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AN ALTERNATIVE ROYAL AUSTRALIAN NAVY

(RAN)

Murray Makin, B.Eng (Naval Architecture), Grad. RINA.
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Invitation: The purpose of this paper is to encourage public debate and analysis of the Australian Defence Strategy and particularly the "Force Structure" (ie: weapons, equipment, and personnel) being developed to support the strategy.

All contributions are most welcome.

1.0 INTRODUCTION:

"The budget allocation to defence in 1991-1992 is $9,434.8 million, accounting for 9.3% of Commonwealth outlays, this is equivalent to 2.4% of the expected Gross Domestic Product" (Ref 2, page 1B).

Defence is both a national insurance against aggression and a major component of the nations influence. Australia is fortunate to be geographically isolated from the main regions of global conflict and to have no regional enemies or disputes. Australia is one of the regions wealthiest, most stable and secure nations. It is not, and should not become the regions policeman.

Maintaining a technological advantage over potential aggressors is and has been a cornerstone of our defence strategy (Ref 1, page 31). The changes in the worlds demography, wealth and education make such a technological advantage far less maintainable.

This is the beginning of the "Pacific Era" of increasing wealth, development and influence. As such our regions importance and hence stability must also increase. To maintain adequate defence funding Australia must participate in this new growth and actively develop itself from a primary producer to a regional exporter of manufactured goods and services.

The government in developing a strategy of "Self Reliant Defence in Depth" (Ref 1, page 31) has compromised between the 1970's notion of "forward" (expeditionary) defence and an alternative "continental" (coastal) defence policy. The overall strategy whilst endorsed, has faults in its execution. This paper seeks to highlight these faults and offers alternative solutions to affordably enhance both the insurance and influence values of the Australian Defence Forces (ADF) especially the Royal Australian Navy, across all levels of conflict.

2.0 THE THREAT AND POSSIBLE SOLUTIONS

The Government Defence Policy was presented as the "Defence of Australia in 1987" (DOA87).

The DOA 87 summarises the principal national defence interests as

" - the defence of Australian territory and society from threat of military attack;
- the protection of Australian interests in the surrounding maritime areas, our island territories, and our proximate ocean areas and focal points;
- the avoidance of global conflict;
- the maintainance of strong defence relationship with United States;

- the maintenance of a strong defence relationship with New Zealand;
- The futhereance of a facourable strategic situation in South-East Asia and the South-West Pacific;
- the promotion of a sense of strategic community between Australia and its neighbours in our area of primary strategic interest;
- the maintenance of the provisions of the Antarctic Treaty, which ensure that contininent remains demilitarised."

NOTE: The DOA 87 was published prior to operations such as DAMASK (the Australian participartion in Desert Shield/Storm), and possible responses to hostage taking or regional unrest and violence such as the Fiji Coups and Bougainville.

The possibilities or scenarios for Australian Defence Force and in particular RAN involvement are numerous, and range from coastal policing in peacetime to global warfare. The challenge thus facing defence planners is extremely difficult especially when economic and political constraints are applied.

A generic description of weapons, tactics and scenarios along with recommendations is thus presented. An enemy is not defined or implied as all nations do or soon will have the capabilities described for most of the scenarios.

2.1 ILLEGAL ACTIVITIES (Peacetime)

This includes fishery infringements in our 200 nautical mile Australian Fishing Zone (AFZ). It also includes illegal immigration, smuggling and piracy. Currently the government utilises the "thin grey line" of 15 Fremantle Class Patrol Boats (FCPBs), supported by organisations such as the Customs and the Coast Watch contractors to patrol, and intercept illegal activities. This is clearly inadequate not least because of the potential impact on the Australian fisheries, agriculture and population.

It is therefore recommended that Australia increases the range of resources protected by the AFZ legislation by immediately declaring and legislating the AFZ as an Australian Exclusive Economic Zone (AEEZ). To give credibility to the AEEZ and to increase ADF northern experience RAN Frigates (FFGs), destroyers (DDGs) and more Royal Australian Airforce (RAAF) assets must be also assigned immediately to totally (ie: 100%) enforce the AEEZ. Such patrol, surveillance and intercept experience would have been useful to the RAN during operation Desert Shield and currently in enforcing the United Nations (UN) embargo on Iraq, and also in possible future Low Level Conflicts (LLCs).

2.2 LOW LEVEL CONFLICT

Is given emphasis in DOA87 due to the disproportionate cost it would require of the ADF to block or counter given the range of targets and techniques of harassment available especially against civilians. This is of course state sponsored terrorism used by another nation to force concessions from the Australian government.

It is recommended that Australia takes the obvious approach and establish an agreement between Australia / Papua New Guinea / Indonesia and other regional nations "guaranteeing the nations non-use and active assistance in preventing third party terrorism". Non regional nations attempting such action on Australia or its neighbours would also face the much more effective AEEZ patrol, surveillance and intercept capability recommended above. More details to improve AEEZ protection are included also late in this paper.

2.3 Note on FORCE DEVELOPMENT and PLANNING

Australia should utilise its more potent current and future weapons systems in these lower levels of conflict and patrol. It should however, continue to develop the total defence system capability and training primarily for the highest levels of combat. This is because Low Level Conflict can always escalate, and if this occurs rapidly it really will be a "come as you are war".

The current "fitted for but not with" government policy is inadequate mainly as the installation time for the equipment / weapons may not be available before the shooting starts. This is especially so of RAN destroyers and support ships where Australia should not pool its "current self-defence systems, the phalanx gun" (Ref 5, page 20). Australia must maintain an excess of relatively cheap self defence systems, such as the phalanx, as the RAN ships are currently and will continue to be, far too few in numbers to all not be "fitted with not for it".

2.4 ESCALATED LOW LEVEL CONFLICTS

The author considers these to be the most dangerous scenarios facing the RAN as it is not equipped for them. The author agrees that if these occur directly against Australia:

> "These could take the form of increased levels of air and sea harassment, extending to air attacks on northern settlements and off-shore installations and territories, attacks on shipping in proximate areas, mining of northern ports, and more frequent and more intensive raids by land forces." (Ref 1, page 24) and that "the ADF should be capable of countering them essentially from the force - in - being". (Ref 1, page 25).

If these attacks occurred at sea or in Australian waters

and the RAAF was forward deployed against a threat in our North Western approaches retribution could be swift and decisive. Of course the likely Rules of Engagement (ROEs) would politically have to be changed or be contingency based to allow such action.

The Australian continent is a very effective aircraft carrier as it is unsinkable. Our north west offshore territories, such as the Cocos and Christmas Islands, have suitable airstrips but currently no permanent ADF garrison or presence. These Islands are also unsinkable but considerably more vulnerable than even the remote northern Australian bases of the RAAF. Unfortunately neither Australian nor offshore territory based fighter cover can continuously accompany RAN ships on longer patrols. If the RAAF is faced with multiple threat axis it would have to disperse its RAAF assets. Air cover over RAN ships is simply not sustainable unless they are restricted to coastal waters close to the air bases. Therefore the RAN if forward deployed can only expect the RAAF to provide retribution, maybe intervention but unlikely act as a deterrent to attacks.

The RAN must therefore have a credible Anti-Air Warfare (AAW) capability if it is to operate beyond Australian coastal waters especially in the early pre-conflict period. Rules of Engagement would most likely preclude pre-emptive fire in this pre-conflict period.

Imagine the forward deployed FFG captain faced with two shadowing missile boats and four rapidly approaching military aircraft. He would be most uncomfortable but probably less so than his escorting ANZAC captain who as junior is even less entitled to decide to engage and begin a war for Australia.

Therefore the era of gunboat diplomacy for Australia has been prevented despite the previous Minister of Defences DOA87 preface (Ref 1, page viii) comments that

> "The Navy's fleet of major surface combat ships will be expanded from twelve to sixteen or seventeen by developing and building a new class of warship", (the ANZACs), "with the range and armament to operate throughout our area of direct military interest and beyond".

The RANs surface combatants are currently outranged by air launched anti-ship missiles such as the AM 39 Exocet which has a range of 50 - 70km depending on aircraft speed (Ref 7, page 80). The option of shooting down the aircraft carrying the weapon cannot occur as the maximum range of the FFG or DDG SM1 surface to air missile is 46km (Ref 8, page 25). However as the AM 39 is a fire and forget, active radar homing, sea skimmer it can be deceived by shipboard Electronic Counter Measures (ECM) or decoyed by Chaff (Aluminium foil clouds). As a last resort it must be shot down by Phalanx guns at closer range of 1.5km or the ANZACs NATO Sea Sparrow missile. At an estimated unit cost of US$650,000 in 1986 (Ref 7, page 80) each for the Air Launched Exocet, sufficient can

affordably be fired to saturate the defending Australian ship or ships defences. Of course RAN ships may not detect or even realise they are being attacked until too late. The initial escalation period during Low Level Conflict is therefore extremely dangerous.

2.5 MORE SUBSTANTIAL CONFLICT

"No regional country now has the capability - nor the motivation - to sustain high level intensive military operations against Australia" (Ref 1, page 25).

Australia is unlikely therefore to be involved in a more substantial regional conflict without its allies such as the Untied States. The United States Navies (USN) overwhelming fire power may not however be available to support Australia in the lower levels of conflict. Involvement with allies outside Australia's region especially for United Nations sponsored or endorsed operations may also involve the RAN in more substantial conflict. Once again ROEs and an RAN ship on radar picket duties at a lightly defended or unprotected section of the UN fleet may make it a valuable propaganda target.

As part of a United States navy group the Australian ships FFGs or DDGs would still be useful, the ANZACs however are unlikely to be as suitable. A "blue water" ie Open Ocean multi platform (aircraft, ship, submarine) battle is unlikely to occur now that the Soviet Union is disbanding. Which of the current states would support any such action by the soviet fleet? The Australian involvement in very large exercises such as the bi-annual RIMPAC (the west versus the Soviet Pacific Fleet scenario) seems less relevant. A more relevant scenario might be practising the challenging of a medium power which is attempting to block or interfere with foreign merchant or naval ships in international waters. During the 1980s the USN practised for attacks on the soviet bases by the US carrier battle groups (CVBGs). This would have forced the Soviets into a defensive posture. Thus preventing their fleets going to sea for attacking NATO and its Allies, Atlantic and Pacific shipping. This concept of aircraft carriers forcing an enemy into a defensive posture and non-aggression, however may be useful to Australia for future conflicts.

