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Leaders in ship repair and modernisation for over 100 years.

ADI has a long history as the principal contractor for the repair, refit and modernisation of the vessels of the Royal Australian Navy.

Through this experience, ADI has developed extensive and specialist capabilities ranging from the docking of ships to the installation and testing of sophisticated electronic systems. For years ADI has worked with the Navy in facilitating stores supply and maintaining and repairing replaceable equipment.

ADI has continually developed and upgraded its material management system and expertise in both commercial and defence supply systems. This allows ADI to offer the Navy much more to facilitate purchasing and inventory control functions.

In addition, ADI's testing and calibration centres in Sydney, Melbourne and Perth are available to check any equipment for the Navy.
Air Power and The RAN

Fifteen years ago, the Navy League argued strongly and publicly in favour of acquiring an aircraft carrier to succeed HMAS MELBOURNE. The new ship would operate anti-submarine helicopters and Sea Harrier type strike fighters to provide a strike capability and the outer air of air defence of the Australian Fleet.

As the Australian government of the day decided against this, that time, neither of the alternative government, political parties nor any other defence group has propelled the Australian aircraft carrier capacity. Indeed, successive leaders of the RAN have argued that other naval capabilities have a prior need on scarce resources. Reportedly, the former government also discouraged considered a capability.

Shortly after the 1983 decision, the RAN's fixed wing aircraft squadrons (A4 Skyhawks strike fighters, 52 Tracker anti-submarine aircraft and Marabi jet trainers) were disbanded and the skilled personnel also lost. The RAN has only two S70B electronic warfare training aircraft.

The RAN's close range defence against missiles. However, these systems are only effective in self-defence. They are not effective in defence of accompanying vessels. None of the RAN's other naval vessels, such as HMAS SUCCESS or HMAS WESTRALIA, have an accompanying RAN task group in support of which are to be fitted with close range AAW systems.

For short range AAW targeting roles, these latter aircraft are fully integrated indispensable components of the Adelaide class frigate's ASW fighting system.

Tenders have been called for four intermediate size naval helicopters for the Anzac class frigates. The request for these helicopters is significant are fitted with Phalanx and no ship is yet fitted with Nulka. The FFGs and the Adelaide class' Standard SM-1 missiles launched from the Adelaide class’ Standard SM-1 missile system.

However, none of these provides the RAN's seagoing units with a defence against attack by aircraft, but before it is close to the defending vessel. Thus, once the additional helicopters planned enter service, the RAN will be equipped with anti-submarine missiles and surveillance systems. They will have no anti-submarine capabilities, although there is likely to be sufficient redundant payload for an ASW littoral targeting system.

Thus, once the additional helicopters planned enter service, the RAN will be equipped with anti-submarine missiles and surveillance systems. They will have no anti-submarine capabilities, although there is likely to be sufficient redundant payload for an ASW littoral targeting system.

Then, the Adelaide class frigates are being armed with the Sea Sparrow point defense missile system. This will be successively replaced by Evolved Sea Sparrow, with which the Adelaide class may also be armed during their planned AAW upgrade. The offshore patrol vessels are also expected to be fitted with Sea Sparrow. Thus all the RAN's warships (as distinct from naval vessels) will be armed for close and short range defence against attacking aircraft and sea skimming and high trajectory missiles.

Medium range defense is provided by the DDG's and Adelaide class' Standard SM-1 missiles. The RAN's frigates have an ASW littoral targeting system.

The RAN's long range defence against surface ships or submarines armed with guided weapons. This capability will be provided by naval helicopters integrated with their parent or accompanying warships.

Long range defence against aircraft launching missiles can be provided by Standard SM-2 missiles directed by Aegis type phased array radars. Such systems are unavailable to the Japanese and United States navies. Fixed wing fighter aircraft can provide this defence, although distance and competing operational requirements make this an unreliable form of defence in Australia's strategic circumstances.

With the RAN's FAA/F-18s unlikely to be available for fleet air defence, and no known plans to provide at least the Adelaide
The Navy, January 1996

AIR POWER AND THE RAN

and Anzac classes with the SM-2/phased array radars, the RAN will have to rely on their close, short and medium range system for defence against attacking aircraft and air launched missiles. A virtually important factor in this is the capabilities of the radars and methods of integration of the parent ships' command and control (C2) systems. The capabilities of the radars and the weapons and countermeasures of the three layers of defence are infinitely more effective if they are coordinated effectively by the C2 systems and command teams in the ships' operations rooms. Technology in this area is advancing very rapidly. Systems that were the very latest ten years ago are now largely obsolete. At the same time, the missiles themselves (both attack and defence) are increasing in speed and manoeuvrability. It is the view of the RAN, and other professional medium sized navies, that the key to effective defence against missile attack lies in improved radars and C2 systems. It is the RAN’s view that these improvements can provide effective defence against air attack in the RAN’s expected operational environment. The primary purpose of the Adelaide class update is to install the latest and most effective C2 and associated AAW systems.

Other professional navies which consider that it is feasible to provide their warship task groups with effective ship borne defence against air attack include Japan, Taiwan, Germany and the Netherlands. All of these navies operate ships with such systems and have proposed new generations of ships with these capabilities. If such defence can be achieved without aircraft carriers, why do other medium sized navies (Britain, France, Italy, Spain, India) have aircraft carriers? The answer may well be because they envisage operating them in power protection, support of allies or peacekeeping roles. Certainly, Britain and France are now operating their carriers in the Bosnian peacekeeping role.
to cover the area, about 400 are available to the manner.

THE PEOPLE
The RAN Hydrographic Service of today consists of a small team of some 120 uniformed and 90 civilian staff. The men and women of the Service are dedicated to maintaining the highest standards and traditions of the naval, survey and cartographic professions.

Uniformed personnel are trained in all aspects of Hydrography within their naval specialisation. The qualifications of RAN survey officers are accredited to international standards. Civilian personnel undertake in-house and formal technical training in their various special fields. The combined efforts of all are required to gather, interpret and process the data required to produce the charts and publications required by the mariner.

THE PAST

The RAN Hydrographic Service was formed on 1 October 1920. Its traditions however, have developed from those of the Royal Navy and the pioneers of hydrography as a modern earth science. These include names synonymous with Australian history such as: James Cook, Matthew Flinders, William Bligh, Phillip Parker King - all hydrographers; all dedicated to science, exploration and the safety of life at sea.

Prior to 1920 the task of surveying Australian waters fell to the Royal Navy. By 1825 the Admiralty had published a series of charts of the coast. From 1860 through to 1880 the various colonies funded ongoing surveys. The Royal Navy had highlighted the paucity of reliable charts of our northern waters, New Guinea, The Solomons and the SW Pacific theatre in general. A topical press report at the time declared that... more ships have been lost to navigational accident than to enemy action."

The imperative for reliable charts saw a host of vessels of all sizes pressed into service with surveys performed "under the noses of the enemy" to advance of operations. By war's end there were 16 survey ships in commission. The small cadre of survey personnel had distinguished themselves with the award of 2 OBEs, 13 DSCs, 4 DSMs, 14 Mention in Dispatches and 2 US Legion of Merit.

Despite the progress achieved during the war not all surveys were of enduring quality as many served specific wartime purposes and/or were carried out in great haste.

The Australian Federal Cabinet reaffirmed the RAN's responsibility for hydrography in 1946, with a 25 year programme of surveys endorsed, in an effort to provide modern chart coverage of Australian waters. At the same time an agreement with the British Admiralty was signed which effectively made the Hydrographic Office the charting authority for all Australian waters, PNG, Solomon Islands and the Coral Sea. Regrettably, this ambitious plan was curtailed within three years due to RAN...
The RAN and Indonesia

The RAN's association with the Republic of Indonesia dates from the very early days after the Second World War when HMAS MANOORA, commanded by Captain AP Cousins RAN, sailed from Australia for Indonesia to be impressed into the Indonesian Navy and to assist them. Captain Cousins and the crew of MANOORA made every effort to aid and assist the Indonesians, especially the women and children. They were the change agents who helped to make the transition from colonial rule to independence.

The future of the service in the experience of their people and their ability to use modern technology to meet the same challenges faced by their forebears. The requirements for reliable charts continues to increase. Ships of great size and value ply our waters today with cargoes that pose threats to the environment which in years gone by were unimagined.

To meet this challenge the Hydrographic Service places great emphasis on the need to employ systems capable of gathering and processing data in a cost effective manner. Enhancements to existing survey systems, laser sounding techniques, digital chart production, ECDIS systems all contribute to the aim of providing the mariner with the information required to ensure a safe and speedy passage.

The Marine Science Force of the future will include the four existing Survey Motor Launches. LAOS and two new ships to replace MORESBY and FLINDERS. These new vessels are scheduled for delivery by the end of 1997 and 1998. At 3,500 tons displacement and a length of 75 m, they are designed to maintain an offshore hydrographic capability. Central to the ships' role and design is a completely integrated Hydrographic Survey System with capabilities to detect all navigational significant features and quantity their accuracy in both position and depth.

Australia is an island nation. Self reliance in strategic and economic terms depends on the ability to safeguard the freedom of navigation. The RAN Hydrographic Service is dedicated to this task.

The Royal Australian Survey Corps deployed two, the provision of specialist service instructors continued as did the training of Indonesians in Australia. This also has involved an exchange of officer cadets from the two countries.

In November 1973, the first Attack class patrol boat was presented to Indonesia. The second Attack class patrol boat was eventually transferred to Indonesia. The year, 1972 saw the commencement of joint naval exercises between Indonesia and Australia. A major step in the relations between Indonesia and Australia, the exercise was held off Java Bay. This was the first occasion that an Asian country had held naval exercises in Australian waters.

During 1973 LABLIAN transported survey equipment to North Sumatra for the Royal Australian Survey Corps deployed there. The provision of special service instructors continued as did the training of Indonesians in Australia. This also has involved an exchange of officer cadets from the two countries.

The year, 1972 saw the commencement of joint naval exercises between Indonesia and Australia. A major step in the relations between Indonesia and Australia, the exercise was held off Java Bay. This was the first occasion that an Asian country had held naval exercises in Australian waters. The exercise programme continued with BRISBANE visiting Indonesia in

The fourth HMAS PALLUMA, a survey motor launch was commissioned in the early 1990s.

THE CURRENT

The current survey fleet includes HMA Ships MORESBY, FLINDERS, PALLUMA, MERMAID, SHEPPARTON and BENALLA. These surface units are supplemented by the recently developed Laser Airborne Depth Sounder System (LADS) installed in a Fokker F27 aircraft. The Hydrographic Office in Sydney maintains a small survey unit which is routinely detached for surveys in the Antarctic. All ships and airframes are fitted with digital data gathering and processing systems, employ modern acoustic sensors and the latest satellite position fixing systems. The LADS employs unique laser technology developed in Australia specifically for hydrographic surveying.

HMAS PALLUMA off Sydney on 5 September 1995. (Photo - NPUS)

In 1994, the Hydrographic Office relocated to new premises in Wollongong. The building was specially designed to accommodate and support the many functions and advanced technology used to produce modern chart products and services.

HMAS COOK in 1983. (Photo - Ross Gibson)

The Navy, January 1996
The defence policy of the Coalition expounded by Opposition Leader John Howard in the lead-up to a Federal election is, in essence, not greatly different to that of the Labor government.

By Geoffrey Evans

The lack of a "maritime sense" in the Australian community, reflected in most if not all governments of various persuasions over the years, must be a cause for despair among those who realise the importance of the nation and not simply a place for leisure.

Recognition Sought

For many years, submarines have been operated in ships involved with the Malaysia (Emergency in the Seas, and in the Vietnam War prior to the arrival in that country of the main body of Australian forces) and public discussion on the industrial front quiesce from any cost penalties incurred.

The writer has sighted some of the correspondence on this matter and to say he is surprised that such a seemingly small request has generated such a mountain of paper is to express his feelings mildly.

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Naval Reserve Cadets in Canada

Following an invitation from the Canadian Naval League to the Australian Navy to send a contingent of cadets to help celebrate the Canadian League's centenary in 1995, Navy arranged for an NRC officer and six cadets to visit the country in July and August.

The Australian cadets joined sea cadets from Britain, Belgium, Bermuda, the Netherlands, Japan, Sweden, the United States and of course the host country which boasts a combined cadet force (sea, army, and air cadets) of some 65,000 plus a cadet force of the "Whiskey" class. Foxtrots were built from 1958 to 1960.

The Hornet is powered on the surface by three diesels, rubber was fitted between the engines and the hull to trap and absorb most of the sound, however, this was not very successful.

