supporting operations in our area of direct military interest, to develop those capabilities that can be efficiently produced from our own resources, and to adapt and maintain equipment in the Australian operational environment.

3.49 In relation to the question of operational readiness, the forces we would require to deal effectively with the types of military threats that could arise in the shorter term need to be maintained at a high state of readiness. This does not mean that all such units should be at uniformly high readiness but we need to be confident that they could become effective, deploy, and sustain operations in an appropriate timescale.

3.50 Readiness will be enhanced by increased training and basing in those areas of the continent most likely to be involved in credible situations. Training in northern areas fosters familiarity with likely areas of operation and thus allows an immediate advantage over an adversary. It allows us to determine more accurately the substantial demands on defence and other infrastructure of this harsh operating environment—for example, the requirements for surveillance, command, control and communications, mobile strike forces and the necessary logistic capacity in remote areas.

Requirements for force development

3.51 The broad requirements which result from the application of the priorities discussed in this chapter can be summarised as:

—intelligence collection, assessment and regular review processes to detect changes in strategic circumstances;
—planning processes which regularly test the consequences for our force structure of the types of military pressure that could arise over shorter time-scales; and
—a defence force able to:
  —undertake current and foreseeable peacetime operational tasks;
  —deal effectively with the kinds of military pressure that could arise over shorter time-scales; and
  —provide a suitable basis for timely expansion to meet higher levels of threat if our strategic circumstances deteriorate over the longer term.

3.52 Within this planning framework, priority capability areas include:

—surveillance and patrol operations in our maritime resources zone and proximate ocean areas;
—maritime forces (including mine countermeasure forces) able to protect shipping in coastal waters and in our focal areas and ports;
—ground reconnaissance and surveillance forces;
—mobile ground forces able to defeat hostile incursions at remote localities and protect military and infrastructure assets that support the projection of our maritime power
—air defence within our maritime areas and northern approaches;
—maritime and land interdiction and strike capabilities, particularly the ability to
—undertake maritime strike operations in the approaches to north and northwest Australia;
—a capability to sustain operations in areas of Australia and its territories remote from our industrial and logistic support centres; and
—command, control and communications systems commensurate with these tasks.

3.53 These basic requirements determine our force structure. The characteristics of range, endurance and mobility that we plan for the ADF provide the Government with practical options for sustaining our defence activities further afield should the need arise.
Chapter four
The Australian Defence Force and its development

4.1 The preceding chapters have drawn conclusions from our strategic circumstances about priorities for the capabilities we need in the Australian Defence Force (ADF). This chapter describes the capabilities of the ADF and outlines the directions in which Government will develop the ADF in the light of these priorities.

Intelligence and surveillance

Intelligence

4.2 A high level of capability in strategic intelligence is fundamental. This allows us to review developments in the defence capabilities and political positions of other countries and to monitor them for changes that could affect our security. Our intelligence priorities focus on those potential changes that affect us directly. We must also, however, be able to assess developments beyond our region of primary strategic interest.

4.3 By continuing to develop our own capabilities and by supporting existing arrangements for intelligence sharing with allied countries, the Government will ensure that our needs for strategic intelligence of high quality will continue to be met.

4.4 The Government plans to enhance our independent intelligence capabilities by establishing a large satellite communications station in Western Australia. This will contribute to Australia’s security in our area of strategic interest. The station will be totally Australian owned and will be manned and operated by the Defence Signals Directorate.

4.5 With the operational emphasis of the ADF being focused on lower levels of conflict, our priorities for operational intelligence should be similarly directed. The Government will ensure that, through our own capabilities and co-operation with allies, we shall continue to meet our needs for operational intelligence.

Broad area surveillance

4.6 The ADF requires a manifest capability to conduct surveillance of our vast sea and air approaches. The capability must provide the means to detect, identify and, if necessary, respond to sea and air activity in our sovereign air and sea space.

4.7 This national requirement for broad area surveillance poses formidable problems. Ground based or ship based microwave radars lack coverage beyond about 250 nautical miles for high flying aircraft; for detection of low flying aircraft and surface ships, the range is much more limited. Although airborne early warning and control (AEW&C) aircraft can provide greater coverage, a solution based on the sole use of AEW&C aircraft would be prohibitively expensive.

4.8 Recent technological developments in over-the-horizon radar (OTHR) have led to practicable broad area surveillance at an affordable cost. For Australia, OTHR with its ability to sweep large volumes of air and sea space from a single location offers the only affordable solution. With an OTHR network, we expect to be able to monitor the great expanses of our sea and air approaches and provide long range detection and tracking of aircraft and surface ships. Without an OTHR network, we would remain essentially unaware of movements of interest in our vast maritime approaches.

4.9 The Government has given high priority to the design and development of this network, based on the Australian designed Jindalee experimental radar. The OTHR network will be a basic element of a national system for air defence and airspace control.
4.10 Up to three new radars have been identified as required and studies are underway on their precise locations. Current planning is for one or two to be sited in north-eastern Australia and one sited in the west or south-west. The system will be developed to improve tracking of surface ship movements.

4.11 The ability of OTH to control air intercepts will continue to be investigated; however, the precision required for such a task is probably only consistently achievable in the foreseeable future by use of microwave radars, either in the intercepting aircraft or ship or in an AEW&C aircraft.

4.12 The Government has decided to upgrade the existing Jindalee radar at Alice Springs to provide a test bed for scientific, engineering and operational development. This will allow the testing of important new features including specialised transmitters, greater computing capacity and further development of the computer software. The upgrade will also enable Service operators to gain valuable operational experience on OTHR in preparation for the new network.

Air surveillance

4.13 The Government will develop a national system of air defence and airspace control which will integrate the information available from a variety of sources (eg, OTHR, civil and military microwave radars, intelligence sources), collate and analyse that information, and present the results to commanders. Other major elements of the system include the Tactical Fighter Force, an infrastructure of air bases, command and control, and the supporting communications system.

4.14 The RAAF operates three ground based microwave air defence radars, and the acquisition of further radars is under consideration. These can provide greater definition and control in the vicinity of airfields and other important areas. All RAN major combatants have early warning radars for monitoring and controlling their respective environments, which includes the control of aircraft. These radars can also assist in the protection of important coastal installations.

4.15 The combination of an OTHR network and AEW&C aircraft offers considerable potential for airspace surveillance. AEW&C aircraft have the flexibility and speed to respond quickly to targets detected by OTHR. The microwave radar of the AEW&C aircraft has the precision to monitor with great accuracy the movements of a target and, if required, direct an interception.

4.16 The Government has requested and the Department of Defence is now evaluating proposals from industry for AEW&C systems. The Government accepts in principle the need for such systems and will include provision in the Five Year Defence Program. The Department is also conducting a major study into air defence surveillance elements.

Maritime surveillance

4.17 The planned OTHR network will form the basis for our system of maritime surveillance. However, even if a ship has been detected by OTHR, it may still need to be intercepted and identified by ship or aircraft. In the vast expanses to our north, this is a formidable task.
Anti-submarine surveillance and anti-submarine-warfare

4.20 The threat to Australia from submarines is low. Nevertheless, because the necessary skills are difficult to acquire and the lead times for adapting and developing anti-submarine warfare (ASW) technology for the Australian environment are long, we need to maintain our expertise in anti-submarine warfare.

4.21 Our first priority for surveillance against submarines is the protection of our major focal areas and their approaches. Although shipping using our southern ports and waters gains some protection from submarine attack by virtue of the distances that an attacker would need to cover to operate in those areas, no such protection is afforded to shipping using northern ports and waters.

4.22 Anti-submarine surveillance and ASW are conducted by units of the Fleet and the LRMP force. The guided missile destroyers (DDG) and destroyer escorts (DE) of the RAN are equipped for ASW with the Ikara ASW missile and anti-submarine torpedoes. The submarines and the FFGs are also equipped with the latter.