2.6 THE GOVERNMENTS PROPOSALS (FSR 91)

In May 1991 the Department of Defence completed a 12 month long extensive review of itself. This "Force Structure Review, 1991" (FSR 91) attracted considerable public attention when first released. It was conducted

> "to ensure that Defence planning for the 1990s goes forward in a balanced way, taking proper account of strategic priorities and the likley resource environment.
>
> Within this frame work, "...(was proposed)..."a long

term restructuring programe that would maintain the momentum of the 1987 White Paper by converting some combat capabilities - prinicpally in Army - to the reserves, by greater efficiency in support and maintenance functions for all three Services, and by some adjustments to the major capital investment program.

This will allow new investment proposals to be developed in the second half of the decade. This is important, because from the first decade of next century there will be heavy demands to replace obsolete equipment. Consequently the scope for new initiatives lies mainly in this decade."

(Ref 5, covering letter)

The following table covers the maritime aspects of the FSR 91 proposals (ships and aircraft).

3.0 ALTERNATIVES

The author in accessing the RAN force structure proposed in the "FSR 91" was concerned that Australia's technological edge and hence its defence capabilities were being reduced relative to both the current and possible future threats.

The following alternatives are proposed and discussed.

These alternatives were conceived such that the mutually reinforcing action of each system or ship type would together produce an effect greater than that of all components acting separately. This synergistic behaviour of the proposed alternatives is essential if the RAN and the ADF is to remain a credible deterrent beyond the turn of the millennium.

3.1 AUSTRALIAN AIRCRAFT CARRIERS INSTEAD OF SUPER ANZACS

3.1.a OVERVIEW

One possible solution to the deficiency in the RAN of long range Anti-Air Warfare (AAW) capability is to provide aircraft carriers with both fighter and radar aircraft. There are only two proven variants of this concept, the Harrier carrier and the Conventional Take Off and Landing (CTOL) carrier.

The Harrier carrier was made famous by the British Invincible Class during the Falklands War in 1982. At the end of which the Royal Navy had modified some of its Sea King helicopters with a long range radar so that the subsonic Harrier fighters could be vectored to intercept the enemy aircraft. The Italians have the Guisseppe Garrabaldi (13,370 tons), Spain the Principle de Asturies (16,700 tons), and the United Kingdom the 3 Invincible

Class (20,600 tonnes). Each of these ships carries only a dozen Harriers and three radar Sea Kings plus some Anti-Submarine Warfare (ASW) helicopters. The Harriers can also be used to attack enemy warships ie, Anti-SUrface Warfare (ASUW). Compared with more advanced supersonic USN aircraft carrier planes such as the F/A-18 the Harrier is out-classed, similarly the E2C Hawkeye Radar plane is far superior to the radar equipped Sea King but requires a larger flight deck and steam catapult launching to operate.

The smallest conventional aircraft carrier being built for F/A-18 Hornet and Hawkeye type aircraft is the new French nuclear powered Charles de Gaulle (36,600 tonnes). It carries 40% of the USN Nimitz class nuclear super carriers (87 aircraft). The author to illustrate this alternative has decided to present a spartan conventional (ie non-nuclear) variant of the Charles de Gaulle. The purpose being to demonstrate both the advantages and disadvantages of such ships.

These new 35,000 ton aircraft carriers provide a large flight deck for CTOL aircraft and will be extremely spartan as they are conceived to be modern variants of the World War II escort carriers. Their purpose is to provide local air superiority and sea-denial not act as attack carriers in the United Stated Navy tradition nor as anti-submarine platforms such as the Royal Navies Invincible Class.

"Aircraft carriers are the ultimate 'modular' ships " because "The war fighting technology of the carrier is always as current as the latest aircraft embarked on board" (Ref 11, page 230).

As a weapons system aircraft carriers have two main components. The ship component which provides endurance, range and sustainability. The air group component provides offensive and defensive capabilities rapidly and effectively over far greater an area of ocean than any other means such as surface combatants, submarines or land based aircraft.

3.1.b <u>The Air Group</u>

Australia already owns 73 aircraft carrier capable F/A-18 Hornets of which 3 are the two-seater version used to upgrade pilots from the 50 Maachi (MB-326) subsonic jet trainers. The RAAF bought standard USN carrier designed and built Hornets but has not included the latest carrier specific modifications to its aircraft. These upgrades may be advisable to operate from any new carrier for the Australian Hornets built prior to the USN upgrade.

The RAAF is beginning planning to replace the 50 Maachi's with similar but more modern aircraft. It would appear to the author to make more sense logistically and

for training purposes to purchase 40 more 2 seat carrier capable Hornets (F/A-18 Bs). The lesser numbers and lower support costs by utilising the existing Hornet logistics and trained maintainers should compensate for the higher price of the 40 two seat Hornets compare to 50 Maachi type aircraft.

If this was done along with the USN upgrades to the current single seat RAAF Hornets, Australia would have 113 carrier capable air defence fighters/attack aircraft.

The RAAF is also deciding on Airborne Early Warning and Control (AWAC) aircraft. The choice being between the USAF (United States Air Force) E-3A Sentry which is a modified 707 airliner with a long range radar and specialist avionics or the much smaller and cheaper USN E-2C Hawkeye, which has similar radar and avionics in a smaller turbo prop plane. The Hawkeye has shorter range and endurance (time airborne) than the Sentry but as the Hawkeye could be carried on aircraft carriers in our Northern Air Sea Gap the time to and from station or patrol would be less and thus the range or endurance differences less relevant. Proposals to fit Hawkeye or Sentry radars on Hercules (C130H), Orions (P-3Cs) or converted airliners are also being made to the RAAF.

It should be obvious that the foregoing discussion leads to the suggestion of, Australia purchasing 40 two seat Hornets (F/18Bs), upgrade the current RAAF Hornets to be carrier capable and purchase at least 12 Hawkeyes. The RAAF is to retain ownership of all these aircraft. There should not be a resurrection of the Fleet Air Arms fixed wing squadrons. The RAAF should manage, man and maintain the aircraft but the Chief of Defence Forces assigns them either to the carriers, the Air Commander or the local tactical commander as appropriate. Quite obviously any aircraft carriers should be treated just as a floating airbase. They can be rapidly shifted to the threat axis and interlocked with the existing RAAF land bases or the airstrips of Cocos and Christmas Islands. Each could be used as a refuelling and re-arming stop or as a means of concentrating air power or influence for prolonged periods which the limited (4) tanker aircraft (Converted 707s) currently available to the RAAF could not provide.

A typical air group or detachment could be 12 Hornets and 3 Hawkeyes. This should be sufficient to provide 24 hour local air control and denial of passage for enemy surface ships as well as air cover for patrolling Orions (P-3C) and RAN vessels. The Hawkeyes acting as the airborne command and control posts and not the carriers, thus shortening and securing communications and command. A larger airgroup may be embarked as the carrier is designed to accommodate in the hangar and deck park up to 40 aircraft. This excess capacity would allow the airgroup of a damaged carrier or RAAF base to also embark and continue operations. It also allows the usual

airgroup to be hangared and therefore protected from the weather.

3.1.c. THE SHIP ITSELF

As mentioned previously this ship is to be a modern version of the World War II Escort (CVE) carriers. These CVEs were built in huge numbers especially for the air control and support role during the American amphibious assaults, and in driving the U-Boats from the Atlantic Ocean. Unfortunately the performance and size of modern CTOL aircraft has forced the size up from the 23,000 tons of the Commencement Bay Class (CVE 105) of 1944 to the authors 35,000 tonne design which has an 8.5 degree angled flight deck and two USN C-13 steam catapults. The idea of resurrecting the CVE concept is not new for the USN and is regularly raised in the U.S. Naval Institutes "Proceedings" as a means of augmenting and supporting the 15 USN super carriers.

France is the only country to design, build and maintain 2 CTOL aircraft carriers of this 30-35,000 tonnes size and the author has adopted the flight deck layout of their latest design the Charles de Gaulle which is to be commissioned in 1998. The author has not adopted the Charles de Gaulles (300 MW/83,0000hp) nuclear propulsion nor its top speed of 27 knots.

The propulsion chosen instead being a combination of diesel electric and steam electric (CODASL) driving four controllable pitch propellers via four electric motors. A maximum speed of 24 knots is expected based on 70,000 shp produced by two new automated version of the P5 USN 1200 psi diesel fired boilers. The boilers also provide the excess steam (1 ton per launch) for each of the catapults. Additional generating capacity for both the electric propulsion motors and the ship and aircraft services is provided by 3 MTU 12V 1163 TB 83 diesel generator sets (these 3250 kw MTUs are the same as the 2 propulsion units from the ANZACs CODOG plant).

The ships CODASL propulsion allows the Navigation and Aircontrol functions and the boiler and diesels exhausts to be situated in the island superstructure forward on the starboard side for improved angle flight deck safety and efficiency. The boilers and diesels are mostly below the hangar deck level forward.

The majority of the accommodation is forward or in the gallery deck immediately below the flight deck, as in USN practice.

Two large deck edge elevators to starboard service a hangar which can be divided in half by fire doors and would have automatic water mist and foam monitor fire systems.

A docking well is provided aft somewhat similar to the US WASP/TARAWA Class to allow the Australian aircraft carriers to support and transport the army landing craft and troops for amphibious operations. Reinforcement sea transport along our northern coastline and offshore territories would also be possible. This feature is also extremely useful for regional disaster relief operations.

The ship will have an excess of deadweight capacity and this is to be used to carry fuel, stores and munitions so that escorting or forward deployment ships can be sustained on station for longer periods. This capability frees the RAN of the need to replace HMAS WESTRALIA and lightens the responsibility and risk to HMAS SUCCESS during its RAN Underway Replenishment Group (URG) support. This will allow the RAN far greater operational flexibility and capacity for sustained operations.

All the technology described above already exists, the propulsion systems in cruise liners, the flight deck design from the French and the hull as a simplified USS TARAWA. Australia could utilise contracted in overseas designers for some of the specialist parts of the design. The most complicated part of the project is the rebuilding of the Australian capacity to design, develop and build such ships. This naval work is intended to be a catalyst for future specialty merchant ship work such as Ro-Ro's and passenger ship construction.

The possible locations for construction would include Whyalla (Australian Submarine Corporation and partners), Melbourne (AMECON and partners), Newcastle or even a new yard in Wollongong. with an overall flight deck length of 262m by 65m wide and a water line length of 238m and water line beam of 31.5m, light draft of 6m at light ship 23,000 tonnes and deep draft at 8.5m at 35,000 tonnes its sheer size would be challenge enough. The author would insist that zone technology be rigorously applied throughout the design and construction.

