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AUSTRALIAN SECURITY PLANNING IN A CHANGING STRATEGIC ENVIRONMENT

by

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in the Department of International Relations,
The Australian National University
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This thesis is my own original work.

Ross E. Babbage
Abstract

During the decade from 1967 Australia's strategic environment altered fundamentally. This thesis explores the nature of the most important changes and examines their implications for Australia's current and future security policies.

The two most significant alterations - the changed nature of the strategic relationship with the United States and the revolutionary advances in conventional military technology - are discussed in Part I. In Part II, the major implications of the changes in the strategic environment for Australian security policy are detailed. This is followed in Part III by an examination of the bureaucratic constraints on adapting Australian security policy to more closely satisfy the requirements of the new situation. In Part IV, a range of concepts is discussed which might assist in overcoming many of the difficulties of coherently planning security policy development in a highly uncertain strategic environment. Finally, in Part V, attention is focussed upon the broadened range of strategy and manpower options which are deserving of consideration as Australia seeks solutions appropriate to its new requirements.

The overall conclusion, stated baldly, is that many concepts which are part of the Australian security structure have been outmoded by recent changes in the nature of the strategic environment. A thorough process of reassessment is required if Australia is to be appropriately prepared to meet the security challenges which may arise in the 1980's and 90's.

* Partly because an abstract is not a firm requirement for Ph.D theses from the Department of International Relations
and partly because the material contained herein is repetitive of the discussion in the Preface and the Introduction, this note has not been bound into the thesis copies. This document has been produced simply for lodgement in the University Administration files, should it be required.

Ross Babbage
Future needs will differ from those of even the quite recent past. Changes that have occurred in the rest of the world, and Australia's more independent stance in international affairs, require that Australia should have a Defence Force more self-reliant in military capability and more oriented towards the defence of Australia and its interests. Defining our future defence capability requirements is a large and complex task that embraces many types of professionalism.

Old ideas die hard, especially when valued tradition surrounds them, but new ideas are no better than the perceptiveness, imagination and prudence of those who originate them. But ideas are what Australia needs in order to create a Defence Force and a defence policy truly reflecting the requirements of independent Australia in the decades ahead.

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Within the Australian security system, there is a general recognition that since the middle 1960s the strategic environment has changed. The altered regional role of Australia's major power allies, the post-colonial proliferation of nation-states, the altered nature of the global balance of power, the changing character of the world economic order and the accelerating pace of new technological developments are just a few of the trends which have been discussed in government and academic circles alike. Yet the consequences of these changes for the Australian security system have been discussed only in the most generalised sense. For example, the altered nature of the relationship with the United States produces a requirement for increased self-reliance but exactly what this might mean for strategy, force structure, manpower, equipment, doctrine, industrial support capacity, etc., has not been elaborated in any detail. Similarly, the importance

1 The absence of detailed discussion concerning the implications of the changing strategic environment for Australian security policy is one of the most notable omissions from the Defence White Paper. (Australian Defence, presented to Parliament by the Minister for Defence, the Hon. D.J. Killen, 4 November 1976). This document is the first major governmental review of Australian security policy which has been made public since the 1960s. However, it fails to elaborate and discuss the ramifications of the changed strategic environment in any but the most superficial manner. Chapter 1 of the White Paper discusses briefly some of the changing strategic influences. Chapter 2 elaborates the general state of the global and regional strategic situation. However, this is followed in Chapter 3 by a statement of the Government's view of Australia's defence requirements. No attempt is made to delineate alternative strategic options or even to justify in any detail the stance adopted by referring back to the changed nature of Australia's strategic circumstances. There is thus little attempt to relate the military capabilities planned for the future, outlined in Chapter 4, to the dramatically altered nature of the security requirements with which the country is confronted.
of maintaining contact and familiarity with advancing military technologies is undisputed but, again, the major consequences for Australian security of recent developments in this field have not been delineated even in the most general terms. This fundamental deficiency has effectively retarded the processes of coherent security planning and system adaptation. It is thus appropriate and important than an effort now be made to remedy this situation.

This thesis does not represent an attempt to develop a new security and defence policy for Australia. Such an undertaking would be far beyond my personal competence and probably beyond that of any other individual. Rather, this analysis is intended to clarify the nature of some of the more important changes in Australia's strategic environment, to discuss the most significant implications and to examine the scope for the future adaptation of Australia's security policy. No attempt is made to derive an optimum strategy and structural 'solution' to Australia's security problems, although alternative concepts are evaluated briefly for their capacity to contribute to such a goal.

Accepting the theoretical objective of developing an optimising 'solution' to Australia's security problems implies a degree of adherence to the 'rationalist' school of security policy development. It is appreciated that, because of a wide variety of unpredictable variables in the strategic environment, it is not practicable to derive a single definitive conceptual or structural 'solution' which fully satisfies Australia's national security requirements. Moreover, even if it were theoretically possible to derive an optimal solution, there would remain a vast array of practical influences constraining its implementation. However, these practical limits to the achievement of

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2 The 'rationalist', 'efficiency' and 'overseas model' approaches to defence policy development are defined and discussed in W.H. Smith, The Determinants of Defence Policy (A paper delivered to the conference on Armed Forces and Australian Society, Royal Military College, Duntroon, Canberra, 20-22 May 1977), pp. 19-23.
optimal solutions serve only to qualify, rather than invalidate, this type of planning concept. Because it can be demonstrated that some security postures are more effective than others in particular situations, it is possible, and indeed desirable, for attempts to be made to approach the goal of developing an optimising 'solution'. A range of concepts which might be suitable for performing this function is elaborated in Part IV.

This thesis should be viewed as a discussion opener rather than in any sense a concluding piece to the debate on Australian security policy. A conscious effort has been made to introduce a significant number of new ideas and concepts for serious consideration. This has been done without any pretensions. I have been constantly aware that most of the topics being discussed are the daily concern of thousands of other Australians - politicians, public servants, service men and women, industrialists, journalists, pressure groups of many varieties and, of course, taxpayers. Opinions are bound to differ on a wide range of issues. But if this volume serves to stimulate an increased level of informed debate and contributes to a broader understanding of the crucial issues at stake, the effort required for its production will have been well worth while.
ACKNOWLEDGEMENTS

For their assistance in the production of this thesis, I owe a great debt to a large number of people. First, I would like to express my thanks to the University as a whole, and to the Department of International Relations in particular, for its generous support of my field work programme and for its provision of office accommodation and support. I am also grateful to the Department of Defence for supporting my application for three years leave without pay from the Public Service.

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suffered most from the financial stringencies which have been necessary to undertake this work. They have also had to put up with long periods of absence on field trips and with extended working hours on weekends and evenings. But, in addition, Lynne has helped in a very practical manner by reading draft chapters and assisting in the final processes of proof reading. The family's long-suffering support and encouragement has largely made this thesis feasible.
LIST OF ACRONYMS AND ABBREVIATIONS

ACT  Australian Capital Territory
ADFA  Australian Defence Force Academy
AIDATS  Army In-Flight Data Transmission System
ALCM  Air Launched Cruise Missile
AMM  Advanced Multi-Purpose Missile
ANOP  Australian National Opinion Polls
ANZUS  Australia, New Zealand and United States (Security Treaty)
AOCM  Advanced Optical Countermeasures (System)
APC  Armoured Personnel Carrier
APFSDS  Armour-Piercing, Fin-Stabilised, Discarding Sabot (Tank gun round)
APSA  Australian Political Science Association
ARPA  Advanced Research Projects Agency
ARM  Anti-Radiation Missile
ASD  Aeronautical Systems Division (US Air Force)
ASW  Anti-Submarine Warfare
ATF  Advanced Tactical Fighter (Programme)
ATIGS  Advanced Tactical Inertial Guiding System
AWACS  Airborne Warning and Control System
BCS  Battery (Artillery) Computer System
C²  Command, Control and Communications
Capt.  Captain
CAPTOR  Encapsulated Torpedo
CDFS  Chief of Defence Force Staff
CIWS  Close In Weapons System
CLGP  Cannon-Launched Guided Projectile
cm.  Centimetre
CMF  Citizen Military Forces
CODAG  Combination of Diesel and Gas Turbine
        (ie. Capable of operating simultaneously.)
CODOG  Combination of Diesel or Gas Turbine
        (ie. Only one of the types can power the ship at any one time.)
Col.  Colonel
COMINT  Communications Intelligence
CSE  Central Studies Establishment
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<tr>
<td>DARPA</td>
<td>Defense Advanced Research Projects Agency</td>
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<td>DC</td>
<td>District of Columbia</td>
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<td>DME</td>
<td>Distance Measuring Equipment</td>
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<td>DMS</td>
<td>Defense Marketing Services</td>
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<td>DoD</td>
<td>Department of Defence</td>
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<td>DP</td>
<td>Decision Point</td>
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<td>ECOM</td>
<td>Electronics Command</td>
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<td>ELINT</td>
<td>Electronic Intelligence</td>
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<td>EW</td>
<td>Electronic Warfare</td>
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<tr>
<td>FAE</td>
<td>Fuel Air Explosive</td>
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<td>FEBA</td>
<td>Forward Edge of the Battle Area</td>
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<tr>
<td>FLIR</td>
<td>Forward Looking Infra-Red (Sensor)</td>
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<td>FYDP</td>
<td>Five Year Defence Programme</td>
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<td>FYRP</td>
<td>Five Year Rolling Programme</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>Gp. Capt.</td>
<td>Group Captain</td>
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<tr>
<td>GPS</td>
<td>Global Positioning Satellite (System)</td>
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<td>GNP</td>
<td>Gross National Product</td>
</tr>
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<td>GVN</td>
<td>Government of Vietnam (ie. South)</td>
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<td>HALO</td>
<td>High Altitude Large Optics</td>
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<td>HARM</td>
<td>High-Speed Anti-Radiation Missile</td>
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<tr>
<td>HIMAG</td>
<td>High Mobility and Agility (Programme)</td>
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<td>HIMAT</td>
<td>High Manoeuvrability Aircraft Technology (Programme)</td>
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<td>HMAS</td>
<td>Her Majesty's Australian Ship</td>
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<td>HOWLS</td>
<td>Hostile Weapons Location System</td>
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<td>HSM</td>
<td>Hard Structure Munition</td>
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<td>IAC</td>
<td>Industries Assistance Commission</td>
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<tr>
<td>IBCS</td>
<td>Integrated Battlefield Control System</td>
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<tr>
<td>ICBM</td>
<td>Intercontinental Ballistic Missile</td>
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<td>ie.</td>
<td>That is</td>
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<tr>
<td>IISS</td>
<td>The International Institute for Strategic Studies</td>
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<tr>
<td>ILAW</td>
<td>Improved Light Anti-Tank Weapon</td>
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<tr>
<td>IRS</td>
<td>Infra-Red Scan</td>
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<tr>
<td>JTIDS</td>
<td>Joint Tactical Information Distribution System</td>
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kg. Kilogram
km. Kilometre
LRP Long Range Plan
Lt. Lieutenant
Lt. Cmdr. Lieutenant Commander
Lt. Col. Lieutenant Colonel
MAD Mutually Assured Destruction (Doctrine)
MAGCOM Magnetic Contour Matching (Navigation Technique)
MERDC Mobility Equipment Research and Development Centre
MICRAD Microwave Radiometric (Technology)
MICV Mechanised Infantry Combat Vehicle
mm. Milimetre
MRBM Medium Range Ballistic Missile
MSS Moored Surveillance System
NAP/TAWS Naval Air Power and Tactical Air Weapons Study
NASA National Aeronautics and Space Administration
NATO North Atlantic Treaty Organisation
No. Number
OTH-B Over-The-Horizon Backscatter (Radar)
p. Page
PHM Patrol Hydrofoil, Missile (Armed)
PLSS Precision Location Strike System
PNG Papua New Guinea
pp. Pages
PRC People's Republic of China
PRAM Propelled Rocket-Assisted Mine
RAAF Royal Australian Air Force
RAF Royal Air Force
RAN Royal Australian Navy
REMBASS Remotely-Emplaced Battlefield Sensor System
RPV Remotely Piloted Vehicle
SAM Surface-to-Air Missile
SAR Synthetic Aperture Radar
SCRAM Supersonic Combustion Ramjet Missile
SEATO South East Asian Treaty Organisation
SIAM Self-Initiated Attack Missile
SIG-D Simplified Inertial Guidance-Demonstration (Programme)
SIPRI Stockholm International Peace Research Institute
SLCM  Sea Launched Cruise Missile
SLBM  Sea Launched Ballistic Missile
SMEAC  Scene Matching Area Correlation (Navigation Technique)
SOTAS  Stand-Off Target Acquisition System
SSBN  Ballistic Missile-Firing Nuclear Submarine
SSLP  The Secretariat for National Security and Long Range Defence Planning, Swedish Ministry of Defence
SSN  Nuclear Attack Submarine
TACTAS  Tactical Towed Array Sensor
TASS  Towed Array Surveillance System
TERCOM  Terrain Contour-Matching (Navigation Technique)
TOSS  Tactical Operations System
ULTRA  Ultra Lightweight Transmissive Array
US  United States
USAF  United States Air Force
USS  United States Ship
USSR  Union of Soviet Socialist Republics
Vol.  Volume
V/STOL  Vertical/Short Take-off and Landing
INTRODUCTION

There is a large degree of consistency in the history of Australian security policy. Those who inhabited the first European settlements in Australia regarded themselves as an isolated and vulnerable outpost of western society. They sought to ensure their security by fostering close links with the Empire and encouraging the presence of elements of the Royal Navy. As an integral part of this imperial relationship, military forces from the individual Australian colonies, and later from the federated Commonwealth of Australia, were deployed abroad to support British commitments in a number of colonial wars. Thus, by the First World War, the concept of ensuring Australian security through an alliance maintained, in part, by the subsidiary deployment of local forces overseas was well entrenched.

This form of close cooperation in security affairs continued largely unaltered until the paucity of British forces in the Far East during the Second World War prompted Prime Minister Curtin to turn to the United States as the primary guarantor of Australia's security. While this represented a major change in policy direction, the basic conceptual nature of Australia's security strategy remained

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1 In this thesis, the term 'security policy' is generally favoured over that of 'defence policy'. This is primarily because security policy can be defined in a broad manner to encompass a wide range of diplomatic, political, economic, military, social and other pressures and threats to which nation states are potentially susceptible.

2 This system of alliance security, sustained in part by the deployment of Australian forces abroad to support the foreign commitments of major power allies, is termed, for the purposes of this thesis, the 'forward defence concept' or 'forward defence strategy'. Its nature and significance is elaborated in considerable length in 'Forward Defence and Regional Commitments', Chapter 3 in T.B. Millar, Australia's Defence (Melbourne, Melbourne University Press, 1969), pp. 44-63.
much as before. Thus, during the late 1940s and through the 1950s and 1960s, the United States was viewed as the prime source of Australian security and significant components of the Defence Force were again deployed overseas to support major allied commitments and to foster the relationship.

In retrospect, it is now clear that in the middle 1960s Australian security policy was approaching the end of an era. At that time, the structure of the global strategic balance was essentially bi-polar with the central division being primarily ideological in character. Although Sino-Soviet frictions had developed considerably since the 1950s, these were regarded as being transitory by many western commentators and as being over-rated by others. In the South East Asian region, SEATO was still of some significance, at least in western rhetoric, and both Britain and the United States were engaged heavily in the regional containment of communism. During this period, Australia deployed ground, naval and air forces, first to support the British in Malaysia and then to support the United States in South Vietnam. Forward defence strategy still dominated the Australian national security structure.

However, the relatively stable conceptual progression of Australia's security policy was not to last. In the late 1960s and early 1970s the Sino-Soviet split developed further; new centres of power emerged in Japan, China, the Middle East and a more unified Europe; the superpowers moderated the ideological character of their differences and engaged in extensive consultations on a wide range of matters; the tension between the industrial and developing countries increased regarding the distribution of wealth and the terms of trade; and the world generally became more interdependent - the industrial states increased their reliance on external sources of raw materials and energy and the developing states in turn became increasingly reliant upon external sources of capital and technology.

It also became clear during this period that a technological revolution was under way in conventional
military capacities. New surveillance, long-range targeting, ordnance delivery, precision guidance and other technologies were being developed which promised unprecedented enhancements to military capabilities. The accepted ground rules of conventional warfare, of what was possible and impossible on the battlefield, began to alter dramatically.

Yet while all of these developments were of great significance for Australian security policy, it was the altering nature of the relationship with the country's traditional major power allies which was to be the strongest direct influence for change. In the decade from 1967, Britain completely withdrew its military presence from the Far East and the United States withdrew all its forces from Indo-China, all of its combat forces from Thailand and commenced a total withdrawal of ground combat forces from South Korea. During this period, the United States also took steps to define the form of assistance which would be made available to friends and allies more narrowly than had been understood by them in the 1950s and 1960s. Without shifting the focus of its attention away from Europe and the Middle East, the United States relegated her security interests in more peripheral theatres, such as South East Asia, to a much lower level than in the 1960s.