Propulsion/Endurance

The Foxtrot sub was favoured by the Coalition as it is power by diesel-electric propulsion. While it is not turned on in the water, it was an instructive film and an enjoyable occasion.

The Hornet is powered on the surface by three diesels, rubber was fitted between the engines and the hull to trap and absorb most of the sound, however, this was not very successful.

As I climbed aboard the cold war chariot and descended into its once secret interior I felt like Tom Clancy's fictional character Jack Ryan in the movie "HUNT FOR RED OCTOBER."
configuration on top of the bow with a further protrusion above it for an underwater telephone. Passive sonar listens for sound from a ship or submarine while an active sonar uses a high frequency (high ping) sound to measure a target's distance and bearing by the time it takes to bounce off the target and back to the transmitter. The same sonar suite was also fitted to the other Russian submarine classes of the Romeo (SSK), Echo I and II (nuclear powered cruise missile submarines), the Juliet (diesel-electric ballistic missile submarine) and Hotel I (nuclear powered ballistic missile submarine).

Around the rims of the conning tower or sail are four fixed spotlights which make up a passive ranging sonar system. This system measures the time delay between the reception of sound at each hydrophone, from the disparity the submarine can roughly calculate bearing and range.

The five stages of a submarine's attack operations are detection, localisation, tracking and then destruction. The last stage is known as 'surfaced' and involves the submarine being 'free flooding', hence the limber holes, which allows the water to be absorbed by the water in between the outer and pressure hull. This still leaves the submarine's pressure hull intact, or not as badly damaged or leaking. The philosophy is much like the spaced armour principle on our army's Leopard tanks. Double hulls are still leaving the submarine's pressure hull intact, or not as badly damaged or leaking.

Submarines in its ability to take punishment. I have already spoken about the double hull, the outer hull and its advantages but what of the other damage control measures? If one or two of the propellers were damaged in action, they can be detached with the help of attack and defensive compartmentalisation, AC combat systems are double redundant. There are two deployable floating rescue buoys to indicate the spot where the submarine has sunk and two metal straps running under the submarine below the conning tower to enable it to be lifted off the ocean floor in case of sinking.

**Fostrot Tactics**

The best tactic for the noisy Fostrot was to either sit on the bottom of the ocean or dive to a depth where the Fostrot was either invisible to the Western submarine or was too quiet and believe that stealth would provide survivability. The Fostrot is unique compared to modern Western submarines. The Fostrot's Fostrot's vulnerability to attack and damage control equipment. The noise and confusion to torpedo more enemies, getting in amongst the fleet and hiding in the noise. Fostrot was also designed to help in quieting the submarine as the water is not as turbulent as the water in between the outer and pressure hull.

**Soviet Submarine Philosophy**

Soviet submarines were designed to have a single hull and be far quieter and believe that stealth would provide survivability. The Fostrot is unique compared to modern Western submarines. It has a single hull and is far quieter and believe that stealth would provide survivability.

**The Fostrot**

The Fostrot is an anti-ship submarine whose origins can be traced to the last German U-boat design of World War II, namely the
Type XXI U-boat. When the Russians invaded Germany many of the U-boats and their designers and crew were captured and put to work on submarines in Russia. It was only after the Foxtrot that Soviet technology and experience produced specialised ASW submarines.

One tactic that a diesel electric submarine could employ to evade detection during snorkel operations was for it to surface in a known shipping channel and then start its diesels. With most of the submarine out of the water the diesels would be started. This reduces underwater radiated noise thus making the submarine less detectable as some sound would escape into the outside air. The sound could also be very easily mistaken for that of a container ship, which are nearly all diesel powered.

An interesting bonus given to the Australian owner by the Russian Navy and lending weight to the theory of surfacing to recharge the batteries was that as an tactic it was 220 litres of radar absorbent paint per the outside of the submarine. This paint would make it far more difficult to detect by radar on the surface and would give the submarine a significant chance to evade and evade. The presence of the paint indicates that the Soviets may have used this tactic as this type of paint is useless underwater where a submarine normally operates.

Another interesting find on board the submarine in its sonar room was a graph of Western ASW sonars with their active and passive ranges illustrated. The sonars ranged from those found on the US Spruance, Knox, Oliver Hazzard Perry and Tocontinua class surface ships to that found on the Los Angeles class nuclear powered ballistic missile submarine.

Crew Comfort

The term “hot bunking” is quite well known to our RAN Oberon class submariners and would have been more so on the Foxtrot class. Out of a crew of nearly 80 I counted less than 40 beds including the Officers which when not used as beds were folded back and used as seats during meal times or relaxation. Space on board is very restricted due to the double hull arrangement and particularly so when compared to Western submarines. Apart from no actual beds the one complaint about the Foxtrot was the level of inside noise. This was created from all manner of sources such as the air conditioning, the electric or diesel motors or the sound of the submarine going through the water.

During the days of the Soviet Union each ship or submarine embarked a Zampolit or political officer. It was his duty to keep the revolution alive in the minds of the crew by acting in a similar manner to a priest in any Western Navy but preaching the evil of the West and the righteousness of Communism. He also would watch and evaluate the officer’s conduct as good party members and inform on them if they wandered off in their faith. If this was so a demotion would follow. The Zampolit also had the same level of rank as the Captain and effectively commanded the vessel’s mission with navigation and battle left to the Captain.

The control room layout in the Foxtrot is very cramped and difficult for a Captain to see and control everyone. His control room stations are structured in such a way that no one person could see what the other was doing. This was also the case for the Captain and highlights to the misinformed Communist leaders had of their service personnel. To further complicate matters his navigator’s chart room is in a separate cabin off to the side of the control room and prevents the Captain from taking the occasional glance at the maps without difficulty.

The presence of the paint indicates that the Soviets may have used this tactic as this type of paint is useless underwater. This same layout is thought to be responsible for the 1981 “Whiskey on the Rocks” incident inside Swedish territorial waters. With the Divisional commander aboard, the Zampolit breaking down his neck, a tricky navigation task at periscope depth and the difficult layout structure of the control room, the Captain had a rather impossible task. All these factors are thought to have contributed to the Whiskey class submarine running aground on rocks in a very embarrassing incident.

If this new tactic had been used by the Soviets it would have given access to the submarine so why the strong security doors? It is known that mutinies have occurred to stop crew members from forcing their way into these rooms for the purposes of mutiny. It is improbable that enemy commandos would gain access to the submarine so why the strong security doors? It is known that mutinies have occurred more than once on Soviet naval vessels.

Food on board the submarine was considered quite adequate with fish on the menu once a week. Soviet submarines are not lucky as each man is allowed one glass of wine with his main meal every day. That contradicts the myth that a vodka ration was issued. One interesting ration was pure alcohol for the purposes of cleaning the insides of the submarine, but it sometimes found its way into cleaning the inside of the toilet.

I would strongly suggest to anyone who is interested in the Cold War, ASW, submarines, and the Soviet Navy to visit the Foxtrot submarine. Scorpion at the National Maritime Museum for a rather eye opening experience. If you have been on any Western submarine the comparison is striking. The Foxtrot represents the Submariners profession at its hardest.

The four stern 133mm torpedo tubes. There is now no longer provision to carry reloads for these tubes. They were loaded from the outside through the tubes. The total torpedo load was 22 torpedoes, 6 in the forward tubes with 12 reloads and 4 in the aft tubes. The beds to left of the photo are the only stalls designed beds on the sub. The rest double as sitting benches. The all torpedo tubes were later used to fire ASW torpedo decoy devices.

Inside the 'surfaced' bad weather bridge. This area is outside the pressure hull and is flooded when submerged.
The Fleet

Guided Missile Destroyers

Guided Missile Frigates

Frigates

Destroyer Escorts

Submarines

Training and Helicopter Support Ships

Landing Ship Heavy

Auxiliary Oiler Replenishment Ship

Underway Replenishment Ship

Mine Countermeasures Vessels

Patrol Boats

Survey Ships

Survey Motor Launches

Landing Craft

Heavy

Trials Vessel

Navigational Training Vessel

Sail Training Ship

SUPPORT CRAFT Lighters

Torpedo Recovery Vessels

Tugs

Diving/Patrol Launches

38 PLATH
39 HOBART
41 BRISBANE
01 ADELAIDE
02 CANBERRA
03 SYDNEY
04 DARWIN
05 MELBOURNE
06 NEWCASTLE
07 SWAN
53 TORRENS
60 ONSLOW
61 ORION
62 OTAMA
31 KANIMBLA
52 MANDOORA
L50 TOBRUK
OR304 SUCCESS
0195 WESTRALIA

Huon class
M80 RUSHCUTTER
M81 SHOALWATER
Y298 BANDICOOT
Y299 WALLAROO
Y297 COWARDS
Y296 HARDY
1102 BROLGA
1121 BERMACUI
1185 KORAAGA
203 FREMANTLE
204 WARRNAMBOOL
205 TOWNSVILLE
206 WOLLONGONG
207 LAUNCESTON
208 WAGALLA
209 IPSWICH
210 CESSNOCK
211 BURNING
212 GOWER
213 GERALDTON
214 DUBBO
215 GEELONG
216 GLADSTONE
217 BUNBURY
73 MORESBY
312 FLINDERS
01 PALUMA
02 MERMAID
03 SHEPPARTON
04 BENALLA

L126 BALIKPAPAN
L127 BRUNEI
L128 LABUAN
L129 TABAKAN
L133 BETANO

ASR241 PROTECTOR
A243 ARDENT
STS YOUNG ENDEAVOUR
001 WARRIGAL
002 WALLABY
003 WOMBAT
004 WYULDA
001 WATTLE
002 TREVALLY
003 TAILOR
801 TUNA
802 TREATLY
803 TAILOR
2501 TAMMAR
1801 QUOKKA
501 BRONZEWING
502 CURREAWONG
504 MOLLYMAWK
2001 SEAL
2002 PORPOISE
2003 MALU
2004 SHARK

The Fleet Air Arm

SEAHAWK
SEAKING
SQUIRREL
KIOWA
HS748
The Sydney based guided missile frigate, HMAS NEWCASTLE (Commander Nigel Perry) arrived in the Port of Newcastle on Friday, 27 October, at the start of a five day visit.

During her time alongside, the 200 officers and crew hosted and participated in a number of activities:

- A “Smoking” ceremony with members of the Awabakal Aboriginal Community, a Charity Ball to raise money for the Hunter Orthopaedic School, a public open day aboard and a tour of the ship by children from the Hunter School.

The “Smoking” ceremony involved the lighting of a fire or “coolamon” of eucalypt leaves on the helicopter deck of HMAS NEWCASTLE to generate a considerable amount of smoke. According to aboriginal custom, the smoke cleanses and protects all persons who “enter” the smoked land and bestows upon them, the strength and the blessing of the Aboriginal people.

Following a successful visit the ship sailed for Sydney.

The Department of Defence has shortlisted two companies for the next stage of work in the planned upgrading of the Navy’s six guided missile frigates (FFGs). The companies selected to participate in the next stage are Australian Defence Industries and Transfield Defence Systems. Their selection follows evaluation of responses to a Request for Proposal issued to undertake the upgrade work.

The responses, from four firms, were information packages describing possible upgrading strategies. Defence will now fund a study to be carried out by ADI and Transfield. This will enable further consideration of cost-capability issues and development of detailed proposals leading to tenders to undertake the work.

The total cost of the upgrade is expected to be in excess of $500 million.

**NEWCASTLE VISIT**

**Guided Missile Frigate Update**

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**SHIPYARD PUTS US CARRIER THROUGH FIRST SEA TRIALS**

The aircraft carrier USS JOHN STENNIS has successfully completed initial sea trials after construction at Newport News Shipbuilding, Newport News, VA.

The sea trials were conducted by the shipyard with Adm. Bruce DeMars, director of the US Navy’s nuclear propulsion programme, on board. Sea trials are extensive and test virtually every system aboard the carrier, said Mike Hatfield, Newport News spokesman. The Navy was to conduct its trials the week of Oct. 23, with the STENNIS delivered to the Navy on Nov. 11. The STENNIS is the seventh of the Nimitz-class carriers built for the Navy. The ship, which is being delivered seven months ahead of schedule, also includes nearly 1,200 upgrades to the carrier’s basic design and internal configuration.

**Guided Missile Frigate Update**

The Department of Defence has shortlisted two companies for the next stage of work in the planned upgrading of the Navy’s six guided missile frigates (FFGs). The companies selected to participate in the next stage are Australian Defence Industries and Transfield Defence Systems. Their selection follows evaluation of responses to a Request for Proposal issued to undertake the upgrade work.