4.23 The anti-submarine surveillance capabilities of the Fleet will be considerably enhanced as a result of the Government’s decision to purchase Seahawk helicopters for the FFGs. The Sea King helicopters already in service can provide a further land based ASW capability in our major focal areas. In anti-submarine operations, the P-3C aircraft has the ability to lay and monitor sonobuoys, including the Australian designed and produced Barra sonobuoy, to attack submarines with torpedoes, and to lay mines.

4.24 Another important development in anti-submarine surveillance is the surface-towed acoustic array. This new technology, coupled with advanced computer processing, offers prospects of long range detection of modern submarines in some nationally important sea areas, including those of our south. Our investigations of the potential of this new approach will proceed, as a matter of priority, to at least the trials and evaluation stage. Similarly, acoustic arrays towed by submarines will contribute to anti-submarine warfare.

Ground surveillance and reconnaissance

4.25 There is a need for ground force surveillance of our northern areas against the prospect of an adversary’s raiding forces crossing the sea and air gap and conducting operations on the Australian continent. To meet this requirement, three Regional Force Surveillance Units manned largely by the Army Reserve have been established to cover the Pilbara, the Kimberleys and Northern Territory, and Northern Queensland.

4.26 To complement the surveillance role of Regional Force Surveillance Units the Special Air Service Regiment can undertake ground reconnaissance to locate and identify any raiding forces operating on Australian territory. In addition, 2nd Cavalry Regiment, which is to be relocated to Darwin, has a considerable capacity for mobile reconnaissance over a wide area. Specialised equipment will be acquired to expand further our capabilities for surveillance and mobility.

Electronic warfare

4.27 The incorporation of modern technology into defence equipment has led to a greater and more complex use of the electromagnetic spectrum by sensors and weapons. This has increased the importance of being able to exploit an adversary’s use of electromagnetic radiation and to restrain his exploitation of ours.

4.28 Our priorities in electronic warfare (EW) reflect the operational needs of lower level contingencies. This gives emphasis to electronic support measures as an aid to surveillance and identification, and to communications EW to support ADF operations. We need to know the transmission characteristics of the friendly, neutral and hostile forces that would be most relevant in such contingencies. The establishing and development of the Defence EW Data Base will be important in this regard.
4.29 In other areas of EW, our priorities concentrate on the need for scientific and technological understanding of EW and its developments rather than on acquiring a high level of operational capability.

**Mapping, charting and infrastructure knowledge**

4.30 The availability of comprehensive and up to date military maps and charts, together with a detailed knowledge of the environment and its infrastructure, is fundamental to the effective conduct of military operations. The size of Australian sovereign territory and our area of direct military interest makes this an imposing task. Priority in this work is being given to operationally important geographic areas.

4.31 Productivity increases arising from new technology will speed up the production of military maps and related data required by the ADF for military operations. Nevertheless, the mapping of the priority areas of the north will still take many years. Further advances may be possible in the context of Government's consideration of the rationalisation of Commonwealth mapping. Aerial photography for mapping purposes will continue to be conducted using leased aircraft.

4.32 Detailed knowledge of Australia's marine environment is fundamental not only to Australia's commercial interests and purposes but also to the safe and effective conduct of maritime operations, especially for navigation, mine and counter-mine warfare, and submarine and anti-submarine operations. The task is formidable and there are few specialised ships available. Measures are being taken to redress this.

4.33 Two heavy landing craft have been allocated as interim survey ships to assist in the national charting effort undertaken by HMA Ships MORESBY and FLINDERS. The Government is acquiring four survey motor launches. In addition, an Australian designed laser airborne depth sounder is under development. This promises accurate surveying of coastal waters at a faster rate than conventional means. Other options under consideration include the acquisition of more survey ships.

4.34 Oceanographic research is conducted by HMAS COOK. Another vessel will be acquired particularly to assist in the development of towed acoustic arrays.

**Nuclear, Biological and Chemical Defence (NBCD)**

4.35 No neighbouring country now has nuclear weapons, and their development or acquisition is not in prospect. Similarly, no neighbouring country maintains chemical or biological weapons although, by their very nature, the time-scale for the development of chemical or biological weapons would be much shorter.

4.36 The ADF undertakes some basic training in NBC defensive and protective measures, but such training does not command a high priority. A scientific competence in NBCD matters is maintained to advise on policy and to give direction to ADF training.

**Strike and interdiction**

4.37 Earlier chapters have noted that although political constraints could limit the use of our strike capabilities in lower levels of conflict, they represent a useful option that a Government would wish to have available. They are also part of the expansion base we need for higher levels of conflict. Two force elements have a primary strike and interdiction function—the F-111 strike and reconnaissance force and the submarine force. Other elements such as the Tactical Fighter Force, LRMP aircraft, surface ships and special action forces can also contribute to this capability.

**Strike aircraft**

4.38 Our 23 F-111 aircraft represent a unique force in regional terms. They are long range aircraft with the ability to strike sea and land targets with substantial immunity. Four F-111s are fitted to conduct all-weather, long range reconnaissance. Since their acquisition, the F-111s have been updated progressively and their effectiveness enhanced. They have been fitted to fire Harpoon for maritime strike. The Pave Tack precision weapon delivery system, which significantly enhances target identification and weapon delivery, is being fitted. It increases the accuracy with which conventional bombs can be delivered, it can designate targets for the delivery of the laser guided bombs which have been acquired for the F-111, and it could be used with other precision weapons that might be acquired.

4.39 The effectiveness of the F-111 will decline unless some of its avionics and support systems, which are becoming increasingly difficult to maintain, are updated. The introduction of the F/A-18 Hornet raises the possibility that Hornets could be used to replace F-111s lost from the strike force through attrition. A submarine launched missile is another strike option for the longer term.

4.40 The lead times for taking up these options are substantial. Meanwhile, separate options are being developed to refurbish the F-111 fleet at minimum cost to maintain the aircraft in service and to reduce significantly its operating costs.

**Submarines**

4.41 Our six Oberon class submarines were commissioned into service from the late 1960s. With their updated sensors and weapons they represent the most formidable sub-surface strike force in the region. Their weapons include the Mk48 torpedo, effective against both ships and submarines, and the anti-ship Harpoon missile.
The long range F111 aircraft have a highly effective maritime strike capability. Four are being fitted for all-weather, long range reconnaissance.

4.42 The characteristics of the Oberons (and their replacements) include long range and endurance and the ability to operate independently and effectively in areas where an adversary might have air superiority.

4.43 The Oberon submarines are expected to be paid off during the 1990s as they become more difficult to maintain and suffer operational degradation. The Government is introducing a new class of submarine which will be constructed in Australia. We will acquire six new submarines which, with their modern equipment, high performance and greater availability, will enhance the capability of our submarine force.

4.44 To ensure that the Commonwealth gets value for money in this costly project and to reduce risk, the Government has funded competitive tenders between two different submarine designers and two different designers of submarine combat systems. These tenders have been submitted and are being evaluated. The Government will announce its decision in 1987.

Maritime warfare

4.45 By its very nature, the defence of Australia and its territories emphasises maritime warfare capabilities. The ADF must be able to conduct maritime operations to prevent an adversary from substantial use or exploitation of our maritime approaches. The maritime force structure reflects the requirements for both coastal operations—particularly for mine countermeasures and to counter harassment and infiltration—and ocean operations, which require a higher level of offensive and defensive capabilities.

Surface combatant force

4.46 The present surface combatant force consists of 12 destroyers (three DDGs, four FFGs, five DEs) and 20 patrol boats (15 Fremantle Class and five Attack Class). Two further FFGs are being built at Williamstown Naval Dockyard, and will enter service in the early 1990s, when two of the older DEs pay off. The Government will expand the Navy to a force operating 16 to 17 major surface combatants.

HMAS DARWIN, one of the RAN’s fleet of 12 destroyers. Two further guided missile frigates are being built to enter service early next decade.
Present planning for the development of the surface combatant force envisages three broad levels of capability. At the first level are high capability surface combatants able to contribute to a wide range of operations in both low level and more substantial contingencies. They have sensors and weapons able to provide a wide range of capabilities and a high degree of survivability, and are capable of integrating with allied forces if required. At present, the DDGs and FFGs comprise the first level. The DDGs are being progressively modernised at Garden Island Dockyard, with the last to be completed by 1990. They are expected to remain in service for at least ten years after modernisation. The FFGs are expected to be in service for 30 years.