It is argued in this thesis that in combination these developments represent a fundamental transformation of Australia's strategic environment. Any future force commitments in support of regional states would almost certainly need to be undertaken without the direct assistance and joint action of a major power ally. This type of deployment would represent a major and potentially perilous departure from the pattern of Australia's historical experience. Australia does not possess the military capacity nor the political will to undertake many types of foreign intervention successfully. The limited scale of the Australian Defence Force restricts heavily its capability to combat regional domestic violence, insurgency or conventional conflict either independently or with local
support. As a consequence, it is unlikely that significant components of the Defence Force will again be deployed overseas, except possibly for short-term specialised operations such as the emergency evacuation of Australian citizens from a hostile environment.\(^3\)

Thus, primarily because of the altered United States role in the Western Pacific, the long established basis for the policy of forward defence no longer exists. In the future, Australia's security concerns are likely to focus much more directly upon the continent itself and its offshore islands and resources. In this altered strategic environment,

\(^3\) The prospect of significant portions of the Australian Defence Force being deployed abroad in the future is most frequently discussed in the context of a range of scenarios involving domestic violence, sub-national violence and regional interstate conflicts in Papua New Guinea (PNG). There is undoubtedly some potential for each of these possibilities to arise. However, because the Australian Defence Force is currently only capable of providing up to two battalions for a protracted external commitment, its capacity to contribute meaningfully to the support of indigenous capabilities through the provision of troops is extremely limited. Consequently, in nearly every conceivable situation, the primary burden of maintaining PNG's security is likely to fall upon the local Police and Defence Forces. This is not to imply that Australia would fail to provide any support to PNG in a security crisis. In the military sphere, increased quantities of equipment, supplies, technical assistance and training might be made available. In addition, diplomatic, economic and other avenues of support might be mobilised.

However, it is important to appreciate that, in the context of Australia's overall security responsibilities in the future, those involving the dispatch of forces to PNG are not of overriding significance. As a consequence, it is unlikely that contingencies in this category would be permitted to dominate Australia's future processes of security planning. These considerations are discussed at greater length by Robert O'Neill in 'The Defence Relationship: Aid - When, Where, How Much and For How Long?' *New Guinea*, Vol. 10, No. 4, December 1976, pp. 62-70.
many of the types of pressures and threats to which Australia might be subjected will differ substantially from those of the 1960s. In the 1980s, the basic roles and concerns of the Australian security system appear likely to be of a significantly different nature to those of the past.

Because of the fundamental alterations in the strategic environment and the markedly different character of the demands likely to be made upon Australia's security system in the future, the time is ripe for a thorough process of policy review. It is necessary to question what really are the responsibilities of the national security structure in the new environment. What types of contingency should it be prepared to meet in the context of what geographical environment and within what timespan? What should be the priorities in developing capabilities to meet the types of pressures and threats with which the country may be confronted in the future? What level of independent capacity is required? And finally, what operational concepts, doctrines, technologies and force structures would most efficiently and economically provide the capabilities desired? It is time to challenge many of the basic ground rules long held as conventional wisdom and to institute a thorough reappraisal of all aspects of Australia's security policy.

This thesis represents an attempt to initiate, in a most elementary manner, these processes of reassessment. Its central elements are divided into five parts.

Part I analyses some of the major areas of change in Australia's strategic environment. Primarily because of the constraints of space, it has not been possible to survey comprehensively the broad range of dynamic influences which impact upon Australian security policy. Rather, attention is concentrated on elaborating the significance of two of the more important areas. In Chapter 1, the changing nature of the US-Australian strategic relationship is discussed and the major consequences outlined. This is followed in Chapter 2 by a detailed description of recent developments
in conventional military technology and an analysis of their implications for security policy in the decades ahead.

Part II examines the implications of the changing strategic environment for Australia's current security policy and structure. In Chapter 3, the broadened range of pressures and threats for which Australia may require a response capacity is described and the country's potential vulnerabilities are discussed. This review is followed in Chapter 4 by the identification and analysis of those aspects of Australia's current security system which appear to be challenged most directly by the changed nature of the strategic environment. The discussion in this part concludes that many of the concepts, structures, doctrines and procedures which have been inherited from the forward defence era are inappropriate for meeting the demands of the new strategic circumstances. Several policy areas are identified as requiring substantial change.

However, there are important practical limits to change in the Australian security system. These are analysed in Part III. In Chapter 5, the primary non-bureaucratic, domestic and international restraints on adapting the security system to accord more with the demands of the new strategic environment are discussed. This analysis is followed in Chapter 6 by an elaboration of the wide range of bureaucratic factors which restrain change. A number of measures which might conceivably reduce the strength of these influences is discussed in the latter stages of this chapter.

It is concluded from the first three parts of the thesis that planning independently for the security of the Australian continent and its vital interests is a substantially different and much more demanding task than that of satisfying the requirements of forward defence strategy. Many of the difficulties to be faced in performing this new task are analysed more closely in Part IV. In Chapter 7, the most important weaknesses of the current security
planning concept are discussed and a series of planning characteristics which are desirable to meet Australia's new requirements are outlined. One of the major factors which frustrates coherent security planning in the new strategic circumstances is the almost imponderable nature of future pressures and threats. In Chapter 8, this problem is addressed and a potential means of managing it for planning purposes elaborated. Chapter 9 discusses a series of concepts which might conceivably provide a basis for determining strategies and force structures which optimise Australian security capacity with respect to financial resource allocation in both the short and long term.

In Part V, the analysis moves from the discussion of the nature of the changed strategic environment, the possibilities and problems of change and concepts for evaluating optimal solutions to the elaboration of a broadened range of potential security options. In Chapter 10, a series of strategic and structural themes is discussed and in Chapter 11 there is an analysis of an array of new manpower options.

In broad summary, this thesis is a study of the nature of Australia's changing strategic environment, the implications for current security policy and the potential for adapting the existing security system. Inevitably the analysis is not in any sense comprehensive. Many areas of strategic change, implications for security policy, constraints on adaption and new options are not mentioned at all and others only fleetingly. Even where attention is directed to specific issues, the analysis is frequently far from exhaustive. In one sense this is a natural result of the subject being discussed. Security policy is multi-disciplinary and inherently complex. But in another sense, this thesis is designed intentionally to provide an overview of a very extensive and complicated issue. It attempts to emphasise the nature of the problem and to outline an array of conceptual approaches to solutions rather than the solutions themselves. For many readers, this type of analysis may stimulate more questions than it resolves. Hopefully the
discussion may encourage others to enter the debate and to conduct further research in this vital aspect of national policy.
PART I
MAJOR CHANGES IN AUSTRALIA'S STRATEGIC ENVIRONMENT

The strategic environment confronting Australia's security planners in the late 1970s is of a substantially different character to that of the middle and late 1960s. Many of the broader areas of change affecting Australia have been delineated briefly in the Introduction. Primarily because of the constraints of space, the detailed discussion in Part I is concentrated upon two of the most important areas of change.

The ANZUS relationship has been the undisputed centrepiece of Australian security policy for over a quarter of a century. However, in the late 1970s, both the nature of the relationship as it exists and the manner in which it is perceived in Australia are being transformed in a fundamental way. The importance of these changes and their implications for future Australian security policy are discussed in Chapter 1.

Attention is then directed towards the nature and consequences of recent rapid advances in conventional military technologies. Although extensive studies of these matters have been undertaken in the United States and Europe, their critical significance for considerations of future security policy is inadequately appreciated and frequently misunderstood. In Australia, a great deal of originality will be required if the potential of the new technologies is to be exploited fully to capitalise on the unique character of the local strategic environment. Yet despite the requirement for a major investigation of the implications of the new technologies for Australia's future security policy, very little research appears to have been initiated. As a consequence, the analysis of these developments in Chapter 2 is undertaken in considerable detail.
CHAPTER 1
THE CHANGING NATURE OF THE UNITED STATES-AUSTRALIAN
STRATEGIC RELATIONSHIP

Because of the central role played by the relationship with the United States in Australia's post-war security policy, the status and likely future significance of this connection deserve primary attention in the consideration of Australia's changing strategic environment.

It is important to a proper understanding of the US-Australian relationship to appreciate fully its multi-dimensional asymmetric quality. In terms of international power and influence, the sheer enormity of the United States' resources tends to overshadow Australia's contribution to nearly every aspect of the relationship. For instance, in economic affairs the United States has become Australia's largest source of foreign capital investment and is its second largest trading partner, taking 12 per cent of Australian exports and providing 21 per cent of her imports. By contrast, Australia supplies just over 1 per cent of US imports and receives approximately 2 per cent of its exports.

Considering the relative scale of resources and power, it is perhaps not surprising that the US is of far greater importance to Australia than is Australia to the US. As Dr Siracusa points out:

Since the turn of the century, the United States could normally count on at least sixteen


2 These figures are for the financial year 1973-74. ibid., p. 324.

3 These figures are calculated from those for 1973 appearing in Direction of Trade Annual 1969-75 (Washington, International Monetary Fund, 1976), p. 230.
times the population and nineteen times the economic resources of Australia. This huge disparity in power, both real and potential, had thus one inevitable consequence. In any partnership, the United States had to be vastly more important to Australia than Australia could ever be to the United States. Any perusal of a documentary history or reader in Australian-American relations invariably bears ample evidence to the fact that Australian policymakers were necessarily thinking and talking about the United States far more than Americans were ever thinking and talking about Australia.4

However, in addition, the perceptions of Australians concerning the relative importance of the US to Australia have been reinforced heavily by the very uneven flow of culture and sentiment across the Pacific. During and since the Second World War, Australian society has become very heavily influenced by the American mass media. Partly because of this, partly because of the developing US global role and partly because of the growing security and economic relationship, many Australians have tended to identify closely with the United States, its values, culture, products, policies and actions. By contrast, Americans have been exposed to very little Australian culture and have limited knowledge of the country. As Robin Boyd pointed out, 'communication is virtually one way along the Pacific axis'.5

Identification with the United States has been reinforced further by the emphasis which Australia's politicians have continually placed upon the broader aspects of the relationship when discussing national security affairs. For example, in his June 1976 posture statement, Mr Fraser said:


Of all the great powers with active interests and capabilities in the areas of critical concern to Australia, the United States is the power with whom we have the closest links. These links are based not merely on known common interests and in commitments to a peaceful stable world, but on common traditions of democratic institutions and values of respect for the individual.6

It is certainly true that both countries share similar democratic institutions and ideals, are predominantly white, English speaking and share a similar 'frontier' type history. But continued Australian reference to these matters and to the two countries' history of comradeship in arms has led to a very much stronger perception of the significance of the relationship in Australia than in the United States.

Australia is, at best, a middle-ranking power. Although its interests are global in character, its effective influence in most policy spheres is confined to the Asia-Pacific region. The United States, on the other hand, is a superpower whose primary interests concern the world-wide balance of power. Its relationship with Australia represents merely a small portion of its overall global interests.

From the United States' perspective, Australia is of some limited importance. Most notably, it occupies a significant position in the economic structure of the western world and, in particular, it plays a major part in supporting Japanese economic growth and stability. In addition, its national resources, its suitability for the siting of an array of military and scientific installations and its strategic location bordering the major transit routes between the South Pacific and the Indian Oceans are of positive value. But perhaps even more importantly from the US point of view, the close relationship with Australia effectively denies an opponent access to all of these features. However, while these considerations may appear to be of considerable significance in isolation, they are quite peripheral in the context of the United States'

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overall strategic concerns.

Few Australian descriptions of the nature of the relationship emphasise its limited utility to the United States. In a sense, this is a manifestation and direct consequence of the very great value which successive generations of Australians have placed upon alliance relationships. Heavy emphasis upon the maintenance of a close affiliation with major allies has traditionally been perceived as an ideal means of enhancing the country's security at a time when it could not realistically be performed independently. The enormous size, extreme inhospitality and relative isolation of the Australian continent, when considered in the light of the limited population and financial resources which have been available, has always served to make access, even if only in theory, to the resources of a major power ally an extremely attractive option. It has, for instance, meant that national budgetary priority could be given consistently to the enormous, continuing and more politically appealing requirements of national development, social welfare, education, etc.

Over time, the reduction of Australia's long and deeply held feelings of isolated vulnerability through the employment of major power alliances has inhibited severely the development of strategic independence. Successive Australian governments have considered that the relationships with major allies have required continuous supportive activity. Apart from frequent declarations of affinity, the prime Australian means of establishing and maintaining these close security relationships has been participation in joint-force deployments overseas. Thus, the process of sending forces abroad in support of major power allies accounts for the nature of almost all of Australia's military history. In professed loyalty to the Empire, Australians fought in the Maori Wars, the Sudan, served in the Boxer Rebellion and shared the frustrations of the Boer War. This experience largely continued through both world wars, although the demonstrated weakness of the British forces in
the Asian region in the Second World War led Prime Minister Curtin to place the nation's primary reliance upon the security capacity of the United States. Since the Second World War, Australians have played further supporting roles in Korea, the Malayan Emergency, Indonesian Confrontation and Vietnam. The cultural and structural impact of this continuing experience upon the Australian population and, most particularly, the Australian defence establishment can hardly be overestimated. For the Australian defence structure, the primary effect has been to direct most of the country's scarce national security resources away from the requirements of developing an independent defence capacity. This question was discussed briefly in a United Service Institution report on the ANZUS alliance:

A major problem for Australia within the Alliance is that the global strategic priorities of our ally, its primary adversarial relationship to the military forces of the Soviet Union and its desire to see Australia 'play its full part' with 'compatible' forces have the potential (and have tended) to shape Australia's forces into those of a 'mini-great' power. This has been to the detriment of acquiring defence capabilities required by Australia in meeting regional, low level threats. This problem raises complicated issues about the level and type of technology, manpower and defence industries which we should possess in our defence forces and whether or not we need very expensive weapons systems such as aircraft carriers and the 'latest and best' United States aircraft. The fact of the ANZUS Treaty has seemed to discourage the attainment of a greater level of self-reliance in defence capacities relevant to Australian circumstances. 

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7 The emphasis here is in the original text.

8 United Service Institution of the Australian Capital Territory, The United States/Australia Alliance—Problems and Prospects (Syndicate Research Reports), (Canberra, United Service Institution of the Australian Capital Territory, 1976), p. 6.
Up until the late 1960s, the neglect of Australia's independent national security capacity could be justified by the then-perceived necessity of maintaining and developing an expeditionary capacity well-suited to participation in joint allied operations overseas. But during the past decade, this rationale has been undermined primarily as a result of a series of changes in US policy towards the region.

When viewed in perspective, the trauma of the Vietnam experience appears to have had a very significant and enduring impact upon the US propensity to maintain the strength of forces stationed abroad and to deploy them in support of regional allies. United States national security policy is now reorientated much more directly towards those areas of the world which are of central significance in supporting US interests in the global strategic balance (continental United States, Europe, the Middle East and North East Asia in particular). In terms of the physical US presence in Australia's proximity, this global reorientation has already had a significant impact. President Carter has instituted a very broad reappraisal of US deployments in the Western Pacific. Although this reassessment is still underway, its first fruits are apparent in the programme to withdraw all US ground combat forces from South Korea. It is difficult to predict the nature of further policy developments in this field. However, it is known that senior officials in the Carter administration have proposed additional significant

9 In reality, a large number of influences have encouraged a reassessment of US commitments abroad, although most are related either directly or indirectly to the very great domestic and international political and social costs which were incurred during the Vietnam debacle. Other specific factors include the processes of rapprochement with China, the growing pressure to employ military manpower more efficiently as a result of the abolition of the draft, the increasing role of Congress in the generation and conduct of US foreign policy, etc. These matters are discussed at length in Leslie H. Brown, American Security Policy in Asia (London, The International Institute for Strategic Studies, Adelphi Paper 132, 1977), pp. 1-9.
reductions of US forces in the Pacific.\textsuperscript{10} It is by no means clear how far or how fast these processes of US withdrawal may proceed but it is quite apparent that the military presence of the United States is declining in the Western Pacific and may continue to do so for many years.\textsuperscript{11}

\textsuperscript{10} There have, for instance, been reports that some senior officials in the Carter administration have proposed a wholesale 25 per cent reduction of US forces in the Pacific and suggested a complete withdrawal from the Subic naval and Clark air bases in the Philippines. See the report by Ian Hicks, 'US Charting a New Pacific Course - Military Cuts Likel in The Sydney Morning Herald, 16 April 1977, p. 9.

\textsuperscript{11} It is interesting to compare US force levels in Europe and Asia both before and after the major phase of the Vietnam war and before and after the introduction of all-volunteer US armed forces.