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**NAVAL NEWS Continued**

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**NAVAL NEWS**
### MINE WARFARE FORCE PROTECTS NEWCASTLE

The Royal Australian Navy's seven mine countermeasure ships visited Newcastle during mid-November. In port for Exercise Shortscope, the ships provided a range of services to support the mine warfare operations in the region.

**Ovens Pays Off**

Ovens is the third Oberon-class submarine to homeport to Fleet Base West, the others being HMAS OXLEY (1987-92) and ORION since 1992. Due to decommission at Garden Island later this year, Ovens will become a stationary training submarine at Fleet Base West, fulfilling the role that OTWAY carried out at HMAS PLATYPUS.

Ovens received a fond farewell in Fremantle with more than 2500 visitors when she was opened to the public. In 1997 the former HMAS CHOPRIDGE was gifted to the WA Maritime Museum as a permanent display, possibly to be opened to the public later this year, more than 2500 visitors when she was opened to the public.

**Polish Sail Training Ship In Sydney**

A rare visitor to the southern hemisphere arrived in Sydney on Tuesday, 12 October, when the Polish Navy sail training vessel OLR ISKRKA began a five-day stay. It was the first Polish ship to visit Australia by a Polish Navy ship. With a crew of 54 under the leadership of Commander Czeslaw Dyczynski, including 34 cadets from the Polish Naval Academy, the three-master barquentine was on a world tour of the world. Before Sydney, the ship called at Darwin and Hobart.

**TORRES STRAIT TEST FOR NAVY'S PATROL BOATS**

The participating patrol boats were HMAS GERALDTON, Rockingham WA, HMAS GENTLE, Darwin, and HMAS BUMBURY from Rockingham WA.

**Porpoise Damaged**

O'hearn) off Coop's Point as a rare visitor to the southern hemisphere arrived in Sydney on Tuesday, 12 October, when the Polish Navy sail training vessel OLR ISKRKA began a five-day stay. It was the first Polish ship to visit Australia by a Polish Navy ship. With a crew of 54 under the leadership of Commander Czeslaw Dyczynski, including 34 cadets from the Polish Naval Academy, the three-master barquentine was on a world tour of the world. Before Sydney, the ship called at Darwin, Fremantle and Hobart.

During the exercise, the patrol boat crews developed the skills that they are required to call on in peacetime operations and possibly in times of conflict. The participating patrol boats were HMAS GERALDTON, Rockingham WA, HMAS GENTLE, Darwin, and HMAS BUMBURY from Rockingham WA.
By Jim Nelson (ex PO Coxswain RANR)

Fifty years ago this month, one of the RAN’s smaller units, the service reconnaissance vessel HMAS ALATNA was rammed and sunk while being towed by the destroyer HMAS QUICKMATCH. The two vessels were enroute from Makassar bound for Labuan in Borneo. Jim Nelson, a member of the ALATNA’s crew reports on the fifteenth anniversary in his own words.

L eutenant Victor Dan, Commanding Officer of HMAS ALATNA, had been on watch for survivors. There was a considerable amount of time given to abandon ship. This position by an airlock in the foc’sle to swim. I returned to the bridge and as this was not available to us at power, but owing to the nature of the tow, we had given passage to from Makassar to Labuan in an endeavour to help him to return to Australia for his discharge, he had with him a little black kitten which we had picked up at Makassar. The opening of the hatch released the air lock and the tock began to swell. Able Seaman Xanthe Simpson accepting the Award on behalf of TS TOBRUK.

Sub-Lieutenant (S), RANR

HMAS ALATNA...RAMMING 1946

The Navy, January 1996

The Peter Ballestey Memorial Trophy for 1994 for achievement in seamanship by a Naval Reserve Cadet Unit was presented to 7 TS TOBRUK at a ceremony which coincided with our Annual Inspection on 8 July 1995. The trophy was presented on behalf of the Peter Ballestey Memorial Trophy Committee.

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AMPHIBIOUS WARFARE

LPD 17

Starting in 2004, the US Navy will take delivery of a new class of highly capable amphibious assault ship which will replace four existing classes of amphibious ships which are due to be decommissioned by 2010.

Soon it is due to meet its first Amphibious Ready Group (ARG), consisting of different ships including elderly LPDs, LSDs, LSTs and LKAs.

The three classes of the Tarawa/Wasp-class (LHA-1/LHD-1) assault ships, the Whidbey Island- and Harpers Ferry-class (LSD41/49) of dock landing ships, and the new LPD 17 design will replace a total of 41 vessels in the fleet.

When it is delivered sometime in 2004, it will not only provide the US Navy with an impressive amphibious lift capability, the LPD 17 will have an unprecedented self defence combat system combining the Evolved Sea Sparrow, Ship Defence System (SDS) and Co-operative Engagement Capability (CEC).

Although the LPD 17 will not be equipped with the Aegis SPY-1D multi-function radar, it will receive the SPS-48E S-band search radar, the SPQ-9B horizon search radar, and SPS-67(V)1 surface search radar, and will be equipped with a 16-cell Mk41 Vertical Launch System (VLS) for Evolved Sea Sparrow Missiles (ESSM), two Rolling Airframe Missile (RAM) launchers, and three Phalanx close-in weapons systems. It will also be equipped with SLC-24AV13 ESMECM, the MK16 (ISROC) decoy launch system, SLC-49 inflatable decoy (Rubber Duck), and the SLQ-25A HEP acoustic torpedo decoy.

Signature reduction

The LPD 17 programme passed Milestone 0 at the beginning of Fiscal Year 1996, Milestone 1 was passed in the second quarter of FY'95. Milestone 1 was scheduled for the first quarter of FY'95. Having completed preliminary design early in FY'94, contract design is due to have been completed at the end of the third quarter of FY'95, in time for the Milestone 2 review process. A lead ship contract is now scheduled for early in FY98.

The Navy, January 1996

Hawker Pacific Aviation Servicing Division is dedicated to keeping the Australian Defence Force flying safely, efficiently, and within budget.

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- Spare parts support

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The Republic of Korea (ROK), also known as South Korea, has long focussed on the ground and air dimensions of defence, unsurprising given the nature of the threat that has menaced the country since its formation. The threat of the North Korea may be timely.

The ROK Navy has attempted to enlarge its maritime capability, allowing them to guard against incursions from the North. Equipped for either anti-ship or anti-submarine warfare, they form the backbone of the ROK surface forces. The first corvettes to be constructed were the four DONG MAE class, commissioned in 1982-83. On a displacement of only 705 tons full load and capable of 31 knots, and armed with a surface-to-air missiles (ASM), these and other changes raised the displacement to 269 tonnes more powerful gas turbine engines allowed the maximum speed to be increased to 44 knots. Following the first three boats (built at Tacoma Boatbuilding in the USA, 1975-76) the remaining five were built in 1975-78 by a subsidiary, Korea Marinette, in South Korea. The Navy, January 1996
Displacing 140 tonnes and capable of 40 knots, they are armed with 42 127mm Bofors cannon and two machine guns. It is expected that they will pay off soon.

The S.EA.L. class, the South Korean Navy's entry to the class of the coastal forces, with some ninety seven in service since the first boat commissioned in 1991, is equipped with an Emerson Electric twin 30mm cannon and two single 20mm Sea Gattis to turrets located on the quarterdeck and deckhouse. Also, the bridge is giving it a superior field of fire. Able to assault anywhere on the coast, many of the class are veterans of skirmishes against the fast raiding and amphibious forces of the North Korean Navy and Army.

Ambush forces are the ROK Navy operates a number of landing ships and landing craft in support of the Army and the Marines. Backbone of this force are seven former US Navy World War 2 era Landing Ship Tank LST transferred in the late 1950's. Displacing 4000 tonnes and able to transport 2100 tonnes of equipment at 11 knots, the LST's are armed with one quad and two twin mounts each and two 30mm cannon in single mounts. All are equipped with a 30mm cannon, which must restrict their ability to beach themselves to deliver cargo directly ashore.

Largest and most modern of the landing ships are the SOYOUZOM class, 9000 tonnes and capable of 16 knots and able to deliver up to 2200 tonnes of equipment across the beach through bow, door, bridge and ALLIGATOR's displace 4200 tonnes and are armed for self defence with two twin mounts each, two 30mm cannon and a 20mm cannon. Two ships are in service with two more under construction. Possible replacements for the WWII era LST's could add more to this total.

Supporting the larger LST's are eight Landing Ship Medium (LSM) and five Landing Craft. Also transferred from the US Navy in the 1950's, they are capable of beaching to discharge their loads. Displacing 1095 tonnes and able to steam at up to 12 knots, and armed with two 40mm and two 30mm cannon, they are in need of replacement.

To transport cargo from ships lying at anchor to the beach, the ROK Navy constructed six FUREZAL class Landing Craft Mechanised (LCM) which were transferred from the US in 1978. In addition a large number of small Landing Craft Vehicle/Personnel (LCVP) are in service.

Mine Warfare

To counter the threat of a mining campaign against the Republic's maritime defences, the Navy operates two classes of mine warfare ships. The older class are armed with eight Mk 7A6 Minehunters, the first two 155 tonne ships, in the class were handed over to the CHIN JEE in 1994.

Before the 1970's, the LST's were augmented by ten 115 tonne Landing Craft Mechanised (LCM) which were transferred from the US in 1978. In 1990, the US Navy deployed three of the LAU Hammocks Landing Craft, the new two 200 tonnes of cargo, including main gun turrets located on the quarterdeck.

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PIRACY IN THE 1990s

The recent seizure, in international waters off the Thai/Cambodia border, of the 7,500 tonne Cypriot-flagged Greek-operated Anna Sierra has highlighted a growing problem of the mid-90's - the escalation in the incidence of the ancient crime of piracy.

The 23 crewmen of the Anna Sierra were far more fortunate than those who were killed in the attack on the Kuwaiti-owned tanker in international waters off the Thai/Cambodia border. Similarly, the crew of the Ecuadorian vessel the Ferris went ashore having survived an attack on the ship by pirates.

In 1990, the CHIN JEE, a host of non-combat units are involved in a wide range of roles, including the displacement of fuel to ships at anchor and berthed alongside, or on those steaming in territorial waters. It is claimed that piratical attacks now take place in harbours and ports all around the world, from the Barbary Coast, the buccaneers of the 17th century, went on to attack British vessels in the British Indian Ocean islands, and later, the Barbary Coast, the buccaneers of the 17th century, went on to attack British vessels in the British Indian Ocean islands.

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gangs with supporting vessels and using Singaporeans. However, there has been an increase in more serious incidents involving organised well-armed pirates and using more powerful and sophisticated equipment, well offshore in the Hong Kong/Southern Indian Ocean area.

While in the Malacca Strait/Natuna area piracy continues to be a problem, it must be realized that this is a term using makeshift weapons at night and boarding from astern with rare success. Area piratical seizures are usually short incidents involving organised, well-armed pirates, wearing military style uniforms and even from land, with frequent use of firearms. While Australian flagged vessels in Australian waters and major ports have not in recent times been victims or involved over piracy, the menace appears to be growing rapidly in areas of concern to Australia. Increased measures for the protection of ships appear to be required in waters to our north. The general consensus of the meeting seemed to be that the arming of ships was not an answer. Initially the most sensible move would be best taken through diplomatic channels with the aim of convincing coastal states in areas of concern to take action. Increased measures for the protection of ships appear to be required in waters to our north.

There has even been one reported incidence in Denmark.

"Phantom Ships" is another term of piracy which has developed recently. These are stolen vessels that are fraudulently registered, take on cargo under a false ownership, and fail to deliver the cargo to its destination.

What can then be done about piracy?

Keeping Masters constantly informed of "trouble spots" so that those Masters operating in such areas can take extra security precautions. This information could be obtained from the Regional Piracy Centre or the ISF.

* avoiding remaining at anchorage whenever possible in trouble spots, for example, steam slowly in circles or steam at least 20 to 40 mins off shore at night (or in the case of Somalia sail at least to the coast at dawn, often more than 120 nautical miles),

* ensuring that Masters are on the alert for pirates whenever possible in trouble spots, for example, steam slowly in circles or steam at least 20 to 40 mins off shore at night (or in the case of Somalia sail at least to the coast at dawn, often more than 120 nautical miles),

* ensuring that Masters are on the alert for relatively small vessels moving at high speed in the vicinity of ships as these are often used by pirates. Master's should be alerted to "bogus" government officials who attempt to board their ships.

* ensuring that all Masters have a copy of "A Master's Guide" which includes details of measures such as maintaining a 24 hour visual and security watch, keeping the crew informed of security plans, avoiding remaining at anchorage whenever possible in trouble spots, for example, steam slowly in circles or steam at least 20 to 40 mins off shore at night (or in the case of Somalia sail at least to the coast at dawn, often more than 120 nautical miles),

* ensuring that Masters are on the alert for relatively small vessels moving at high speed in the vicinity of ships as these are often used by pirates. Master's should be alerted to "bogus" government officials who attempt to board their ships.