The second level comprises ships of lesser capability, suitable for dealing with lesser forms of military pressure which could arise in Australia's resource zones and proximate waters or in Australia's area of direct military interest. A new class of vessel—a light patrol frigate—has been proposed for this level of capability. Eight ships will be constructed in Australia. They will be designed so that their sensors and weapons can be enhanced to enable them to contribute to operations in more substantial contingencies and to complement the first level of capability in operations in the direct defence of Australia. They will need endurance, sea-keeping and combat capabilities commensurate with these tasks, and will be able to embark Seahawk helicopters. A significant influence on their selection will be the need to achieve the required numbers within reasonable cost. The ship will be of a type that will allow the Government to select from a number of Australian yards for construction.

At the third level are the patrol boats, which are suitable for coastal operations. Their capabilities are primarily defensive. They can undertake national peacetime tasks including fisheries patrol and law enforcement and are also capable of contributing to coastal, port and harbour defence if the occasion demands. The present Fremantle boats will remain in service well into the 1990s. The number of third level vessels required in the longer term will depend on the numbers, capabilities, and cost of the ships acquired for the second level.

Submarine force

As well as being able to conduct strike operations against surface ships and other submarines, the submarine force can conduct reconnaissance and patrols, and operate in conjunction with the Army's special action forces. The Government has recognised that the effectiveness of the submarine force would be enhanced by basing some of the submarines in the west closer to priority operating areas. HMAS Stirling is being developed as a major submarine facility. Oberon class submarines will be home-ported there, as will some of the new submarines. The Government has authorised the construction of a substantial submarine training facility in Stirling and has more facilities under consideration.

The second level comprises ships of lesser capability, suitable for dealing with lesser forms of military pressure which could arise in Australia's resource zones and proximate waters or in Australia's area of direct military interest. A new class of vessel—a light patrol frigate—has been proposed for this level of capability. Eight ships will be constructed in Australia. They will be designed so that their sensors and weapons can be enhanced to enable them to contribute to operations in more substantial contingencies and to complement the first level of capability in operations in the direct defence of Australia. They will need endurance, sea-keeping and combat capabilities commensurate with these tasks, and will be able to embark Seahawk helicopters. A significant influence on their selection will be the need to achieve the required numbers within reasonable cost. The ship will be of a type that will allow the Government to select from a number of Australian yards for construction.

At the third level are the patrol boats, which are suitable for coastal operations. Their capabilities are primarily defensive. They can undertake national peacetime tasks including fisheries patrol and law enforcement and are also capable of contributing to coastal, port and harbour defence if the occasion demands. The present Fremantle boats will remain in service well into the 1990s. The number of third level vessels required in the longer term will depend on the numbers, capabilities, and cost of the ships acquired for the second level.

Maritime air operations

The Government decided in 1985 to acquire Seahawk helicopters to operate from our six FFGs. The Seahawks will provide surveillance and weapon targeting, and will conduct ASW operations. The eight light patrol frigates will be able to operate these helicopters. Our Sea King helicopters can undertake coastal and focal area ASW operations from land bases. Navy's helicopter needs for HMA Ships SUCCESS, STALWART and TOBRUK after the Wessex utility helicopters reach their end of life are presently under study.

Mine countermeasures force

The Government gives a high priority to the development of a capable mine countermeasures force. The present force consists of a single minehunting ship. This is inadequate. A mine countermeasures force will be developed that will ensure that our major ports can be kept open.

A new class of glass reinforced plastic inshore minehunter (MHI) catamaran has been developed in Australia for hunting mines in inshore waters. The first of two prototype MHIs has been delivered and the second is expected in mid-1987. Subject to successful evaluation and further review of our priority needs, it is planned to acquire at least four additional MHIs.

Because the waters in which we could need to counter mines vary in their characteristics, we need minesweepers to complement the minehunters. The RAN is developing an innovative Australian concept for acoustic and magnetic sweeps, and will acquire craft-of-opportunity, such as fishing boats and tugs, for the rapid expansion of our mine countermeasures force. This concept involves the use of members of the Naval Reserve whose knowledge of local waters would be of great advantage in mine warfare.

The mine countermeasures force also needs the capability to counter mines specifically targeted against mine countermeasure vessels themselves. A mine warfare systems centre will be developed in Sydney to support the mine warfare force. This support will include the collation of extensive environmental data on the mining characteristics of our ports.
Amphibious forces
4.59 The Fleet currently includes seven amphibious ships—a heavy landing ship (LSH) and six heavy landing craft. In peacetime and in low level contingencies they provide the sea transport capability of the ADF. An advantage of these ships is their ability to discharge cargo and personnel across a beach or through non-operational ports by beaching and, in the case of the LSH, HMAS TOBRUK, by using helicopters or small vessels.

Afloat support
4.60 Underway replenishment has advantages particularly where naval units are required to undertake sustained operations at long ranges from bases and logistic support. There are similar advantages with afloat maintenance support where ships are operating in areas away from major Naval bases.

HMAS SUCCESS provides underway replenishment. This vessel was commissioned in 1986 and will join the Fleet as a fully operational unit in 1987. Afloat maintenance support is provided by HMAS STALWART which is due to reach its end of life in the later 1990s.

Naval infrastructure
4.62 With major Fleet units homeported on the west coast and to cater for possible expansion, there are advantages in acquiring a second underway replenishment ship. Various options are being examined including the acquisition and conversion of a merchant tanker or the acquisition of a low cost naval vessel.

HMAS TOBRUK, a heavy landing ship of the amphibious force which provides sea transport capability for the Australian Defence Force.

4.63 The need for the Navy to operate from both the east and the west coasts has been recognised for many years. However, for historic, strategic and economic reasons the RAN has operated primarily from the east coast.

4.64 The homeporting of major fleet units at HMAS Stirling recognises the need for the Navy to be able to operate effectively from both coasts for the direct defence of Australia. Two DEs, two Fremantle class patrol boats, one Attack class patrol boat (operated by the Naval Reserve) and a survey ship are based at Stirling. They will be joined shortly by an Oberon class submarine.

4.65 To inform judgements on options for the future disposition of naval units and the location of infrastructure, the Department of Defence has conducted the Fleet Base Relocation Study. This study reported on all significant
4.67 Rationalisation of shore training and support establishments to enable more efficient use of resources is being examined. Relocation of substantial functions to Jervis Bay and HMAS Stirling is probable.

Air warfare

4.68 By the very nature of the medium in which it takes place, air warfare is part of all forms of warfare—maritime, land and air. Consequently, some aspects of air warfare have been covered earlier in this chapter in the sections describing air and maritime surveillance, strike and interdiction, maritime air support, anti-submarine surveillance and anti-submarine warfare. Air support of the land battle is covered later in this chapter. This section covers air defence and the Tactical Fighter Force, ground based surface to air missiles, strategic transport, and northern airfield infrastructure.

Air defence and the Tactical Fighter Force (TFF)

4.69 Airspace surveillance, including the need for a national system for air defence and airspace control, has been discussed earlier. The developments planned for OTHR, the Tactical Fighter Force (TFF), defence communications and defence command systems should result in such a system for northern Australia by the late 1990s. It is a primary requirement for effective air defence.

4.70 Doctrine and operating procedures which effectively integrate all air defence elements, including naval elements, will be developed for the defence of vital assets. This will become increasingly important if the potentials of OTHR and AEW&C aircraft are to be fully realised.

4.71 Within the TFF, the replacement of the Mirage fighter aircraft by the F/A-18 Hornet is proceeding smoothly and, with the associated upgrading of the TFF's air-to-air missiles, represents a major upgrading of capability. Two squadrons and the operational conversion unit will be based at Williamtown (NSW) and the third squadron will be based at the major airfield being developed at Tindal (NT). The last of the 75 Hornet aircraft that have been ordered is planned to be delivered by the Government Aircraft Factories in 1991.