### US Force Levels in Asia and Europe (Thousands)

<table>
<thead>
<tr>
<th></th>
<th>1963</th>
<th>1973</th>
<th>1976 (January)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>57</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>Japan (Ryukyus)</td>
<td>91</td>
<td>57</td>
<td>48</td>
</tr>
<tr>
<td>Philippines</td>
<td>14</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Taiwan</td>
<td>4</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Vietnam</td>
<td>14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Thailand</td>
<td>4</td>
<td>42</td>
<td>11</td>
</tr>
<tr>
<td>Afloat</td>
<td>38</td>
<td>32</td>
<td>21</td>
</tr>
<tr>
<td>Total Asia</td>
<td>222</td>
<td>198</td>
<td>137</td>
</tr>
<tr>
<td>Total Europe</td>
<td>380</td>
<td>300</td>
<td>303</td>
</tr>
</tbody>
</table>

**Source**

This table has been reproduced from Leslie H. Brown, \textit{American Security Policy in Asia}, p. 7.

Manpower is not the only determinant of military capacity but in this case it is the indicator concerning which information is most freely available. The International Institute for Strategic Studies first started listing deployment strengths for US forces in the West Pacific in 1974. Since that time, tactical fighter squadrons have been reduced from 11 to 9. Aircraft carriers deployed with the Seventh Fleet have been reduced from 3 to 2 and other surface combatants from 25 to 18. See The International Institute for Strategic Studies, \textit{The Military Balance 1974-1975} (London, The International Institute for Strategic Studies, 1974), p. 7 and The International Institute for Strategic Studies, \textit{The Military Balance 1976-1977} (London, The International Institute for
In addition to a reduced US physical presence, US inclinations to intervene in conflicts in the region have also declined. Successive US presidents and a large number of congressional leaders have expressed their desire to avoid any new commitment of major land forces to the Asian mainland. The most coherent and enduring expression of this view was made by President Nixon during an informal meeting with reporters at Guam on 25 July, 1969. According to the official text, the following exchange took place:

QUESTIONER Mr. President, sir, on the question of U.S. military relationships in Asia if I may ask a hypothetical question: If a leader of one of the countries with which we have close military relationships either through SEATO or in Vietnam should say, "Well, you are pulling out of Vietnam with your troops, we can read in the newspapers. How can we know that you will remain to play a significant role as you say you wish to do in security arrangements in Asia?" What kind of an approach can you take to that question?

THE PRESIDENT I have already indicated that the answer to that question is not an easy one— not easy because we will be greatly tempted when that question is put to indicate that if any nation desires the assistance of the United States militarily in order to meet an internal or external threat, we will provide it.

However, I believe that the time has come when the United States, in our relations with all of our Asian friends, be quite emphatic on two points: One, that we will keep our treaty commitments, our treaty commitments, for example, with Thailand under SEATO; but, two, that as far as the problems of internal security are concerned, as far as the problems of military defense, except for the threat of a major power involving nuclear weapons, that the United States is going to encourage and has the right to expect that this problem will be increasingly handled by, and the responsibility for it taken by, the Asian nations themselves.

... It will not be easy. But if the United States just continues down the road of responding

11 cont'd

Strategic Studies, 1976), p. 7. It could be argued that these numerical reductions may be at least partially offset by qualitative improvements. However, as is argued in Chapter 2, in the new technology environment, increased concentration of military capacities normally also implies increased vulnerability.
to requests for assistance, of assuming the primary responsibility for defending these countries when they have internal problems or external problems, they are never going to take care of themselves.12

This heavily qualified expression of US policy towards the region and subsequent supporting statements and actions are clearly of great significance for Australia. One of the most important implications is that, if US ground forces are not to be committed to the Asian mainland again, there is unlikely to be a further opportunity for the Australian armed forces to be committed in their support.13

However, this altered US policy also impacts upon the future scope for cooperative or joint US-Australian operations in the defence of Australia itself. The Guam Doctrine and more detailed US elaborations of it have explained consistently that the level of peacetime force structure integration with allied regional powers will be determined primarily by the nature of the threat with which they are confronted. This relationship is most clearly illustrated in a table which summarises a large part of the


13 T.B. Millar has argued that the apparent cessation of joint force commitments is likely to reduce greatly the strategic significance of the ANZUS Treaty to Australia.

'It seems extremely unlikely that the United States will be engaged in war in Southeast Asia during the remainder of this century. If this is so, it will have little need of Australia, and the ANZUS Treaty will become increasingly a formality, an excuse for occasional rhetoric, and unfortunately also a specious rationalization for continued Australian reluctance to come to terms with its environment.'

findings of a major Rand Corporation study into the implications of the Guam Doctrine. 14

Table 1

<table>
<thead>
<tr>
<th>Objective</th>
<th>Level of Assistance</th>
<th>Likely Conflict</th>
<th>Degree of US involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total force planning</td>
<td>Combined force planning</td>
<td>Attack by USSR or PRC on US friend or ally.</td>
<td>Greatest</td>
</tr>
<tr>
<td>Regionalism</td>
<td>Complementary force planning</td>
<td>Attack by a minor communist power on US friend or ally.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attack by a Soviet client on US friend or ally.</td>
<td></td>
</tr>
<tr>
<td>Self-reliance</td>
<td>Supplementary force planning</td>
<td>Conflict between US friends or allies.</td>
<td>Least</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communist-supported insurgency. Soviet client-supported insurgency.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Home-grown insurgency.</td>
<td></td>
</tr>
</tbody>
</table>

It would thus appear that under current US policy, unless Australia is threatened directly by the Soviet Union or China, the Australian Government cannot expect to receive unqualified US support. In the circumstances of a regional dispute or crisis, it is by no means clear what type of support the US might be prepared to supply its allies.

Primarily as a result of these policy changes, the limited utility of the ANZUS relationship in US eyes has become much more evident to the Australian national security community. The high levels of ambiguity and uncertainty

which characterise the alliance are now being cited more frequently as an important element of the relationship. This is evidenced most clearly in the 1976 Defence White Paper:

Remote from Europe, we now have one significant alliance - the ANZUS Treaty, with New Zealand and the US. Both countries are important to us; but it is prudent to remind ourselves that the US has many diverse interests and obligations.... Our alliance with the US gives substantial grounds for confidence that in the event of a fundamental threat to Australia's security US military support would be forthcoming. However, even though our security may be ultimately dependent upon US support, we owe it to ourselves to be able to mount a national defence effort that would maximise the risks and costs of any aggression.

Short of this major, and improbable situation, we could face a range of other situations that we should expect to handle more independently. It is not our policy, nor would it be prudent, to rely on US combat help in all circumstances. Indeed it is possible to envisage a range of situations in which the threshold of direct US combat involvement could be quite high.15

The United Service Institution report on the alliance also emphasised the ambiguous nature of the relationship in describing the formal security connection:

The ANZUS Treaty makes no guarantees, it entails no binding obligations. It depends on consultation and mutual consent. In the event of armed aggression on one of the member states the character of the assistance offered is not stated unequivocally; rather, the Treaty looks to a declaration of intent. ANZUS like all treaties depends ultimately on trust.16 By their very character treaties cannot be 'watertight'; they depend on the actions in


16 The emphasis here is in the original text.
the future of governments of men in as yet unknown situations.17

The central clauses of the ANZUS Treaty state that:

The Parties will consult together whenever in the opinion of any of them the territorial integrity, political independence or security of any of the Parties is threatened in the Pacific.

Each Party recognizes that an armed attack in the Pacific area on any of the Parties would be dangerous to its own peace and safety and declares that it would act to meet the common danger in accordance with its constitutional processes.18

But in the absence of firm assurances concerning particular types of assistance in categories of situations, evaluations of the Treaty's utility are, of necessity, very unclear. Certainly a high level of imprecision has almost always been a notable feature of treaty arrangements. This provides a basis for each party to declare general intent without unduly restricting future freedom of action. The fact that treaties rarely usurp governmental prerogatives or pre-determine government actions enhances greatly their political acceptability. Such agreements certainly do not assure each partner the provision of defence resources from its allies in all situations. However, they do provide each party with a level of proxy deterrence. For while each partner to such a treaty may be unsure what action its allies may take in particular circumstances, those same types of doubts are also likely to arise in the minds of any intending adversaries.

17 United Service Institution of the Australian Capital Territory, The United States/Australia Alliance, p. 3.

18 The full text of the ANZUS Security Treaty is published as an appendix to Claire Clark (ed.), Australian Foreign Policy: Towards a Reassessment (Melbourne, Cassell Australia Limited, 1973), pp. 243-245. It is interesting to compare the phrasing of the ANZUS Treaty with that of other major US written commitments. This is discussed at length in R.A. Paul, American Military Commitments Abroad (New Jersey, Rutgers University Press, 1973), pp. 14 ff.
For Australia, the Guam Doctrine represents the overlay of an unclear statement on top of an already imprecise treaty. President Nixon's briefing at Guam was deliberately blurred at the edges through the encouragement by journalists, politicians and members of the President's staff of a variety of interpretations. This presentation provided a sophisticated level of ambiguity which was apparently intended to keep potential aggressors uncertain of future US intentions while at the same time satisfying the demands of friends and allies.

For Australian security planners, the degree of uncertainty inherent in this type of alliance relationship makes long-term conceptual and structural planning of the Australian Defence Force extremely difficult. On the one hand it can be argued that the Guam Doctrine is analogous to, and in reality as tenuous as, Dean Acheson's perimeter strategy. In other words, the case can be made that, regardless of public pronouncements of US intentions, it is practically impossible to pre-determine the types of force commitments which the US may make some time in the future. It is quite conceivable, although of doubtful probability, that, in the circumstances of some types of pressure against Australia, the US might abandon or waive its current foreign policy principles and provide massive assistance to meet a regional threat. On the other hand, it can also be argued that virtually no assistance can be guaranteed


20 On 12 January 1950, the US Secretary of State, Dean Acheson, said: 'The defensive perimeter runs along the Aleutians to Japan and then goes to the Ryukyus .... to the Philippine Islands .... So far as the military security of other areas of the Pacific is concerned, it must be clear that no person can guarantee these areas against military attack'. Such a guarantee is, 'hardly sensible or necessary'. Despite the fact that Korea was clearly placed outside this 'defensive perimeter', within six months US forces were heavily committed there. This is cited by J.L.S. Girling, *ibid.*, p. 48.
from the US under any circumstances and hence, Australia must be prepared to develop an independent capacity to meet all conceivable threat categories. It is difficult to resolve these alternative views. Perhaps the best independent formulation of likely US reactions was given by McGeorge Bundy, a former Assistant to the President for National Security Affairs. He stated that:

.... the American commitment anywhere is only as deep as the continued conviction of Americans that their own interests require it.21

But if this is true, can Australian policy be made to impact upon US evaluations of their own interests? Certainly, there are some factors which, in the circumstances of any future crisis involving Australia, would have a major influence upon US decision-making and which are, to some degree, under Australian control. The formal Treaty itself, the state of the diplomatic linkage, the strength of economic connections, the significance which the US Government places upon the Australian continent and installations upon it, the capacity of Australia to act in her own defence, the number of US citizens resident in Australia, the number of US citizens who have visited Australia, the state of US sentimental ties with Australia, etc., can all be structured to some degree from Australia to maximise the probability of a favourable US response. However, in a crisis situation, even though an Australian government may use its full influence to stimulate, encourage, cajole or even coerce a favourable US response, in the final analysis the decision on whether or not forces would be committed to support Australia can be expected to be made by the US government of the day in the light of its full range of domestic and world-wide interests.

The nature of the problem confronting those who are tasked with the long term planning of Australia's security

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21 Quoted in United Service Institution of the Australian Capital Territory, *The United States/Australia Alliance*, p. 3.
capacity can be elaborated to some degree by examining more closely expressed US intentions in the circumstances of particular types of crises. For instance, the Guam Doctrine indicates that the level of security assistance which Australia can expect to receive from the US will not necessarily be related to the seriousness of the threat which arises to Australia's security. Rather, it will tend to be related much more closely to current US perceptions of the indirect threat to the US itself of Australia being attacked by the country concerned. Thus, if a major power mounts a heavy attack upon Australia, the US response will not be conditioned primarily by the severity of the assault and its implications for Australian security and survival but rather by US perceptions of the impact that the conflict and the possible outcome will have upon US regional and global interests. If the country which is attacking Australia happens to be a superpower rival of the US, it can be concluded that the US would almost certainly wish to respond vigorously. However, even in this relatively clear-cut situation, the desire to assist Australia may not automatically be converted into the physical provision of the level of aid which the Australian Government may request. Most particularly, if such an attack took place in the context of global superpower conflict, the US may be distracted by higher priority commitments of a pressing nature elsewhere and be unable to render significant assistance.

In other circumstances, if the country attacking Australia happens also to be allied to the US or possibly non-aligned, the US may not necessarily perceive its interests to be best served by heavily supporting Australia. It may provide a minimum of supplies, it might support both sides, it may decide to stand aloof and mediate, or in some circumstances it might favour Australia's opponent. Even in circumstances where the US administration may in fact wish to assist a hard-pressed Australia and would appear not to be diverted elsewhere, there might still be significant difficulties for Australia in actually receiving
the assistance which it might desire. For instance, the US inventories of specialised armaments or highly critical spare parts might run low. Because of a heightening of global tensions, the US might be concerned not to run down its immediate supplies of some war materials for fear of rendering itself vulnerable to more serious attacks elsewhere. In addition, in some circumstances, there might be an impasse between the legislative and executive branches of the US Government which could serve to delay or even prevent the provision of assistance.

These major uncertainties in the alliance relationship serve to make Australian national security planning extremely difficult. They generate a large grey area of doubt and uncertainty within which long term judgments must be made as to what Australia can plan on receiving from its great power ally in given situations. These assessments must obviously be made in a conservative manner for if, in a given scenario, the country plans on receiving much more than the United States is either willing and/or able to provide in those circumstances, the complete defence structure may be undermined. With this requirement for caution in mind, it is important to note that the assumptions which were made in the 1960s concerning the circumstances in which the US could be expected to support heavily an Australia under threat can no longer be considered valid. For example, in 1969 Dr T.B. Millar wrote:

> Darwin remains the most vulnerable point. It is closer to Djakarta than it is to Sydney. It is a small, isolated and only lightly-defended base, from which any

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22 In recent years the US Congress has involved itself far more intimately with foreign and military policies. One of the more notable features of this development has been the War Powers Resolution of 1973. Its relation to and significance for the ANZUS Alliance are discussed in F.A. Mediansky, 'United States Interests in Australia', *Australian Outlook*, Vol. 30, No. 1, April 1976, pp. 144, 145 and also in J.M. Siracusa, 'Further Reflections on United States Interests in Australia', *Australian Outlook*, Vol. 30, No. 3, December 1976, p. 479.
air attacks, pre-emptive or retaliatory, on Indonesia would presumably be launched if coming from the Australian mainland. (Malaysia, where Australian bomber and fighter squadrons are stationed, is of course very much closer.) A sudden, well-planned combined attack on Darwin might appear to have a good chance of success, especially if linked with an assault on Tindal. Yet strategic warning of such hostilities should enable extra defences to be located in the Northern Territory. And we must assume that if the ANZUS Treaty means anything, any attack of this kind would entitle Australia to invoke the Treaty with near-certainty that the United States would come to our aid, as it would in any of the other situations mentioned.23

In the late 1970s, this type of presumption can no longer be supported by declared US policy. It is now clear that, in the specific hypothetical circumstances of a limited Indonesian attack upon Australia, the US expects Australia to provide the main forces for its own defence. The type of support which Australia might expect to receive in these circumstances would almost certainly be limited to military supplies, intelligence and possibly diplomatic support. However, as was discussed above, the provision of even this type of assistance could not be guaranteed under all circumstances. Thus, for national security planning purposes, this assistance would best be regarded as a welcome bonus to, rather than an anticipated central element of, Australia's response capacity.

Attempting to perceive in advance the likely US response to a series of hypothetical situations is a highly speculative type of forecasting. As has been emphasised above, this question continues to be hedged about by a very large number of imponderables. However, bearing these difficulties in mind, it is possible to summarise, in a very tentative fashion, likely US responses to a variety of threats to Australian security by drawing upon stated US Government intentions and elaborations of them made by US Government-funded research bodies. This is attempted in Table 2.

