how and when he various movements should be conducted.

LAUNCHED, MAY 1911.

1" = 24 Feet.

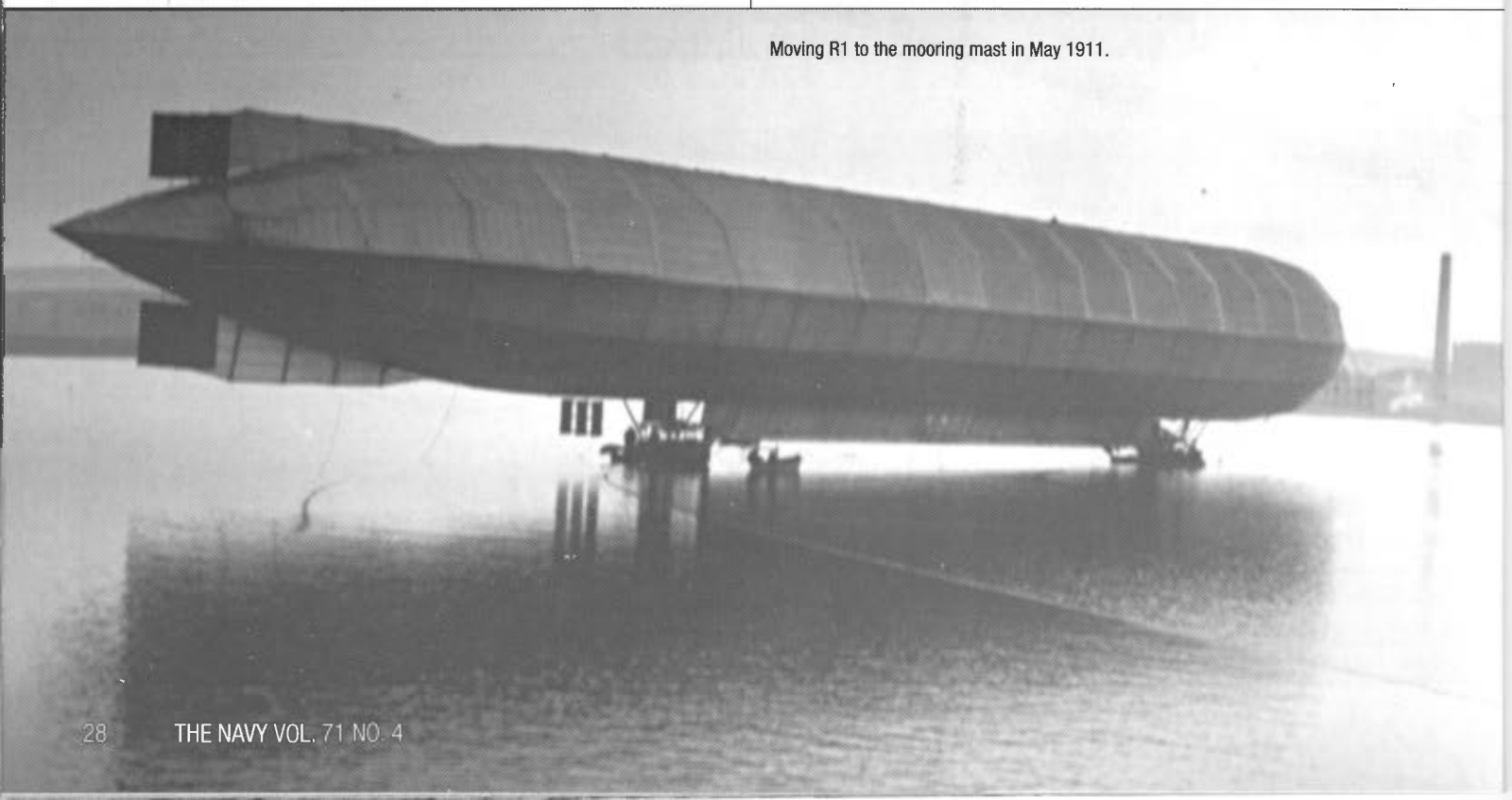


DESIGN AND DEMONSTRATION

R1, commonly but unofficially known as 'Mayfly', was designed in the late autumn and winter of 1908/9 before the Treasury had agreed to its funding and before Vickers had a contract for its construction. The design team included Captain Bacon and the newly appointed Inspecting Captain of Airships, Captain Murray Sueter, one of a group of submarine experts who had worked with him for some years as well as other naval officers and a team from Vickers supervised by Sir James McKechnie the managing director of the naval construction works at Barrow-in-Furness, Cumbria. Under him were Charles Robertson the chief engineer, B Comyn the manager of the Cavendish Dock, James Watson the works manager and S W Hunt the chief draughtsman. The whole team drew heavily on their experience with submarine design and what little information they were able to obtain from Zeppelin construction in Germany. Captain Bacon helped with the latter as he was a German speaker and was able to translate a number of documents. The state-of-the-art was far from mature and this small group that would be known today as an 'integrated project team' was asked to design and construct an experimental airship that was to be the largest flying machine ever built as quickly as possible. This 'cutting-edge' project encountered problems that would be all too familiar to project managers today.