4.72 The Government's decision to modify the four Boeing 707 aircraft of the RAAF will allow the Hornet aircraft to increase its effective range and payload. This number of aircraft is sufficient to provide a training capability, a limited operational capability and a base for expansion. It facilitates the development and acquisition of the complex skills needed for effective refuelling operations.

4.73 The Hornet has capabilities for strike and interdiction as well as air defence. Its existing capabilities include precision weapons such as the Harpoon anti-ship missile and laser guided bombs.
Modern munitions have greater accuracy and effectiveness and can lead to enhanced survivability of the delivering aircraft. They are costly, however, and the priority for their acquisition needs to be based on a clear understanding of their use in different levels of contingency. Also important are lead times for acquisition, the development of necessary doctrine and skills, and ascertaining performance in our areas of interest. These considerations lead to a policy of acquiring limited stocks of selected types of munition to gain a basic level of familiarity in weapon performance and procedures and to maintain a contingency reserve.

Land based surface-to-air missiles

The Rapier low level air defence weapon system and the RBS-70 very low level air defence weapon system, which will replace Redeye in 1987, provide close-in protection to airfields, important installations and vulnerable points.

Land based area surface-to-air missile systems command a low priority in present strategic circumstances. In more substantial conflict they could be required for the protection of vital areas and points. However, they can be readily integrated into the nation’s air defence system if a change in circumstances leads to their acquisition.

Strategic transport

The strategic transport needs of the ADF are met by the Boeing 707 and C-130E aircraft of the RAAF. These can be augmented by aircraft of the civil air fleet. That augmentation is of special significance in the event of conflict as it offers a major reserve capacity.

The Boeing 707 aircraft, above, together with C130E aircraft meets the strategic transport needs of the Australian Defence Force. It is planned to modify the 707 aircraft for in-flight refuelling.

Northern airfield infrastructure

A chain of northern air bases is needed for the RAAF to react effectively to possible contingencies and to support ADF operations across the vast expanses of the north. There are already major manned bases at Darwin.
and Townsville, and unmanned bases at Learmonth and Tindal. Stage one of the construction of Derby airfield is due for completion in 1987, and the current development of Tindal will allow the basing of a Hornet squadron there from late 1988.

4.80 The Government will build an airfield on Cape York Peninsula. A number of issues, however, have yet to be resolved. For example, site options must be developed, environmental impact studies must be completed, land acquisition resolved, and extensive engineering and design effort conducted after the selection of an appropriate site. The aim is to have the airfield operational as early as possible in the 1990s.

4.81 Civil airfields in the north are also available for military use. They include Port Hedland, Broome, Kununurra, Gove, Mt Isa, Weipa and Cairns. Some can sustain regular military movements while others are suitable only for emergency use of limited duration.

Land Warfare

4.82 The Government’s policy is that, in response to the wide range of credible northern contingencies, the Army’s structure must include highly mobile forces capable of rapid deployment anywhere within Australia and its territories. The ground force must be able to conduct protracted and dispersed operations in harsh terrain where the existing infrastructure and resources are sparse, and be logistically supportable within Australia’s resources. An expansion base is required at a lower priority to maintain the essential skills and capabilities needed for more substantial conflict, together with sufficient units on which to base timely expansion. Elements for lesser contingencies also form a large part of the expansion base. The command, training and logistic framework to support the development, operation and maintenance of the total force is also required.

4.83 These requirements indicate changes of emphasis rather than a significant departure from existing organisation. We need a force structure that includes a light air portable force, capable of rapid deployment; forces capable of following up an initial deployment; and the availability of greater combat power to reinforce deployed formations if necessary. In addition, elements capable of deploying to defend vital defence installations and national infrastructure, and a logistic organisation capable of supporting the deployment and subsequent operations of these forces, need to be given priority.

4.84 This force structure requires no major changes from the current Army organisation based on the 1st Division (essentially Regular), two Reserve divisions (2nd and 3rd), and Training and Logistic Commands. However, some changes are needed to meet requirements for readiness, sustainability, and strategic and tactical mobility.

1 Division

4.85 1 Division will become more readily deployable, with a priority task being to provide the tactical headquarters, formations and units required for credible contingencies. All elements will be required to achieve specific degrees of operational readiness. As a secondary priority, 1 Division will continue to develop and maintain doctrine and skills for the broad range of conventional operations required in more substantial conflict.
4.86 1 Division will remain structured as an infantry division, with 3 Brigade, 6 Brigade, and 7 Brigade (a Reserve formation) providing the formations likely to be deployed to meet shorter term contingencies. 1 Brigade and 11 Field Force Group (a Reserve formation) will also remain with 1 Division, but in different readiness categories from the other formations. This grouping will give flexibility within the division to assign units according to the particular requirements of a contingency.

3 Brigade (Townsville)
4.87 3 Brigade, comprising two infantry battalions, will continue to provide the bulk of the Operational Deployment Force (ODF) and short degrees of readiness will continue to apply. The ODF will remain a lightly equipped air portable force. In addition, to broaden the scope of its employability, Regular units including an armoured personnel carrier squadron and the parachute battalion (from 1 Brigade) have been earmarked to augment the ODF should they be required. Other units that might be required are currently under review, and could include ground mobility, surveillance, reconnaissance, communications and logistics elements. Such units would also be placed on appropriate degrees of notice.

6 and 7 Brigades (Brisbane)
4.88 These brigades are manned and equipped at a level that is adequate for training but not for operations. Consideration is being given to placing the regular elements of 6 Brigade on 90 days notice to move and the Reserve elements of 6 and 7 Brigades on six months notice from callout. Both brigades will be 'rounded out' from other Reserve elements in the event of operational deployment.

1 Brigade (Sydney)
4.89 1 Brigade currently provides the structure for the development of a parachute capability (3 RAR), the mechanised capability (5/7 RAR), and the armoured capability (1 Armoured Regiment in association with 5/7 RAR). A battalion group parachute capability is being developed to secure a point-of-entry for the ODF or alternatively to augment the ODF should a third battalion be required. The parachute group will be placed on similar readiness to other ODF elements. The other battalion of the brigade, together with the armoured regiment, provides the expansion base for mechanised and armoured capabilities.

Logistic support
4.90 To support 1 Division if deployed, a Logistic Support Force will be formed. The force will provide essential third line logistic support. It will be built on the current structure of the existing but smaller Logistic Support Group that is part of the ODF, with additional elements being provided by the Reserve.

Protection of vital assets
4.91 In the event of military conflict, military bases and the civilian infrastructure and population in the north must be protected. Plans will be developed to use both Regular and Reserve forces for this vital task. Planning will proceed on the basis of a possible initial need to use Regular units deployed at short notice, followed by their relief by designated Reserve elements to release the Regular units for mobile offensive operations.

Regional Force Surveillance Units
4.92 The development of three Regional Force Surveillance Units covering the north of the continent is well advanced. These units are North West Mobile Force (Norforce, headquartered in Darwin), Far North Queensland Regiment, and the Pilbara Regiment. Further expansion of these units is constrained by the limited availability of manpower in these regions.

Versatility in operations is needed for Regional Force Reconnaissance Units. Pictured are members of Norforce patrolling the Walker River, NT.
Northern basing

4.93 Focusing attention on the needs of credible northern contingencies raises the issue of basing Regular Army units in the north. The 2nd Cavalry Regiment, a reconnaissance unit currently based at Holsworthy, will be relocated to Darwin.

4.94 2nd Cavalry Regiment will provide a considerable capability for mobile reconnaissance over a wide area, and a modest capacity to deal with incursions. The unit is capable of independent operations in low level contingencies and, with its mobility and communications, can react to sightings by Regional Force Surveillance Units.

Armoured Personnel Carriers provide the capability for highly mobile reconnaissance, a task to be undertaken by the 2nd Cavalry Regiment.

4.95 Northern basing will allow the unit to gain valuable experience in northern operations which, in turn, will inform decisions on the acquisition of future light armoured vehicles. On present planning, the unit’s existing tracked M113 vehicles will be replaced with wheeled armoured vehicles carrying weapons and surveillance equipment suitable for credible northern contingencies. A selected range of vehicles will be evaluated under northern conditions.