### Table 2

**United States' Expressed Intentions and Capabilities to Assist Australia in a Range of Hypothetical Situations**

<table>
<thead>
<tr>
<th>Type of Crisis</th>
<th>Expressed US Intentions</th>
<th>Likely US Capability to Assist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Isolated attack by a superpower rival of the US.</td>
<td>Full support would be provided.</td>
<td>Likely that full support would be forthcoming.</td>
</tr>
<tr>
<td>2. Attack by a superpower rival of the US in the context of a superpower conflict.</td>
<td>Full support would be provided within capabilities.</td>
<td>Unlikely to be able to divert significant resources away from the major effort.</td>
</tr>
<tr>
<td>3. Heavy attack by a non-aligned major power.</td>
<td>Unclear. May supply equipment, intelligence and diplomatic support.</td>
<td>If this attack did not take place in the context of a major global conflict, the US could assist to the extent of its intentions.</td>
</tr>
<tr>
<td>4. Heavy attack by a major power which is allied to the US.</td>
<td>Unclear. May supply some equipment, intelligence and diplomatic support to both parties, may try to mediate, may favour Australia's opponent.</td>
<td>As above.</td>
</tr>
<tr>
<td>5. Heavy attack by a neighbouring power.</td>
<td>Expects Australia to be self-sufficient. May assist with heavy equipment supplies, particularly if attacking neighbour receives heavy support from a superpower rival.</td>
<td>As above.</td>
</tr>
<tr>
<td>6. Other attacks by a neighbouring power.</td>
<td>Australia expected to be self-sufficient.</td>
<td>As above.</td>
</tr>
<tr>
<td>7. Resource crises directed against Australia.</td>
<td>As above.</td>
<td>Australia might receive priority treatment if the US controlled scarce resource supplies.</td>
</tr>
<tr>
<td>8. The effects of foreign wars and resource conflicts.</td>
<td>As above.</td>
<td>As above.</td>
</tr>
</tbody>
</table>
From this discussion, it is clear that the criteria to be employed in designing Australia's national security capacities to deter and meet regional pressures and threats will need to be quite different to those of the past. Australian ground forces are unlikely to be deployed again into the South East Asian region except possibly for small-scale specialised operations of short duration. But more importantly, because of the reduced US commitments in the region, the adoption of a significantly altered declaratory policy and the accompanying high degree of uncertainty surrounding the nature of the US response which can be anticipated in a wide range of possible scenarios, it is highly desirable that the limited national security resources which are available to Australia now be allocated almost exclusively to the priority requirements of conducting operations independently in Australia's immediate environment. This represents a change of fundamental importance.

The implications of this major shift in Australian national security policy for the continuing US-Australian relationship are difficult to determine fully. The re-ordering of Australia's security priorities does not, of itself, serve to degrade severely the importance of many of the broader aspects of the relationship. Certainly the value of the ANZUS alliance for the deterrence of proxy warfare is likely to remain of considerable importance to Australia. Very significant value is still likely to be placed upon cooperation and exchanges in the fields of intelligence, defence science and technology, training and the development of tactical doctrine and operational procedures. However, because Australia will be seeking a heightened degree of independent operational capacity and will be concentrating far more than in the past upon tasks

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24 As was discussed briefly in the Introduction, the most likely possibility in this regard would most probably be an operation to evacuate Australian citizens from a regional country which is in a state of chaos either as a result of internal disturbances, external conflict or a natural disaster.
within its immediate security environment, the direct value of many of these areas of exchange can be expected to be reduced. In contrast to most of Australia's military history, the design criteria for the country's force structure and operational concepts may, in the future, differ much more significantly from those of its major power ally. Thus, Australian security policy-makers may need to be far more selective than in the past in their use of US concepts, doctrines and practices.

There is, in addition, a further asymmetric dimension to the US-Australian relationship which is of considerable significance in this context. It is important to realise that, because the United States is a superpower, the bounds of the relationship extend beyond the local and regional dimension and into world-wide strategic matters. In an overall sense, the general mutuality of global interests between the two countries is well established and is likely to remain no matter which major political party is in power on each side of the Pacific. It is certain to remain in Australia's interests for the US to retain sufficient strength at least to act as a balancing counter-weight to the Soviet Union. In the past, Australia has been willing to contribute to this balance where it has been possible for her to do so. This basic desire to assist in the maintenance of the global strategic balance is likely to remain indefinitely. However, because of the increasingly dynamic nature of global strategic developments, and particularly of global strategic technological developments, the potential for Australia to lose effective control over activities with a global strategic significance undertaken within or supported from Australia under the aegis of the alliance is rising. The propensity for this loss of effective control to take place can be illustrated by reference to the debate concerning the presence of US and joint US-Australian controlled defence facilities on Australian territory.

When the Australian Government originally sanctioned the construction of these facilities in the early 1960s,
the officials and politicians who were intimately involved appeared to harbour little doubt that the facilities were stabilising in the global sense and hence a positive contribution to the maintenance of the superpower balance.25 As an added bonus, these facilities were also perceived, and still are by some commentators, to be a major means of binding the US to Australia, thus ensuring that a high level of assistance would be forthcoming to Australia should she be threatened by a regional power.26 However, because of a large number of developments in the strategic technological environment, both of these assumptions, which have long been part of the conventional wisdom in the Australian defence community, are now the subject of considerable doubt.

There are currently eleven 'scientific' and defence installations and facilities in Australia of which the United States has partial or complete control.27 Several critics have argued that the facilities at North West Cape, Pine Gap and Nurrungar not only have a capacity to support the Mutual Assured Destruction (MAD) Doctrine but, in addition, play a significant role in providing the US with a nuclear war fighting capability.28 They reason that the

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25 This case has been made in a variety of forms. See, for example, 'Barwick Explains Agreement on US Radio Base'in *The Sydney Morning Herald*, 10 May 1963, and also *Opening of the US Naval Communication Station at North-West Cape, Western Australia* (Speech by the Prime Minister, Mr Harold Holt), 16 September 1967, p. 2.


27 This information is provided in the reply to a Parliamentary Question posed by Mr. W. Hayden, *Commonwealth Parliamentary Debates*, House of Representatives, Thirtieth Parliament, 2 November 1976, p. 2255.

US acquisition of this capability not only increases the likelihood of some types of nuclear war, but it also provides the US with a strategic advantage which the Soviet Union and China cannot match because of the geographical constraints which limit their ground station siting options. Thus the critics conclude that the North West Cape, Pine Gap and Nurrungar facilities are a destabilising influence in the global nuclear balance.

The argument that the presence of the US and jointly controlled defence installations would serve to bind the United States to an Australia which is threatened by a regional power is also highly questionable. There is abundant evidence to show that the US places a very high value upon space-based systems generally, and those facilities in Australia which support space-based systems in particular.29 There is little doubt that the presence of

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29 For example, the former US Secretary of Defense, Donald Rumsfeld, stated in his Congressional testimony that:

'As space technology matures space-based systems will play an even more important role in support of US and Soviet military operations. In the future dependence on these systems may increase to the point where their loss could materially influence the outcome of a conflict'.


One extract from what is purported to be the Australian Defence Department's 1975 Strategic Basis document states that 'the US has repeatedly made clear the value it attaches to the defence facilities it maintains in Australia'. See Alan Reid, 'Top Secret: Our Defence Planning', The Bulletin, 12 June 1976, p. 19.

The Defence White Paper also raises the point briefly:

'Our co-operation which includes the joint maintenance of defence related facilities on Australian soil, is also, despite the disparate strength and resources of the two countries, of value to the US'.

See Australian Defence, p. 11.
these facilities in Australia is supportive of the general US-Australian relationship as a whole. Thus, to the extent that their siting in this country increases US perceptions of the friendly relationship with Australia and strengthens sentimental affinity, they may be important. However, this should not be confused with an expectation that the presence of the facilities will trigger automatically a favourable US response to an Australia threatened by a regional power.

By way of precedent, it is interesting to note that during the Turkish invasion of Cyprus in 1974 the presence of important US and NATO intelligence gathering facilities, especially on Mt Olympus, did not stimulate an open American response to ensure their security. Certainly the invading and defending forces were both allied to the United States. It is quite conceivable that an understanding was reached at an early stage with both sides concerning the inviolability of the installations. But in the event of a non-nuclear threat to Australia, or attack upon it some time in the future, could not similar arrangements be made by the US with attacking forces? In the circumstances of a regional power threat, harassment or even lodgement upon Australian territory, the US Government may, in many circumstances, prefer to reach an understanding concerning the facilities with Australia's opponent, rather than be committed automatically to assist Australian forces in their defence.

Hence, it does appear that at least some of the considerations which were cited originally to support the case for constructing the facilities may no longer be valid. This discussion is not to suggest that the impact of these

30 See this discussed in 'An Eye on the Enemy Over the Horizon' in New Scientist, 7 November 1974, pp. 420-423.

31 Alternatively, the US would have the options of destroying and evacuating the facilities or removing them to another location. There were press reports that the administration considered the latter option late in 1975. See Andrew Clark, 'In a Politically Unstable Country (Like Australia) America's Pine Gap Base is a Risk', The National Times, 17 November 1975, p. 3 and also 'One For Rumsfeld', Boston Sunday Globe, 28 December 1975, p. 4.
changed technological and strategic circumstances necessarily renders the continued presence of these facilities undesirable. This is a much broader question. However, this illustration does serve to emphasise that the current pace of technological and strategic change appears to have already altered in a fundamental manner the national security significance of an established aspect of the alliance relationship. Moreover, there are indications that this phenomenon can be expected to recur more frequently in the future. This is primarily because both the United States and Australia are expanding greatly the physical capacities and technical sophistication of their military structures. Many of the new US developments have direct implications for and possess the potential to change significantly the nature of a wide range of institutionalised arrangements. At the same time, Australia's acquisition of

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32 Perhaps the most notable instance in this regard is the potential which modern developments in military technology display to alter greatly the implications of continuing to provide hitherto uncontroversial assistance to US forces in the form of aircraft staging and refuelling facilities. The US has conducted major exercises to test the concept of employing long-range land-based aircraft, B-52s, P-3s, F-111s, etc., with multiple in-flight refuelling on long-range, over-ocean, sea-control missions. See, for example, the testimony of General D.C. Jones, Chief of Staff of the US Air Force, before the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 2, 18 February 1976, p. 985. During the course of his testimony to Congress Admiral Gayler, the former US Commander in Chief in the Pacific, expressed strong support for the employment of this mode of operations in the Pacific-Indian Ocean region. See Hearings before the Subcommittee on Manpower and Personnel of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 7, 1 March 1976, p. 4070. The concept of the long-range aerial task force has been discussed at length in the US. For example, see 'Navy Cool to Land-Based Aircraft Study' in Aviation Week and Space Technology, Vol. 105, No. 15, 18 October 1976, p. 91; Major General W.J. Ellis, 'Air Mobility and Flexibility' in Flight International, Vol. 110, No. 3519, 21 August 1976, p. 432 and W.C. Moore, 'Time for Aerial Task Forces?' in US Naval Institute Proceedings, Vol. 101, No. 112/874, December 1975, pp. 79, 80.
new technological capacities, particularly involving long range surveillance systems, provides potential for the employment of such systems not only for national and

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It appears that originally the US Department of Defense intended to deploy long-range aircraft fleets through the Indian Ocean from Guam or the Clark Air Base in the Philippines as soon as the 3658 metre runway on Diego Garcia was completed in October 1977. This strip is adequate to handle fully-loaded KC-135 aerial tankers on a regular basis and to act as an emergency landing ground for B-52s. See testimony of General G.S. Brown, Chairman, Joint Chiefs of Staff, before the Committee on Armed Services, US Senate, Disapprove Construction Projects on the Island of Diego Garcia, 10 June 1975, p. 61 and also The Australian, 15 April 1977, p. 7.

In April 1977, a decision was announced to 'shelve indefinitely' long-range flights into the Indian Ocean by B-52s. However, it is interesting to note that the primary cause given for this decision was rivalry between the Air Force and Navy, although it was also compatible with President Carter's proposal for 'mutual military restraints'. See 'America Stops Plan for B-52s in Indian Ocean', The Australian, 15 April 1977, p. 7.

The clear implication for Australia is that support for aerial task forces, in either the Pacific or Indian Oceans, through the refuelling of transiting aircraft, and particularly KC-135 tanker aircraft, would be a proposition with quite different implications to those of current arrangements. The likely reactions of regional and other powers to such activities and their implications for Australian foreign policy would need to be examined thoroughly prior to the provision of diplomatic clearance for task force aircraft to land in Australia.

There are, in addition, other areas where changing United States technological capacities offer the potential to alter fundamentally the nature of established aspects of the US-Australian relationship. For instance, the rapidly expanding US capacity to perform all its major military functions without reliance upon installations situated on the territory of foreign states may, in time, impact significantly upon the strategic value of Australia to the United States.
regional purposes but also for global alliance functions. In combination, these technological and strategic developments possess a very great capacity to change the whole nature of the alliance partnership by providing completely new meaning and a wide range of new ramifications to already established procedures, processes and agreements.

If the Australian Government is to possess a capacity to affect the impact of these developments on the alliance relationship in anything but a limited negative sense, the

33 There are a number of systems which, if procured by Australia, could have a major impact upon Australia's role within the alliance. For instance, if the experimental over-the-horizon backscatter radar system called JINDALEE proves to be successful and is operationally deployed, it is quite possible that much of the target tracking and regional high frequency signals intelligence information obtained may be passed to the US for use in its global strategic surveillance network.

Similarly, if and when Australia deploys fixed long-range sonar surveillance systems, the information gained may be used not only to support Australia's regional defence effort but also to feed into the United States' global anti-submarine surveillance system. The same can be said of information which might be gained from advanced long range towed-array sonar systems. The US FFG-7 Patrol Frigates will be fitted with the very advanced TACTAS towed array. Presumably the three Australian Patrol Frigates will also be equipped with TACTAS at some stage. But if so, would the information gained be passed automatically to the US?

If fixed and mobile units of the Australian Defence Force routinely feed air, surface and undersea surveillance information into the United States global command and control network, these Australian systems and their support bases might well be regarded as legitimate and valuable targets by the Soviet Union in the event of some types of nuclear exchange. If this is so, naval and air bases within and adjacent to Australia's major population centres may well be targeted for nuclear attack by the Soviet Union. The statement of this possibility is not to argue that such intimate US-Australian cooperation should necessarily be avoided, but merely to point out that the alliance implications of current technological developments are far-reaching and deserve thorough examination prior to any such procurement decision. Technical details of the systems mentioned in this footnote are discussed in Chapter 2.
changing trends in strategic technologies and their impact upon various aspects of the ANZUS relationship will need to be monitored continuously and in considerable detail. The relatively benign and comparatively undynamic strategic and technological environment of the 1950s and early 1960s scarcely made this necessary.

Conclusion

One of the major themes of this chapter is the assymetric nature not only of the national power of the ANZUS partners but also of their relative perceptions of the importance of the relationship. The US is far more important to Australia than is Australia to the US. But, in addition, Australians have tended to overvalue greatly the significance of the relationship globally and particularly the significance of the relationship to the US itself. In reality, US interests in Australia represent a minor portion of that country's overall global perspective.

Primarily as a consequence of the Vietnam experience and the rapprochement with China, the US has instituted a process of reassessing thoroughly its interests in the Asia-Pacific region. This basic re-evaluation has stimulated a reduction in the strength of US forces stationed locally and a significant conditioning of declaratory policy concerning the type of support which might be made available to regional allies in future crisis situations.

These changing factors have two major implications for Australian national security planning. First, it seems unlikely that there will again be the opportunity or the requirement for large portions of the Australian Defence Force to be deployed overseas in support of major power ally commitments. Second, primarily because of the increased hedging and uncertainty surrounding the assistance likely to be received from the US in crisis situations, there is a greatly strengthened requirement to allocate Australia's
scarce national security resources so as to maximise her independent security in her immediate environment.

In addition, because the US is a superpower whose primary strategic interests are world-wide, the ANZUS relationship is also influenced by much wider global strategic implications. These are rapidly becoming more complex as the pace of strategic and technological progress increases. The management of these developments in Australia's independent, as well as the alliance's mutual, interest will require closer scrutiny and attention than has been necessary in the past.

The US-Australian relationship is likely to continue to be of great significance to Australia in the strategic, as well as a broad range of other, spheres. However, primarily as a result of changes in US policy and the wider international environment, it is clear that in the future Australia will require a much more independent capacity to secure its national interests than has been the case in the past.
CHAPTER 2
NEW CONVENTIONAL MILITARY TECHNOLOGIES AND THEIR IMPACT
UPON DEFENCE STRUCTURES, CONCEPTS AND DOCTRINES

The nature and speed of recent technological developments and the impact which they are having upon the conventional military battlefield is a second area of fundamental change in Australia's strategic environment. In perhaps its simplest form, technology is merely providing new and better pieces of equipment. Yet because of the quantum jumps in capability which new systems frequently provide, even this relatively straightforward replacement of old equipment usually also involves the abandonment of traditional techniques, procedures and skills and the development and adoption of those that are new.

A far more involved consequence of new technology is its provision of an ever widening array of alternative means of performing important military functions. Sometimes these new technological options serve to reinforce traditional means of undertaking tasks, but in other situations they effectively compete with the established means of task performance. Thus, in many environments, we now face a situation where a mix of new and traditional means can better perform a task than an improved version of an old means on its own. In other situations, new technology options may actively compete with, and even serve to replace, traditional options.

In an elementary sense, these processes of technological development are not new. However, the speed of current change and the scale of its potential impact is quite unprecedented. Dr Heilmeier, the Director of the United States Defense Advanced Research Projects Agency (DARPA) described the nature of the current situation in the following terms:

I really do believe this is a unique time. I cannot remember a time in the last
decade, or perhaps the decade before that, where there were so many technology initiatives on the horizon that could make a major difference to the national security. I think that in this case, the payoff is very, very large. We are not talking about incremental changes to the way we do things today. We are talking about radically different concepts, things that can make a big difference.¹

As Dr Heilmeier implies, the pace of technological change affects much more than simply the performance of the items of equipment with which armed forces are supplied. Quantum jumps are being made in the capability of many types of system and in some fields completely new capacities are being developed. Strategies, doctrines, tactics and force structures are all being subjected to increasing pressures for change. The nature of conventional warfare as it has been known in the past is being altered fundamentally. The realms of what is possible and impossible on the conventional battlefield are in a state of flux which is unprecedented in both scale and scope.