The Admiralty Specification called for an experimental aerial scout capable of sustaining 40 knots, roughly twice the speed of a contemporary battleship, for 24 hours. It was to be able to land on the sea, float and be moored by an attachment on its nose to a warship or mast set up for the purpose. It was to carry powerful wireless equipment and to have an operational ceiling of 1,500 feet or more. The normal crew was to be 20 accommodated in "reasonable comfort". At 512 feet long and 48 feet in diameter she was only a few feet shorter than the new battleship DREADNOUGHT and was to carry a great deal of naval equipment that appears odd to a later generation of aviators. These included an anchor and cable, a capstan, hawsers and even a lightweight sea-boat! The ship was to be experimental and, therefore, to be built "as cheaply as possible". In order to meet the specification she had to be big because the total lift of a rigid airship increases as the cube of the dimensions whilst the drag or resistance to forward motion only increases as the square. Numerous shapes were considered but the one chosen was designed by the American professor Zahm. This comprised a parallel sided hull with a bow curve of twice the curvature of the hull and a stern of nine times the curvature. This was calculated to have only two-fifths the air resistance of the hull form used on Zeppelins to that date. The hull was not cylindrical but twelve-sided for ease of construction. R1 was the first airship in the world to be fitted with bow-mooring gear as standard equipment and it was to prove one of the most successful features of the design.

Material for the construction of the airship was ordered in May 1909 while contractors began work on the shed in which it was to be built. One side of it rested on the wall of the Cavendish Dock and the other was to rest on piles driven into the dock bed. Trouble was experienced with these and completion was delayed from the original planning assumption of August 1909 to June 1910. A wooden 'floor' was built over the water in the shed on which a cradle was built on which the airship framework was assembled. At this stage there was considerable discussion about the actual material from which the 'skeleton' framework of R1 was to be constructed. Vickers recommended wood but Captain Bacon insisted that, given the experimental nature of the ship, metal was necessary to give the most data for future construction. A trial section thirty-seven and a half feet long was built in the boiler shop to a design prepared by one of Vickers' foremen. One end was of hollow wood spars, the middle was half wood and half aluminium and the other end all aluminium. Wood proved by far the best and wires made of extruded aluminium proved useless. The metal itself proved weaker than tests had indicated when supplies arrived from September. In November 1909 however, Vickers' metallurgists heard of an alloy called Duralumin. This was made in Germany but it appeared to be perfect for the application and the firm bought the Patent for the British Empire. It comprised 94% aluminium, 4% copper with manganese, silicon and iron and the resulting metal had nearly the strength of iron with the weight of aluminium. In practical terms, this meant that the strength of the ship would be doubled while saving a ton in weight. Tests proved the suitability of Duralumin and validated the Navy's insistence on metal. The Admiralty gave its approval for the new alloy to be used early in 1910 and R1 was the first aircraft to be built using it. The first duralumin Zeppelin, LZ 56, did not fly until December 1914 nearly five years later. The only problem was that little was then known about



Moving R1 to the mooring mast in May 1911.

heat treatments for rolled metals and in most shipments of components from Germany; only a quarter were usable at first. This situation improved as experience was gained.

The choice of fabric for the 17 gas bags and the outer skin was another area where considerable unforeseen research and development proved necessary and which, in turn, delayed construction. Previous British gas bags had been made of 'gold-beaters skin', part of the intestines of oxen which were dried, glued to a cloth backing and varnished. The Army advised strongly against this material, however, as it became brittle and had a short life. In its place the Admiralty chose the Continental Rubber Company's Number 21 fabric which comprised alternating layers of Egyptian cotton and rubber glued together. This was used for 15 of the gas bags which were made to Admiralty contract by Short Brothers. Bag 1 was made up by the North British Rubber Company with its own material and bag 17 was made by the Dunlop Rubber Company. Both were gifts in the hope of gaining more airship work and were included for comparative analysis. Each bag contained a Parseval-type valve at the top for venting gas. Design limits were for the ship to rise at up to 3,000 feet per minute, venting gas at up to 4,800 cubic feet per minute to prevent expansion ripping open the bags.