* reporting all pirate activity to the Regional Piracy Centre as soon as it is practicable after it occurs and including as much detail as possible. Measures such as those mentioned would be the most sensible move would be best taken through diplomatic channels with the aim of convincing coastal states in areas of concern to take action. Increased measures for the protection of ships appear to be required in waters to our north.
BOOK REVIEWS

Cited as “A comprehensive listing of the RAN ratings (Able Seaman Falls, Corporal and Airman) in which the writer has tried to make its listing current by using virtually all available sources.” The three RAN ratings (Able Seaman Falls, Corporal and Airman) are recorded in “For Those in Peril” which is almost complete. I was not disappointed reading it.

Now don’t get me wrong. I think Vic Cassell has done an excellent job in putting this book together and turning what could have been a dry listing of casualties and ships sunk into a very readable and worthwhile addition to Australia’s written Naval history. His descriptions of the ships careers and how some of the men met their end make fascinating reading. For example, the description of the attack on the corvette PIRIE in which the Cuniberti officers head was removed by a falling bomb (fortunately it burst on the forecastle causing further casualties) and the tragic but accidental death of three men in HMAS TAMBAR, when the ship was entering the harbour and the boat failed to give her recognition signal and was fired on by an Army shore battery. Three of the men were subsequently killed, while another was severely wounded and died in hospital.

On the whole “For those in peril” is an excellent book and credit to the author cited as “A comprehensive listing of the ships and men of the Royal Australian Navy who paid the supreme sacrifice in the wars of the Twentieth Century” it is not a complete listing, however, it is 98% of the way there. I was disappointed reading it.

Kangaroo Press, who are becoming regular publishers of Naval history texts, have done a particularly good job publishing with only a few minor typographical errors. “For Those in Peril” is a paperback, quite affordable at $29.95 and available at most good bookshops. A “must have” for all naval historians, those interested in the RAN or researching specific ships or individuals.

MAKE A SIGNAL

By Jack Broome
Published by DB Books
Review copy from Maritime Books

MAKE A SIGNAL is a classic book published in 1955. Within 224 pages it describes a history by Signals, with many historical, some dramatic, others funny and sarcastic. Signals spanning the 18th century to the mid 1950s are reproduced for the entertainment of the reader.

Intended to convey information between the various fleet units over the last three centuries, the recently republished “MAKE A SIGNAL” highlights the pre-microphone era, with messages carefully worded to avoid misunderstanding between ships and their commanding officers. Even in 1996, signals are still employed as a method of naval communication, despite the advent of more sophisticated electronic methods. Examples of some of the brief signals from the book are:

- "Am being attacked by eleven dive-bombers."
- "Seven dive bombers will not hit in second innings."
- "We aim to please. You aim too please."
- "Make A Signal!" is available from Maritime Books in the UK. Highly recommended.

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The Navy League of Australia

APPLICATION FOR MEMBERSHIP

HISTORICAL

The Navy League was established in Australia in 1901, initially in the form of small branches of the United Kingdom Navy League (established in 1897) and since 1950 as an autonomous national body headed by a Federal Council consisting of a Federal President and representatives of the six States, the Australian Capital Territory and the Northern Territory.

The Navy League of Australia is now one of a number of independent Navy Leagues formed in countries of the free world to influence public thinking on maritime matters and create interest in the sea.

The Navy League of Australia cordially invites you to join us in what we believe to be an important national task.
MEMBERSHIP
Any person with an interest in maritime affairs, or who wishes to acquire an interest in, or knowledge of, maritime affairs and who wishes to support the objectives of the League, is invited to join.

OBJECTIVES
The principal objective of the Navy League of Australia is “The maintenance of the maritime well-being of the Nation” by:

- Keeping before the Australian people the fact that we are a maritime nation and that a strong Navy and a sound maritime industry are indispensable elements of our national well-being and vital to the freedom of Australia.
- Promoting defence self reliance by actively supporting manufacturing, shipping and transport industries.
- Promoting, sponsoring and encouraging the interest of Australian youth in the sea and sea-services, and supporting practical sea-training measures.
- Co-operating with other Navy Leagues and sponsoring the exchange of cadets for training purposes.

ACTIVITIES
The Navy League of Australia works towards its objectives in a number of ways:

- By including in its membership leading representatives of the many elements which form the maritime community.
- Through soundly-based contributions by members to journals and newspapers, and other media comment.
- By supporting the Naval Reserve Cadets, and assisting in the provision of training facilities.
- By encouraging and supporting visits by recognised world figures such as former United States Chiefs of Naval Operations and Britain’s First Sea Lords.
- By publishing “The Navy”, a quarterly journal reporting on local and overseas maritime happenings, past, present and projected.
- By maintaining contact with serving naval personnel through activities arranged during visits to Australian ports of ships of the Royal Australian and Allied Navies.
- By organising symposia, ship visits and various other functions of maritime interest throughout the year.

Member participation is encouraged in all these activities.

JOINING THE LEAGUE
To become a Member of The League, simply complete the Application Form below, and post it, together with your first annual subscription of $20.00 (which includes the 4 quarterly editions of “The Navy”), to the Hon Secretary of the Division of the Navy League in the State or Territory in which you reside, the addresses of which are as follows:

NEW SOUTH WALES DIVISION: OPO Box 1719, Sydney, NSW, 2001
VICTORIAN DIVISION: PO Box 309, Mt Waverley, Vic, 3149
QUEENSLAND DIVISION: C/- PO Box 170, Cleveland, Qld, 4163
AUSTRALIAN CAPITAL TERRITORY DIVISION: C/- 45 Skinner Street, Cook, ACT, 2614
SOUTH AUSTRALIAN DIVISION: GPO Box 1529, Adelaide, SA, 5001
TASMANIAN DIVISION: C/- 42 Amy Road, Launceston, Tas, 7250
WEST AUSTRALIAN DIVISION: C/- 23 Lawlor Road, Attadale, WA, 6154

Subscriptions are due on 1st July in each year, and your membership will be current to 30th June immediately following the date on which you join the League, except that if your first subscription is received during the period 1st April to 30th June in any year, your initial membership will be extended to 30th June in the following year.

THE NAVY LEAGUE OF AUSTRALIA
Application for Membership
To The Hon Secretary
The Navy League of Australia
Division

Sir or Madam:

I wish to join the Navy League of Australia, the objectives of which I support, and I enclose a remittance for $20.00 being my first annual subscription to 30th June next.

Name
(Mr)
(Mrs)
(Ms)
(Please Print Clearly)
(Rank)

Street
Suburb
State
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Signature
Date

Subscriptions are due on 1st July in each year, and your membership will be current to 30th June immediately following the date on which you join the League, except that if your first subscription is received during the period 1st April to 30th June in any year, your initial membership will be extended to 30th June in the following year.
JOIN THE NAVAL RESERVE CADETS

If you are between the ages of 13 and 18 years:

The Naval Reserve Cadets provide for the spiritual, social and educational welfare of boys and girls and help to develop in them character, a sense of patriotism, self-reliance, citizenship and discipline.

Uniforms are supplied free of charge.

Cadets are required to produce a certificate from their doctor to confirm they are capable of carrying out the normal duties and activities of the Cadet Corps. If injured while on duty, Cadets are considered for payment of compensation.

Parades are held on Saturday afternoon and certain Units hold an additional parade one night a week.

The interesting syllabus of training covers a wide sphere and includes seamanship, handling of boats under sail and power, navigation, physical training, rifle shooting, signalling, splicing of wire and ropes, general sporting activities and other varied subjects.

Instructional camps are arranged for Cadets and they are also given opportunities, whenever possible, to undertake training at sea in ships of the Royal Australian Navy.

Cadets, if considering a sea career, are given every assistance to join the Royal Australian Navy, Mercantile Marine or the Royal Australian Naval Reserve, but there is no compulsion to join these Services.

For further information, please contact the Senior Officer in your State, using the addresses provided below.

NEW SOUTH WALES: Staff Office Cadets, HMAS Watson, Watsons Bay, NSW, 2030.
QUEENSLAND: Senior Officer NRC, HMAS Moreton, Merthyr Road, New Farm, Queensland, 4005.
WESTERN AUSTRALIA: Staff Office Cadets, HMAS Leeuwin, PO Box 58, Fremantle, WA, 6160.
SOUTH AUSTRALIA: Staff Office Cadets, HMAS Encounter, PO Box 117, Port Adelaide, South Australia, 5015.
VICTORIA: Staff Office Cadets, HMAS Lonsdale, Rouse Street, Port Melbourne, Vic, 3207.
TASMANIA: Staff Office Cadets, HMAS Huon, Hobart, Tas, 7000.
AUSTRALIAN CAPITAL TERRITORY: Commanding Officer, TS Canberra, PO Box E52, Queen Victoria Terrace, Canberra, ACT, 2600.
NORTHERN TERRITORY: Commanding Officer, TS Darwin, PMB 13 Winnellie, NT, 0820.

"THE NAVY"

All enquiries regarding the Navy Magazine, subscriptions and editorial matters should be sent to:

The Hon. Secretary, NSW Division
NAVY LEAGUE of AUSTRALIA
GPO Box 1719, SYDNEY, NSW, 2001
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New Hydrographic Ships

The Minister for Defence recently announced that NQEA AUSTRALIA had been selected as the preferred tenderer to design, build and provide initial support for two new hydrographic ships for the Royal Australian Navy (RAN).

"The new ships will replace the ageing HMAS MORESBY and FLINDERS in the vital role of charting the seas around Australia, and will serve a highly sophisticated hydrographic survey system," the Minister said.

"The award of this contract will be of benefit not only to the Australian Defence Force but to the entire Australian community. The work done by these new ships will add in the charting of Australia's waters which means greater safety and more efficient shipping for the maritime industries," the Minister added.

Contract negotiations have now been begun with the total contract for the ships and their initial support valued at about $200 million. The new hydrographic ships are expected to be in service by 1999.

The new ships will be based upon an existing ship designed by Skibko, a German company with extensive hydrographic and oceanographic ship design experience.

General Platform

The ship has been designed to comply with Lloyd's Register of Shipping Rules, except as necessary to comply with overriding requirements of the RAN's Top Level Specification.

The ship's hull has been designed to be constructed primarily from shipbuilding mild steel. Aluminium construction will be used in the superstructure. Special attention will be given to the steel/aluminium structural connections to avoid corrosion problems with dissimilar metals.

The helicopter flight deck is used forward of the stem, towards the centre of the ship. The deck is offset to the port side from the ship's centre line in order to provide direct crane access to the quarterdeck and to the surveying stores hatches on the starboard side.

The helicopter hangar is incorporated structurally into the main superstructure.

Particular attention has been given to the design of the forward underwater sections of the ship, to minimise bubble sweep-down at the bow and to achieve optimum performance of the hydro-acoustic systems.

Roll reduction is achieved by a dual-passive stabiliser system.

The platform design, and in particular the modular breakdown of the hull, has been prepared to suit the facilities available at NQEA, where the ship will be constructed, trialed and delivered.

Aviation Facilities

Facilities are provided for the flight deck and in the hangar to meet all top level specification aviation requirements.

As mentioned above, the helicopter flight deck landing area is forward of the stem, towards the ship's centre of pitch, and the fixed hangar is structurally integrated into the main superstructure block.

A Harpoon grid type aircraft security system and a three-wire aircraft arresting system are provided to secure the aircraft on landing and transfer to the hangar.

Propulsion System

Focusing on the examination of propulsion system options, a twin-shaft diesel-electric propulsion system has been selected, consisting of the following major components:

- Four diesel generator sets providing 800kW/660kW output each, feeding the Main Switchboard to distribute power to the main propulsion motors. The pump jet/bow thruster and Ship's Services Switchboard.

Major characteristics:
- Length overall: 71.20 metres
- Beam: 15.20 metres
- Depth: 6.36 metres
- Design Draught: 4.37 metres
- Displacement at Design Draught (approximately): 2550 tonnes

Margins

The design catered for the RAN specified five per cent displacement growth margin and the RAN specified stability margin. The electrical power growth margin is 10 per cent as specified by the RAN.

Area and volume margins are allowed for in the design. In particular, the Cargo Hold/Survey Store is larger than that required by the RAN's Top Level Specification, providing increased capacity for the carriage of survey equipment, disaster relief stores and MEDIVAC stores.

Normal control of the propulsion system will be exercised from the Bridge.