To avoid confusion or misinterpretation, these ships must be conceived so that it can be affordably designed and built in Australia, to be run in peacetime by the RAN and such that the RAN can buy several not see all the funds expended on a single Nimitz type clone. Attrition does occur in war therefore Australia must be prepared to accept and acknowledge the risk that one of these carriers could be sunk in combat. They must be able to be put in harms way, they are a weapon not a sacred icon. The design should therefore:

a). Not be specified to survive nuclear blast (like the USN carriers), nor Nuclear Electro Magnetic Pulse Hardened.
b). Not be longitudinally subdivided against torpedoes, and hence requiring counter flooding and have less transverse bulkheads and compartments.

c). Not become a repository for all expensive forms of command and control systems. Relying instead on the Hawkeyes and escorts to f ight the detailed Anti-Air (AAW), Anti Submarine (ASW) and Anti-Surface (ASUW) battles. The ships commander will require Authority, Intelligence and Communications systems but these should be modular system like the ANZACs with only software differences

d). Wherever possible civilian specification equipment common to recent merchant ships is to be included in the design.

e). Wherever possible, logic, analysis and common sense are to be applied to the design. It must be kept simple, affordable, reliable and effective, therefore <u>all</u> improvements identified during the construction of the first carrier are to be included in the second and so on. Computer Aided Design / Manufacturing and Logistics can now make this an effective,affordable and manageable approach.

f). The ship should be designed for minimum manning a target figure of 235 crew (100 engineering) not including RAAF aircrew and maintenaners, estimate 150.

3.2 <u>ALL COASTAL CRAFT TO BE REPLACED BY A SINGLE EVOLVING DESIGN (MPV 2000) FOR AEEZ DUTIES</u>

3.2.a Apart from the need for a much greater maritime Anti-Air Warfare capability Australia needs coastal craft primarily for AEEZ surveillance patrol and enforcement. No matter how effective Australia's blue water navy can become, it is unlikely (including Jindalee Oer The Horizon Radars, OTHR) that there will not be a continuing and pressing need for coastal craft. It is these small ships that shoulder much of the peacetime burden of the RAN. There are 15 Patrol boats (FCPBs), 6 Landing Craft Heavy (LCHs), the Hydrographic ships and the Naval Reserve manned craft. All of these ships are usually forward deployed along Australia's northern coastline, or aiding and assisting Australia's regional neighbours.

It will be argued that all these roles and missions can be achieved with a single common design of vessel. The aim is to reduce the logistics support and training costs by ensuring RAN wide commonality in equipment. The design and design refinement, support and building of these vessels is to be shared amongst small competitive shipyards from Perth, Darwin, Cairns and Brisbane. These vessels are to be designed for multiple roles in northern Australia and the S.W. Pacific.

3.2.b Currently the Department of Defence is seeking Invitations To Register Interest (ITRs) from Australian industry for three new Medium Hydrographic ships. Later this decade there are plans to provide the FCPBs with a life extension and senior upgrade until 12 new more capable Offshore Patrol Vessels (OPVs) can be designed

and built by 2004. No mention in the FSR 91 was made of replacements for the LCHs. The more requisitioned counter mine vessels (Craft Of Opportunity, COOPs) were not to be continued beyond proof of concept for the DSTO developed anti-mine sweeps.

It is considered that for such low threat coastal or regional activities that numbers of vessel and their allocated patrol times is more important than developing 12 more capable OPVs (Corvettes).

3.2.c Taking advantage of existing techniques and technology such as data fusion and sharing of all relevant intelligence in almost real time from, to and between these vessels is essential as is sharing the tasking and duties. The USN provided intelligence fusion system was given prominence by one expert for the part it did and is playing in managing the operation Desert Shield UN sanctions on Iraq.

3.2.d Given the common capability MPV 2000 hulls it would then be possible to vector a vessel at high speed (25 knots) that was conducting deep water oceanography to investigate or apprehend a nearby vessel that was flagged by the data base as suspicious. Similarly a vessel assigned to patrol duties could be vectored to a nearby beach to embark and transport a motorised company of NORFORCE soldiers and their vehicles to another remote section of coastline 200 nm distant overnight.

3.2.e All of the 24 proposed MPV 2000s would be capable of being fitted with Aerostats which are search radars attached to the underside of a helium balloon tethered to the vessels aft deck winch. Whilst these devices appear to be similar to World War II barrage balloons they provide a very useful area surveillance capability. With just 6 MPVs utilising Aerostats at any one time in northern Australia most of the major focal points such as Torres Strait could be kept under continuous surveillance. Intercepting MPVs, other RAN warships or RAAF assets can then be used to conduct the intercept if the vessel under surveillance does not equate as innocent in the shared defence Intelligence data base.

3.2.f The MPV 2000 is to be diesel electric drive, so that abundant electric power is available for surveillance, hydrographic and Aerostat radars and sensors. This also allows the 3 main propulsion electric motors to drive 3 waterjets, thus ensuring shallow draft and multi propulsion selection. It is therefore possible to hold station on one jet, cruise on two and sprint on three. Towed array sonars could also be fitted thus complicating an enemies submarines approach or operation in northern Australia. An Electronic Surveillance Measures (ESM) suite of electronics and senors is to be fitted initially in preference to an offensive missile system such as canister launched Harpoon. It is essential to know what

the unidentified or suspicious target is and be able to vector strike aircraft against it. Only if Australia's regional environment becomes extremely hostile should heavier armament be fitted to these vessels.

3.2.g The MPV 2000 is to be of all steel construction with a degaussing/de-perming system installed to reduce its magnetic (mine) signature. This combined with the quiet propulsion and jets should reduce its vulnerability in assisting the governments planned 4 new Mine Hunter Coastals (MHCs). The helicopter flight deck doubles as the vehicle deck for 20 army vehicles, or allows a large helicopter to land, be refuelled and continue operations back to the helicopters mother ship.

3.3 MODIFICATIONS TO EXISTING OR PROPOSED RAN SHIPS

3.3.a ANZACs

All to be fitted with Phalanx guns immediately. All to have the second cell vertical launcher system (VLS) option installed when built, giving a total of 16 cells.

3.3.b FFGs

All to have their Mk13 single rail launcher replaced with a Mk41 29 cell launcher. This will allow Sea Sparrow also to be carried. Modify our current Harpoon anti-ship missile by incorporating the electronics in each for vertical launch profile. Modify our current SM1 missiles by adding a booster phase with integral inertial guidance to extend the missiles range from 46 to 100 km. Carry an embarked flight of 2 helicopter at least one of which is to be Sea Hawk always.

3.3.c DDGs

Pay these 3 steam ships off as in the FSR 91 but at the end of the 1990s but instead of Super ANZACs take their 100 man engineering staff to crew the new carriers engine rooms and flight deck. Allowing for modern automation to compensate for the changes in ship size (but not power) and the need for catapults and arrestor wires maintenance to balance. Therefore 100 engineering crew would appear adequate.

3.3.d FREMANTLE CLASS UPGRADES

The author would prefer to see these vessels kept longer but assigned to the RAN Reserve instead of paid off from the regular Navy. Their regular crews manning the new MPVs keep more ships in service longer.

3.3.e. OCEANOGRAPHIC and HYDROGRAPHIC SHIPS

Build at leaset six of the MPVs instead of these three larger ships. The rapid progress in oceanographic and hydrographic equipment such as airborne LAser Depth Sounders (LADS) and electronic charting techniques ensure the need to instal or upgrade and modifyequipment is a continuing process. As the aim is to provide chart and quality oceangraphic data not necessarily run a fleet of white painted navy vessels. This approach matches the Hydrographer and DSTOs experts with the forward based MPVs. This dual role will avoid the Hydrographic ships being of little value in conflict compare to the MPVs.

3.3.f THE TRAINING and HELICOPTER SUPPORT SHIP

If the press speculation as to the required capabilties of this ship are correct (Ref 13) then Australia could finally be attempting to overcome the weakness it has to conduct Amphibious warfare. With a mainland coastline of approximately 20,000km and very poor road and rail services especially to the north and west in the Monsoon (Wet) season such a need has existed since the government decommissioned the ex-carrier HMAS SYDNEY in 1973. The Fiji coups also revealed how little utility the current RAN would have for evacuation of nationals from overseas civil unrest (even given the local governments assistance). Similarly have we forgotten the utility and the effectiveness the old light carrier HMAS MELBOURNE (CVL) played during the disaster relief operation in Darwin following Cyclone Tracy.

There is an urgent need for such a ship that shouldn't require tying its procurement to await the paying off and role assumption of HMAS JERVIS BAY as the training ship later in the decade. The carriage of one army battalion (900men) their vehicles, landing craft and helicopters requires a large ship with large flight deck and hangar (Ref 13).

If anything the author considers this ship should be more capable and certainly procurred much earlier than "later in the decade".

4.0 AFFORDING AN ALTERNATIVE RAN

The Department of Defence in the FSR 91, the Defence Report 1990-91 as well as the Defence Corporate Plan 91-95 show in the following figures and Tables the departments financial resources and committments.

It can be seen that defence is dependant on the performance of the National economu (GDP) primarily for its available base of funding. The second largest influence is the political and public committment based on the perceived threat and relative priority assigned to defence as part of

government spending. The third level of influence is that exercised by the ADF executive and force planners. This third level influences the cost of the equipment, the logistical support, manning and training costs achievable plus the operating and overhead costs. Efficiencies and savings that are proposed in the FSR 91 and the successful performance of contracts such as the ANZAC Frigates and COLLINS Class Submarines will be essential to the future of Australian defence.

The author has not the resources to provide accurate costing details of the alternatives offered. Although some comparative prices are presented to give broad orders of magnitude of the cost. The results of these comparisons is that Australia cannot afford all the authors alternatives. Decisions must therefore be made as to whether the FSR 91 proposals are adopted unchallengied or if alternatives should not be examined or perhaps re-examined.

5.0 CONCLUSIONS

Australia faces no immediate direct military threat or conflict. The strategy of "Defence in Depth" is sound. The government has maintained, funded and supported defence properly, increasing the level of local content appreciably. Projects such as the ANZAC Frigates and Collins Class Submarines test whether Australian industry can build a quality product on time and on budget. The choice of what to build and when should be publicly debated now so that all contributions are considered and no alternative or technology missed.

The author has proposed some alternatives to these presented in the FSR 91. These alternatives should maintain the RANs technological and capability advantage for most future conflicts.