4.96 The Government has directed that detailed studies commence on the possible relocation of a brigade to the north. Together with support elements and accompanying families, such a deployment would involve some 6 000 to 7 000 personnel. Detailed analysis of the implications of relocating a brigade is required, including careful consideration of possible alternatives. The Government’s decision will be influenced by experience with the move of the 2nd Cavalry Regiment.

Offensive air support

4.97 Offensive air support in land warfare can be provided by both the TFF and F-111s. This support can be given in the form of interdiction of the battlefield or close air support for our troops. Close air support is important in all levels of conflict; however, in operations against small units of dispersed forces, restricted and limited battlefield interdiction and close air support could also be conducted by less capable aircraft such as advanced fixed wing trainer aircraft or armed utility helicopters.

Battlefield helicopters

4.98 Helicopters integral to the land force contribute importantly to its combat power, providing reconnaissance, tactical mobility, fire support and logistic support within the area of operations. As battlefield helicopters are an important element of the Army’s combat team, the Government has decided to transfer full command and ownership of battlefield helicopters from the Air Force to the Army. This will enhance the ADF’s capability at all levels of conflict and, in particular, will improve its ability to bring its combat power swiftly to bear on enemy forces in the dispersed operations which would be typical of the more credible contingencies we face.

4.99 The Government has already decided to acquire 14 Blackhawk helicopters to supplement the 30 UH-1H helicopters already in service. A further 22 Blackhaws will be acquired to complete a company group lift. More Blackhawks will be acquired for a second company group lift and further helicopters for a third company group lift will be considered in examining force development priorities.

Army aviation

4.100 The Army’s surveillance, reconnaissance and communications aircraft (44 Kiowa light observation helicopters, and 14 Porter and 11 Nomad fixed wing aircraft) are expected to remain in service until the 1990s. Experience from training in the north will be important to inform judgements on the capabilities needed in the replacements for these aircraft.
The Army's battlefield mobility will be enhanced by the introduction of the Blackhawk helicopter (top) to supplement the capability provided by the in-service Iroquois (lower).

M113 light armoured fighting vehicles

4.101 Light armoured fighting vehicles are essential for mobility, protection and firepower in credible northern contingencies. The Government has decided that the present fleet of 773 M113s, of which 700 are currently on issue, can be reduced to 600 or fewer under current circumstances. Some of the fleet will be upgraded, others placed in storage.

Mechanisation

4.102 With greater priority being given to dispersed low level operations, the present level of mechanisation of 1 Brigade will be restricted to battalion group level. This will provide a suitable level of mechanisation to meet expansion base needs and to contribute to credible contingencies. There will be increased emphasis on training in northern Australia.

Tanks

4.103 1 Armoured Regiment is to become an integrated Regular and Reserve unit, with initially one of its three Regular tank squadrons being converted to Army Reserve. In the light of experience, the composition of the Regiment will be further reviewed.

Artillery

4.104 Acquisition of 59 new field guns (105mm) for the Regular Army will continue, including 36 guns for the Regular component of the Field Force. This Government has approved 46 new guns for the Army Reserve. Acquisition of further new guns for the Reserves will be considered in the light of the current review of the structure of the Army Reserve.

4.105 The Regular 8th/12th Medium Regiment consists of two medium batteries and one field battery, with one of the medium batteries also equipped with field guns. The Reserve 10th Medium Regiment provides general support medium artillery. The balance between Regular and Reserve medium batteries will be reviewed.

Rationalisation of the Reserve structure

4.106 Our requirements for land warfare cannot be achieved without extensive Reserve participation. Accordingly, the Army Reserve structure is being reviewed and changes will be implemented progressively. Since World War Two the Reserve has provided the expansion base for the Army. It will now, in addition, be required to contribute to operations which might arise in the shorter term as part of the total Army, at a level commensurate with achievable degrees of training and readiness. The Government will soon legislate for restricted call-out of Reservists, thus ensuring their availability in credible contingencies.
4.107 New areas of Reserve activity will include integration with Regular forces, particularly in 1 Division and the Logistic Support Force, augmentation of high priority elements of the Regular force, defence of vital assets across the north, and participation in some higher level capabilities in the expansion base such as tanks. These challenging tasks will provide a new focus for the Army Reserve. With some restructuring and changes to roles it will be achieved within a ceiling of 26,000.

Tactical air transport
4.108 Tactical air transport in support of land forces is provided by the C130H Hercules, Caribou, Chinook medium helicopters, and utility helicopters. The Caribou short range transport aircraft will reach the end of its planned life of type in the 1990s. In considering its replacement we will take regard of the potential of our northern airfields (military and civil) to support movements by different aircraft types and the potential benefits of aircraft commonality—such as an expanded fleet of C-130 Hercules. Our studies on how best to meet the ADF’s needs for tactical air transport will also consider the future of the Chinook helicopters, newer technologies such as the tilt-rotor and X-wing concepts, and the need for air transport support in dispersed northern operations.

Command, control and communications
4.109 Since the re-designation in 1984 by this Government of the Chief of the Defence Force Staff as the Chief of the Defence Force (CDF), and the creation of Headquarters, Australian Defence Force (HQ ADF), the CDF now commands the ADF with direct staff support being provided by HQ ADF. In conjunction with the Service Offices, HQ ADF undertakes operational military planning for the CDF.

4.110 Under these arrangements, the single Service Chiefs of Staff retain command responsibilities. They remain responsible to the Minister, under the CDF, for commanding their individual Services. In addition, they are responsible for advising the CDF on all matters relating to their Service, including operations, and in raising, training, supplying and maintaining combat ready forces. Under command arrangements approved by the Government in 1986, they are also responsible for providing combat ready force elements to joint force commanders.

4.111 In 1986, Maritime, Land Force and Air commanders were appointed. Supporting operational headquarters are being developed. The joint force commanders report directly to CDF and have responsibility for the conduct of designated joint ADF operations and exercises.

4.112 These new command arrangements enhance the ADF’s operational ability—they facilitate the development of staff procedures and the conduct of joint exercises; and they are expandable if strategic circumstances deteriorate. In a transition to operations, HQ ADF would expand to support the CDF in furnishing military advice to Government and in operational planning.

4.113 The Government has given a high priority to the development of an automated system to support the new command arrangements. This system will be capable of displaying, recalling and transmitting a wide variety of data. The progressive introduction of the Defence Secure Communications Network will overcome the limitations of the present communications system.

4.114 With increased ADF activity and basing in northern Australia, the Government believes there could be value in developing joint administrative and command arrangements in northern Australia. This will be further examined after the new joint operational command system is established and working effectively.
Further changes will also be made to the organisation of HQ ADF. In 1986, the Government created the appointment of Vice Chief of the Defence Force (VCDF), whose initial task has been to study how force development planning can be co-ordinated better between HQ ADF and the single Service offices. The results of the VCDF's study are being examined. Some initiatives, including a greater centralisation of force development planning under the CDF, have already been taken.

Summary—The ADF and its development

As a result of this Government's decisions, the ADF in the late 1990s will be a highly capable force better matched to our strategic needs. Through its training and exercising it will be skilled in operating in our unique geographic environment. The Defence Force will have modern weapons, greater mobility and endurance, and better logistic support. A chain of forward bases and facilities in the north and west of the continent will be complete. Our surveillance capabilities, especially for air defence, will be greatly improved. And we will have an effective system for the command and control of the ADF in joint operations.

Some of the more important developments in the ADF's capabilities achieved and planned for the years ahead are summarised below:

Command, control and communications
- The ADF's command arrangements have been improved by the redesignation of the Chief of the Defence Force Staff as the Chief of the Defence Force, the formation of Headquarters ADF, and the creation of a Vice Chief of the Defence Force at equal rank to the Chiefs of each Service.
- A joint operational command system has been created through the appointment of Maritime, Land Force and Air commanders who report directly to CDF.
- Computer based information systems are being developed to support the decision making of operational and higher level commanders.
- New communication systems to support operations and administration will be introduced, making use of modern technological developments including satellites. The use of cryptographic security will be considerably extended.