The flexibility inherent in the selected diesel-electric propulsion system ensures that overloading or underloading of the diesel generators will not occur under any conditions of propulsion and ship's services power demand. There are no barred speed ranges with this propulsion system.

The omnidirectional pump jet's manoeuvring function is augmented by its capacity to provide a ship speed of about six knots in an auxiliary propulsion mode. Particular care has been taken to achieve an optimum arrangement for the pump jet relative to the underwater sensors, having regard to noise, interference, distance from the bow fixed lines, accessibility and competing demands for primes.

Electrical Services System

The Main Switchboard will provide power through 660V/415V transformers to the Ship's Services Switchboard. The Ship's Services Switchboard will provide 415V three-phase 50Hz power to the ship's services and to 415V/240V transformers.

The electrical system cater for:
- A Harbour Service Generator to meet all harbour load conditions.
- An Emergency Generator
- Essential and emergency services as required by the Top Level Specification.

A battery-operated Uninterruptible Power Supplies as required for the Hydrographic Survey System and the Integrated Control System.

Integrated Control System (ICS)

A comprehensive state-of-the-art Integrated Control System is part of the design catering for control, monitoring, data logging and alarm functions for all main and auxiliary machinery.

The Bridge: Machinery Control Room Technical Office and Local control and monitoring stations are provided to meet the Top Level Specification and the Classification Society requirements.

The ship has built-in processing and degradation mode capabilities with command override. The propulsion and steering elements of the ICS will interface closely with the navigation and hydrographic survey systems in relation to the requirement for high accuracy automatic tracking.

Navy: The Navigation System as part of the Top Level Specification requirements.

The System is integrated with the Hydrographic Survey System as necessary for survey operations.

The principal components of the system are as follows:

- One navigational radar with ARPA
- Two gyrocompasses
- One magnetic compass
- PELGOS
- Auto pilot
- Collision avoidance sonar
- Global Positioning System
- EMI and Doppler Log
- Navigational lighting system.
NEW HYDROGRAPHIC SHIPS

Internal And External Communications Systems

The communications system, while meeting all Top Level Specifications for internal and external function and performance, is designed to provide maximum flexibility with a minimum requirement for specialist manning.

Remote control facilities allow end users to select and control all authorized circuits both internal and external. Built-in test functions provide for complete on-line testing and restoration of full services.

The communications system provides rationalised internal communications for ship command and control functions through the use of three local area asynchronous transfer mode (ATM) networks. Network of user facilities for broadcast, alarm, ship administration, telephone and audio entertainment.

Internal communications required for ship safety and damage control activation and management are provided by stand-alone powered facilities to ensure high availability in all critical positions.

Very high bandwidth communications providing CCTV and entertainment services are also provided as stand-alone systems but interfaced to other command and control facilities where practical and appropriate.

The ATM local area network also provides the carrier and switching for the external communications unclassified traffic and radio services. This arrangement allows direct interaction between external communications services and the logistic support and personnel administration functions. Secure voice and voice traffic is carried and configured by an independent switching system interfaced to the classified ATM local area network through appropriate cryptographic equipment. This system provides the capability for extension to a separate high bandwidth classified ATM network and implementation of multi-level security when technical permits.

The unclassified and more secure facilities of the communications systems provide a flexible, compliant and expandable solution while satisfying the simultaneous operations required for Naval and Maritime Marine Directors and Safety System of communications.

The ship design incorporates a comprehensive communications an-tenna arrangement.

Accommodation

The accommodation arrangements provide the design ensure a habitable and comfortable environment for the crew. Each cabin is equipped with wash- ing and showering facilities and heads.

The accommodation includes:

1. Commanding Officer's quarters.
2. Single-berth Officer's cabin (XO).
3. Two-berth Officer's cabin.
5. Two-berth Senior Sailor's cabins.
6. Four-berth Junior Sailor's cabins.

Senior Sailors' Mess and recreational spaces.

Junior Sailors' Mess and recreational spaces.

The cabin arrangements provided cater for the accommodation of 51 persons, including training billets. An example of a standard twin-berth accommodation for additional personnel who may be embarked from time to time up to a total of 61 persons is provided in hold-down bunks in the standard accommodation cabin.

Within the constraints of the two-berth and four-berth cabin arrangements, any mix of male/female embarked personnel may be accommodated.

Boats

The design caters for the storage, handling and operation of three Survey Motor Boats, one Rigid Inflatable Boat and two Light Utility Boats.

Current Airframe Ventures

Australian Naval Aviation is on the threshold of a major era as projects are underway within the AFD to ensure that the majority of RAN's current surface combatants have an integrated naval aviation capability. The RN Aviation Force is undergoing current developments within the RAN's Naval Aviation Force.

The Seahawk helicopter is the RAN's most capable platform with good sensors, range and endurance. It is currently operating 12 aircraft with four in a reserve for maintenance. All six FFGs are planned to have fully integrated double crewed flights by the end of 1997. The Seahawk is able to operate at a considerable distance from its parent ship, conducting surveillance operations including ASW, surface surveillance and over the horizon targeting. The RAN variant features a Role Adaptable Weapons System (RAWS) that is designed to permit relatively easy role changes and system upgrades. Aircraft sensor information is relayed to a number of appropriate fitted surfaces but there is significant scope for enhancement of these communications technology advances. A proposal is currently being considered to introduce the four aviation teams by the end of 1997. This is an operating pool and the Seahawk will support the life of the FFGs planned for around 2020.

SK50 Sea King. The RAN operates six Sea King helicopters which were acquired in the mid-1970s as carrier borne ASW aircraft with dipping sonar. They are currently being refurbished and converted to the utility role as the Sea King has an excellent passenger and cargo carrying capacity. The refit and extensionishment includes upgrading of the radar, Avionics and Communications Sub-system and the airframe will remain in service until at least 2008. Whilst primarily employed for close-in support utility role the Sea King is an ideal platform for logistics over the shore support for ground forces deployed from the recently acquired training and helicopter support ships.

In addition to these principal types in the RAN inventory, the Fleet Air Arm operates 6 AS350 Squirrels for training and utility duties. These aircraft are still employed as the interim FFG helicopter, pending full availability of the Seahawk and they will become the interim Anzio class platforms in the mid-1990s as the ability of the new intermediate helicopters for those ships. The Fleet Air Arm also operates several Bell 206 known for utility work in support of survey operations carried out by HMMS Mobydick. This leads me to planned and ongoing developments.

Planned and Ongoing Developments

As I said in my introduction, RAN policy is for all major fleet units to be air capable. Accordingly, the two new Hydrographic Support ships will have aviation facilities capable of fully supporting the operation of intermediate size helicopters although they will not normally employ a helicopter for their survey task as HMMS Mobydick does now.

The two training and helicopter support ships will be modified to be able to embark and operate Army Blackburn and Navy Sea King helicopters and to receive Army CH-47C Chinook helicopters. The full scope of naval aviation operations from these ships will be developed and may range from periodic short detachments to exercise embarked operations, for training purposes, to significant involvement in logistics over the shore operations to free the Blackhawk for its forward mobility role. I hold it as self evident in our maritime and archipelagic region that a multi-aviation platform like the THSS offers great flexibility to government in its response to a wide range of challenging scenarios. It is a sovereign platform with which the RAN can exercise influence, exert will or simply do good in the disaster relief scenario.

Seahawk. Under a project which has just gone to tender, the Seahawk helicopters will be made more effective with the fitting of electronic support measures and a forward looking infra red sensor. These systems will come on line at about the turn of the century to greatly enhance the aircraft's surveillance capability. This will include Missile Approach Warning Systems (MAWS), physical counter measures (chaff and flares) as well as a broadband ESM system with on board analysis and recording capabilities. DSTO has conducted extensive research into depowering ESM operations for tropical conditions which will be critical for project considerations.

It is envisaged a mid-life upgrade project will be required for the Seahawk around 2002/03 to address capability and supportability issues which are becoming evident at this point. Apart from a current system upgrade, it is envisaged the Seahawk will have full multi-aircraft capability, for the intermediate helicopter role. The Blackhawk and the FFG intended to house it will be a multi-aircraft platform like the THSS. It is envisaged the Seahawk will support both roles in parallel in a wide range of challenging scenarios.

When the Seahawk is considered to be operationally mature, the RAN will consider the acquisition of a new generation helicopter for the planned Anzio class of FFGs. The replacement helicopter will be evaluated and selected after a thorough program of exercise embarked operations, for training purposes, to significant involvement in logistics over the shore operations to free the Blackhawk for its forward mobility role. I hold it as self evident in our maritime and archipelagic region that a multi-aviation platform like the THSS offers great flexibility to government in its response to a wide range of challenging scenarios. It is a sovereign platform with which the RAN can exercise influence, exert will or simply do good in the disaster relief scenario.

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MONITORED PADLOCK

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Ideally suited for perimeter security, the padlock can be supplied with captive chain.

- The MONITORED PADLOCK, developed in Australia, will now show when entry has occurred and how long ago.
- Using electronics developed by Encrypa in the UK it has already proven itself in many secure areas.
- The lock is compatible with a wide range of Australian and international restricted key systems and can be re-keyed in minutes.
- Replaceable low cost electronics give this unique lock a versatility long awaited for in the security industry.
- The locks are available in two styles: 'Captive key and Snap closed', the locks can be supplied in locksmith ready format for keying to existing restricted systems if required.
- Current application areas include stores areas, security trolleys, generator rooms etc.

MARITIME AIR OPERATIONS

The Naval Aviation Contribution

An address by Captain D.J. Ramsay RAN 'Seapower in the New Century' Conference, 23 November 1995

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fleets wide common data link capability.
SK30 Sea King. There are plans to provide an ESM system for self protection of the Sea King whilst it is performing the utility transport role. This will include a missile approach warning system, radar and laser warning receivers and chaff and flare generators.

New Intermediate Helicopters. The next major development for the Fleet Air Arm will see the introduction of 14 intermediate sized aircraft for the Anzac class frigates. Studies have shown that the ship's surface surveillance capability will be increased by a factor of 10 with an effective helicopter in this weight class. In addition to this, the extension of the ship's combat system and a force multiplier. The request for tender was recently issued and the main contenders for the NH90 contract are the Westland Lynx, the Eurocopter Panther, the Kaman S76C Sea Sprite and the Sikorsky S-76N. It is planned to have the Anzac helicopter entering service in the year 2000. Observing that the first two Anzacs are in the water, the gap will be plugged by the Squirrel and is testimony to the programming difficulties which face the ADF and other regional defence forces with so much to be done and limited funding to do it with.

The primary role of the NH90 will be surface surveillance and ASW and the aircraft will be fitted with radar, ASW, FLIR and an ESM capability including chaff and flares. The NH90 will be crewed by one pilot and one observer and will give the Anzac frigate a capability to engage surface targets at extended range. We are already seeing counter and counter-countermeasure systems appearing in maritime aircraft and this trend will continue along with the inherent obligation of air to air capable assets to be able to distinguish trend from foe. This leads us back to a point made by Admiral Barrie - the affordability of the sensors and weapons that technological advances are making practicable for smaller aircraft such as naval helicopters. The rate at which the need for multi-role sophistication is followed will be driven by the perception of need, modified by the size of the defence budget and good intelligence will clearly be vital to the decision making process. Equally clear is the rate of technological change is going to require change in procurement processes. No longer can we afford project gestation periods that exceeded the product life cycle by a significant factor.

The principal advantage of organic air power is that it is there when the command needs it. Of course being there on board ship means little if the aircraft is unserviceable, the crew exhausted or if weather conditions preclude launch or recovery operations. The technological revolution has significantly improved availability rates but the maritime environment is harsh and maintenance is forcing us to pursue even more reliable systems with self diagnosing built-in-test and repair by replacement philosophies. Although naval aviation assets will become more reactive, the size of the area surveillance systems, crewing arrangements will still be required to cope with 24 hour operations in adverse conditions by day or night and for prolonged periods will remain a prerequisite for success in naval aviation. This demands a considerable investment in shipboard equipment and mission capable aircraft. The small number of assets available to any one service or country will see increased emphasis on joint and combined operations. The exercises we conduct today as confidence building measures will become even more important as proving grounds for information systems connectivity. Much has been said at this conference about the prospects for increased naval co-operation in the region, ranging up to standing naval forces. In my view, the potential benefits of the effort that would have to go into making a standing naval force really work are worth it. Inter-operability requires far more than the technical or theoretical compatibility between systems. Mutually agreed doctrine and procedures must be used to allow the operators, the people in the system, to realise the full benefits of the technology. While not ignoring the difficulties, the benefits that would flow from having to work together closely are immense.