The Defence of Australia is the responsibility of all who can contribute. The assistance the maritime community can offer to the RAN with new technology, concepts or ideas must be harnessed. An informed, active and constructive debate on defence is the first step.

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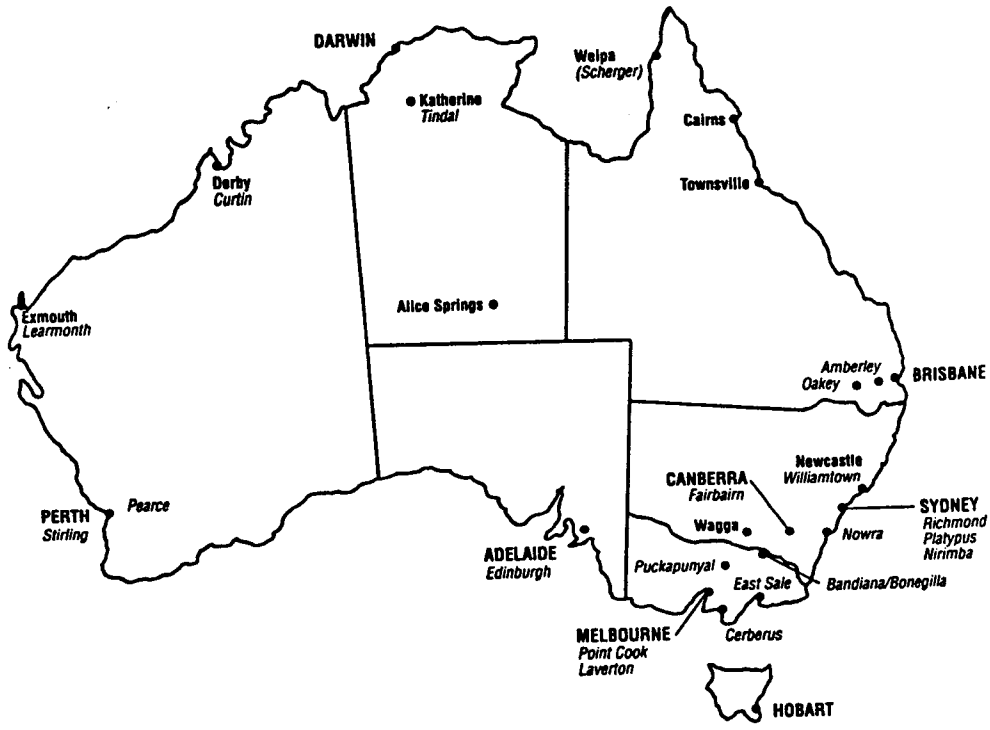
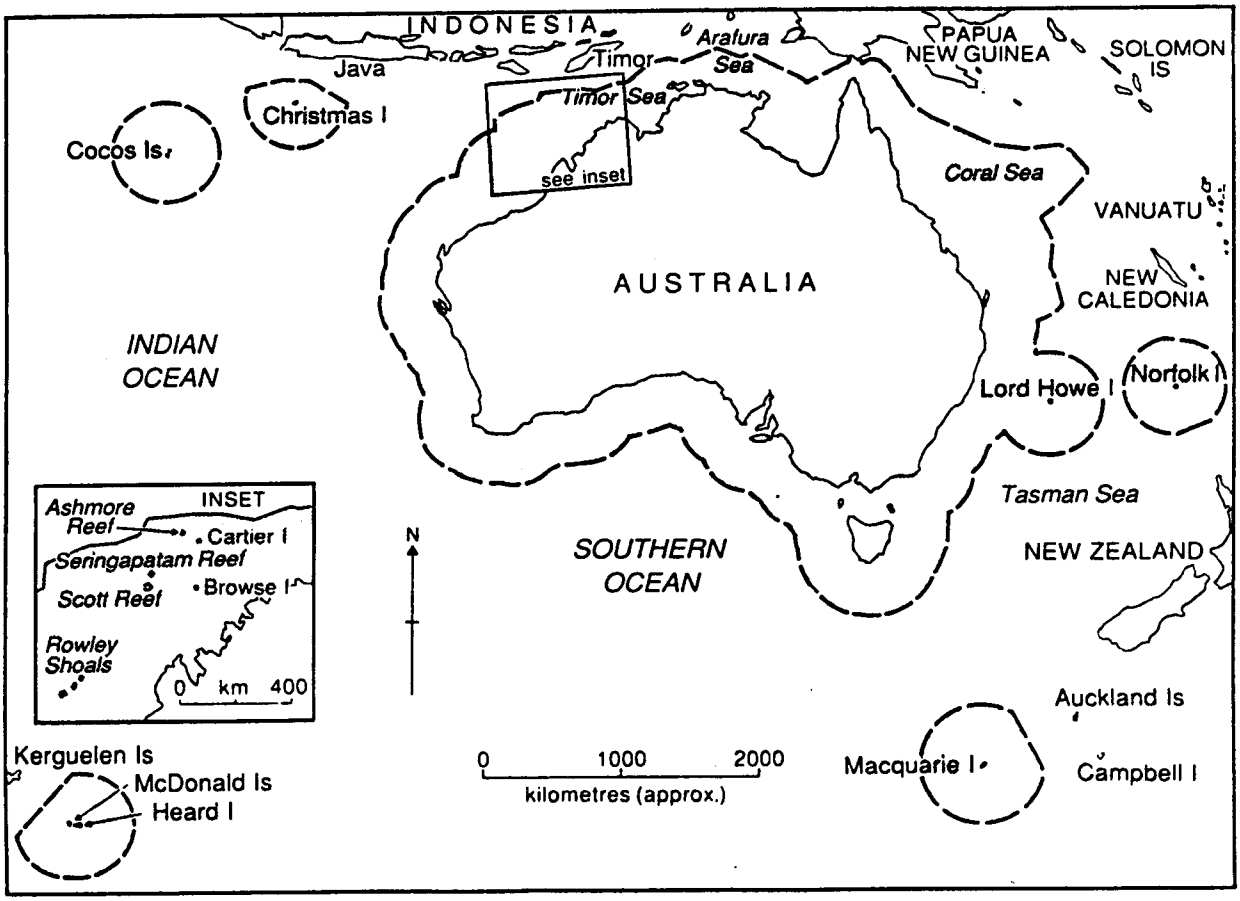
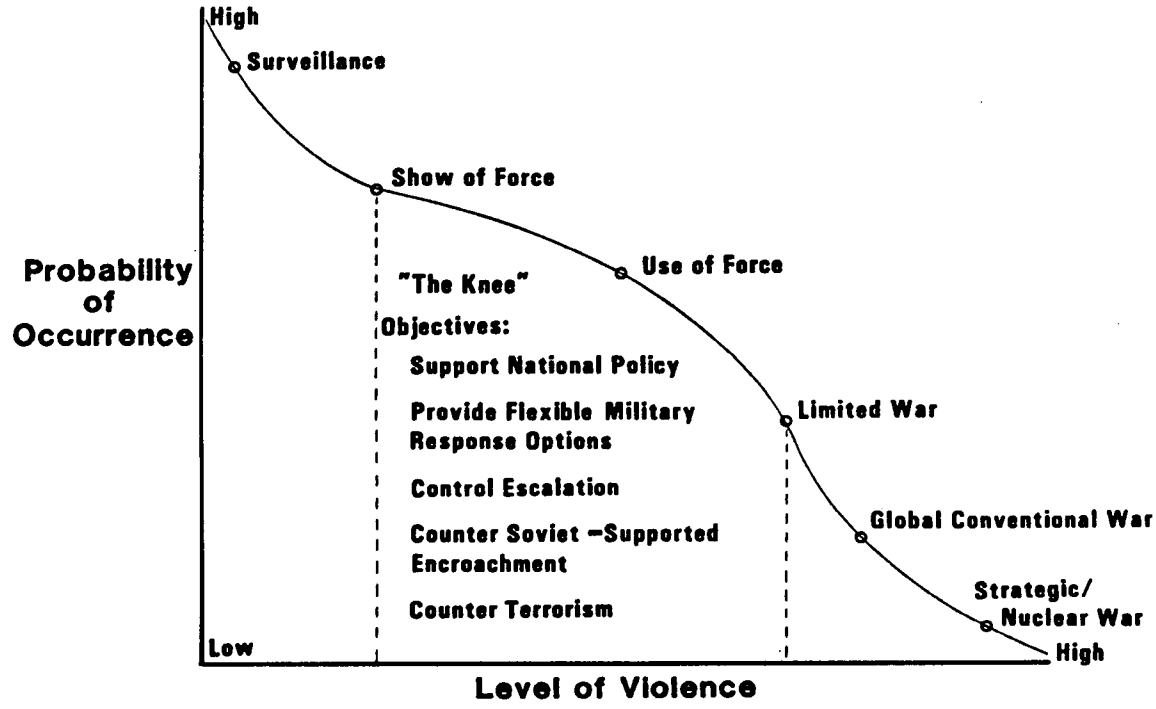