The discussion in this chapter is divided into two distinct sections. The first is an introductory description and discussion of the capabilities of the key new technologies. The second part of the chapter is an elaboration of a series of tactical and strategic implications which arise from their development.

A Review of Recent Developments in Conventional Military Technology

1. Greatly Enhanced Precision Guidance Capacities

By using various terminal homing techniques, it is now possible to direct rockets, bombs, artillery rounds, mortar rounds and other types of ordnance to impact very accurately upon targets of small dimensions whether they are stationary or mobile. There are two broad categories of terminal guidance technique. Systems in the first category rely for homing upon those characteristics of the target which distinguish it from its surrounding environment. Those systems in the second category of terminal guidance rely upon highly accurate navigation to impact upon fixed targets with known locations or upon mobile targets passing known locations.

The vast majority of precision guidance techniques fall into the first category and rely upon the target's distinguishing characteristics. Perhaps the simplest and earliest examples of precision guidance employed visual target tracking and the radio control of a missile to close and impact upon a target. Slightly more sophisticated systems were developed particularly for anti-tank usage which again relied upon unaided optical target tracking but utilised a very fine wire connection unravelled from the missile through which guidance commands could be passed. The latest generation of wire guided missiles still rely upon visual target tracking but, as long as this is achieved

2 Guided bombs were first developed during the Second World War. See D.A. Hicks, Important Technologies and Their Impact (Unpublished paper, Los Angeles, Northrop Corporation, 1975), p. 2.

3 Examples of this type of system include ENTAC, MALKARA, MOSQUITO, SWINGFIRE, SAGGAR etc.
through the launcher's optics, accurate weapon guidance is automatic. 4

Electro-optical or television-guided weapons carry a visual sensor on board which beams pictures of the scene ahead back to the weapon controller. 5 Hence, in theory at least, these weapons can be launched into a target area without a specific target having been identified first. Target acquisition and detailed guidance can be performed through the weapon's sensor once it arrives in the general target area. Thus, some electro-optical glide bombs, for instance, possess a true 'launch, leave, then aim' capability. 6

A very advanced development of existing optical terminal guidance techniques may provide a highly reliable 'fire and forget' capacity for a range of tactical weaponry. Current developments in focal point array technology are directed towards the development of an integral optical target 'lock-on' system. This will involve the acquisition of a target through a weapon's on-board sensor, either before launch or during flight, and the automatic homing of that weapon upon the locked target image without command processing or

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4 Examples of these more advanced anti-tank missile systems include TOW, DRAGON, MILAN, HOT etc.

5 Examples of this type of system include the various electro-optical glide-bombs - WALLEYE, HOBO, electro-optical GBU-15 as well as the powered MAVERICK, MARTEL, CONDOR and LUZ-I etc.

assistance through electronics on the launcher platform.\textsuperscript{7}

There are, in addition, other types of precision guidance which require initial optical or optically assisted target tracking. For instance, laser beam riding systems require the direction of a low power laser beam so that colocated weaponry can fly down the 'pencil' beam of laser light to impact upon the target.\textsuperscript{8} Laser designation systems also involve the direction of a low powered laser beam at the target. However, in this case, the ordnance can be launched from locations remote from the designator and need only be fired into the general 'basket' area of the target. Laser designator homing ordnance is designed to guide itself automatically onto targets which are 'illuminated' by 'friendly' laser designators.\textsuperscript{9}

\textsuperscript{7} Dr Heilmeier, the Director of DARPA, discussed the potential of focal point array technology in his testimony before the Research and Development Subcommittee of the Committee on Armed Services US Senate Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, p. 5888. This should not be confused with optical lock-on and weapon guidance through the electronic systems aboard launcher platforms. This has been deployed for several years in a number of systems. For example, see a diagramatic explanation of WALLEYE 2 guidance in Aviation Week and Space Technology, Vol. 99, No. 24, 10 December 1973, p. 15. There is also a detailed explanation of this second technique as it operates in the MAVERICK system by John S. Phillip in 'Precision-Guided Weapons', Aerospace International, Vol. 13, No. 2, March/April 1977, pp. 23,24.

\textsuperscript{8} Laser beam riding weapons include the RBS-70 and SABRE light surface-to-air missile systems.

\textsuperscript{9} An example of this type of system is the cannon launched guided projectile (CLGP) COPPERHEAD. For a relatively simple account of laser designated artillery systems see B.E. Blunt, 'Surface to Surface Artillery: Developments in Fire Support in the 1980s' in Royal United Services Institute Journal, Vol. 119, No. 4, December 1974, p. 15.
All of the precision guidance techniques so far described require optical target sighting and, if the targets are mobile, optical tracking. Thus, in their 'pure' form, these systems are inherently limited because darkness, rain, fog, snow, smoke, smog and dust can effectively reduce non-assisted optical visibility to very low levels. Many of these difficulties can be overcome by the fitting of alternative imaging systems for target tracking. For example, image intensification systems can artificially enhance, in a passive manner, the light which is available for night viewing. Passive infra-red sensors provide an even more valuable capacity to see through not only darkness but also dust, smoke, smog and limited amounts of fog, snow and light camouflage. These systems develop images from the thermal, rather than the optical, signature of targets against their background environments.  

Infra-red technology is also being used in a non-imaging precision guidance technique. In those environments where a target's heat signature provides an obvious differential to its surrounding environment, infra-red 'heat seeking' missiles provide a valuable terminal guidance option. For example, the thermal contrast provided by jet aircraft engines against the relatively cool and uniform expanse of the sky has meant that infra-red homing has been employed as the dominant means of terminal guidance for light air-to-air missiles since the 1950s. In recent years, infra-red homing heads have also been fitted to an array of ordnance designed for shipping and surface targets. Infra-red

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10 For details of recent developments in night vision equipment see D.M. Clements, 'Eyes that See in the Night', Marine Corps Gazette, Vol. 60, No. 7, July 1976, pp. 54 ff.

seekers can now be 'tuned' to discriminate in favour of particular types of temperature and spacial signature. Most recently, this has meant that artillery pieces, armoured vehicles and other ground targets which are frequently warm and of moderate size (but not intensely hot or very large) can be attacked with discriminating infra-red homing techniques.\textsuperscript{12}

The metallic composition of many battlefield targets provides the basis for distinguishing them from their background environments through the use of radar sensors. Some missiles carry small active radar sets aboard which can acquire targets and generate homing commands.\textsuperscript{13} Others, in the semi-active homing category, can home upon the radar signals which are beamed by the launching platform and which are reflected by the target.\textsuperscript{14}

There are other features distinguishing particular types of targets from their surroundings which can be used for precision guidance. For instance, the United States is developing homing sensors which identify and home on agitated metal components.\textsuperscript{15} Others distinguish some types

\begin{itemize}
\item \textsuperscript{12} For details see the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 19?? Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 11 March 1976, pp. 5781, 5782.
\item \textsuperscript{13} Examples of this type of system include HARPOON, EXOCET, KORMORAN, etc.
\item \textsuperscript{14} Semi-active radar homing missiles include SPARROW, MATRA R530, SKYFLASH, etc.
\item \textsuperscript{15} General A.D. Slay, Deputy Chief of Staff for Research and Development, discusses this development in his testimony before the Subcommittee on Tactical Airpower of the Committee on Armed Services, US Senate, Fiscal Year 19?? Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 10, 15 March 1976, p. 5313.
\end{itemize}
of targets by acoustic techniques.\textsuperscript{16}

The final class of targets which are relatively easily distinguished for precision guidance purposes from their background environments are those which emit electronic signals. Radar emitting targets can not only be acquired relatively easily but weaponry can be equipped with a guidance system to home onto the signal's source.\textsuperscript{17} This type of anti-radiation precision guidance has been developed to the point where it can home on the very faint emissions forthcoming from the back lobe or rear of an antenna and from the weak transient signals which remain for a short time after the radar is shut down but not isolated from its power source.\textsuperscript{18}

The second major category of precision guidance really involves extremely accurate navigation to known fixed points at which targets are located or through which mobile targets are passing. Inertial navigation systems have been available for many years. However, new ring-laser and nuclear magnetic resonance gyro technology appears likely to provide greatly improved accuracy within constrained weight, size and cost parameters.\textsuperscript{19} Because of their inherent

\textsuperscript{16} Ibid.

\textsuperscript{17} Examples of this type of weapons system include SHRIKE, HARM, BRAZO, etc. There are also several other anti-radiation weapons under consideration. One proposal is to fit a radiation homing head to the COPPERHEAD cannon launched guided projectile. Another is to fit an anti-radiation and a new generation infra-red seeker sensor together on the MAVERICK missile. See \textit{Aviation Week and Space Technology}, Vol. 106, No. 19, 9 May 1977, p. 59 and \textit{Flight International}, Vol. 110, No. 3537, 25 December 1976, p. 1834.

\textsuperscript{18} This homing capacity is discussed in a Defense Marketing Services, \textit{Market Intelligence Report} on the AGM-45 SHRIKE, April 1976.

\textsuperscript{19} Much of the applied work done on ring-laser gyros has been undertaken within the US Simplified Inertial Guidance Demonstration (SIG-D) and the Advanced Tactical Inertial Guiding System (ATIGS) programmes. ATIGS and microwave area correlation technology have now been combined by the US Navy to provide a new and inexpensive guidance system for long range air-to-ground missiles. See \textit{Flight International}, Vol. 110, No. 3537, 25 December 1976, p. 1834. For information on nuclear magnetic resonance gyros see \textit{Aviation Week and Space Technology}, Vol. 106, No. 20, 16 May 1977, p. 53.
lack of complete precision, it seems probable that most inertially guided conventional weapons systems will be supplemented by a specialised form of terminal homing.

The terrain contour matching technique (TERCOM) provides a very precise method of long range navigation via a series of over-land way points. An essential prerequisite of this system is for the detailed characteristics of the terrain at each way point and at the target's location to be obtained in advance either by satellite reconnaissance or by some other method. By using the ground elevation characteristics as inputs, digital terrain maps of each way point must be constructed and inserted into the missile computer memory for instant on-site recognition. Upon launch, the missile is directed towards the first way point and, as it is approached, the guidance system rapidly scans the terrain profile. Divergence or drift from the optimal course can be detected instantaneously by comparing the stored digital contour map with that being sensed by the missile's altimeters. Corrective command steering can then take place before the missile changes course for the next way point. Upon approaching the target itself, the missile again compares the stored digital map with its sensor's image of the terrain below and then automatically directs its impact onto the allocated portion of the ground.

In the United States' strategic cruise missile programme, an alternative form of terminal guidance may be employed in conjunction with TERCOM for terminal target recognition. On-board scene matching area correlation (SMEAC) equipment can store a black and white negative film of the target site instead of a digital map. When the missile reaches the target area, a positive image of the external scene is superimposed upon the stored film. The

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missile flight path can then be adjusted until the images match. Obviously, unless image intensification or passive infra-red techniques are used in this process, its application would be limited to daylight, fair weather conditions which are smoke-, smog-, rain-, fog- and snow-free. In operational form the total system is expected to demonstrate a guidance accuracy comparable to that of short range electro-optical missiles.

In addition, there are long range ordnance navigation techniques which determine position during flight by extremely precise sensing of the earth's natural magnetic field. Others use passive microwave radiometric technology (MICRAD) to sense the natural radiation of the earth's surface and calculate precision position fixes.

Yet other forms of long range navigation such as TACAN, VOR, LORAN and OMEGA use active ground-based radio beacons. The receipt of continuous emissions from these radio networks makes it possible for positions to be determined continually through a series of rapid trigonometric calculations.

There is a related ordnance navigation system of some significance which uses an opponent's fixed radar and jamming emitters and where necessary supplementary specialised emitter beacons to provide the basis for a complex emitter reference grid across the battlefield. When established, this grid can

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22 One example of this type of system is MAGCOM which operates in a manner similar to TERCOM except that its position fixing sensors are purely magnetic.

be used as a source of reference, when non-emitting objects are acquired and targeted on the battlefield. Targets acquired within this system can then be attacked by ordnance which is fitted with distance measuring equipment (DME) guidance heads. Such systems can navigate precisely to given fixed points by referring continuously to their sensed position within the adopted emitter grid. The great advantage of DME guidance is that it can be used in all weather and visibility conditions and the disposable ordnance guidance units can be produced relatively inexpensively. 24

Perhaps the ultimate form of beacon positioning will be available from the United States' NAVSTAR Global Positioning Satellite (GPS) system which is expected to be partially deployed and operating for experimental purposes in August 1978. GPS terminals will initially weigh 13.6 kg and may eventually cost less than US$10,000 each. For this price, they should provide a wide range of weapon platforms and ordnance systems with highly jam-proof position-fixing with accuracies within 9 metres 90 per cent of the time and 5 metres 50 per cent of the time. 25


Many of these precision guidance techniques can be countered effectively by an opponent who is well prepared. For instance, a range of passive measures can be employed to foil optical tracking. Special camouflage materials and a range of operational techniques, such as terrain masking, can be employed to maximise the difficulties of optical tracking. Heat suppression measures and materials can be employed to reduce infra-red signatures. Several systems exist to provide warning of active infra-red energy and laser illumination. Screens of smoke, dust and fog can be generated rapidly in some tactical environments not only to inhibit and prevent optical tracking but also to dissipate laser beams employed for munition guidance and target ranging. Most types of active navigation beacons and radio command links can be jammed or degraded. Infra-red homing and anti-radiation missiles can be decoyed and magnetic and radiometric navigation systems spoofed. In addition, there are automatic countermeasure systems available for many applications. One notable example, which the United States currently has in advanced development, is an aircraft optical countermeasures pod which is designed to sense weapon flashes and automatically direct a high power laser beam to destroy or seriously damage the eyes of the weapon controller.

26 There is a discussion of some of these developments in a Defense Marketing Services, Market Intelligence Report on the US Army Natick Development Centre, November 1975.

27 For information on these types of passive detection systems see Defense Marketing Services, Market Intelligence Report on US Army Electronics Command (ECOM), December 1975, pp. 1, 2.

28 In the US, the Mobility Equipment Research and Development Centre (MERDC) has developed devices to produce almost instant smoke, fog and aerosol screens. See report on MERDC in the Defense Marketing Services, Market Intelligence Report, October 1975, p. 5.

29 Details of the Advanced Optical Countermeasures System (AOCM) are given in a Defense Marketing Services, Market Intelligence Report on 'AN' Equipment, May 1976.
There are also precision guidance counter-counter-measures. The security of radio command links can be improved; operating procedures can reduce the opportunities for an opponent to detect the use of laser designators; laser designator homing ordnance can be coded to match the frequency of the designator to which it is assigned and infra-red homing weapons can be tuned to match the signature of the target sought.

In addition to these many refinements of precision guidance technology, there is a significant trend in weapon design which is likely to complicate further the task of countering the new precision guidance technologies. This concerns the development of multi-sensor terminal guidance. In the case of some light weapons systems, this can be expected to be manifested in the development of a modular character. Light SAM systems, for instance, may be designed for the alternative fitting of infra-red homing, passive radar seeking and laser beam riding guidance heads. Man-portable anti-tank missiles may be fitted with alternate laser beam riding or tuned infra-red homing guidance heads. For weapons of greater size, significant advances in a series

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The problems, difficulties and potential of remotely launched laser designated ordnance are discussed at length by Steven L. Canby in Terminal Guidance on the Battlefield, Obtaining its Potential Payoff (Santa Monica, Technology Service Corporation, 1975).

31 For details see testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 11 March 1976, pp. 5781, 5782.
of antenna designs are making it possible for a wide range of alternative guidance or homing systems to be accommodated aboard individual weapons. There are a large number of programmes currently under development which fall into this category. For instance, the US Army has initiated a programme to provide the laser designated cannon launched guided projectile (COPPERHEAD) with a secondary infra-red homing capability. Several anti-radiation weapons that are already deployed possess a home-on-jam capability. The future prospects of a target which is under attack being able to counter effectively all potential types of missile guidance at once seems highly improbable.

In summary, it can be seen that the new technologies are proliferating the means which are available to hit acquired targets and exact locations with precise accuracy. The overall consequence is that, if a mobile target can be acquired or the location of a fixed target can be determined, it is becoming much more likely that it will be hit by the first round of ordnance which is fired.

2. More Efficient Propulsion Systems

The propulsion systems of most types of weapons platforms and weapons themselves are being improved significantly. Most

32 This significant development is discussed by Dr G.H. Heilmeier, Director of DARPA, in his report to the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part II, 11 March 1976, pp. 5828, 5829.

33 This development is discussed in a Defense Marketing Services, Market Intelligence Report on Terminal Homing, September 1976, p. 2.

particularly, there are several research and development efforts which appear to promise very much improved fuel, weight and space efficiencies.