Navy
- The number of major surface combatants will increase from the present 12 to 16 or 17 with the introduction of the light patrol frigate. This warship will be built in Australia. It will have the sensors and weapons, the endurance, and the sea-keeping capabilities required for the ADF's operating environment.
- The six new submarines to be brought into service in the 1990s will enhance substantially the capability of our submarine force with their greater availability, higher performance and more modern equipment.
- The high priority given by the Government to the development of mine countermeasures (MCM) will result in an MCM force of at least six inshore minehunter catamarans, minesweepers (probably using innovative Australian technology), and a mine warfare centre. Naval reserves will be expanded to undertake minesweeping operations in key geographical areas.
- A second underway replenishment ship will be acquired, as will hydrographic survey vessels and a trials and research ship. Capabilities for charting will be improved.
- The Government has recognised the need for our Navy to operate effectively from both coasts: HMAS Stirling will be developed as a main naval base for half the Fleet—both surface and submarine forces.
- The anti-submarine capabilities of the Fleet will be considerably enhanced by the purchase of Seahawk helicopters and the development of an Australian surface-towed acoustic array.

Army
- More emphasis will be given to highly mobile forces capable of rapid deployment.
- 1 Division (an infantry division) will be more readily deployable. The ODE will be augmented when necessary by a parachute battalion group, an armoured personnel carrier squadron and other capabilities. The other brigades of the Division will be rounded out and made more ready for operations. A Logistic Support Force will be formed to support 1 Division.
- Responsibility for command and operation of battlefield helicopters is being transferred to Army.
- Blackhawk helicopters will be acquired to provide a company group lift. More Blackhawks will be acquired for a second company group lift. A further purchase for a third company group lift will be considered.
- Studies on the relocation of a brigade to the north have begun. Initially, a reconnaissance unit (the 2nd Cavalry Regiment) will be based in Darwin.
- The Army Reserves will have a greater role, including specific duties to protect vital defence installations and infrastructure, especially in the north. They will also participate to a greater extent in expansion base activities.
- Legislation will be introduced to enable restricted call-out of Reservists.
- New and more capable small arms will enter service throughout the ADF.
- New field artillery with increased range and mobility will be introduced to both the Regular and Reserve components of the Army.
- The entire fleet of general service off-road vehicles is being replaced by new 1,2,4 and 8 tonne vehicles manufactured in Australia.
- Modern surveillance devices and electronic warfare systems will be introduced for land warfare.
The capability of the M113 light armoured fighting vehicle fleet will be improved. Some M113s will be upgraded, others will be placed in storage. Faster, more mobile wheeled light armoured fighting vehicles, carrying weapons and surveillance equipment suitable for northern contingencies, will be introduced into service.

1 Armoured Regiment will become an integrated Regular and Reserve unit. An expansion base including mechanised and armoured capabilities, will be retained to allow timely expansion if our strategic circumstances deteriorate. 1 Brigade will develop mechanisation at the battalion group level.

**Air Force**

A national system of air defence and airspace control will be developed.

A combination of an OTHR network and AEW&C aircraft will form the basis of the national system. Up to three OTHR radars will be built. The number of AEW&C aircraft is to be determined; provision has been made in the Five Year Defence Program.

The capabilities of the P-3C Orion long range maritime patrol aircraft will be improved through the acquisition of modern sensors.

The introduction of the F/A-18 Hornet into service represents a major upgrading of our air defence, maritime strike, and ground support capability.

The F-111 strike aircraft will be refurbished, at minimum cost, to reduce significantly operating costs and to maintain them in service. The need for F/A-18 Hornet aircraft to supplement the F-111 fleet as it reduces through attrition, will be considered.

The four Boeing 707 aircraft will be modified for in-flight refuelling to allow the Hornet to increase its effective range and payload.

The construction of Tindal and Derby airfields will be completed and an airfield built on Cape York Peninsula.

A Hornet squadron will be based at Tindal from late 1988.

Pilot training will be improved by the introduction into service of the PC-9 turboprop aircraft, assembled in Australia.

With these improvements the Government will ensure that the nation has a Defence Force structured, equipped, supported and trained to assure our security into the 21st century.

**Chapter five**

**Supporting the Defence Force—infrastructure, logistics, science and technology**

5.1 This chapter outlines the Government's policies for defence infrastructure and logistic support, and our need for indigenous scientific and technological achievements in meeting the challenges inherent in Australia's defence.

**Infrastructure and logistics**

5.2 The vast area of Australia, its territories, and its maritime approaches, and our relatively small population, strongly influence our requirements for infrastructure and logistic support. For strategic reasons, some operational bases should be located in forward areas in the north and west of the continent. But the separation of our main support bases in the south of Australia from likely operational areas in the north, the likely dispersal of forces across a number of areas, and the limited northern industrial and transport infrastructure, would place heavy demands in a contingency on military transport, supply and maintenance. Civil assets would help relieve the support burden, but the ADF must be prepared to operate from austere forward locations under circumstances where local support would not always be available.

**Infrastructure planning**

5.3 We need an extensive infrastructure of bases, airfields, communications stations, training and other facilities to support the ADF and its operations. The Government's policies for the development of this infrastructure reflect the increasing emphasis on operations in the north and north-west of Australia, but also acknowledge the concentration of population and industry in the south and south-east. Defence infrastructure development also has regard to wider concerns, including the ability of civil infrastructure to meet defence needs, and the impact of defence activities on the community.

5.4 There is already a defence infrastructure of bases, airfields and other facilities in Australia's north and north-west. These include: patrol boat bases at Cairns and Darwin, the major development at Tindal airfield where an F/A-18 squadron will be based from late 1988, the new bare-base airfield at Derby, due for completion in 1987 and suitable for all types of RAAF aircraft, the airbase at Darwin, and the bare-base airfield at Learmonth.
5.5 The Government has a range of initiatives for the further support of northern operations:

- An airfield will be built on Cape York Peninsula to complete a band of airfields across northern Australia. The Government will proceed shortly to identify a site and commence construction.

- Naval facilities will be progressively developed in the north-west to enhance patrol operations in that region.

- There will be further development of the naval base at HMAS Stirling to allow more surface vessels and submarines to be based there. One submarine will be based at HMAS Stirling from 1987 and others, including some of the new submarines, in later years.

- The 2nd Cavalry Regiment will move from Holsworthy to Darwin

5.6 Mining and other civil developments have provided civil infrastructure in the north on which Defence can draw. Civil airfields available for military use include those at Port Hedland, Broome, Kununurra, Mt Isa, Gove, Weipa and Cairns, though not all are suited to the full range of possible defence use. Port facilities at Dampier and Port Hedland, heavy engineering repair and maintenance facilities at mining towns such as Mt Newman, and local communications facilities are other examples of civil assets with defence utility. Nevertheless, specialised maintenance services, and military demands beyond the civil capacity in remote areas, would largely need to be provided from Service resources.

5.7 Future defence infrastructure planning will emphasise longer term options for developing, rationalising and in some cases relocating defence facilities throughout Australia, and the greater use of civil infrastructure.

5.8 While Defence needs to be aware of major civil infrastructure developments from their earliest stages, there is no need for Defence to subsidise such developments, unless defence requirements would add significantly to their cost and if they were not justified on normal civil criteria. Generally neither will be the case.

Defence infrastructure and the community

5.9 Defence is by far the largest Commonwealth owner or user of land in Australia, and most Defence establishments are in or near the more populated areas of the continent. The Government will review its use of Defence properties. It will release those not required for efficient operations and as necessary acquire new facilities including training areas.

5.10 Concern for wider social issues is important in Defence infrastructure planning. Local problems sometimes arise when areas currently used by Defence, or sought for future use, are also wanted for civil purposes. The economies of many local communities depend on employment provided by Defence establishments and the local expenditure they generate.