SELECTED DEFENCE LOCATIONS

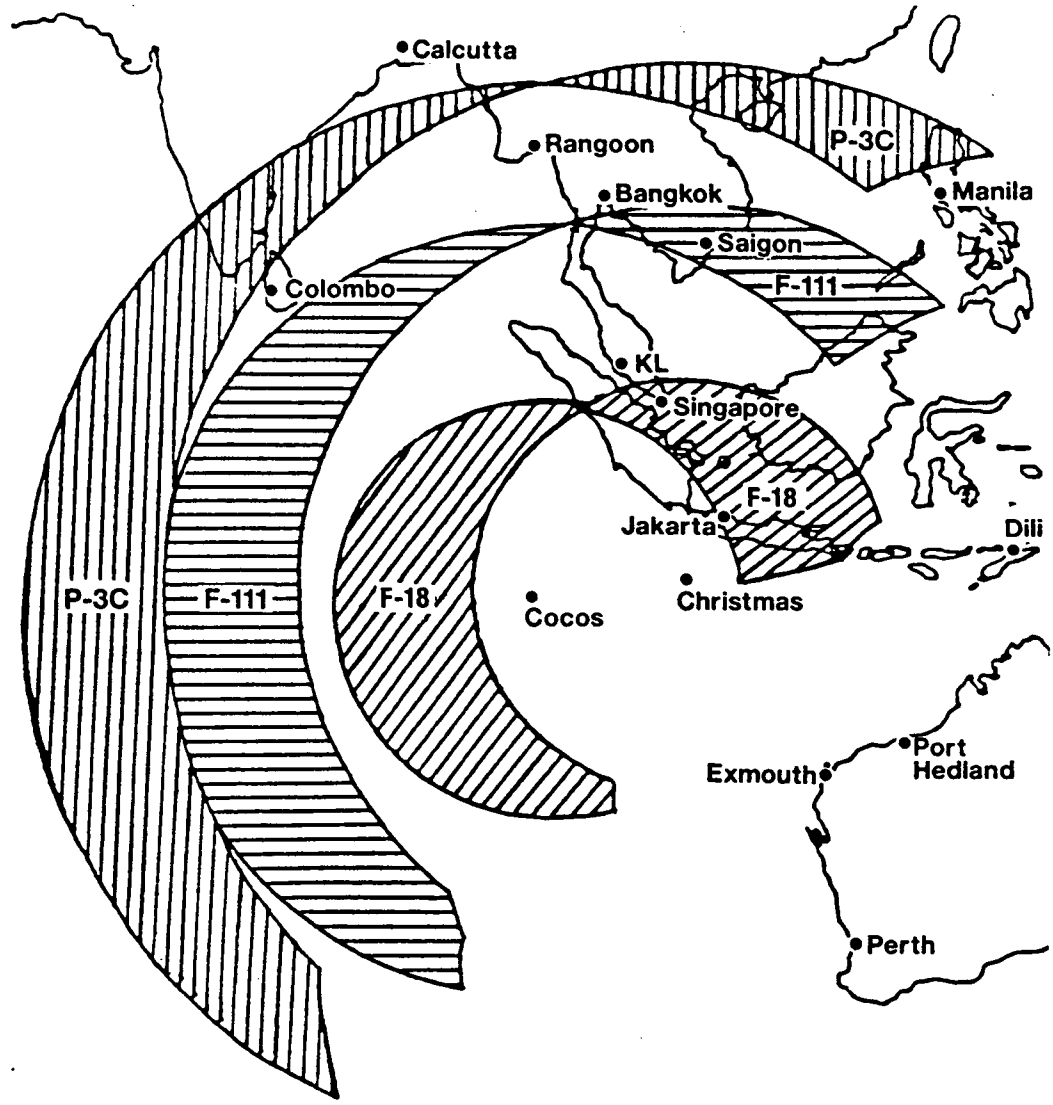
THE 200 NAUTICAL MILE AUSTRALIAN FISHING ZONE

Australian territorial waters extend only 3 nautical miles from coastal baselines





Spectrum of Conflict Graphs



Air coverage provided to RAAF aircraft by access to the Cocos Islands and Christmas Island not available from other Australian territory (assumes no aerial refuelling).

THE RAN AS PRESENTED IN FSR91 MAJOR POINTS

1. Maintain a fleet of 6 submarines (Collins)

2. Plan for a surface combatant force comprising 16 destroyers/frigates and 12 Offshore patrol vessels (OPVs) early next century.

   (16 = 6*FFGs + 8*ANZACs + 2*Super Anzac (in 2006)).

   (Super ANZACs replace DDGs and possibly the first four FFGs)

   (First OPV planned for 2004)

3. Acquire 4 Coastal Minehunters (MHCs), with option for 2 more.

4. Dual role training ship and helicopter Support Ship (THSS)

5. Offshore Hydrographic ships*2 + Oceanographic Ship*1.

6. Acquisition of 6 utility helicopters.

7. Completion of acquisition of 16*Seahawk helicopters.

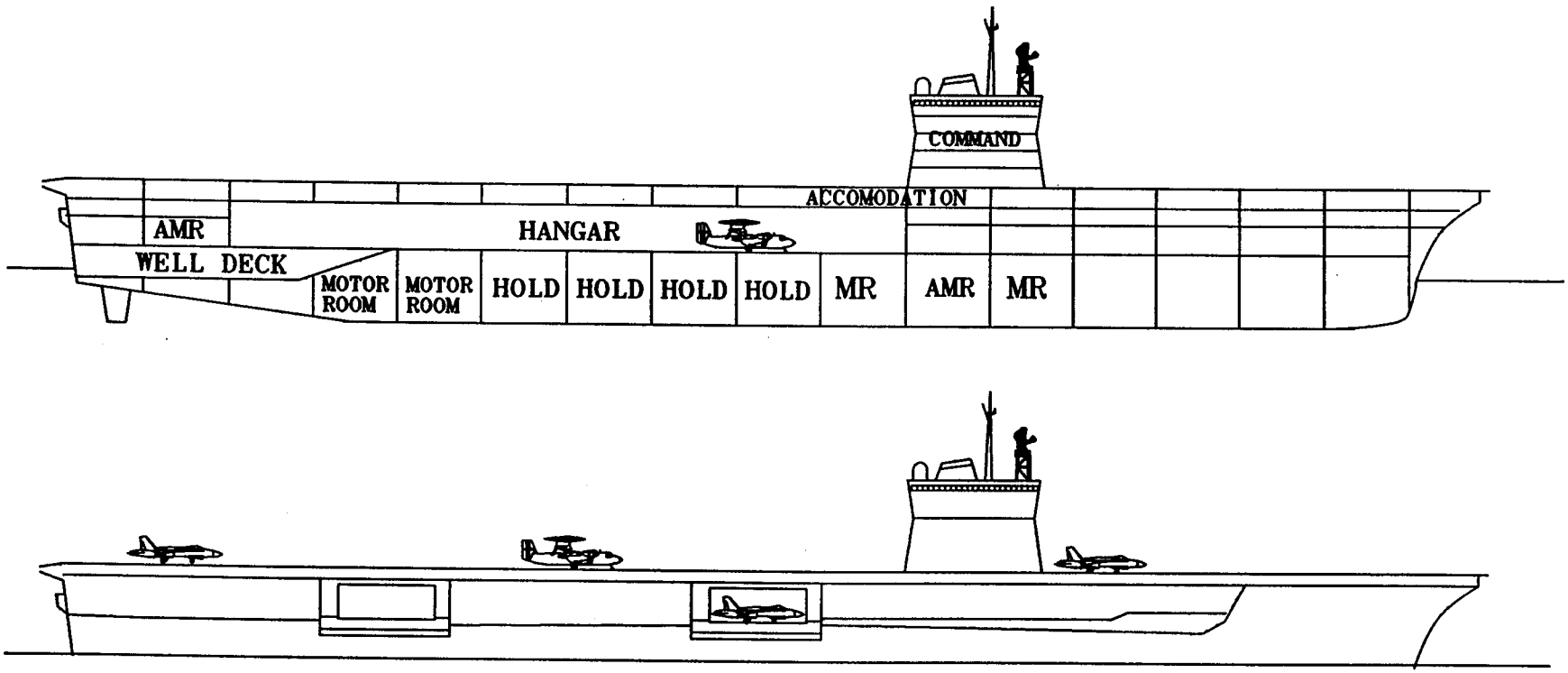
8. High priority to life of type extension beyond 1999 and sensor upgrade of the Fremantle class patrol boats (FCPBs).

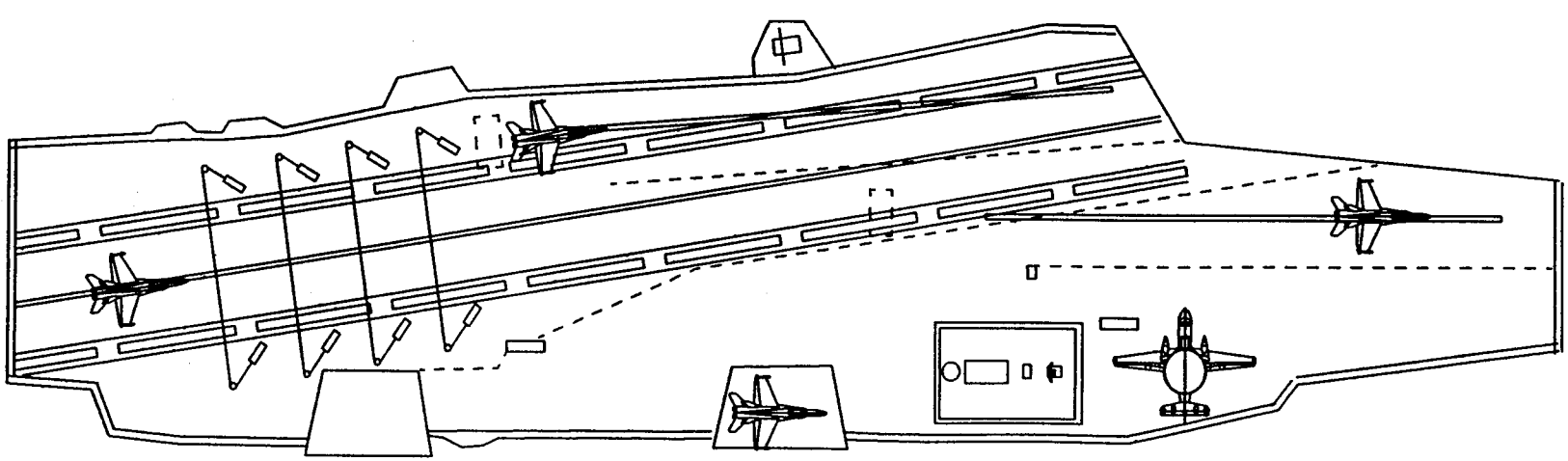
9. Two Ocean basing (Sydney and Perth), FCPBs in Darwin and Cairns

10. Manpower changes in RAN = -1020 Regulars + 450 Ready reservists -630 civilians over the decade.
    Final manning levels of regulars = 14720

11. Also of significance is the decision to employ 3*Jindalee Over The Horizon Radars (OTHR).
    Also the upgrade of the RAAF P3C ORION Maritime Patrol Aircraft (MPAs).
    The upgrade in F-111C avionics will aid their maritime strike capability.
    The improvements in surveillance and intelligence capabilities of the ADF.
    Conversion of 4*707s to in flight refuel F/A-18s
    Consideration of purchasing Air borne early warning and control aircraft (AWACs)