For nuclear submarines, there is great potential for increased efficiency and decreased weight and noise through the employment of superconducting and segmented magnetic motors. For conventional submarines and torpedoes, the closed cycle BRAYTON gas turbine, the STIRLING engine and a combination of the STIRLING and WALTER engines show new promise. New types of batteries are also becoming available.

In small and medium sized surface shipping, the trend towards gas turbines either on their own or in a CODOC or CODAG arrangement with diesels may be further strengthened by the proliferation of new types of naval platforms, surface effect ships, hydrofoils, semi-submerged hull systems, etc.

In the field of aircraft engines, there has been a great amount of research into the use of ceramic components. Their introduction may make it possible for the production costs of some types of engine to fall dramatically. But, in addition, the employment of ceramic components should enable

35 See these systems discussed by Mr H.T. Marcy, the US Assistant Secretary of the Navy for Research and Development, in his testimony before the Research and Development Subcommittee of the Committee on Armed Forces, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 6, 26 February 1976, p. 3348.

the normal operating temperature of many engines to be increased significantly. This, in turn, will have a favourable impact upon fuel economy. 37

In weapons themselves, new forms of high density propellants will give much increased speed and range to man-portable systems. For applications where rockets of larger dimensions with longer sustained power and high speeds are required, integrated rocket/ramjet designs will greatly enhance the accepted norms of performance. 38 In the field of cruise missiles where speed is normally compromised heavily by the requirements of fuel efficiency, range and compact dimensions, small turbo-jet and turbo-fan engines can be expected to be improved further and to become far more common.

In total, these developments in propulsion systems are providing both weapon systems and platforms with greater range, speed and fuel efficiency, while at the same time contributing to the reduction of their sound, heat, radar and other media signatures. On the tactical operational level, the new propulsion systems and terminal guidance technologies, when combined, provide an unprecedented capacity to hit accurately targets which can be acquired and identified, even at very long range. On the strategic level, much of the traditional tyranny of distance, in the sense of isolation, is being replaced by a new tyranny of military accessibility.

3. More Effective Conventional Warheads

The destruction potential of a given conventional warhead volume and weight has increased greatly in recent years. A

37 For details see the testimony of Dr G.H. Heilmeier, ibid., pp. 5794-5796 and also 'ARPA's Current Thrust' in Aviation Week and Space Technology, Vol. 102, No. 15, 14 April 1975, p.7.

variety of new technology warheads have been developed to meet specific battlefield requirements. For instance, for the purpose of disabling, delaying and channelling concentrated movements of enemy forces, minelets and bomblets of 'fist' size have been developed. Because of their relative cheapness, these weapons can be laid over large battlefield areas by aircraft, artillery and ground based dispenser systems.  

For the neutralisation of airfield runways, hardened aircraft shelters and other similar structures, terminally accelerated penetrator bombs have been developed not only with a capacity to pierce and crater thick concrete but also to cause extensive heaving and disturbance beneath large areas of the surface. 

39 The West Germans have produced the PANDORA, MEDUSA and DRAGON SEED dispenser systems. They are also developing a new air-delivered dispenser system called STREBO which permits a degree of control over the bomblet or minelet delivery pattern. For details see Stefan Geisenheyner, 'Pandora, Medusa, Dragon Seed - A Defensive Weapons Mix for Europe' in Aerospace International, May-June 1971, pp. 56-58.

The United States has a similar system called GATOR. See the statement of Captain G.R. Bowling, Head of the Tactical Air Launched Weapons Section, US Navy, before the Subcommittee on Tactical Airpower of the Committee on Armed Services, US Senate, Fiscal Year 19?? Authorisation for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 10, 15 March 1976, pp. 5308 ff.

A third major development in conventional warhead technology has been that of fuel air explosives. These are designed to spray rapidly and then ignite an aerosol cloud of highly volatile fuel. The effect is to exert very high overpressures over the immediate area of the explosion. In the case of a large third generation weapon, the overpressures generated by a strike in the immediate target area are comparable to those which would be produced by the detonation of a 20 kiloton nuclear explosion at a distance of less than two hundred metres. The blast wave effect is between 2.7 and 5 times that produced by an equivalent quantity of TNT. Immediate applications are for mine clearance, for the destruction of hard targets, bunkers, aircraft shelters, armoured vehicles, ships, etc., and as an anti-personnel weapon against units in the open and in entrenchments.\(^1\) In the longer term, it may also be possible to mount fuel air explosive canisters on or above the seabed as anti-shipping mines. Once triggered, fuel and buoyant detonating mechanisms could be released to the surface where the vaporising cloud could be ignited in a similar manner to that of a surface-delivered warhead.

There are two other warhead developments of note. One


Despite FAE's obvious potential, it should be noted that their performance can be degraded significantly by rain, fog, snow, sleet and to a lesser extent by naturally high humidity environments.
involves the use of navel shaped charge concepts. The other involves the use of complex multi-stage warheads. The most notable example of this advance is the Hard Structure Munition (HSM) warhead being developed by the US Air Force for the destruction of bunkers, aircraft shelters, bridge piers and other hardened targets. It is believed to take the form of a shaped-charge munition with a secondary follow-through warhead.

The main consequence arising from these new warhead technologies is that, if a target can be hit, the resulting destruction is likely to be far greater for a given warhead weight than has been the case in the past. So, when the new conventional warheads are combined with the new precision guidance and propulsion technologies, it becomes clear that if a target can be acquired and identified there is now an order of magnitude increase in the probability that it can be destroyed quickly even if it is positioned at a distant location. As a consequence of these developments, it seems likely that target acquisition and identification, even at extended ranges, will become an increasingly important function on the conventional battlefield.

4. Greatly Improved Long Range Surveillance and Target Acquisition Technologies

The efficiency with which long range detection, identification and tracking systems can operate depends

42 See the reference to this programme in the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, p. 5898.

heavily upon the strength of the signature contrast between the target and its background environment. The high level of contrast between a fast moving, warm or hot metallic aircraft against the cool and almost uniform expanse of the sky makes the long range detection of aircraft possible. Large, noisy, warm, metallic ships on the surface of the sea present a similar contrast signature, which renders them also susceptible to long range detection. On the other hand, submarines operating within the very dense sea environment represent quite a different type of long range detection problem. Yet despite the fact that sound and other emissions from sub-surface craft pass in uneven patterns, there are now clear indications that in many environments long range detection and identification of submarines is possible. Small or moderately sized targets on the earth's surface which do not radiate active electronic emissions are even more difficult to detect and identify at long range. The ground itself is an extremely dense and uneven environment which can provide effective masking for a wide range of targets from long-range detection by nearly every type of sensor.

Satellites currently carry an array of optical photographic, infra-red, radar and electronic intelligence sensors for the detection, location, identification and tracking of objects of military significance on the ground and on the surface of the sea. The specific capabilities of each type of sensor are highly classified but one expert in the field has calculated that the resolution of current US optical photographic sensors is at least 35 centimetres and may be

significantly lower.\footnote{These calculations are made by Ted Greenwood in 'Reconnaissance and Arms Control', Scientific American, Vol. 228, No. 2, February 1973, pp. 14, 15.} It is also known that a new type of sensor system is under development which will permit flying aircraft and large cruise missiles to be detected and tracked from space.\footnote{See the reports on the High Altitude Large Optics (HALO) and the TEAL RUBY programmes in Aviation Week and Space Technology, Vol. 106, No. 9, 28 February 1977, p. 13 and Aviation Week and Space Technology, Vol. 106, No. 13, 28 March 1977, p. 11. For more substantial articles on this subject see Barry Miller, 'Advances in Missile Surveillance Pushed' in Aviation Week and Space Technology, Vol. 105, No. 2, 12 July 1976, pp. 17 ff. and Barry Miller, 'Aircraft Detection System Advances', Aviation Week and Space Technology, Vol. 106, No. 25, 20 June 1977, pp. 22, 23.}

However, satellite surveillance sensors do suffer from a number of significant weaknesses. If the ground support facilities are highly concentrated and positioned in obvious locations, in some types of conflict they may be vulnerable to early destruction. In addition, it should be noted that satellites themselves can be intercepted and destroyed, at least by the superpowers.\footnote{This capacity is discussed fully by Barry Miller in 'USAF Pushes Satellite Survivability', Aviation Week and Space Technology, Vol. 106, No. 13, 28 March 1977, pp. 52 ff. and also in Stockholm International Peace Research Institute, World Armaments and Disarmament SIPRI Yearbook 1977, pp. 121, 122, 129, 130.} Hence, unless a state has the capacity to incorporate a series of extremely expensive countermeasures, their survivability cannot be assured under all circumstances. Another difficulty arises from the fact that in order to be effective many satellite sensor systems have to be launched into low altitude orbits. This effectively reduces satellite lifespan, necessitating system
replacement at frequent intervals. As a consequence, it appears that some types of satellite-borne military sensors are likely to remain exclusively in the hands of a small number of major powers. The technology involved is extremely complex and the costs of developing, procuring and actually positioning sensor packages in space are likely to deter the active involvement of most states.

A most promising method of detecting aircraft, large cruise missiles and some types of surface shipping at long range is over-the-horizon backscatter radar (OTH-B radar). The development of the JINDALEE OTH radar system was discussed briefly in footnote 33 in Chapter 1. Essentially, these systems consist of an advanced active phased-array radar transmitter which emits high frequency, high powered signals which are frequently adjusted to minimise the degrading effects of natural or man-made ionospheric disturbances. This type of signal harmony is important because the objective is to bounce the signals off the ionosphere to detect targets at ranges between 800 and 3,200 km or even further around the curvature of the earth. The efficiency with which this can be done varies greatly according to the matching of frequencies to the current state of the ionosphere. Signals beaming off the ionosphere impact upon targets and return again via the ionospheric 'mirror' to a separately located receiver station. The filtering of targets from the enormous amount of 'noise' and clutter created by the signal's reflection off the earth's surface and by the ambient electro-magnetic activity deriving from the earth and extra-terrestrial sources is an extremely difficult process.


49 These range figures are cited in *Air Force Magazine*, Vol. 59, No. 7, July 1976, p. 56. They are slightly in excess of those which have been released officially in Australia. See, for instance, 'Schematic of Operation of Over the Horizon Radar' in *Triad*, No. 2. p. 7.
and can be done only by using the DOPPLER principle. This involves the detection of objects which move against the relatively stable background environment.  

Hence, in the detection of aircraft, large cruise missiles and large metallic fast-moving shipping this type of system can be effective in most environments.  

As a long range detection system, OTH radar displays obvious potential. There are strong indications that refinements to this type of system may provide accuracies which make direct vectoring of intercept aircraft possible.  


The question of whether OTH-B radar systems are capable of detecting the very small radar signatures of modern long range cruise missiles is discussed later in this chapter.  

The expectation that JINDALEE would have a capacity to detect and track shipping was raised by Dr J.L. Farrands (Australia's former Chief Defence Scientist) in his address to the National Press Club on 6 October 1976.  

Imagine how many (conventional radars) would be needed to cover the Australian coastline and imagine the increased difficulty of locating ships out to the margin of the (320 km) economic zone.  


It is worth noting that OTH-B radar operation in regions subject to auroral disturbances can cause significant problems. This has been a major difficulty in the US 414L OTH-B programme. See James R. Schlesinger (Secretary of Defense), Annual Defense Department Report FY1976 and FY1977, US Department of Defense, 1976, p. II-44.  

However, when difficult ionospheric conditions are experienced or when an opponent attempts to jam the system, it may be necessary to dispatch an airborne warning and control aircraft system (AWACS) to the target's vicinity to vector intercept aircraft more precisely.\textsuperscript{55}

An integral and obvious part of all OTH radar systems is their extremely elaborate high frequency receivers. In this connection, it is notable that a very large proportion of civil and military communication is also undertaken within this frequency spectrum. Thus, in the words of Philip J. Klass, the avionics editor of \textit{Aviation Week and Space Technology}:

\begin{quote}
... any type of OTH radar is also potentially a means for eavesdropping on high frequency radio communications that might otherwise be too weak for ordinary radio communication receivers.\textsuperscript{56}
\end{quote}

General Gould of the United States Air Force has supported this view by stating in his Congressional testimony that: 'It is clear from what we know that this system will have intelligence value'.\textsuperscript{57} It is by no means clear whether use of an OTH system for these purposes would require the shutdown of the radar transmitter. It may well be possible to modulate the receiver at microsecond intervals to permit both functions to be performed simultaneously.\textsuperscript{58}

Further development of the OTH backscatter radar principle may provide additional capabilities of great value.

\textsuperscript{55} This requirement for OTH-B radar and AWACS interaction is suggested by Philip J. Klass in 'HF Radar Detects Soviet ICBM's', \textit{Aviation Week and Space Technology}, Vol. 95, No. 23, 6 December 1971, p. 40.

\textsuperscript{56} \textit{Ibid}.

\textsuperscript{57} General Gould is quoted by Philip J. Klass, \textit{ibid}.

\textsuperscript{58} Dr Desmond Ball suggests that the OTH radar transmitter could be shut down completely for periods of up to 30 minutes if this was necessary. See Desmond J. Ball, 'Some Further Thoughts on Jindalee', \textit{Pacific Defence Reporter}, Vol. 3, No. 11, May 1977, p. 57.
Most importantly, it may be possible to employ BISTATIC or SANCTUARY concepts to OTH radar. This would involve the construction of multiple OTH radar receivers at forward sites, most probably several hundred or even thousands of kilometres distant from the centrally located transmitter. These forward receivers would not necessarily need to be as large or complex as the current base sites and certainly would not be expected to be prohibitively expensive. Some might be mobile, perhaps mounted aboard heavy trucks, ships or even large aircraft. The development of SANCTUARY OTH radar concepts would offer two major advances in system capability. Firstly, the reception of the transmitter signals which return from targets to receivers at multiple locations would make target tracking far more accurate through the use of multiple triangulation techniques. Secondly, and perhaps even more importantly, the forward receivers would be able to detect and track aircraft, large cruise missiles and metallic fast-moving ships in their vicinity in a completely passive manner. This capacity would facilitate command and control and perhaps even ordnance targeting without a requirement to emit active signals from forward positions or to conduct active airborne reconnaissance. The tactical and strategic significance of this type of capability might be of crucial importance in many environments.

The potential exists for an even more refined capacity.

59 This concept is outlined in Aviation Week and Space Technology, Vol. 105, No. 8, 23 August 1976, p. 61. See also the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, pp. 5898, 5899. Dr Heilmeier is also quoted on this subject in Aviation Week and Space Technology, Vol. 106, No. 10, 7 March 1977, p. 171.

60 The possibility of employing mobile OTH radar receivers is raised by Desmond J. Ball in 'Some Further Thoughts on Jindalee', Pacific Defence Reporter, Vol. 3, No. 11, May 1977, p. 57.
if more than one OTH radar transmitter is deployed. By using variable frequency techniques, the United States has apparently demonstrated a capacity not only to detect and track aircraft targets but to identify them positively as well. According to *Flight International*:

Tests have showed that - provided the frequencies used are such that the wavelength is longer than the largest dimension of the target, and that two or three different frequencies are used - examination of the amplitude, phase and polarization of the reflected signal gives each target a recognizable signature. During trials with models it has proved possible to differentiate the Mig-19, Mig-21, F-104 and F-4.61

The further development and deployment of OTH radar systems would appear not to be excessively expensive and hence their acquisition by a number of large and medium powers can be anticipated during the 1980s.62

Of complementary significance in this field is the newest generation of airborne warning and control aircraft (AWACS). Aircraft of this type are equipped with powerful radar and carry very advanced computer processing and communications systems. Their overall tasks are many and their capabilities extend beyond that of long range surveillance. However, in the context of this discussion, it should be noted that by utilising the altitude at which


62 Dr J.L. Farrands, Australia's former Chief Defence Scientist, indicated that he expected the total development cost (excluding final system installation costs) of JINDALEE to be about A$20m., *The Australian*, 7 October 1976, p. 11. This contrasts markedly with the US expenditure levels at approximately US$50m. by 1976. See testimony of Secretary Donald H. Rumsfeld, *Annual Department of Defense Report for FY 1977*, US Department of Defense, 1976, p. 90. One of the major reasons for this disparity was cited by Mr Killen, 'Costs have been kept down by borrowing special electronic equipment from the United States', *Commonwealth Parliamentary Debates*, House of Representatives, Thirtieth Parliament, 4 June 1976, p. 3115. However, a second and possibly equally important reason is that the Australian programme has not had to solve the difficult problem of auroral interference. See *DMS Intelligence*, Vol. 5, No. 5, January 1977, pp. 3, 4.
they patrol for long periods, these systems can detect air, naval and some ground movements far beyond the horizon-imposed constraints of conventional radar installations on the earth's surface. Aircraft or cruise missiles flying at altitudes from ground level to 30,000 metres can be detected and tracked readily from AWACS aircraft, if they fly within a radius of approximately 600 kilometres. If necessary, the electronic systems on board can be used to vector friendly aircraft for interception.