The outer cover had to cover an unprecedented 66,000 square feet; it had to be as light as possible, not absorb rainwater and to resist heat absorption from sunlight. Silk was lightest but weakened badly when rubberised. Chemists found the answer with a substance which had the trade name 'loco'. This waterproofed silk without making it difficult to handle but the sheets had to be glued together as it could not be sewn. The material intended for the bottom of the airship was dyed yellow to aid visibility but that for the top was painted with aluminium dust to prevent heat absorption. This was found to weaken the silk as much as 'loco' strengthened it, however, and a further process had to be devised in which the fabric was dusted with aluminium powder after 'locoing'. The area of outer skin aft of the engines was made of fireproof material and the control surfaces were covered with two layers of Hart-processed silk stuck together, a technique pioneered by Shorts.

The gondolas had to be waterproof and bear some of the ships' weight while it rested on the water acting, in effect, as small boats. They were made of copper-sawn Honduras mahogany and were built by Saunders Roe of Cowes in the Isle of Wight. The forward car contained the control 'bridge' and both contained an engine with its radiator and controls. R1 was originally to have carried a ton of petrol and a ton of water ballast but the design was recast to use petrol for both purposes to give an extended endurance of up to 30 hours at full power. The two Wolseley engines had an ingenious water recovery system intended to compensate for the weight of fuel burned without having to vent much hydrogen. Unfortunately it was heavy and had to be removed. The control surfaces were based on submarine design, modified to conform to images of those fitted to Zeppelin IV. At a late stage Short Brothers' design for box rudders was adopted after favourable comment by the National Physical Laboratory.

Construction, once all these hurdles had been overcome, was relatively straightforward. The frames were made on a round wooden table. When completed twelve men lifted them onto a second table where longitudinals and a second frame were added, the completed section being taken to the shed and placed in the cradle where wire bracing could be fitted. At every stage techniques had to be discovered, evaluated and improved. Literally, everything was being done for the first time. Eventually the completed framework was suspended from the ceiling of the shed by three-inch belly bands under alternate frames. It was raised by sailors and marines pulling on blocks and tackles that would have been familiar to Nelson's sailors but were no less effective for that. By January 1911 the cradle was removed allowing the keel to be installed together with the gondolas, fins and rudders. On 13 February 1911 the ship carried out shed trials during which the engines were run and control surfaces moved. Captain Sueter, the Inspecting Captain of Airships, took charge and the whole Advisory Committee for Aeronautics was present. The weather was not considered suitable for basin trials outside the shed and several defects revealed during the trial had to be addressed so the ship was not filled with hydrogen until May.

Returning safely to the shed - May 1911

Minutes after the 'grinding noises' were heard R1 began to break up September 1911. Why this occurred we will never know as the minutes from the inquiry were subsequently lost.

ENGINES

The airship was powered by two Wolseley engines, each of which developed 180 horse-power. They were eight cylinder, water cooled vertical engines designed to deliver maximum power at 1,000 rpm. As originally designed the forward engine drove two propellers through bevel gearing at 500 rpm. In an attempt to lighten and re-balance the ship in August 1911, the two gondolas' positions were exchanged.

'AVIONICS'

The 'wireless telegraphy' installation was specially prepared for R1 after a number of experiments. It was powered by an alternator driven by the after engine delivering three kilowatts, 350 cycles, 200 volts and was expected to have a range of about 600 nautical miles. The transmitter spark was 'quenched' to reduce the risk of igniting hydrogen and light metal screens surrounded the equipment to eliminate the risk completely. The receiver was a modified Marconi with a 'pericon' detector using a 1,000 ft five-stranded copper wire aerial suspended below the ship in flight.

FIRST 'FLOAT'

At last, on Monday 22 May 1911 inflation was complete and the airship was lowered onto the water in its shed ready for basin trials. Boats were secured either side of the gondolas and padding was fixed to the shed doors which were only inches wider than the airship itself. An elaborate plan had been prepared for extracting it and she was walked aft by 300 sailors and marines pulling on ropes carefully until the nose was clear and then towed to the centre of Cavendish Dock where she was attached to a mooring pontoon secured there. At first a wind baffle was attached to the mast but this caused the airship to yaw violently and so it was removed, curing the problem. The nose mooring arrangement, subsequently used by all airships, proved successful. Designed to withstand a 'pull' of up to four tons, the recorded 'pull' in a 17 knot breeze was only 530lbs. While she rode out at the mast, a crew of nine remained on board and carried out a range of acceptance trials although engine runs were cut short by problems with the radiators. On 23 May she rode out a gale of wind estimated at up to 45 knots successfully and searchlights were played on the ship from HERMIONE during the two nights she was out to make sure that all was well with her. She floated but was too heavy to lift and, because the gas bags leaked at the rate of about 1% per day, replacement hydrogen had to be brought out to her in cylinders carried in a naval cutter. Getting her back into the shed on 25 May turned out to be more difficult than extracting her because of a slight cross-wind. The whole evolution took 100 minutes and resulted in one side being rubbed against the door of the shed and two sailors falling into the dock. She looked beautiful with her silver grey and yellow hull and had cost £41,000 to date. Despite her nickname, R1 was hailed as a success by the press.