AUSTRALIAN CTOL CARRIER 2000





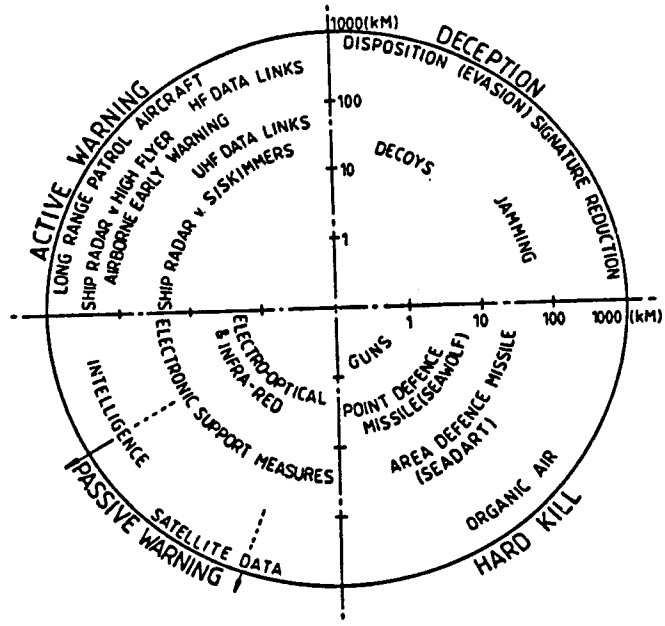


Fig. 3. This diagram illustrates the components of multi-layered surface ship anti air defence. Approximate ranges are indicated on a log scale

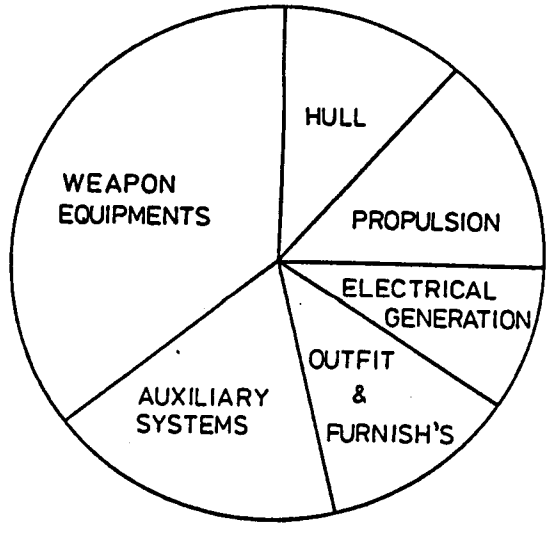
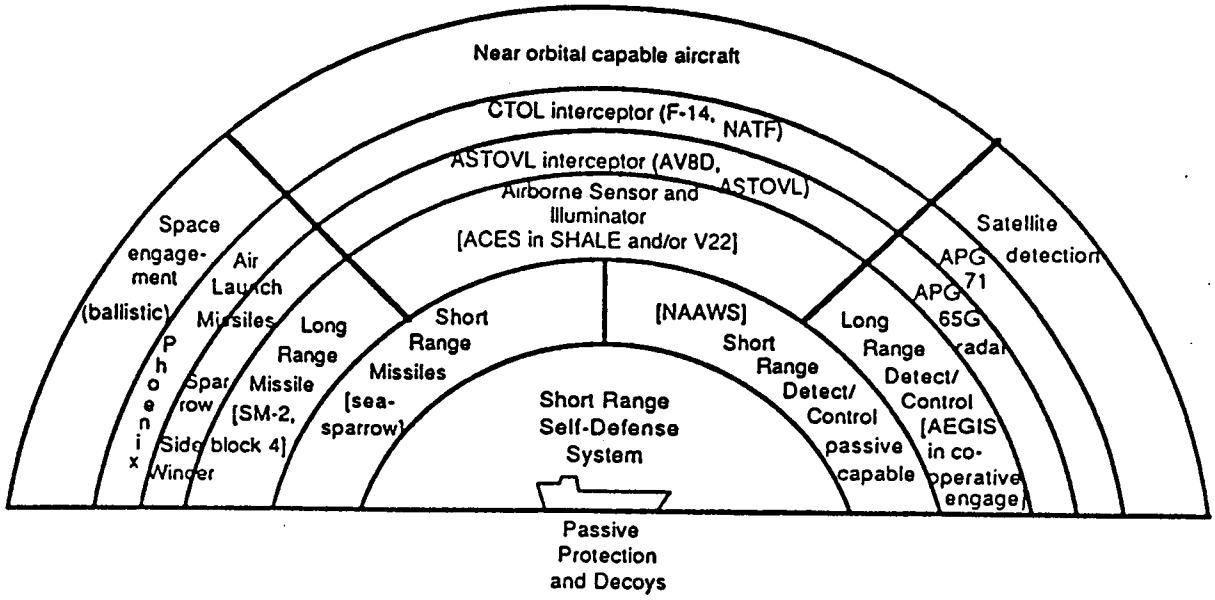
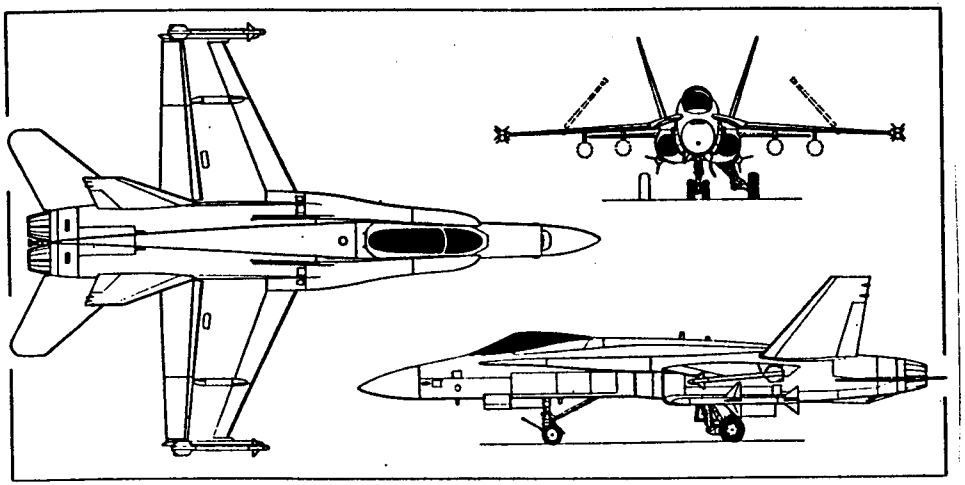


Fig. 9. Typical cost breakdown

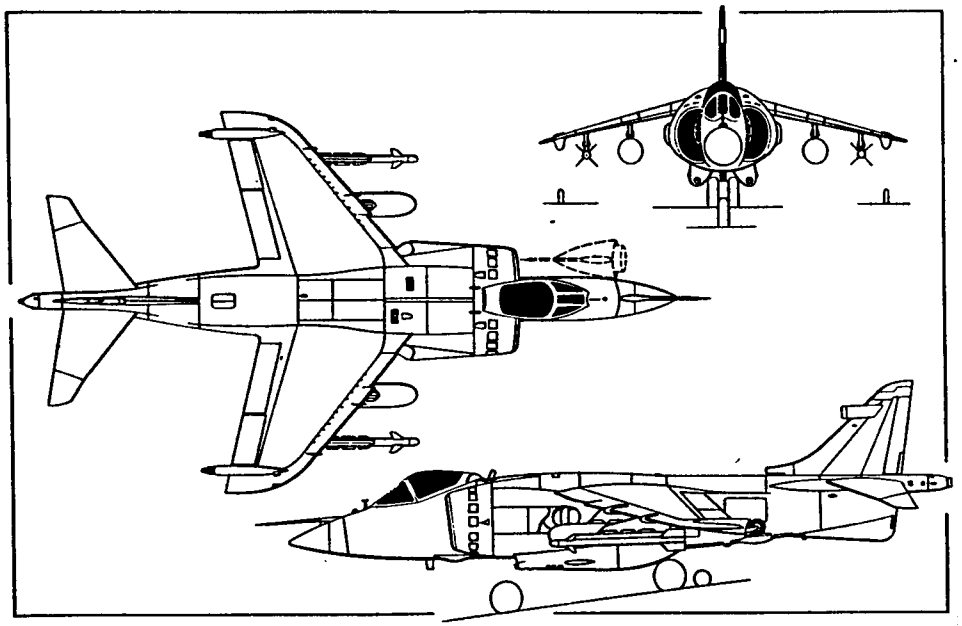


Individual Ship Costs (in millions of FY90 $)

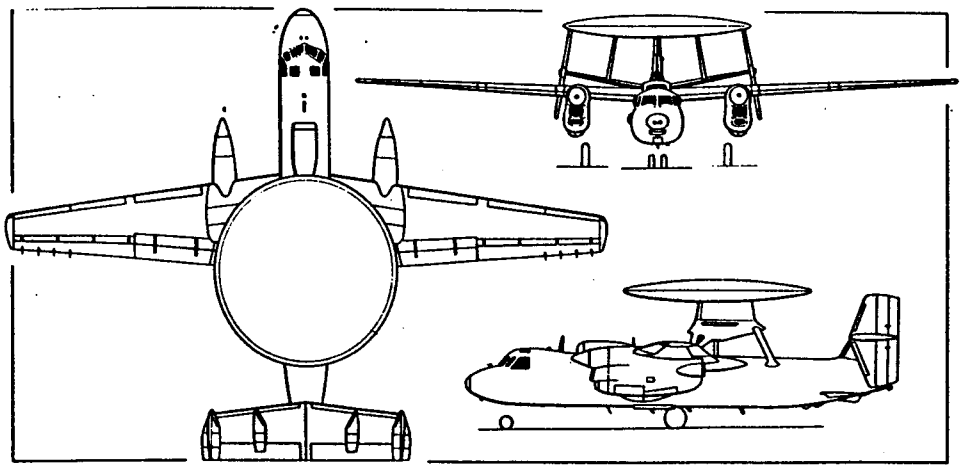
Ship	Avg acq cost	Annual O&S cost	Aircraft cost	Loadout cost
Conventional				
CVN	3273	127	5122	3
CGN	986	50	12	67
BFC	860	41	24	104
DDG	721	41	6	82
DD	387	42	24	52
LHD	1069	55	406	8
LHA	935	55	406	
LSD	244	11		
LX	358	26	14	
AOE6(V)	434	35	36	1
AOE6	434	35	36	1
AO	256	11	0	0
TAO	160	17	0	0
SSN	508	50	0	26
Alternative				
CVN	3273	127	5178	3
CDVlong	968	50	1137	70
CDV	897	40	887	70
CDGN	1500	50	220	199
CDS	812	30	141	70
CDA	690	25	266	66
CDL	684	21	98	105
SF	275	15	0	52
UWACS sub	40	4	0	0
MDV	40	4	0	7