The problems and difficulties of acquiring comprehensive long range underwater surveillance have, until recently, appeared intractable. However a number of important technological developments are altering dramatically the potential for reliable submarine and surface ship detection, identification and tracking. As Dr Heilmeier explained to Congress:

Through DARPA sponsored experiments, the ocean has been found to be a far more tractable underwater sound environment than we had previously thought. Improved detection ranges appear to be achievable. These techniques were previously thought to be impossible with acoustic undersea arrays. We are now attempting to demonstrate a revolutionary capability for detecting submarines.

Much of the progress to which Dr Heilmeier refers is attributable to the multi-sensor integration programme.


called SEAGUARD, which is the subject of discussion later in this chapter. But individual sensor techniques have also advanced significantly as a result of a number of very important developments. Most notable in this regard is the new generation of long range passive sonar sensors which possess a capacity to detect and track both surface and submarine movements in large parts of the world's oceans. Since the early 1950s, the United States and her NATO allies have deployed hydrophone sensors on or just above the sea bed of the Atlantic. The original SOSUS (Sonar Surveillance System - for area use) and CAESAR (for barrier use) systems have been enhanced since that time through five distinct development phases. The latest generation upgrades these systems and supplements them with three new types of passive surveillance sensor.

Currently the United States is deploying a greatly improved Towed Array Surveillance System (TASS). This is a linear sensor which is towed for several miles behind naval shipping so that it can detect the 'noise' of submarines and ships through the multiple salinity and temperature layers of the surrounding ocean. This system is to be partially replaced in the early 1980s by an even longer and more sensitive Strategic Surveillance Towed Array Sensor called SURTAS. This system will require a specialised ocean-going tug, called T-AGOS, and it may employ very

65 These developments are described at length in Larry L. Booda, 'ASW - Challenges and Bold Solutions' in Sea Technology, Vol. 14, No. 11, November 1973, pp. 24-27.

66 In November 1975, there were reported to be six different models of TASS. The original system was developed by the Chesapeake Instruments Division of Gauld Incorporated in 1968. See Defense Marketing Services, Market Intelligence Report on TASS dated June 1976 and another on the Naval Undersea Centre dated November 1975, p. 3.
advanced sonar array techniques with an aperture in two dimensions.67

The third new type of long range passive sonar system is called the Moored Surveillance System (MSS). This is a self-mooring sonobuoy system which can be dropped by aircraft, ships or submarines and which is designed to act as a semi-permanent listening barrier. MSS systems are capable of being monitored by aircraft, ships or coastal installations in the vicinity.68

The sounds which are detected by these passive sonar systems are processed in large computer banks either on shore or aboard ships. This permits the detection, generalised locating and tracking of particular ships and submarines with a high degree of reliability. In addition, particular classes of ship and even, in some cases, individual ships of a class can be identified by their sound signatures. The inherent sophistication of these systems' discriminatory capacity makes decoying or spoofing with specialised noise-making torpedoes and other false targets extremely difficult.69 However, to some extent, it is possible to jam actively a proportion of their capacity by overwhelming them with generated noise. Yet, as with the jamming of OTH radar and other long range surveillance sensors, this action by its

67 See the testimony of Vice Admiral J.H. Doyle, Jr, Deputy Chief of Naval Operations, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1976 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 12, 7 April 1976, p. 7062. See also the testimony of Dr G.H. Heilmeier, the Director of DARPA, before the same Subcommittee under the same volume title, Part 11, 11 March 1976, p. 5774.


69 Vice Admiral D. Murphy, Director of US Antisubmarine Warfare and Ocean Surveillance Programs, gave a clear indication of the sophistication and sensitivity of these systems when replying to a Congressional question
very nature would serve to prevent surprise and to alert opposing forces. It is clear that new technologies for long range target detection and identification are providing greatly enhanced capacities. In the air, satellite sensors and OTH radar may be sufficient to direct intercept aircraft at long range on their own in some environments. However, in many situations, supporting AWACS aircraft and conventional ground-based radar systems may also be required. In the maritime environment, satellite sensors as well as OTH and advanced AWACS radar systems are likely to provide a supplementary capacity to long range passive sonar sensors in the detection and tracking of surface shipping. In the more difficult undersea environment, it now appears that a mix of passive sonar arrays can provide a detection and identification capability and a more generalised locating and tracking capacity. In the land environment, no comparable long range surveillance capacity appears to

69 cont'd concerning their vulnerability to decoys:

Decoys such as you have described (deleted) however, the more experienced the operator and the more sophisticated the sonar, the less effective the decoy becomes. Exact duplication of the target is not possible due to cost and size considerations - difficult tradeoffs are involved. This is an area where intelligence is a key factor. How sophisticated a system do you design against? Likewise, intelligence on decoys assists the operator in distinguishing between real and false targets.


be available for the detection of targets which do not radiate significant quantities of electro-magnetic energy. 71

5. A Proliferation of Battlefield Target Acquisition and Identification Systems

For objects on the battlefield to be targetable, they must be identified and located precisely. As has been discussed above, in the air environment these functions can be performed by satellite sensors or OTH radars on their own in many situations. However, in some circumstances, AWACS aircraft and ground control intercept radars are likely to be required in addition.

The precise location of surface shipping can also be performed by OTH radars, AWACS and conventional ground based radars. Satellite-borne optical, radar, infra-red and electronic sensors are available to the superpowers and may also be procured by other major powers. For undersea and also some surface locating applications, active and passive sonar systems have been employed extensively since the Second World War. Great advances have been made in all types of sonar systems during the past thirty years, particularly in signal processing and computer techniques. In specific applications, air delivered sonobuoys have acquired a directional and multi-level detection capability. 72 Wide aperture submarine hull-mounted sonar arrays are being

71 It is possible that the HALO satellite sensor programme will expand greatly US capacities to detect, classify and track small tactical objects on the earth's surface. Dr G.H. Heilmeier, the Director of DARPA, expressed the hope that this programme would achieve the sensitivity to detect dim targets from high altitudes. See this cited by Barry Miller in 'Aircraft Detection System Advances', Aviation Week and Space Technology, Vol. 106, No. 25, 20 June 1977, p. 23.

72 See, for example, the account of the DIFAR sonobuoy's capabilities in Larry L. Booda, 'Restocking the ASW Arsenal', Undersea Technology, Vol. 13, No. 11, November 1972, p. 20.
deployed to provide a long range surface ship targeting capacity, thus facilitating cruise missile attacks from submerged locations. In addition, a new specialised type of sonar is being developed to detect water disturbances as they are produced by submerged vessels rather than the noise generated within submarines themselves. There are also indications that a new extremely sensitive type of sonar is under development which will provide warning to submerged submarines of overflying aircraft.

In surface ships, hull-mounted sonar systems are being encased in rubber domes in an effort to reduce ambient noise. However, this and other advances in surface ship hull-mounted sonars do not overcome the basic difficulties of penetrating oceanic temperature and salinity layers.


74 For details of this system see Aviation Week and Space Technology, Vol. 106, No. 10, 10 March 1976, p. 17.

75 See the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, p. 5898.

76 This is discussed at length by Vice Admiral D. Murphy, US Navy, Director of Anti-Submarine Warfare and Oceans Surveillance Programs, in his testimony before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 5, 11 December 1975, p. 2014.
Thus, although hull-mounted sonars are now extremely powerful and highly refined, the newest systems have been described as being the 'ultimate ox-cart'. Towed passive array sonar systems overcome most of the difficulties of hull-mounted systems because they can be trailed in such a manner that they penetrate and operate within the layers of the ocean between which submarines normally operate. In addition to the towed array systems which have been designed primarily for large area strategic purposes, there are others which have been designed primarily for precise targeting within more limited areas. For instance, the United States has developed a Tactical Towed Array Sensor (TACTAS) which is intended to provide frigate, destroyer and cruiser size ships with a capacity to detect, classify and target a submarine for attack before it itself can be detected by the submarine. A similar but specialised towed array is being fitted to POSEIDON SSBN submarines in refit as part of the integrated UNIQUE system. This will probably be towed by deep-diving submarines in such a manner that it floats up through the salinity and temperature layers towards the sea's surface, providing a capacity to detect the approach of hostile submarines and surface ships from long ranges.

Experiments are also underway with an airborne towed

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77 This was the description of the powerful AN/SQ553 hull-borne sonar given by the crew of the USS Forster, the second of the new SPRUANCE class destroyers to be built. See J.P. Geddes, 'Operational Assessment of a Spruance Class Destroyer' in International Defense Review, Vol. 9, No. 6, December 1976, p. 944.

78 Ibid.

79 TACTAS is described in a Defense Marketing Services, Market Intelligence Report under 'AN' Equipment, September 1976.

80 For details see Defense Marketing Services, Market Intelligence Report on the BQR-15 Towed Array Sonar under 'AN' Equipment, February 1976.
array system (IA IR TASS) primarily for helicopter usage. This type of sensor may find much expanded application as the US Navy moves towards multipurpose V/STOL aircraft and considers lighter-than-air vehicles for some categories of ASW duty.

Because of its inherently dense and complex nature, battlefield acquisition, identification and targeting is a much more complicated process in the land environment. Natural undulations in terrain and variations in natural vegetation, geology, fauna and many other factors greatly complicate the efficient operation of nearly every type of sensor system. As a consequence, there are a very wide range of complementary target acquisition systems being developed, each of which will have a capacity to perform only part of the total function.

Perhaps the simplest type of target acquisition sensor used in the ground environment extends the capabilities of the human eye and normal optical and electro-optical systems. The most important objective in this field has been to provide an effective vision capacity at night, in periods of bad weather, fog, sleet, rain, snow and through smog, dust and smoke. Inexpensive active infra-red systems were first introduced in the 1950s but these had a limited range capacity and were readily detectable. In the mid-1960s, passive image intensification systems were developed. However, these possessed a very limited capacity

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81 This system is mentioned by Larry L. Booda in 'ASW - Challenges and Bold Solutions' in Sea Technology, Vol. 14, No. 11, November 1973, p. 27.


83 See the testimony of Major General P.R. Feir, Assistant Deputy Chief of Staff for Research, Development and Acquisition, before a Subcommittee of the Committee on Appropriations, US House of Representatives, Department of Defense Appropriations for 1977, Part 5, 10 March 1976, p. 1074.
in poor weather and became temporarily ineffective if subjected to bright light sources, tracer rounds, flares, shell bursts or spot lights. \(^{84}\) Passive or far infra-red devices were then developed with a capacity to permit target acquisition at night, through smoke, smog and moderate amounts of fog, rain, sleet, snow and dust. \(^{85}\) This technology has now been applied to a very large number of specific applications. For instance, night vision goggles have been developed weighing less than one kilogram and possessing a night vision range of 100 metres. \(^{86}\) One particular night sight for crew-served weapons weighs 4 kilograms and possesses a range of at least 1,200 metres but more probably 3,700 metres. \(^{87}\) A long range observation and target acquisition device weighing approximately 30 kilograms has been produced with an even greater capacity. \(^{88}\) Several airborne forward looking infra-red (FLIR) systems have been developed for reconnaissance, target acquisition and designation. Some of these, such as PAVE TACK, are podded systems using slaved low powered laser designators for weapons guidance. \(^{89}\) Others, such as the extremely powerful

\(^{84}\) Ibid.

\(^{85}\) Ibid., p. 1080.

\(^{86}\) Ibid., p. 1083. The unit cost of this system was US$9,917 in March 1976.

\(^{87}\) The shorter range figure is given by General Feir in his testimony, *ibid.*, p. 1083. However, earlier in his testimony, he stated that that same night sight would...

... give (deleted) metres for TOW and enable us to take full advantage of TOW's range capability at night. We consider this a tremendous breakthrough and a tremendous tactical advantage for our side.

*Ibid.*, p. 1079. TOW's maximum range capability is 3,750 metres. The cost for this particular night sight was given as US$5,180 in March 1976.

\(^{88}\) Ibid., p. 1083. The unit cost for this system was given as US$39,726 in March 1976.

TRAM system, have been integrated into aircraft structures to perform similar functions.\textsuperscript{90}

An important and relatively new application of passive imaging infra-red technology has been in the partial replacement of radar and other sensors for ground- and sea-based aerial surveillance and target acquisition. Most notably, the Swedish IRS-700 system has been designed primarily for passive aircraft and missile detection and tracking.\textsuperscript{91} The United States has a similar infra-red scanning system under development which is designed to stare at the horizon to detect the rise of warm mortar or rocket projectiles. When slaved with a laser radar, these projectiles can be accurately tracked and enemy firing points targeted promptly and accurately.\textsuperscript{92} These infra-red scanning systems possess a very great advantage over comparable radar systems because their non-emitting passive nature greatly complicates enemy attempts to acquire them as targets.\textsuperscript{93}

Many types of radar systems are employed for ground target acquisition. For instance, there are man-pack systems which can detect ground troops at 5,000 metres and


\textsuperscript{92} For details see the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, \textit{Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths}, Part II, 11 March 1976, p. 5781.

\textsuperscript{93} The possible employment of infra-red scanning systems to replace radar installations in tactical fighter aircraft is discussed by Stefan J. Geisenheyner and Mark E. Berent in 'Tactical Fighter For Tomorrow (Part Two)', \textit{Aerospace International}, Vol. 13, No. 2, March-April 1977, p. 12.
There are small and inexpensive phased array radars, laser infra-red radars and millimetre radar systems which are suitable for fitting to small remotely piloted vehicles (RPVs) and which, in many applications, are nearly unjammable.\textsuperscript{95} There are also medium range moving target indicator systems, such as SOTAS, which can be stationed between 1,000-2,000 metres altitude, 15-20 kilometres behind the forward edge of the battle area (FEBA), to locate moving targets beyond the enemy's FEBA. The targeting information acquired by this system can be relayed to firing points or strike aircraft in real time to permit timely and efficient attacks.\textsuperscript{96}

There are, in addition, longer range side-looking airborne radar systems which can be orbited further behind the FEBA. For instance, the United States AIDATS system can acquire ground targets more than 330 kilometres away and also beam the information in real time to ground and air locations for both command and control and targeting purposes.\textsuperscript{97}

\textsuperscript{94} For details of PPS-SA see Defense Marketing Services, \textit{Market Intelligence Report} on the Tactical Manpack Radar under 'AN' equipment, March 1976.

\textsuperscript{95} For example, General Electric have developed a miniature phased array radar with six operating modes under the Hostile Weapons Location System (HOWLS) programme. This programme has also been known as ULTRA (Ultra Lightweight Transmissive Array). See \textit{Flight International}, Vol. 111, No. 3538, 1 January 1977, p. 15.

\textsuperscript{96} For details of the US SOTAS programme see the testimony of Major A. Johnson from the Office of the Deputy Chief of Staff for Research, Development and Acquisition before the Subcommittee on Tactical Airpower of the Committee on Armed Services, US Senate, \textit{Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths}, Part 9, 8 March 1976, pp. 4724, 4725.

A similar but much older, less sophisticated and effective system is currently operational in OV-1 MOHAWK aircraft. For details see testimony of Major J. Goldtrap from the Office of the Deputy Chief of Staff for Research, Development and Acquisition, \textit{ibid.}, pp. 4722-4724.

\textsuperscript{97} For details see Defense Marketing Services, \textit{Market Intelligence Report} on USQ-49 Army In-Flight Data Transmission System (AIDATS) under 'AN' equipment, June 1975.
In addition, there is potential for a new generation of synthetic aperture radar which may provide some types of tactical strike aircraft with an autonomous medium range ground target acquisition capacity or large stand-off aircraft with a ground target vectoring capacity.98

There is a host of other ground target acquisition sensor technologies under development to locate radars, radio emitters, jamming systems, gun flashes and the sounds of artillery.99 Some of these technologies are being developed for ground based, aircraft and RPV applications. But many are also being developed for sensor 'packages' which can be fired, dropped or launched to operate autonomously in areas occupied by the enemy. The main United States' unattended ground sensor effort is directed through the Remotely Emplaced Battlefield Sensor System (REMBASS) programme. There are seismic, magnetic, optical, infra-red and acoustic sensors of various types which are designed not only to detect targets autonomously, but also to classify them and provide bearings for accurate target location. These systems will then possess the capacity to communicate targeting information either directly or through a high flying data link to aircraft and ground-based fire units.100

98 For tactical fighter applications see 'SAR Exposes Tactical Targets' in Eagle Flight Leader, Vol. 3, No. 2, September 1976, p. 3.
For the use of synthetic aperture radar for ground target vectoring from large aircraft at stand-off range, see Aviation Week and Space Technology, Vol. 106, No. 8, 21 February 1977, p. 49.

99 For a comprehensive summary of US efforts in this field see Defense Marketing Services, Market Intelligence Report on Army Electronics Command (ECOM) under 'Aerospace Agencies' dated December 1975.

Certainly many of these battlefield target acquisition systems can be spoofed, decoyed and jammed. In the ground environment, remotely emplaced sensors can be spoofed with misleading contacts, some types of imaging infra-red sensors can be decoyed with spurious heat sources and many types of radar can be jammed or destroyed with radar-homing weapons. At sea, some types of passive sonar systems can also be decoyed and in some circumstances jammed. Active OTH radars, AWACS or ground based surveillance and intercept radars can also be jammed, decoyed and spoofed through the employment of a variety of expendable and re-usable electronic warfare equipments.