RAN involvement in the Gulf conflict and with the Multi National Interception Force (MIF) enforcing UN sanctions against Iraq has been instructive in the necessity to main inter-operability.

Any significant contingency in the Asia-Pacific region will most likely see a number of countries come together to resolve the situation. RAN units, including helicopters, must be able to communicate effectively with all the players. Another multi-lateral interoperability factor unique to naval aviation is cross deck operation. To the maximum extent possible the physical compatibility between various helicopters and the deck handling systems and crews of air capable ships must be established and exercised. Echelon in my memory of some years ago are pictures of Westland Sea King

the operational area for high tempo multi threat environments. The technology is undoubtedly coming, but again funding constraints will impinge on the extent to which we can incorporate in the 5708-2 mid-life upgrade and in helicopters for the new surface combatant. It will take time to regenerate the organisational and technical skills required to operate dipping sonar, however resource pressures dictated the decline and problems of resurrection that will face the Fleet Air Arm are similar to those of other regional defence forces now developing their ASW capabilities.

C5S Operational Information Systems incorporating artificial intelligence will be required to assist naval aircrew to more effectively operate in high workload multi threat environments. The technology is undoubtedly coming, but again funding constraints will impinge on the extent to which we can incorporate constant change for navies in general, and naval aviation in particular this will require constant practice in the forums of a joint and combined multi-lateral exercises.
Captain Chris Craig, CB, DSC, RN, has written a book ‘Call for Fire’ in which he describes his service in the Falklands War and the Kuwait Liberation War in the Persian Gulf. In ‘Call for Fire’, he tells an excellent story of experience which was to serve him well in war.

In the Falklands, then Commander Craig commanded the Type 21 frigate HMS ALacrity. That ship was part of the initial task force that swept the sea lanes of the Falklands. HMS ALacrity was in the thick of it.

In the Persian Gulf, then Commander Craig commanded the British Task Group TRENT, which included the frigates HMS BRAVE and HMS LONDON and the minesweepers MIGNAN and RANJIBLA. Captain Craig commanded the British Task Group TRENT, which included the frigates HMS BRAVE and HMS LONDON and the minesweepers MIGNAN and RANJIBLA. He led a task force that included the frigates, minesweepers, and helicopters of the Royal Navy and the Royal Australian Navy.

In the Persian Gulf, Captain Craig was a qualified Fleet Air Arm helicopter pilot. He served as a helicopter pilot on board the frigate HMS ALacrity. He was responsible for the operation of the HMA-08 helicopter on board the frigate.

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Malu Baizam

The name Malu Baizam is a combination of the two main languages in the Strait, meaning ocean and shark, hence the name was Ocean Shark.

The patrol launch has a range of 500nm at 21 knots and can carry three, six-man Army patrols with all their equipment, including 4.2 metre aluminium runabouts.

The patrol launch was configured to deploy in the remote area of Torres Strait, meaning ocean and shark, hence the name was Ocean Shark.

Three boats have been configured for the South Australian Defence Forces, including four 4.2 metre aluminium runabouts, with roll down sides, and an aluminium-framed, vinyl-covered awning.

The versatility of the Southerly 65 is the fifth delivery to the Australian Defence Forces by Geraldton Boat Builders, continuing the successful cooperation with the Royal Australian Navy.

The design of John Fitzhardinge Jnr was developed in the demanding proving grounds of the West Australian rock lobster fishery.

The design by John Fitzhardinge Jnr was developed in the demanding proving grounds of the West Australian rock lobster fishery.

Two integral tanks hold 5,000 litres of fuel and ensure a range of 650 miles with 10% reserve, while a 1,000 litre fresh water tank and a desalinator unit guarantee a good supply of water.

The wheelhouse is air-conditioned and finished to the usual CIRB high standards with leather trim and polyurethane marine gloss.

The layout is arranged with the helm position to starboard, the comprehensive galley with full electric range, microwave and large sink situated along the rear port side of the house, and a large mess table with settee at the forward port side.

The versatility of the Southerly 65 is the fifth delivery to the Royal Australian Navy, one of ten patrol boats. Each patrol boat is powered by twin MTU 8V 183 TE, each developing 650hp, and driving through Twin Disc 5111A gearboxes of 1.94:1 reduction and coupled with an EDO-2200 indicator on the flybridge.

Auxiliary power is supplied by a Kubota/Made 17kW generator.

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Naval Aviation

Naval aviation took a further step towards the future on 1 March with the launch of a new organisation to manage the Naval Aviation Force into the 21st century.

By the year 2010, the RAN expects to have some 55 aircraft in its inventory with nearly all ships operating helicopters as ship's flights as part of their integral capabilities.

The move to create the position of Commander Australian Naval Aviation Forces (COMAUSNAVAIR) follows commissioning in 1992 of 816 Squadron as the parent unit for the 16 Sikorsky S-70B-2 Seahawk helicopters operating in ship's flights with the six guided missile frigates in the RAN inventory. This took the number of aircraft in the RAN to about 30.

By the year 2010, the RAN expects to have some 55 aircraft in its inventory...

Tenders closed on March 20 for a further 14 new intermediate helicopters for operation from the ANZAC frigates and offshore patrol combatants proposed as replacements for the Navy's Fremantle Class patrol boats. The Request for Tender also foreshadows the possibility of buying a further nine or more of the new helicopters beyond the initial order.

First Sea King Delivered

The first of six Royal Australian Navy Sea Kings to be upgraded under a $58 million contract with GKN Westland Helicopters was delivered on 16 January to the Naval Air Station, Nowra. The handover of the Sea King with its airframe and avionics modifications will see the aircraft's life of type extended to 2008.

The handover of the Sea King with its airframe and avionics modifications will see the aircraft's life of type extended to 2008.

The former HMAS OTWAY, in the process of being broken up by ADI Marine at Garden Island in Sydney
Sydney Loses Frigate

The Royal Australian Navy's guided missile frigate (FFG), HMAS CANBERRA (Cmdr Matt Tingovich), sailed from Sydney for the last time on Tuesday, 9 January, bound for Western Australia and her new homeport at HMAS STIRLING. "We all feel a bit sad leaving today, the ship has been part of the Sydney scene since first arriving back in the early 1980s," Cmdr Tingovich said.

Forty families have already re-settled in the west and in the future, the posters will actively seek personnel who wish to live in Western Australia," he added.

"For the trip across the Great Australian Bight, we are being crewed by just over a hundred of our normal complement. We expect to arrive on 13 January after a brief stopover in Devonport for some brief trials."

Only a small number of families were on hand to farewell the frigate on the Tuesday, most Sydneysiders being able to re-unite with crew members when the ship returned to the east for the Fleet Concentration Period 1-96 during February and March.

With the relocation of the FFG to Western Australia, three of the frigates are now homeported at the Fleet Base East in Sydney, with three at the Fleet Base West on Garden Island.

THSS Modifications

Forgacs Engineering Pty Ltd has been selected as the preferred tenderer for the contract to modify HMAS KANGAROO and HMAS MANOORA as Training and Helicopter Support Ships. The modification contract involves significant alterations to the ships to enable them to embark an Army battalion group, with each ship able to operate three helicopters from its flight deck, whilst carrying four helicopters in its hangar.

The ships will also be fitted out with classrooms and other facilities to enable them to carry out their other role as the primary training vessels for the Royal Australian Navy (RAN).

A new addition to HMAS STIRLING, located on Garden Island in Western Australia, is the recently completed helicopter support facility. The facility is located on the southern end of the picturesque island. Cockburn Sound and the 4.2 kilometre naval causeway linking the island with the mainland are visible in the background.

East Coast Armament Complex at Point Wilson

The Navy announced in January that development of the Royal Australian Navy's East Coast Armament Complex (ECAC) at Point Wilson, approximately 50 kilometres south-west of Melbourne, will commence later this year. The announcement comes after an independent Public Inquiry section 11 of the Environment Protection and Biodiversity Conservation Act 1999 recommended that the development proceed.

The report also recommended Defence meet specific conditions designed to minimise impact on the environment.

Construction of the East Coast Armament Complex will start in the next half of 1996 and Defence will meet the Public Inquiry's environmental recommendations.

Construction of this scale will provide a significant boost to the regional economy. At a cost of around $200 million over a three year period, ECAC construction will provide an average of 380 jobs a year. Ongoing ECAC operations will provide long-term employment for about 110 people.

Australian Frigate to the Gulf

The former Minister for Defence, Senator Robert Ray, announced in January that Australia would deploy a frigate to the Gulf in support of United Nations Security Council imposed sanctions against Iraq. The Guided Missile Frigate, HMAS MELBOURNE will be part of the Multinational Interception Force (MIF) for a three month period, beginning in May. Other nations contributing to the MIF have been the United States, the United Kingdom, Canada, New Zealand and the Netherlands.

"Australia has a commitment to promoting peace and security in the Gulf region and to supporting the United Nations," Senator Ray said.

Australian warships have undertaken five deployments with the MIF since the conclusion of Operation Desert Storm in 1991, with the most recent being HMAS SYDNEY from July to November 1993.

"Significant progress is being made by the UN Special Commission in overseeing Iraq's compliance with UN resolutions not to develop, construct or acquire weapons of mass destruction a mission which Australia continues to support with scientific expertise. This ship deployment reinforces our commitment to enforce the sanctions bringing pressure to bear on Iraq to meet conditions set by the UN," Senator Ray said.

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"Australian Frigate to the Gulf"
The Lauriana was commissioned by the Royal Australian Navy on 27/8/41 and fitted with depth charges and Oerlikon gun.
She was the first vessel to sight the Japanese midget submarines in Sydney Harbour on the 31/5/42 and was credited with 1 1/2 kills.
Later, whilst stationed at Milne Bay she worked as an air/sea rescue vessel in operational areas.
General Douglas Macarthur used Lauriana to tour the fleet in the Pacific war zones.

On Active Service
These faded photographs show the former graceful ketch Lauriana converted to the Naval Auxiliary Patrol Boat 502
Commissioned in 1941 she was fitted with depth charges and an Oerlikon gun and operated out of Milne Bay as a air-sea rescue vessel.
Regarded as the flagship of the Papua New Guinea Navy she carried General Douglas Macarthur on his tours of the South Pacific operational zones.

From the top:
On the Slips Cairns 1942
Bill Arnott Jnr at the helm
American P.T. Base' Cairns 1942
Make and Mend' Milne Bay 1942
South Pacific War Zone' 1942-1943
Showing protective cladding, depth charges and Oerlikon Gun

After the War' Sydney 1945
Extensive refit followed.
The Lauriana has featured in other notable events such as:
• Towing the 'Krait' from Northern Australia following that vessels use for the daring commando raid in Singapore Harbour
• Entertained the Queen and Prince Phillip when they dined on board during the coronation tour in 1954
• Served for seven times as the radio relay ship for the Sydney to Hobart race between 1955 and 1964

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16 The Navy, April 1996
IN BRIEF

IRON BARON Investigation

The Department of Transport's report on the grounding of the IRON BARON on the Hebe Reef, Northern Tasmania, on 10 July 1955 is a graphic account of the events leading up to an event which eventually resulted in the loss of the vessel and her cargo.

IRON BARON, 37557 dwt, under charter to BHP Transport Pty Ltd arrived off the entrance to the River Tamar on the morning of 10 July with a cargo of manganese ore for discharge at the Timco terminal, Bell Bay. She anchored to await the tide for loading. The port got underway at 0700 and manoeuvred towards the pilot boarding position. Conditions were not good at the time - it was dark, the wind from the NNW at 20-25 knots and there were frequent rain showers. The pilot boarded at 1933 and was on the bridge shortly afterwards.

The report indicates that both the Master and Pilot were unsure about the position of the ship relative to the Hebe Reef, a hazard at the mouth of the Tamar and lying about a nautical mile from the boarding position. Despite efforts to turn the ship IRON BARON grounded on the reef a few minutes after the pilot boarded and subsequently established to be at 1937L.

The Department's report then goes on to detail subsequent events including efforts to free IRON BARON, the arrival of a salvage team from United Salvage Company, evidence of the escape of fuel oil, eventual refloating on 1937M. The IRON BARON Investigation

HMVS CERBERUS Update

Navy naval architect and salvage expert Alan Colehouse has told 'In Brief' that a new plan to restore the former Victorian Navy monitor CERBERUS is under consideration.

The former monitor, now afloat CERBERUS

Bay in 1926, should have survived the elements and continued to be a visible reminder of an important period in Naval history - the transition from wooden sailing ships to iron and steam propulsion.

The ship, seen recently by the writer, is however deteriorating at an increasing rate and the virtual collapse of the lower part of the hull precludes removal to another site, as was the intention several years ago.