5.11 Urban growth and increasing constraints on the Army’s artillery training in the Sydney area will require the establishment of new training areas. Similar urban pressure has led to Government plans for the movement of the Navy’s major armament depot from Newington. The transfer of the armament depot to Jervis Bay will free some 250 hectares for development close to Parramatta and remove the need for lengthy transits of high explosives through urban areas. Development of the Newington site is being discussed by the Commonwealth and NSW Governments.

5.12 Strong arguments exist for moving the main Fleet Base from Sydney (see Chapter 4). Studies indicate that Jervis Bay is the best alternative location. The Government has directed that an environmental impact study be completed as a matter of priority. This study will also embrace the projected move of the Newington Armament Depot.

Logistics

5.13 Defence manages inventories worth several billion dollars, and employs more than 30,000 military and civilian personnel in support functions. There are over 1.4 million line items stocked in defence warehouses and stores, and about 17 million transactions annually in supply computer systems alone.
5.14 This large logistic system is required to support combat operations. There may be less costly ways of providing peacetime support—with smaller inventories, more centralised services, and minimal redundancies. However, such measures, important in commercial enterprises, are not always appropriate for an effective response to military threats.

5.15 In logistics development as in force development, priority will continue to be given to our needs in the types of military conflict that could arise in the shorter term. Within this context, a central policy need is to identify the logistic capabilities important in such contingencies, to determine which capabilities would be readily available to the ADF through national economic development, and to decide which require special fostering in civil infrastructure or which should be integral to the ADF.

5.16 The Government will extend the use of common logistics support, eliminating unnecessary duplication between elements of the ADF and also between Defence and the civil community. For example, quality assurance activities in the munitions factories will be managed by Army on behalf of the other Services; there will be common support services for the Seahawk and Blackhawk helicopters; Army will be responsible for long distance road freight for all three Services, drawing also on other Government and private operators; and a substantially common computer-based supply system will be developed and introduced for Navy, Army and Air Force.

5.17 Australia’s civil transport assets will complement ADF resources in defence emergencies. Ground force operations would draw on the civil air transport fleet, with heavier items and replenishment stores being moved by road, rail, pipeline or sea. While sea transport is more efficient for bulk cargoes, improvements to the road system will reduce reliance on coastal shipping for many military stores.

5.18 The ADF must have the ability to draw on appropriate resources in the civil community should the need arise. The task of co-ordinating civil transport resources for defence needs involves complex legislative, administrative and operational aspects. This Government has completed a study on the co-ordination of civil maritime resources, the first major interdepartmental transport planning for credible contingencies for many years. Further planning for co-ordination of defence needs with civil assets will continue, including a response by Defence to the Government’s recent direction to the Inter-State Commission to examine the efficiency of interstate transport arrangements.

External logistic support

5.19 The threshold for direct combat assistance from the United States in some circumstances could be quite high, but logistic support from overseas is a different matter. In low level conflict we could expect that overseas resupply would continue. Military action to deny resupply to Australia is well beyond the existing or potential capacity of regional countries.

5.20 The continued vitality of our defence relationship with the United States is an important element in these judgements. The United States is the major source for much of our advanced defence technology and equipment, and in some cases it is the only source. The alliance relationship, supported specifically by a Memorandum of Understanding on Logistic Support, renegotiated by this Government in 1985, makes a substantial contribution to our defence support capabilities.

5.21 The need for weapon systems appropriate to our particular requirements has led to Australia’s acquisition of defence equipment from a range of overseas suppliers. Our selection is influenced by whether suppliers are able and willing to provide assurances of timely and appropriate support in all circumstances, and the willingness of the supplier to provide technical detail required for maintenance and possible modification. Difficulties have been experienced with some suppliers being unwilling to provide detail of the computer software that much modern equipment relies on for operation. This is unacceptable and the matter is being pursued. We have obtained Government undertakings from several European countries to ensure their continuing support for defence material and intellectual property sourced in those countries. Negotiations are proceeding with others.

Science and technology

5.22 The effectiveness of the ADF depends to a significant extent on the maintenance of a high level of technology. Australia should favour advanced technology where it confers an operational advantage, reduces manpower or life-cycle cost, avoids early obsolescence or the need for additional equipment, simplifies operation and support, or where it is otherwise particularly suited to Australia’s strategic circumstances.

5.23 Australia’s large area and small population often call for the selection of advanced technology to meet defence needs. This does not always imply the most advanced ‘state-of-the-art’ equipment. The cost-effective use of technology requires specialist scientific expertise to discriminate between alternative technological options, to modify equipment and in some circumstances to develop indigenous equipment.

Technology and the Defence Force

5.24 This Government’s policy of self-reliance in defence calls particularly for the enhancement of our own capabilities for technological support, modification and development. We cannot rely completely on imported technology and offshore technological support. Australia’s strategic circumstances pose challenges that sometimes call for unique and therefore local solutions.

5.25 While we procure major defence systems off the shelf from foreign suppliers, there are also some important Australian defence requirements not readily met by systems available overseas. In these cases there is a need for
indigenous Australian development. This applies in particular to intelligence, surveillance and sensor equipment, together with associated command and control systems, which need to be tailored to Australia's specific environment. Such capabilities have priority when local technological development is under consideration.

5.26 Australia will continue to rely, nevertheless, on substantial overseas supply of equipment. This calls for a well-informed understanding of how to specify operational and technical requirements, how to evaluate proposals, and how to be alert for possible technical problems as equipment ages. Specialist technical advice and support are essential in the equipment selection process and in its modification or adaptation following the emergence of problems or shortcomings.

5.27 We need to be able to determine the performance in our own environment of equipment of both overseas and local origin and to modify and adapt overseas equipment as necessary to improve its performance in our likely theatres of military operations. For this we need a detailed knowledge of our physical environment (climate and meteorology, terrain characteristics, optical, infra-red and radio propagation, oceanography and ionospheric phenomena) so that we can understand its influence on the conduct and effectiveness of operations and the performance of equipment and systems.

5.28 Our defence planning recognises that in some circumstances our forces could face an adversary using materiel of Western origin. This would demand the development of specific capabilities for our own equipment.

5.29 These technological needs arising from Australia's geo-strategic circumstances emphasise the importance of defence science and technology in effective Australian defence. A highly proficient defence science and technology capability is essential for proper defence decision making and policy formulation, to provide specialist technical support to the ADF so that the leverage of its advanced technology may best be exploited, and to advise and support industry.

5.30 Defence scientists need to be aware of developments in defence policy, strategic assessments, and operational and tactical concepts. This requires close, continual contacts between defence scientists, the Department and the ADF.

The Defence Science and Technology Organisation

5.31 While parts of the wider Australian scientific community and defence industry make useful contributions to defence science and technology, the required capability does not, in general, currently exist outside the Department of Defence. The different objectives of non-defence research and development organisations limit them to a contributory role, while defence industry has a more substantial part to play in the later stages of development and production.

5.32 The Defence organisation's science and technology capability is concentrated in the Defence Science and Technology Organisation (DSTO). DSTO contributes to the development and implementation of Australian defence policy by the direct application of science and technology. DSTO provides assistance to the ADF, the Department of Defence, other defence agencies and, as necessary for defence purposes, Australian industry.

5.33 DSTO employs scientists, engineers and technologists in five major laboratories, with divisions sited in South Australia, Victoria and New South Wales and smaller branches in Queensland and Tasmania. It has a total staff of 4,300 and an annual budget of $180m.

5.34 DSTO contributes scientific advice for defence decision making and policy formulation. It provides a specialist technical service to the ADF, helping it to make the best use of science and technology in choosing, using, maintaining and extending the life of its equipment. DSTO maintains a base of skills and knowledge in defence science and technology and develops selected equipment concepts to meet Australian requirements.

5.35 DSTO's research and development effort will continue to concentrate on problems unique to the Australian strategic and natural environment, and on other areas where research and development information is not available to us or where we need to ensure our access to appropriate overseas military technology.