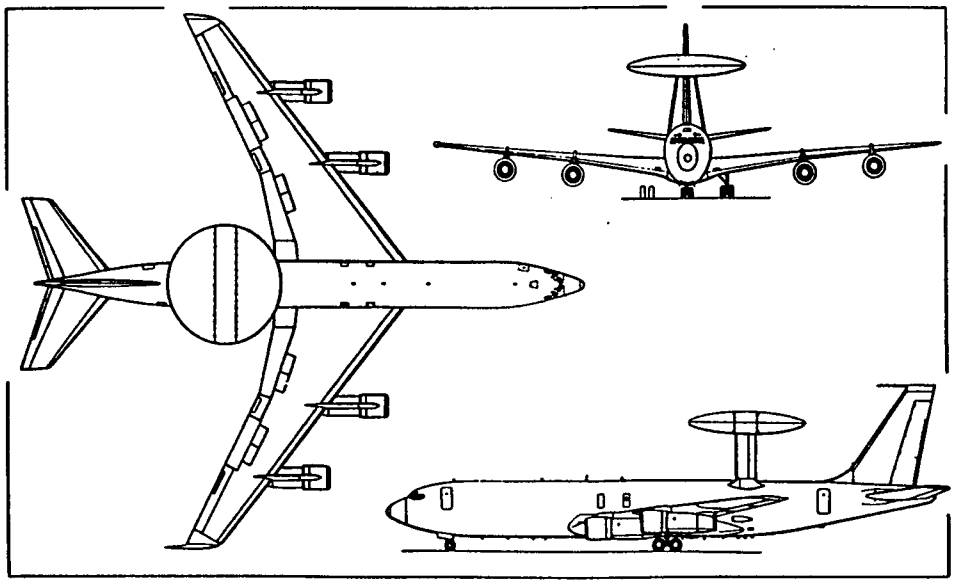
McDonnell Douglas F/A-18A Hornet (two General Electric F404-GE-400 turbofans) *(Pilot Press)*



BAe Sea Harrier FRS. Mk 1 V/STOL fighter, reconnaissance and strike aircraft *(Pilot Press)*

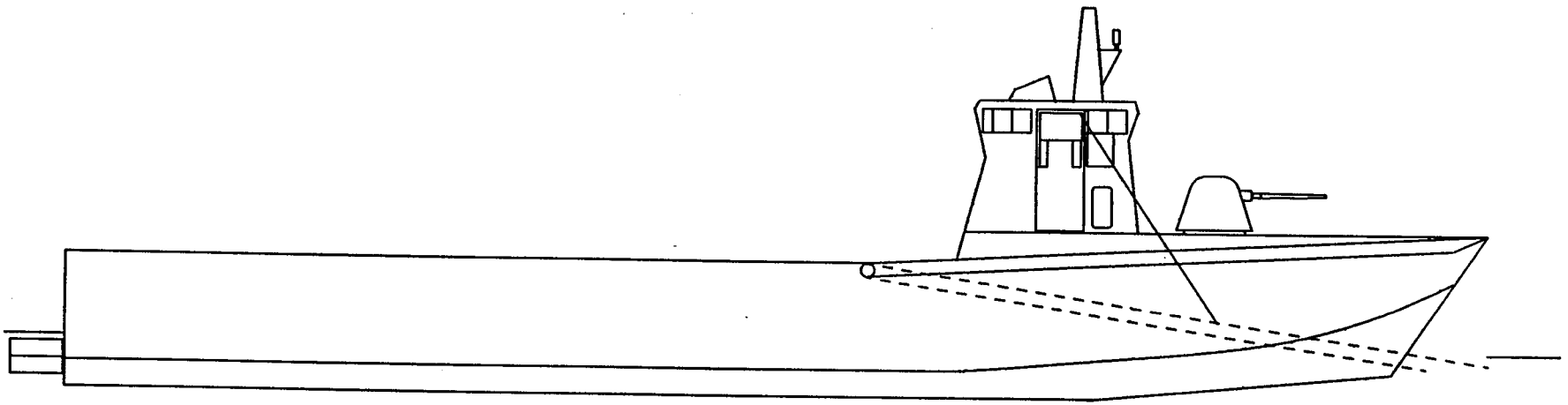


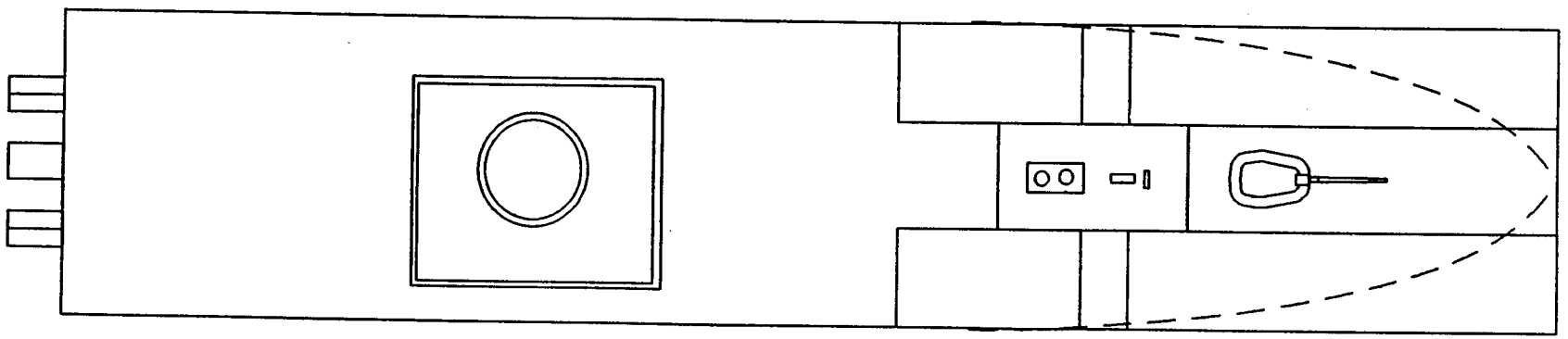
Grumman E-2C Hawkeye twin-turboprop airborne early warning aircraft *(Pilot Press)*



Three-view drawing *(Pilot Press)* and photograph *(S. G. Richards)* of NATO Boeing E-3A Sentry AWACS aircraft

MULTI-PURPOSE VESSEL 2000 (MPV2000)





COMPARISON OF FLEETS

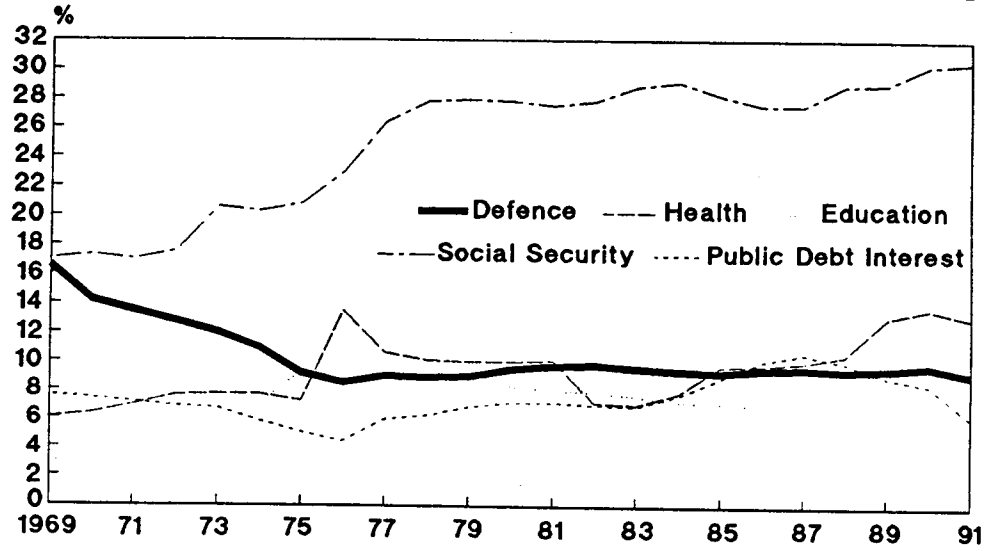
RAN IN 2004 (FSR91)	CURRENT RAN 1992	ALTERNATIVE RAN 2004
———	HMAS WESTRALIA	2 AIRCRAFT CARRIERS (+ 1 BUILDING) each has RAS and Docks (PRICE= A$900 to 1300M each)
3 SUPER ANZACs	3 DDGs	
6 FFGs	5 (+1) FFG	6 FFGs with 100km missiles
12 OPVs	15 FCPBs	24 MPV2000s ($80M each)
3 HYDRO/OCEANGRAPHIC SHIPS	HMAS FLINDERS	
	HMAS MORESBY	
HELICOPTER SUPPORT SHIP	———	HELICOPTER SUPPORT SHIP
8 ANZACs	3 DEs	8 ANZACs
6 COLLINs submarines	5 OBERONs subs	6 COLLINs submarines
HMAS SUCCESS	HMAS SUCCESS	HMAS SUCCESS
HMAS TOBRUK	HMAS TOBRUK	HMAS TOBRUK
———	6 LCH	6 MORE MPV2000s
4 MHCs + 2 MHIs	2 MHI	4 MHCs + 2 MHIs
4 SURVEY CATs	4 SURVEY CATs	4 SURVEY CATs

RAAF REQUIREMENTS

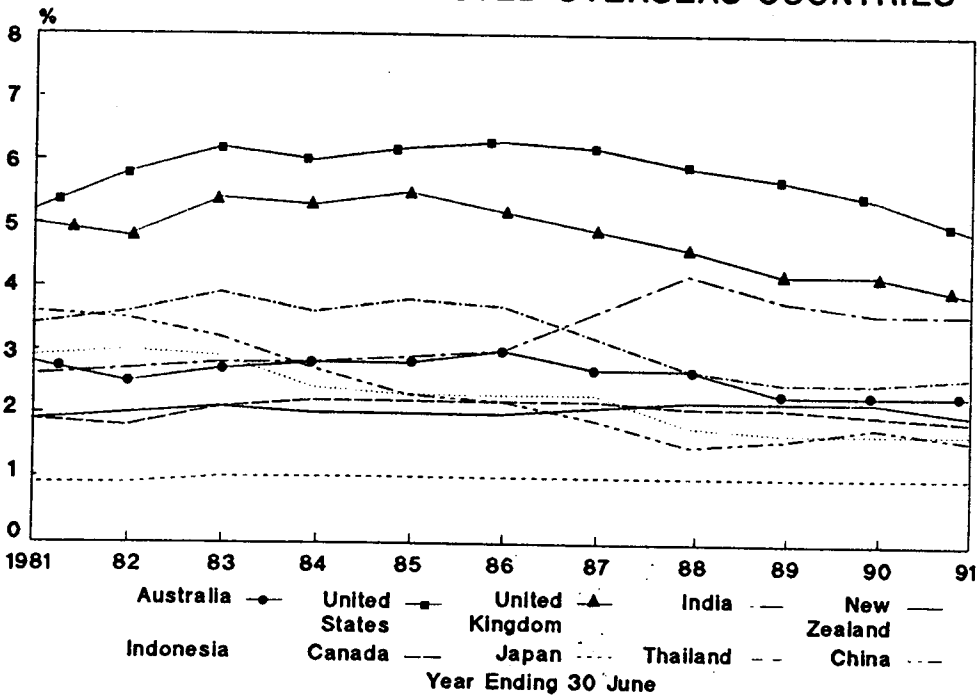
50 NEW MAACHI TYPE TRAINERS	50 MAACHI TRAINERS	40 TWO SEAT HORNETs
AWACs (? type)	———	12 HAWKEYE CARRIER AWACs