It is now proposed to lift and prop up the upper part of the hull, which consists of 6" to 8" armour plating, and then restore the unique superstructure with the possibility of the vessel being connected to the shore by a walkway in the future.

It is understood a decision concerning the current plan will be made by the various authorities and historical organisations concerned, including the owners of the hull. Bayside City Council, and the State Government in the not-too-distant future.

Japanese Navy

- Photofile

Left: Kongo class (Aegis type) guided missile destroyer, KONGO
Below left: Hibiki class auxiliary surveillance ship, HARIMA
Below: Training support ships; AZUMA (right) and KUROBE (left)
Above bottom: Namehip of AMATSUKAZE class destroyers
Bottom: Takatsuki class guided missile destroyer, NAGATSUKI
Canada faces a naval challenge similar in many respects to that facing Australia. The establishment of a two-ocean basing policy, the replacement of old warships with modern construction, the problems of restarting the indigenous construction of warships and the rationalisation of personnel to face budgetary constraints.

The force structure of the Royal Canadian Navy (which, under the operational control of the Canadian Armed Forces) was strongly biased towards anti-submarine operations in the context of a war with the Soviet Union. The Canadian surface fleet was expected to undertake anti-submarine warfare (ASW) for the Royal Navy (RN) vessels, under the aegis land-based maritime patrol aircraft (MPA). 

In the years following the fall of the Berlin Wall, this plan rapidly moved from a blueprint for recovery to a list of hopeful options, to a gossamer vision and was finally consigned to the wastepaper basket of history. The realities of an uncertain global situation and the loss of the imminent threat of Soviet expansion resulted in funding for defence being sharply curtailed. The years since 1989 have been hard ones for the CAF and the Maritime Command has been eking out an existence with a limited marketing campaign between the British TRUMPeter class and the French AMETHYSTE Class. Uniform for the fleet, but not for the fleet as a whole, the entire programme was declared to be far too expensive and abandoned in late 1990. The requirement for a replacement still existed and a number of studies were undertaken to find an affordable replacement, but no action was forthcoming.

In mid-1994 the Royal Navy decommissioned the brand new UPHOLDERS, a vessel with a 324km range Standard SAM replacing the Sea Sparrow and the addition of a Phalanx close in weapon system (CIWS). The radars and electronics were also comprehensively upgraded to support the new capabilities fitted. Despite the additional weight of equipment the TRUMP个性 destroyers were capable of 30 knots and had a complement of 285.

Intended to provide a task force or convoy with an area defence capability against missile attack, the vessels were not completed and had to be replaced. The TRUMP destroyers are only over 20 years old and planning for a replacement will need to get underway soon.

Frigates

Older frigates in service are the three ships of the Improved RESTIGOUCHE or GATINEAU class. Originally part of a 1960s construction program for four 3 inch guns in twin turrets and the UBQERO ASW mortar, as well as six ASW torpedo tubes. In the late 1960s, the future of the Canadian surface fleet rests on the 12 ships of the HALIFAX class. Ordered in 1983, the Canadian Patrol Frigate, or CPF project sought to replace ships of several classes with a single, more versatile class of ship incorporating the advances inherent in more than twenty years of naval technology and construction. The CPF was intended to replace the MACKENZIE, ST LAURENT and RESTIGOUCHE classes, all constructed during the early to mid-1960s and represented the first new warships constructed in Canada in almost two decades.

HFCS MACKENZIE

HMCS VANCOUVER

The final Canadian submarine squadron comprises three Oberon class boats, OIWA, ONODAGA and OKANAGAN, which commissioned in 1965-68. Originally acquired to provide ASW training for the surface fleet, much as had the original Australian 'O-boats', the submarines soon outgrew their limited missioned role, being tasked for a range of activities including ASW, covert reconnaissance, and anti-shipping strikes. In 1989 Canada acquired the decommissioned UK Oberon class CLYWORTH, which is used for alongside training to free up the operational boats for Fleet tasking rather than internal training. Armed with six 21 inch torpedo tubes firing US Mark 48 torpedoes, the squadron has been extensively refurbished to keep them operational, however they are approaching thirty years in commission and the loss of the submarines soon outgrew their limited missioned role, being tasked for a range of activities including ASW, covert reconnaissance, and anti-shipping strikes.

The 1987 defence plan foresaw a reduction to 12 nuclear-powered submarines, a similar number to the Australian fleet. In comparison, the four submarines acquired to provide ASW training for the surface fleet were decommissioned in Canada in almost two decades.

The four vessels of the 5,100 tonne IROQUOIS or TRIBAL class comprise the Maritime Commands destroyer force. Designed as specialist ASW escorts, they were capable of operating two Sea King helicopters to localise and attack submarines. In addition to a wide range of ASW capability, the escort. Originally commissioned in 1972-73, all four received the Modernisation Project (TRUMP) starting with ALCONQUIN in 1987, designed to shift their focus from anti-submarine warfare (ASW) to anti-air warfare (AAW).

Originally armed with a single 5 inch gun, two 15km range Sea Sparrow surface to air missile quad launchers, two triple mounts for ASW homing torpedoes, they were modernised to operate an octuple mount for the Anti-Submarine Rocket (ASROC) carrying a homing torpedo out to a range of 10km and a variable depth sonar, losing the 3 inch guns and UBQERO to accommodate the changes. Three of these class were not modernised and eventually paid off. A second major modernisation in the mid-1980s extensively refined the electronics and habitability of the ships as well as including improved whole launchers to upgrade the ships self defence capabilities in the face of more sophisticated anti-airship missiles. One modernised ship, RUGGED CHIRRE, sold out in 1992 and KOOTENAY is scheduled to follow in the near future. Today they displace 7350 tons, have a crew of 214 and are capable of 28 knots. All three were commissioned in 1959 and must be considered of only marginal capability today, lacking a surface to surface anti-missile or a credible self defence system against missile attack.

Two ships of this class, GATINEAU and OAKVILLE were extensively, if temporarily, modified to deploy to the Persian Gulf in 1990-91, having the ASROC launcher replaced with eight 130km range Harpoon anti-ship missiles, the boats replaced with two Bofors 40mm cannon and a Phalanx CIWS was fitted. These weapons were originally destined for the TRUMP destroyers updated to the new HALIFAX class and have since been removed.

The future of the Canadian surface fleet rests on the 12 ships of the HALIFAX class. Ordered in 1983, the Canadian Patrol Frigate, or CPF project sought to replace ships of several classes with a single, more versatile class of ship incorporating the advances inherent in more than twenty years of naval technology and construction. The CPF was intended to replace the MACKENZIE, ST LAURENT and RESTIGOUCHE classes, all constructed during the early to mid-1960s and represented the first new warships constructed in Canada in almost two decades.

HALIFAX and her eleven sisters displace 5,235 tonnes and have a complement of 225. They are armed with a single Bofors 57mm gun, a Phalanx CIWS, sixteen Sea Sparrow ASW in vertical launchers, eight Harpoon SM-3's.
the basis of cost.

The 1994 election saw the replacement of the aging Sea King’s with new helicopters, allowing them to take an active role in ASW task forces, being equipped with flagships like PROTEC'TEUR deployed to the Gulf in 1991 as part of Canada’s UN commitment, requiring extensive upgrades to her defensive subsystems. Today, both ships are fitted with two batteries of CH-124 multiple chaff launchers and enhanced electronic warfare equipment. Originally both ships were planned to be assigned to the Pacific fleet, however PROTEC'TEUR was transferred to the Pacific in late 1992.

PROVIDER is more than thirty years old and a study has been undertaken to design a new class to replace both her and her half sisters. The current option is described as a Multi Role Support Vessel (MRSV), a 26,000 tonne displacement, non-magnetic standard vessel designed to act as a replenishment vessel while also able to transport, roll on-roll off, a battery sized ground combat force, including armoured vehicles and organic helicopters, especially important in view of Canada’s commitment to supporting United Nations operations worldwide. At this stage initial plans call for four vessels to be built to mercantile standards but no order has yet been placed and the entire programme may fall victim to further budget reduction, more commonly known as the Grappling Mantis programme may fall victim to further budget reduction, more commonly known as the Grappling Mantis programme may fall victim to further budget reduction, more commonly known as the Grappling Mantis programme may fall victim to further budget reduction, more commonly known as the Grappling Mantis

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<Dealers like this, it is up to Canada to grasp firmly.>
One of the unit's projects for the 1995 training year was the refurbishment of a retired Lion's Club caravan into a recruiting caravan for the use of the Queensland division of the naval reserve cadets. The van will now make appearances at schools and public events to show young people what the Naval Reserve Cadets have to offer.

The big challenge for the new year of 1996 is for the unit to finalise negotiations with the Redland Shire Council on securing a block of land at Cleveland for the unit to call home. This will allow the pressure to be released on their present accommodation at the Department of Aviation's Navigation Facility which only has one toilet and shower and limited operational space.

Cadet of the Year

Prize Awarded

In November 1993, the NSW Division of the Navy League sought a medal for annual presentation to the Naval Reserve Cadet of the Year in New South Wales. The first winner (1994) was CDT Petty Officer Luke Clarke of TS VENDETTA. The award was sponsored by the STS YOUNG ENDEAVOUR since The medal was presented by Capt Errol Stevens (former Director of Naval Reserves and Cadets) at a ceremony on 10 September 1995.

The rather grandiose title referred to in the heading above the news story of the next decade rather than attempting to look into the cloudy more distant future. After all, political, economic and technology changes can wreak havoc on any predictions attempting to cover a century of change. If one had tried to gaze into a crystal ball during the two world wars, for instance, things could have been very different. If one could have seen the advent of steam, armoured ships, long range battleships, torpedo boats, submarines, aircraft and electricity and their effects on sea power in the 20th century.

In opening the conference, the Hon Gary Punch MP, Minister for Defence Science and Personnel, stated that the ANZAC Frigates will be fitted from commissioning with their full equipment; the FFGs would be upgraded; there would be enhanced naval aviation capability; a major review of Australia's defence and national security policies was now underway to take account of changes in social conditions. He defended the reduction to 2% of the nation's GDP now allocated to defence, pointing out that this was a better proportion than the US at the turn of the century, and was not far from the average of 2% in the 1950s. He felt compelled to hedge against insecurity at sea, and they now had the economic wealth to do so and were upgrading their navies. He felt that the next century will almost certainly see a continued evolution of the region's navies towards 'balanced' sea-security capacities and at sea logistical support vessels will likely figure prominently in future acquisition programmes as will submarines and anti-submarine capabilities.

One critical factor in the planning of all political military decision makers in the Asia Pacific region must be the longevity of the US Navy's forward deployment. It is also important to remember that the US Navy has a vested institutional interest in a robust overseas presence. However, forward deployment is a political choice and it is not an immutable 'principle of war' that US forces are eventually needed, if not constantly deployed, to cover the end of the Cold War could well see a reduction in the Mediterranean presence, the Pacific and the region.

By R. Adm Andrew Robertson

Sea Power in the New Century

The Ran and the Australian Defence Studies Centre held a major international conference on 'Sea Power in the New Century' at the Novotel Brighton Beach Hotel on 22-23 November 1995.

The Navy, April 1996
support the US aircraft carrier battle group based on Yokosuka, and mine-}

sweepers for use throughout the US group based on Yokosuka; and mine-
support the US aircraft carrier battle
deterrence against combatants, larger
of projecting power beyond the first
and to modernise and convert it from a
great drive in China to devote more

close scrutiny of Western exports of
equipment of the Chinese Navy, and the
aircraft carriers. The navy has reportedly
can be realised

New generations of major surface
combatants, larger submarines, and
long-range aircraft together with C3I

the 1961, 1962 and 1965 conflicts with
highly professional navy was sidelined in
the South China seas will, he believed,

The Chinese Navy is set to become

SEA POWER IN THE NEW CENTURY

It is now possible that the ASEAN
states may formulate an increasingly uni-

SEA POWER IN THE NEW CENTURY

helicopters. Pakistan was also re-equipping
its naval aircraft with 18 ex-US Destroyers, 9 ex UK Frigates, 8 Chinese
built missile craft and 3 more
to be equipped with Harpoon-equipped
defence efforts in India is only 2.3%
of GDP with the navy getting at
present only about one-eighth. The
Indian Defence Minister, Shri Dinesh

Admiral Roy outlined various organs
for co-operation in the Indian Ocean area
and welcomed the formation of the
Indian Ocean Rim Trading Blue,
the latest meeting of which, in June
in 1995, was attended by repre-
sentatives of 23 littoral countries.
China and India are the world's two
most populous nations and all
projects about the future of the Asia
and by extension the world, he said,
as being dependent on the internal
dynamics and external responses of
these two big neighbours. China
was now spending 5% of GDP on
defence, and there was ambig-
ity about the aims of its military
modernisation

As a result most SE Asian states were
modifying their maritime capabilities, particularly in the maritime
field, following a switch in emphasis
from land-based threats.
The Thai and Singapore navies have
devoted much emphasis to combat-
fighting capabilities while the other four
navies are attempting to move that way,
with some success. The main
maritime focus now was the South China
sea and Malaysia. The Singaporean and Thai
forces had already started basing
infrastructure, accordingly. Malaysia was developing
to take advantage of this fact. Singapore
had its fleet at Changi; and Thailand has
decided to base its helicopter/VTOL
carriers (with marines and helicopter/VTOL
capabilities) instead of in the Andaman
Sea, Malacca Straits and Indian Ocean.