The technology base

5.36 The provision of expert and up to date scientific advice depends on the maintenance of an adequate technology base. So too does the ability to solve the various technical problems which arise in defence equipment. The defence technology base encompasses a wide range of technologies which are important to defence interests, but which may have little or no priority for non-defence research organisations. While DSTO draws to the maximum extent possible on research and development in the wider Australian community, it is necessary to maintain a substantial in-house research and development program to secure the medium to long term technological interests of Australian defence.

5.37 The technology base can never be static. It needs to be continually maintained and enhanced by a program of strategically oriented scientific research, development and other activities, anticipating future trends in defence science and technology. This establishes the knowledge and understanding essential for a timely response to defence technological needs. The maintenance of an up to date technology base in many areas of defence related research has enabled DSTO to initiate the wide range of projects listed in the DSTO program below.

DSTO program

5.38 DSTO's current and future program includes many activities specifically designed to increase Australia's self-reliance in defence. Examples of DSTO's capacity for indigenous development of military equipment for the ADF include:—over-the-horizon radar—following a decade of research and trials by DSTO in Project Jindalee, this Government has accorded high priority to the design and development of an Australian OTHR network. This recognises its great
potential for effective wide area surveillance. Jindalee is a good example of how forward looking research on the technology base can lead to the development of important Australian defence capabilities;
—towed acoustic arrays—DSTO’s development of a unique slim-line hydrophone array will enable our new submarines and ships to be fitted with a long, reelable array, adding significantly to our capability for surface and subsurface surveillance of our maritime approaches;
—anti-ship missile defence—DSTO’s research on novel concepts for ship defence has enabled Australia to enter into a unique co-operation with the United States in all stages of design and development in Project Nulka;
—hydrography—the laser airborne depth sounder conceived and developed in DSTO will greatly increase the productivity of the RAN’s charting of Australian continental waters;
—military survey—the graphic superimposition ocular developed by DSTO increases the Army’s efficiency in producing maps from stereophotographs; and
—camouflage—research in DSTO has led to its development of camouflage schemes for a variety of Army applications (including newly developed combat clothing) which are especially effective in the Australian environment.

5.39 Examples of DSTO’s scientific and technical advice and support for the acquisition of new equipment for the ADF include:
— the mine countermeasures force (both minesweeping and minehunting);
— the new submarine;
— the new surface combatant ship;
— the strike and reconnaissance force—the future of the F-111 aircraft, its equipment and systems;
— national air defence and airspace control; and
— electronic warfare, including its tactical command and control.

5.40 DSTO solves a very wide range of technical problems arising in the use of defence equipment. Without this service, the effectiveness and self-reliance of the ADF would be greatly reduced. Examples include:
— investigation of material damage and failure in defence equipment, e.g. cracking in ships’ hulls, failures in aircraft and ship turbine engines, cracking in guns;
— development of protective schemes against fatigue and corrosion;
— development of crack repair schemes for aircraft and other equipment;
— investigation of performance of a wide range of sensors and warning systems such as thermal imagers, radars (e.g. in the F/A-18 aircraft) and visual systems;
— investigation and development of electronic warfare systems;
— quantitative analysis of ADF exercises;
— investigations in radio (including satellite) communication;
— battlefield communication frequency management techniques; and
— investigation of ballistic and terminal performance of ammunition and weapon systems.

5.41 The indigenous Australian expertise developed by DSTO in its program will continue to add greatly to our national defence capacity.

Technology transfer to industry
5.42 DSTO has an impressive record of technology transfer to industry in Australia. Generally, much of this achievement has been through contracts let to industry for technical support and the later stages of equipment development. Technology transfer has been most efficient and effective when scientists and engineers from DSTO and industry work side by side.

5.43 This Government is resolved to improve on this good record. The Government is taking steps to expand the role of defence industry in research and in the early stages of defence system development. This will result in a marked enhancement of relevant industry capabilities. Another initiative to be explored is the formation of companies to promote technology transfer from DSTO to Australian industry.

International collaboration
5.44 Technology transfer with our allies enables us to maintain a current technology base and to support the acquisition and operation of equipment of high technological content.

5.45 Technology transfer is achieved through bilateral agreements and programs such as The Technical Co-operation Program between Australia, United Kingdom, Canada, New Zealand and the United States. DSTO has collaborated effectively internationally for many years. This has been facilitated by DSTO’s unique contributions derived from work done to meet Australian needs and at a quality comparable with world standards.

Government review of DSTO
5.46 This Government recognises the need for special working arrangements within a research organisation such as DSTO. Following earlier Government reviews of DSTO, several reforms have been put in train, including the promotion of research scientists to reward distinguished research performance.

In line with the public service reforms being implemented by the Government, management of the DSTO has been modified to provide greater flexibility, increased devolution of authority and improved accountability.

5.47 This Government has noted that short term priorities have caused research for the technology base to fall below a desirable level and seeks improvement in the balance between DSTO’s longer term and short term support for Defence.
The review of public investment in research and development in Australia, released by the Australian Science and Technology Council (ASTEC) in November 1986, stated that DSTO was an efficient, well directed and well managed organisation, and that with increased autonomy and flexibility, it could make an even greater contribution to national goals.

This Government emphasises the importance of a sound indigenous capacity in science and technology for Australian defence capability. The Government's defence policy will ensure that Australian scientific expertise effectively supports defence decision making, allows the ADF to make best use of advanced technology, and supports industry planning and development.

Self-reliance and support of the ADF

Defence self-reliance demands a defence force capable of independent operations. Fundamental to this capability are appropriately sited bases, effective logistic arrangements, and the scientific and industrial ability to select, adapt, repair, maintain and develop defence equipment. The Government will continue to give priority to these essential elements of defence support, recognising that defence self-reliance demands increased indigenous capabilities in areas where we previously depended on our allies.

This Government's policies emphasise that defence infrastructure, logistic and industry support, and defence science and technology are now fundamental for the self-reliant defence of Australia.

Government policy recognises the need for maximum efficiency, elimination of unnecessary duplication, and judicious use of supporting services available in the national infrastructure, to complement the specialist logistic services and capabilities maintained in the Defence organisation. It recognises the advantages available to Australian defence through the wise exploitation of advanced technology and the need to foster an effective, highly skilled defence science and technology capability directed towards uniquely Australian requirements.

This Government's policy for the industrial, logistic, and scientific support of the ADF will ensure its ability to conduct independent military operations over the vast expanse of our area of direct military interest.

Chapter six
Defence and Australian industry

This chapter explains the role of industry in meeting the Government's requirement for defence self-reliance. It outlines policies for Australian industry to support self-reliance and lists some major defence projects currently underway or planned for the future that heavily involve local expertise.

Industry and defence

Since taking office, this Government has implemented a wide range of policy changes to make Australian industry more internationally competitive and export oriented. The new policies are designed to enable industry to adapt to changing market conditions and to take advantage of opportunities presented by technological developments. To meet these objectives, industry needs to be able to design world class products, manufacture and market them competitively, and be less reliant on Government assistance. Changes have included economic policies, such as deregulation of the exchange rate and of the financial sector; general industry policies, for example those applying to research and development, technology development and exports; and industry specific policies for many areas important for defence, such as aerospace, telecommunications, electronics, machine tools, steel, heavy engineering, shipbuilding and ship repair.

Efficient and successful industry can use the strengths derived from commercial activities to participate more competitively in the relatively small scale production required by the ADF in times of peace. It would also require less of the nation's resources when undertaking larger scale defence production in times of war.

While a substantial commercial workload can provide a base from which to bid for defence orders, the inverse is rarely true. The peacetime requirements of the ADF are usually too small and, particularly for the acquisition of new equipment, too infrequent and too limited in duration, to provide a viable long term base workload for individual firms or industry sectors.

Participation in defence projects can, however, bring to industry important technology, introduce new equipment and skills, and develop expertise in aspects of project management and quality control. This can lead to ongoing work in repair, maintenance and adaptation, as well as to participation in other defence projects, and to work on related civil production or for export. The Offsets obligations generated by overseas suppliers can be exploited by Australian industry to supplement Australian defence orders, providing a longer production run, a more viable production base, and access to new technology and markets.