FINANCIAL STATISTICS

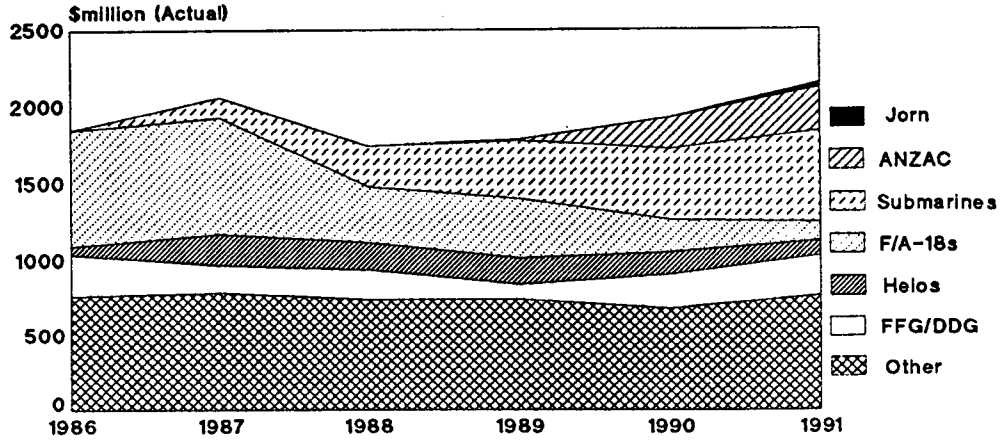
DEFENCE FUNCTION OUTLAY AS A PERCENTAGE OF COMMONWEALTH BUDGET SECTOR OUTLAYS



DEFENCE EXPENDITURE AS A % OF GDP AUSTRALIA AND SELECTED OVERSEAS COUNTRIES

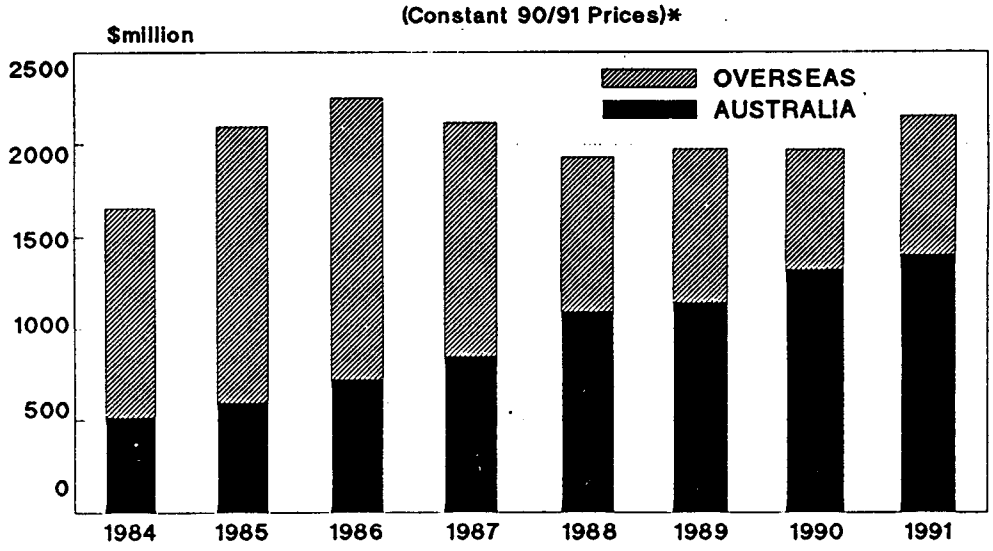


CAPITAL EQUIPMENT EXPENDITURE BY MAJOR PROJECT



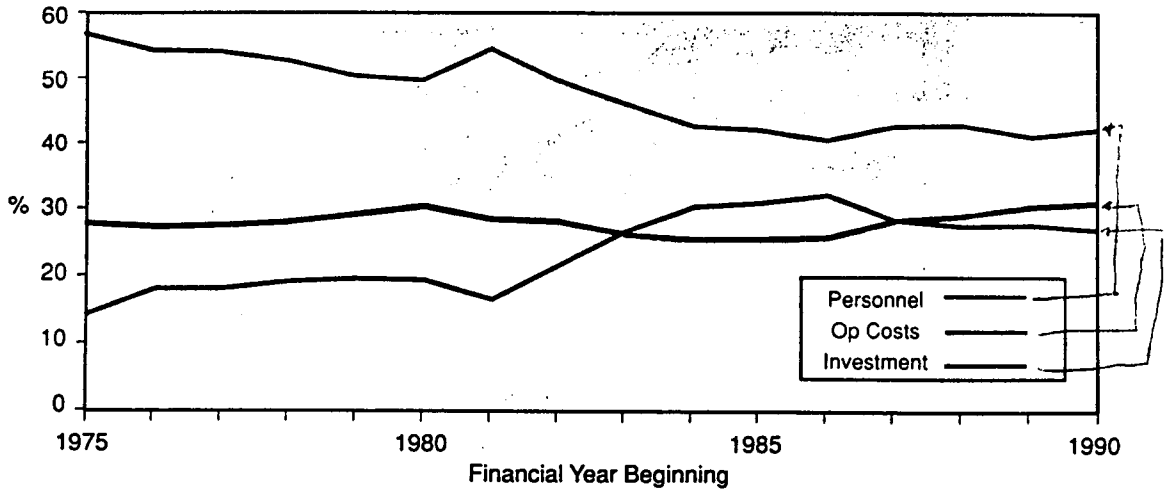
CAPITAL EQUIPMENT EXPENDITURE AUSTRALIA AND OVERSEAS

(Constant 90/91 Prices)*

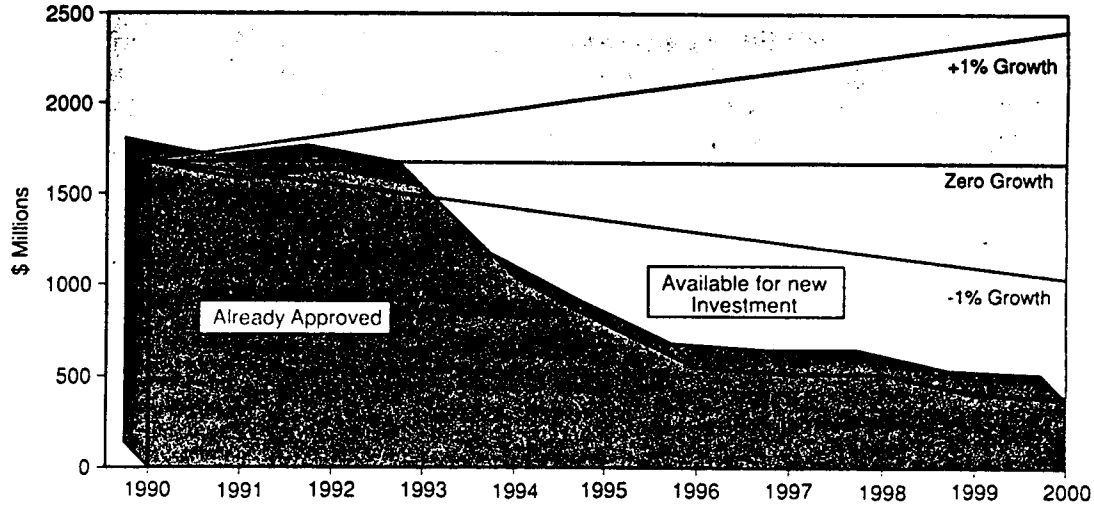


*Deflator - IPD Domestic Capital Equipment and Relevant Overseas IPD/GNP

DEFENCE EXPENDITURE BY MAJOR CATEGORY AS A % OF TOTAL



APPROVED AND PROJECTED CAPITAL EQUIPMENT EXPENDITURE



Guidance lines are simplified for illustrative purposes

Delivery Schedule for Prime Equipment - Significant Projects

Project	Original projected completion	Projected completion 1 July 1990	Projected completion 30 June 1991
Collins Class Submarines	Oct 1999	Oct 1999	Oct 1999
Anzac Ships	Feb 2005	Feb 2005	Feb 2005
Australian Frigates	Jun 1994	Nov 1993	Nov 1993
Seahawk Helicopters	Aug 1989	Aug 1991	Aug 1991
Raven	Oct 1990	Sep 1992	Sep 1992
F/A-18 Hornet	May 1990	May 1990	Completed
Basic Trainer PC9	Nov 1991	Feb 1992	Feb 1992
Black Hawk Helicopters	Mar 1991	May 1991	Completed
F111 Avionics Update	Mar 1996	Mar 1996	Mar 1996
Jindalee	Jun 1997	Jun 1997	Jun 1997

Significant Projects - Approved Costs

Project	Approval as at 1 July 1989 $	Variation $		Approval as at 30 June 1991 $
		Price/Exch	Real	
Collins-Class Submarines	4387.3	232.9	0.0	4620.2
Anzac Ships	3698.3	581.6	0.0	4279.9
Australian Frigates	1288.5	51.1	0.0	1339.6
Seahawk Helicopters	621.7	14.5	0.0	636.2
Raven	410.4	23.5	-0.3	433.6
F/A 18 Hornet	4812.5	8.1	-68.7	4751.9
Basic Trainer PC9	314.0	7.2	0.0	321.2
Black Hawk Helicopters	702.6	5.5	0.0	708.1
F111 Avionics Update	219.7	28.0	*156.3	404.0

* Note: Project cost varied to include award of prime contract and associated costs.