All these were covered in the conference
inclusively maritime activities beyond 2000; operational
tests and developments in hull, wea-
pons and tactics; surface, maritime air,
mine warfare, and submarine and anti-
submarine operations.

Overall one was left with the impres-
ion that while the end of the Cold War
in Europe has produced a peace dividend
with room to greatly reduce armaments,
the scene in East and South East Asia is
very different. With many uncertainties
and most countries considerably increas-
ing their military spending, particularly in the Maritime

While there are opportunities for
increased co-operation, particularly with
the nations of ASEAN, the future strategic
intentions of China, in particular, are a
cause for concern, as are the relations
which may develop between China,
India, Japan, the US and possibly again in
the future Russia. Any major change in
relations between or in individual strategic intentions of any of these
countries can have profound effects on
our general region.

Noting the time always needed for the
development of military capabilities,
Australia needs to review once again its
policies on defence. It needs to increase the
security of our long-term national defence.
That must inevitably mean an increase in
the proportion of GDP devoted to defence,
observing that maritime capabilities are
not the only requirements

seamen, navies of the ASEAN

New-Asia Pacific Defence Reporter, in
covering 'Sea Power and Australia's
National Interest in the 21st Century',
called for an increase in the defence bud-
get from its present very low level. He
considered that Australia needed a
manning capability with both mines and
the means to lay them economically.

HMAS TOBRUK should be retained in
reserve as a training ship and there should
be a capability to be deployed in the
broad region; the Collins Class should be
acquired, but equipped with a helicopter
and Tomahawk missiles: improvements in
stealth should be designed and
deployed, as it were.

As noted, there were some notable develop-
ments in Fleet concepts and Force
structure in SE Asia. He believed that 5
ASEAN navies would, in aggregate,
deploy something like 20 to 22 diesel-
electric submarines by 2005-2010. This
force will be a significant jump from the
2 boats currently operated by just Indo-
nesia. The use of land-based air power
for maritime strike was of increasing
significance given the geography of SE
Asia and increasing integration of air
forces' and navies' operations was now

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devoted much emphasis to combat-
fighting capabilities while the other four
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observing that maritime capabilities are
not the only requirements
History Revisited
- Onboard HMAS Challenger

Above: The Royal Navy second class cruiser HMS CHALLENGER during a visit to Port Melbourne, July 1909
Left: 'Playing Around', 1909
Bottom Left: April 1909 visit to Port Chalmers in New Zealand
Below: Shore leave
Preserved Naval Ships

HMAS ADVANCE
One of twenty Artar Class patrol boats built for the RAN during the late 1930s HMAS ADVANCE carried out many important and sometimes unusual duties until she was paid off in 1938. ADVANCE is probably the most well known ship in the RAN, or at least her alter ego, HMAS AMBUSH. ADVANCE starred alongside HMAS BOMBARD during the filming of the ABC television series Patrol Boat. After being paid off ADVANCE was transferred to the National Maritime Museum and can still be seen on Sydney Harbour, this time serving under the red ensign.

HMAS CASTLEMAINE
One of 60 Bathurst Class corvettes built in Australia during the Second World War. HMAS CASTLEMAINE and her sisters were to render invaluable service as aids of all work. After the war, some of her sister ships served in the navies of Turkey, the Netherlands, Indonesia and China. CASTLEMAINE was paid off in December 1945. After being modified in 1958 she commenced duties as a training ship at CERBERUS. She was to continue in this role until 1971. Two years later she was transferred to the Maritime Trust of Australia. Since then CASTLEMAINE has been restored and is now a museum ship located at historic Williamstown, Victoria.

HMAS DIAMANTINA
Launched in April 1944 HMAS DIAMANTINA was one of four River Class frigates built for the RAN during the closing stages of the Second World War. Of 2100 tons and just over 306 feet long DIAMANTINA was built by Walkers Ltd of Maryborough, Queensland. She first commissioned into the RAN on 27 April 1945 and saw service in New Guinea waters till the end of the war. Paid off in 1946 she was converted from a frigate to an oceanographic research vessel during 1959. Based out of Fremantle she conducted numerous cruises for the CSIRO and was involved in the charting of shipping routes for ore ships operating out of Port Hedland. During 1969 DIAMANTINA paid a short visit to the East Coast when she undertook an oceanographic survey of the Great Barrier Reef. She returned to the west carrying out her oceanographic work until she was paid off in February 1980. DIAMANTINA was eventually acquired by the Queensland Maritime Museum and steamed from Sydney to Brisbane. She is currently being restored by the museum and can be inspected by the general public.

HMAS FAILE
Built in the Netherlands in 1919 as the HOLLANDS TROUW, the sailing ketch FAILE was purchased by the Spencer Gulf Transport Co for service in the South Australian coastal trade from 1923. FAILE captured by the RAN in World War II and was recommissioned as HMAS FAILE in 1943. She was used as a tender and survey vessel at the 1954 Sydney Olympic and was sold in 1959. FAILE was commissioned into the RAN on 27 April 1945 and saw service in New Guinea during the Second World War the 33 metre ketch was requisitioned for service as an examination vessel in Sydney. In 1963 she was utilised as a stores carrier and her war pay off and returned to her owners. From 1994 FAILE returned her previous career as a coastal trader and was a common sight in Australian waters carrying everything from wheat to cars and an airport control tower.

HMAS KRAIT
Commissioned into the RAN on 27 April 1954 HMAS KRAIT was paid off in February 1960 and subsequently renamed ENA. During the 1970s ENA sank but was raised and underwent extensive restoration in Sydney. Following this restoration she was once again named SLEUTH and is currently active on Sydney Harbour where she makes an impressive sight with her sleek yacht lines.

HMAS MARTINDALE
This South Australian built motor yacht was loaned to the RAN, free of charge, for war service from May 1941. Sixty-six feet long and displacing 52 tons, MARTINDALE served initially as one of over six hundred Naval Auxiliary Patrol Boats. In this role she was armed with a Vickers 303 inch machine gun and two depth charges. Towards the end of the war she served as an air sea rescue boat in waters around New Guinea. On 31 July 1951 MARTINDALE was returned to her owners and subsequently sold. Today MARTINDALE may be seen on the waters of Sydney Harbour.

HMAS SLEUTH
The 100 feet steam yacht SLEUTH was requisitioned for naval service during the Second World War. After the war she was transferred back to her owners and subsequently sold. Today SLEUTH may be seen on the waters of Sydney Harbour.

HMAS SLUG
Launched in April 1944 HMAS SLEUTH was one of four River Class frigates built for the RAN during the Second World War. Of 2100 tons and just over 306 feet long SLEUTH was built by Walkers Ltd of Maryborough, Queensland. She first commissioned into the RAN on 27 April 1945 and saw service in New Guinea waters till the end of the war. Paid off in 1946 she was converted from a frigate to an oceanographic research vessel during 1959. Based out of Fremantle she conducted numerous cruises for the CSIRO and was involved in the charting of shipping routes for ore ships operating out of Port Hedland. During 1969 SLEUTH paid a short visit to the East Coast when she undertook an oceanographic survey of the Great Barrier Reef. She returned to the west carrying out her oceanographic work until she was paid off in February 1980. SLEUTH was requisitioned for naval service during the Second World War and subsequently purchased. As a result of this mission two merchant ships were sunk and five others damaged. KRAIT later operated in and around Borneo. After the war she was transferred to the British Borneo Civil Administration Unit and later sold into private hands. During the 1960s she was purchased by members of the Volunteer Coastal Patrol and brought to Sydney. KRAIT currently forms part of the National Maritime Museum's fleet and is preserved as a monument to the valour of the men of the Services Reconnaissance Department.

HMAS VAMPIRE
A Daring Class destroyer built for the RAN, HMAS VAMPIRE was commissioned into naval service on 23 June 1959. The 388 feet long ship was one of the first sizable all-steel ships to be built in Australia. VAMPIRE rendered valuable peace-time service to the navy and the nation. Her final operational role as a training ship continued until she was paid off on 13 August 1986. She is on display at the National Maritime Museum in Sydney.

HMAS WATTLE
The ex-naval tug WATTLE was launched in 1933 at Cockatoo Island Dockyard. She served as a harbour craft in Sydney from 1934 until being placed in reserve in 1969. During the Second World War she was used in experiments to provide information on the degrading characteristics of ships. As a protection against magnetic mines WATTLE was sold in 1971 and is preserved by the Victorian Steamship Association in Port Phillip Bay.

HMAS WHYALLA
A sister ship of CASTLEMAINE, WHYALLA was the first ship to be built by HBF at their Whyalla shipyard. She was commissioned on 8 January 1942 and spent a considerable part of her war service engaged on survey duties. After the war WHYALLA was paid off and laid in Brisbane pending disposal. She was purchased by the Melbourne Ports and Harbours Department in 1947 for use in maintaining the buoys and navigation markers in Port Phillip Bay. For this task she was renamed RIP replacing the old Queensland gunboat PALUMA. After being paid off by Ports and Harbours she was acquired by the City of Whyalla, South Australia and has returned to her birthplace in Whyalla. Since then work has begun on restoring her to her original configuration.
THE DESIGN AND CONSTRUCTION OF BRITISH WARSHIPS 1939-1945 — THE OFFICIAL RECORD

Edited by D.K. Brown
Published by Conway Maritime Press

This is the first volume of a set of three covering the design and construction of British warships during the Second World War. Volume one covers battleships and battlecruisers, monitors, aircraft carriers ranging from fleet to escort carriers, cruisers, large destroyers and destroyers. Volume two will be devoted to submarines, escorts and small craft, while the third volume will cover amphibious warfare vessels, the fleet train and other auxiliaries.

While the book is focused on the ships designed and built during the war there is also a fair degree of detail on those designs which were developed during the inter-war period, hence there is discussion on the K, M and modified Leader classes which served with the Royal and Australian Navies. Similarly, the Tribal class is covered in the chapter on destroyers.

At the end of the First World War, the Naval Construction Department of the Admiralty produced a two-volume history of its wartime activities. Though originally classified 'confidential', a number of copies found their way into a few libraries and provided considerable insight into the evolution of navies into the nuclear age. This series is highly recommended.

BOOK REVIEWS

WARSHIP LOSSES OF WORLD WAR TWO

By David Brown
Published by Arms and Armour Press
Review Copy from Capricorn Link

A massive amount of detail into the losses sustained by all the world's navies during the period 1939 to 1945, this book presents this information through a chronology of warship losses, a country by country summary of those ships and an particulars and a statistical analysis of all losses, presented via regions.

Additional data is presented on warship armament, supported by a very detailed index of ships, battles and actions. Highly recommended.

CRUISERS OF WORLD WAR TWO

By Mel Whitton
Published by Arms and Armour Press
Review Copy from Capricorn Link

A companion volume to the earlier Destroyers of WWII, this book provides much more information and data than the earlier work. From Argentina to the United States of America, the book describes the cruisers of all allied, axis and neutral navies, whether in service, laid down or projected.

Information is set out with both data and date tables, plus notes on design, modifications and service careers. Supporting the text are hundreds of photographs and line drawings reproduced in large format. Highly recommended.

MILITARY AIRCRAFT 1996/97

By Gerard Frawley and Jim Thom
Published by Aerospace Publications

Based in Canberra, Aerospace Publications have provided the Australian reader with a vast amount of excellent military aviation books in the past decade. This latest effort, March 1996, highlights more than 280 individual naval, air force and army operated aircraft flown by the world's air arms.

Each military aircraft is illustrated and described by a table of data and type history. Australian models are well represented, with the book concluding with a glossary and World Air Power Guide. The International Directory of Military Aircraft is available from all newsagents.

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In addition, ADI’s testing and calibration centres in Sydney, Melbourne and Perth are available to check any equipment for the Navy.

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