Back in the shed, the airship 'floated' at a height of three feet without crew, tools, wireless set, hawsers, petrol or ballast. Captain Sueter had refused to accept her and drastic alterations had to be undertaken if she was to fly. The ship was slung from the roof once more and the outer skin was peeled off and the gas bags deflated and removed. Then the water-trimming device was taken out together with the keel, cabin and any equipment intended for non-flying use. The heavier gondola was moved from aft to forward and the control car was lightened and moved aft. By July R1 was still unable to lift itself and the Advisory Committee for Aeronautics was asked for advice. They recommended the insertion of an extra bay with 40,000 cubic feet of gas, a solution that was to be applied to R101 by a later generation to cure a similar problem. The Admiralty declined such a drastic solution immediately because the shed would have to be rebuilt to take the lengthened ship and it was hoped that the weight reduction programme would at least allow a limited trials programme before the end of 1911. After three years work, the Navy wanted results.

Another inflation and weighing on 17 August showed that she was still too heavy and a further 1,195lbs of equipment was removed after she was again deflated. The forward propeller was reduced to 10 feet so that it could be driven directly from the engine without a gearbox and holes were drilled in the engine control levers to lighten them. Tool boxes were replaced by fabric bags and the crew made and installed a canvas water-ballast trimming system. On 22 September 1911 she was inflated for what proved to be the last time, using 1,762 cylinders of

The stern lifted as it was blown away from the dock wall.

hydrogen, in just over ten hours showing that the problems associated with inflation had been overcome, even though by then the gas bags were over a year old and the rate of leakage had increased . Under pressure from the Admiralty Solicitor, Captain Sueter accepted the airship for the Navy "pending the completion of satisfactory air trials".

DISASTER

On 24 September 1911, R1 was eased backwards out of her shed, pulled this time by electric winches. As she was pivoted so that her nose pointed into the Dock, witnesses heard cracking sounds amidships and she broke in two. Some witnesses said she was caught by a squall and rolled her onto her side and steadying ropes between the shed roof and the top of the ship held fast and damaged several frames. Whatever the cause, Captain Sueter wrote to his administrative superior recommending that the airship be repaired, at the very least, for use as a training ship. The crew clearly did not regard her as a 'write-off' and at a cost to date in excess of £70,000 there was an argument for making the maximum use of the investment. Her fate was, however, decided by a Board of Enquiry.

POST MORTEM

The senior management of the Royal Navy had undergone significant changes while the airship was being built. The radical Admiral Fisher retired as First Sea Lord in 1910, replaced by the conservative Admiral Wilson. With Fisher went the 'Fishpond' group of reforming officers including Captain Bacon who resigned to take up a position with Coventry Ordnance Works. In 1911 Winston Churchill became First Lord and spoke out against airships, preferring instead to support fixed-wing aircraft experiments by a handful of officers at Eastchurch. Captain Sueter was the airship's only remaining advocate.

A Board of Enquiry was convened at Barrow in HMS HERMIONE on 18 October 1911 under Rear Admiral Sturdee, a man known to be opposed to Fisher's reforms. The importance attached to it can be gauged by the fact that the First Lord of the Admiralty and the Secretary for War attended on the opening day. Three Army airship officers were called as witnesses together with Captain Sueter and the majority of R1's crew and handling party from 24 September. After the Board's conclusion, Churchill refused to make the findings public but it was stated that it was caused by the breaking of a longeron "under less pressure than the designers thought it would stand". The Admiralty instructed Commander Schwann, the Assistant Inspecting Captain of Airships, to tell the crew that "no blame was attachable to their actions". The minutes of the Board were subsequently lost and so we will probably never know for certain why R1 broke on that fateful day. It is also worth noting that, in 1911, the Admiralty had refused to endorse the exclusive airship construction agreement and was trying to extract itself from the exclusive submarine construction agreement. Relations between Vickers and the Admiralty were not good and the 'failure' of a design for which the firm had been entirely responsible was a convenient reason to give for R1's loss.

THE LOST AIRSHIP TRIALS

The Naval Airship Department was disbanded in January 1912 (to reform a year later when its need became obvious) and R1 was left in its shed until it was eventually scrapped. Nevertheless she was the Royal Navy's first aircraft procurement project and, for a while, she was the world's most advanced aircraft project. Her design and construction provided British scientists with a vast amount of important information at the dawn of the aviation age and, while she may not have flown, she was far from being a dead loss.

Most damage was done dragging R1 back into its shed.

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

The Navy League:

- Believes Australia can be defended against attack by other than a super or major maritime power and that the prime requirement of our defence is an evident ability to control the sea and air space around us and to contribute to defending essential lines of sea and air communication to our allies.
- Supports the ANZUS Treaty and the future reintegration of New Zealand as a full partner.
- Urges close relationships with the nearer ASEAN countries, PNG and South Pacific Island States.
- Advocates the acquisition of the most modern armaments, surveillance systems and sensors to ensure that the Australian Defence Force (ADF) maintains some technological advantages over forces in our general area.
- Believes there must be a significant deterrent element in the ADF capable of powerful retaliation at considerable distances from Australia.
- Believes the ADF must have the capability to protect essential shipping at considerable distances from Australia, as well as in coastal waters.
- Supports the concept of a strong modern Air Force and a highly mobile well-equipped Army, capable of island and jungle warfare as well as the defence of Northern Australia and its role in combatting terrorism.
- Advocates that a proportion of the projected new fighters for the ADF be of the Short Take Off and Vertical Landing (STOVL) version to enable operation from suitable ships and minor airfields to support overseas deployments.
- Endorses the control of Coastal Surveillance by the defence force and the development of the capability for patrol and surveillance in severe sea states of the ocean areas all around the Australian coast and island territories, including the Southern Ocean.
- Advocates measures to foster a build-up of Australian-owned shipping to support the ADF and to ensure the carriage of essential cargoes in war.

As to the RAN, the League:

- Supports the concept of a Navy capable of effective action off both East and West coasts simultaneously and advocates a gradual build up of the Fleet and its afloat support ships to ensure that, in conjunction with the RAAF, this can be achieved against any force which could be deployed in our general area.
- Believes that the level of both the offensive and defensive capability of the RAN should be increased, and welcomes the decision to build at least 3 Air Warfare Destroyers (AWDs).
- Noting the increase in maritime power now taking place in our general area, advocates increasing the order for AWDs to at least 4 vessels.
- Advocates the acquisition of long-range precision missiles and long-range precision gunfire to increase the RAN's present limited power projection, support and deterrent capabilities.
- Welcomes the building of two large landing ships (LHDs) and supports the development of amphibious forces to enable assistance to be provided by sea as well as by air to island states in our area, to allies, and to our offshore territories.
- Advocates the early acquisition of integrated air power in the fleet to ensure that ADF deployments can be fully defended and supported by sea.
- Supports the acquisition of unmanned surface and sub-surface vessels and aircraft.
- Advocates that all warships be equipped with some form of defence against missiles.
- Advocates the future build-up of submarine strength to at least 8 vessels.
- Advocates a timely submarine replacement programme and that all forms of propulsion be examined with a view to selecting the most advantageous operationally.
- Supports continuing development of a balanced fleet including a mine-countermeasures force, a hydrographic/oceanographic element, a patrol boat force capable of operating in severe sea states, and adequate afloat support vessels.
- Supports the development of Australia's defence industry, including strong research and design organisations capable of constructing and maintaining all needed types of warships and support vessels.
- Advocates the retention in a Reserve Fleet of Naval vessels of potential value in defence emergency.
- Supports the maintenance of a strong Naval Reserve to help crew vessels and aircraft and for specialised tasks in time of defence emergency.
- Supports the maintenance of a strong Australian Navy Cadets organisation.

The League:

- Calls for a bipartisan political approach to national defence with a commitment to a steady long-term build-up in our national defence capability including the required industrial infrastructure.
- While recognising 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 yet to be fully accepted back into RAN service from the troubled FFG Upgrade programme, HMAS SYDNEY, passing the iconic Staten Island Ferry and Statue of Liberty in New York harbour recently on her Northern Trident deployment.

The new stealthy French air warfare frigate FS FORBIN on sea trails. (Marine Nationale)

An RAN Seahawk practising the technique of off board refuelling. The technique is valuable if the deck is unavailable due to damage, weather or other helicopters already on the deck and/or damaged and unable to be moved quickly. (RAN)

The new USN Virginia class SSN USS HAWAII arriving in her new homeport port of Pearl Harbor. The USN seems to be boosting its SSN numbers in the pacific. (USN)