However, there is a second major countermeasure trend which is confronting the expanding array of battlefield target acquisition technologies. This concerns the widespread development and application of stealth technologies to reduce weapon system and weapon platform signatures. The heightened demand for these has developed not only from the realisation that area surveillance and battlefield target acquisition technologies have made very great advances but also from the fact that the new precision guidance, propulsion and warhead technologies increase greatly the probability of rapid destruction once a target is acquired. Thus, in the air, there is a move towards relatively inexpensive unmanned aircraft (drones and RPVs) to perform some of the more dangerous tasks. In addition, new materials and design technologies are being applied in an effort to reduce the optical, radar, acoustic and infra-red signature of aircraft.

101 For an account of some of the sensor countermeasures employed in the Vietnam War, see Paul Dickson, *The Electronic Battlefield*, pp. 95 ff.

At sea, there have been extensive and continuing efforts to reduce the noise, heat and magnetic signatures of both submarines and surface craft. The naturally non-magnetic characteristics of plastic hulls have stimulated their introduction for counter-mine operations. In addition, because of their capacity to absorb more sound than they reflect, advanced reinforced plastics are also likely to be introduced for a range of submarine applications.

In the ground environment, many new camouflage techniques are being employed which extend far beyond conventional counter-optical systems. Infra-red absorbing and reflecting paints, netting and clothing have been produced. Anti-radar netting is widely deployed and many new types of optical, radar and infra-red decoys are available. There are also programmes to develop new types of dust-, smoke- and aerosol-generation equipments.

6. Increasingly Sophisticated Communications, Command and Control (C3) Systems

One of the major consequences of new technology developments has been the proliferation of nearly every category of military system. Area surveillance, target acquisition, classification and locating systems as well as weapons systems themselves have all multiplied in different

103 For an account of these developments see H. Feigl, *The Impact of New Maritime Technologies*, p. 27.

104 Ibid. See also a report of a British developed plastic submarine,'Stealing a Maritime March' in *The Australian*, 15 April 1977, p. 7.


106 Ibid., pp. 27 ff.

107 Ibid., pp. 28, 29 and also see the Defense Marketing Services, *Market Intelligence Report on the Mobility Equipment Research and Development Centre (MERDC) under 'Aerospace Agencies'* dated October 1975, p. 5.
forms. However, while in most cases there are more systems of different types and the capabilities of individual systems have risen greatly, the overall effectiveness of military structures as a whole in performing their prime functions has not been enhanced automatically by a comparable increase in efficiency. Total structural effectiveness is dependent heavily upon the manner in which the numerous individual systems are coordinated and directed. If this coordination, command and control function is performed with maximum efficiency, in many environments the potential for overall task performance will exceed the sum of maximum individual system capacities. It is this 'force multiplier' capacity of $C^3$ which stimulated Dr Currie, the former United States Director of Defense Research and Engineering, to emphasise its importance in his Congressional testimony:

I believe that development of integrated intelligence and target engagement systems represents the great challenge and opportunity of the next decade for DOD. These systems will integrate high-altitude sensors, stand-off airborne radars and other sensors, secure communications, computers capable of real-time processing and fusing of sensor data, and surgically accurate weapons. We are approaching this capability. 108

The most basic requirement in this type of development is reliable, secure and speedy communication links for both weapon control and military unit command and control. In both areas, reliability, speed and security must be traded off against the costs involved in providing the most technically advanced communications for each particular task. For instance, the costs of obtaining high security for line-of-sight data links for air-to-ground weapons systems are very great indeed. Thus the highly secure link for the CONDOR weapon is extremely expensive whereas that for the

modular guided glide bombs, while being far less secure, is also relatively inexpensive. Quality-quantity trade-offs between these two extremes are necessarily a central element of communications decision-making.

There have, however, been several breakthroughs in communications technologies, which promise high security and high data rates at a much reduced cost. Of relevance to precision guided weapon and RPV links are developments in optical fibres, permitting multi-channel, high quality transmission through fibres which have the appearance of light fishing line; novel waveforms providing processing gain; the 'chopped chirp' technique which provides an inexpensive quantum jump in data link security; a video bandwidth compression device which permits spreading gains; and an antenna control unit which not only provides beam switching but also uses automatic null steering.


110 See the testimony of Dr G.H. Heilmeier, the Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, pp. 5890, 5891.

111 Ibid., pp. 5845, 5846.

112 For details of this technique see Aviation Week and Space Technology, Vol. 105, No. 6, 9 August 1976, p. 49.

113 See the testimony of Dr G.H. Heilmeier, the Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, p. 5845.

114 Ibid.
General purpose communication links are also being transformed through the application of high data rate, jam resistant and highly secure time-synchronised frequency-agile techniques. This technology will be applied very broadly with the deployment of the United States' Joint Tactical Information Distribution System (JTIDS). For the United States, this system will provide the vital communications links with which a wide range of individual command, control and weapons systems will be tied together.

One notable addition to command and control capacity is being provided by the deployment of AWACS aircraft. These possess the coordination capacity to expand greatly the battlefield potential of a wide range of other systems. For example, the Boeing E-3A system can not only detect naval and air movements and control interceptions and countermeasures, but can also track and take messages in a passive manner from friendly ground units which are equipped with simple transponders. The E-3A can guide friendly attack aircraft along corridors which it 'sees' are free of the enemy's radar emitting anti-aircraft installations. It can also give friendly anti-aircraft units details of approaching enemy aircraft, thus forestalling a need to identify themselves electronically by turning on their own radar sets. However, perhaps most importantly, AWACS aircraft can provide a reasonably comprehensive real time overview of the air, sea and ground battlefield for the command structure.

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At sea, a comparable effort to multiply overall capacity by multiple system integration is under way under the United States code name SEAGUARD. Much of this effort is designed to exploit fully the technology advances in long range passive sonar arrays. Dr Currie, the former US Director of Defense Research and Engineering, indicated the direction of the programme in his Congressional testimony:

> It is interesting - even astounding - that one can hear for thousands of miles under water and this phenomenon offers several advantages for detecting and locating submarines. Signals from a distant source are necessarily faint and suffer by confusion with the noise created by many intervening sound sources. If the same signals can be detected at several different times and places, however, these separate representations can be combined mathematically in ways that remove the unwanted sounds and leave the desired information in a usable form.\footnote{Testimony before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, \textit{Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths}, Part 4, 5 February 1976, p. 2299.}

Dr Heilmeier, the Director of DARPA, elaborated on this multiple detection localisation capacity by referring to some experiments conducted in 1972:

> The experiments demonstrated, among other things, that, while underwater sound conditions are constantly changing, they do remain relatively fixed or coherent for brief periods. Thus, if the whole problem can be worked in a series of shorter time slices, the ocean appears to be a much more benign acoustic medium than was previously thought.\footnote{Testimony before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, \textit{Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths}, Part 11, 11 March 1976, p. 5772.}

In order to acquire, collate and process incoming multi-sensor material within these shorter 'time slices', one of the largest computer systems in the world, the ILLIAC IV...
system, has been mobilised on a full-time basis.\textsuperscript{120} The potential returns from this effort have been identified and quantified in a series of US Joint Chiefs of Staff studies, code named NARAC-G, SEAMIX I, CAPLOC and CAPSTONE.\textsuperscript{121} Vice Admiral Murphy, the US Director of Anti-Submarine Warfare and Ocean Surveillance Programs, alluded to the results of these studies in his Congressional testimony:

All I can say with certainty is that ASW operational personnel feel strongly that coordinated operations enhance the effectiveness of each platform. In the case of undersea surveillance, the probability of detection of a (deleted) SSN in the mid-North Atlantic by a single P-3C aircraft is:

(deleted) when unaided by other sensors or platforms about (deleted) as great when assisted by (deleted) in a vectored-type search about (deleted) as great when assisted by a (deleted) about (deleted) as great when assisted by a (deleted). It is obvious that, when patrol aircraft are provided positional information from a surveillance system, their effectiveness becomes multiplied significantly. This force multiplier effect of undersea surveillance is also applicable to other tactical platforms such as our SSNs.\textsuperscript{122}

Larry Booda, editor of \textit{Sea Technology} magazine, described the force multiplier impact of these developments

\textsuperscript{120} \textit{Ibid.}, p. 5773.
in very clear terms:

Here is a hypothetical case. In a fleet anti-submarine warfare (ASW) exercise, that fleet has x number of sensors available to it for submarine detection and tracking. With them it can make y number of contacts and process them through its command and control network.

In this exercise all of the fleet's data is relayed ashore via satellite. There a command and control centre which integrates it with all other detection data from a variety of sources including: Air Force aircraft and satellites, and Navy aircraft equipped with photographic infrared and electronic sensors; Navy land-based aircraft similarly equipped; and Navy and allied fixed bottom listening sensors.

There the information would be digested and analysed in near real time by already operational computers and the results sent back to the fleet.

Such an exercise has already been conducted. With the meld of detection elements described above, the number of contacts was 3y! - three times the number made by the fleet alone, depending on its ship and aircraft capabilities.123

In the light of these developments, it was perhaps not surprising that Dr Currie could report to Congress that:

We are on the threshold of vastly improved ASW capability to counter the growing number of Soviet nuclear attack and fleet ballistic missile submarines.124

The requirement for advanced C3 capabilities is probably most pronounced in the ground environment because it is here that system and unit proliferation has been most pronounced. In addition, there is a need for a large number of ground


Supplementary Annexe to the Thesis by Ross Babbage


Systems analysis involves a rigorous process of defining and evaluating options. One of the best definitions is that of D. B. Bradley:

Systems analysis is an orderly study aimed at identifying a preferred course of action from among possible alternatives. As applied to complex problems of choice today, however, it includes a variety of disciplines and methods ranging from marginal economics and mathematics to the systematic collection and synthesis of expert opinion.

There are several characteristics of systems analysis which make its employment attractive in the defence planning field.

First, it can provide a means of clarifying and managing extremely complex problems so that an overview or synthesis can be provided to senior management.

Secondly, by its very nature, the technique is heavily goal-oriented and, as a consequence, can be employed flexibly to perform widely dissimilar functions.

Thirdly, systems analysis effectively brings together the three most significant dimensions of decision-making - cost, time and effectiveness - in such a manner that it is possible for each of these variables to be traded against one another.

Fourthly, and finally, because an implicit component of systems analysis is the explication of all assumptions and supporting data, these processes can provide an

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1 D. B. Bradley, Program Budgeting (Santa Monica, RAND Corporation, P-3859, 1968), p.5.
2 Many of the problems of adequately defining the real goals or objectives of studies are elaborated in the Introduction to E. S. Quade (ed.) Analysis for Military Decisions (Santa Monica, RAND Corporation, R-387-PR, 1964), pp. 1-7
important means of reducing uncertainty in decision making.  

The actual processes of systems analysis normally involve a progression through four separate stages:  

- The first is the definition of clear objectives for the study.  
- In the second stage, a wide range of options is elaborated, each of which could conceivably meet the stated objectives.  
- Thirdly, the implications of each of the options are examined. This, in itself, is normally a complex multi-stage process. It firstly involves an identification and detailing of the direct and indirect costs of each option. To this is added an evaluation of the effectiveness of each option - normally determined through the employment of a variety of simulation and operational gaming techniques. Finally, in the third stage  

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stage, the time limitations of the various options may be probed through network analysis techniques.  

In the fourth major stage of the systems analysis process, a series of criteria (and possibly models) is derived to be used as a basis for ranking the various elaborated options.  

This type of analytical progression was first developed in Britain during the Second World War, largely to resolve the pressing tactical dilemmas which arose from the introduction of a number of new technologies onto the battlefield. Among the earliest studies were those to determine the most efficient methods for employing anti-aircraft radar and the optimum anti-submarine search pattern for convoy escorts.  

Because the objectives of these studies were clearly defined and the level of uncertainty limited, systems analysis techniques proved to be not only highly successful but also relatively simple to use. 

Since that time, most developed countries have employed these techniques to resolve a variety of tactical operational dilemmas and to provide guidance in the processes of equipment selection. Some of the most

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7 For an excellent elaboration of alternative processes for the management of the time factor in systems analysis, see H. Raiffa Decision Analysis: Introducing Lectures on Choices under Uncertainty (Reading, Massachusetts, Addison-Wesley Publishing Company Inc., 1968).

8 This process of ranking or applying 'tests of preferredness' is discussed at length by R. N. McKean in 'Criteria' E. S. Quade (ed.) Analysis for Military Decisions, pp 81-91.

9 These relatively simple processes of analysis were termed 'operational analysis' by the British.

10 The wartime and early post-war experience with operational and systems analysis is discussed in the Introduction to E. S. Quade (ed.) Analysis for Military Decisions, pp 2-10.

11 In most countries nearly all of this analysis remains classified. However, it is possible to gain clear insights into the type of work most commonly undertaken by studying the published proceedings of the US Army Operations Research Symposium. This event has been organised on an annual basis by the US Army Training and Doctrine Command since the early 1960s. See, for example, US Army Training and Doctrine Command Proceedings: Fourteenth Annual US Army Operations Branch Symposium (Fort Lee, Virginia, 1975)
most significant work was undertaken at the instigation of the US Secretary of Defense, Robert McNamara, in the Pentagon's Office of Systems Analysis. But overall progress did not come easily, and by the late 1960s some US proponents of analysis were withdrawing from the field in a state of disillusionment.  

While the bulk of defence analysis has remained at the single equipment, tactical operational level, some attempts have been made to apply systems analysis techniques to much more complex questions. Perhaps the most notable efforts have been studies to determine optimal force structure mixes to meet particular types of threats in important potential theatres of operations. For instance, a great deal of work has been undertaken by NATO members in attempts to derive the most efficient ground force mix to meet a surprise Warsaw Pact assault. Some studies have concentrated on maximising the efficiency of air operations in this theatre. Yet others have probed the efficiency of a variety of maritime strategies and force structures for the North


13 One of the earliest examples of this higher level of analysis was a top secret US Air Force study on the selection and use of strategic air bases which was led by A. J. Wohlstetter from 1951 to 1953. Subsequently declassified, this classic example is detailed at length by E. S. Quade in 'The Selection and Use of Strategic Air Bases: A Case History' in E. S. Quade (ed.) Analysis for Military Decisions, pp 24-63.

14 Some of the most notable work in this field which has been published or alluded to in open documents is that which was undertaken on behalf of the Force Structure Commission of the Government of the Federal Republic of Germany in The Force Structure in the Federal Republic of Germany: Analysis and Options (published in 1972/73 by the Force Structure Commission in concurrence with the Federal Government).

15 Steven L. Corby summarises the results of much of this work in an unclassified document entitled Tactical Airpower in Europe: Airing the European View (Santa Monica, Technology Service Corporation, 1976).
Atlantic in the circumstances of a major conflict erupting in Europe.\textsuperscript{16}

It is important to appreciate that this type of theatre analysis is much more complex, and to a degree more tentative, than that undertaken at the comparatively simple tactical and individual equipment level. For instance, because of the larger number of uncontrolled variables at the theatre level, the processes of selecting evaluative criteria are, of necessity, much more subjective, and the analysis itself tends to be characterised by a higher level of uncertainty. But there are also other complicating factors, such as the need to consider a much broader range of security options than is normally necessary at the tactical or single equipment level. Even when the results come to hand, it is frequently very difficult for them to be validated because many studies at this level are one-of-a-kind exercises.\textsuperscript{17}

Notwithstanding the complexity and significant theoretical and practical difficulties of theatre analysis, it is possible to employ these same techniques at an even higher level - that of total force structure planning. Swedish and Swiss defence planners have developed methods for designing and testing a variety of alternative security structures for their capacity to meet the full

\textsuperscript{16} The titles of some of the most important US studies in this field - NARAC-G, SEAMIX I, CAPLOC and CAPSTONE - have been cited in US Congressional hearings. See the testimony of Mr A. Pennington of the Office of the Assistant Secretary of Defense, Program Analysis and Evaluation, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 5, 11 December 1975, pp. 1996, 1997.

\textsuperscript{17} Some of these difficulties with higher level analysis are discussed in the final pages of S. H. Dole, G. H. Fisher, E. D. Harris and J. String (Jr.) Establishment of a Long-Range Planning Capability, p.52 ff.
range of their security objectives. The major reason why this level of analysis has proved to be practical is that, in these countries' situations, they have found it possible to define the goals of their security policy in very simple terms. This clarity of expression has been facilitated by the fact that nearly all their planning variables are well known. The most likely battle zones of both countries are adjacent to, or actually upon, national territory, their indigenous security resources are comprehensively recorded and they are also well-informed concerning the force structures, doctrines and operating procedures of their potential adversaries. As a consequence, in the cases of Sweden and Switzerland, the employment of analysis at the national force structure level is not much more difficult than that at the theatre level.

For countries with wide-ranging security responsibilities extending across several quite different potential theatres of war, analysis at the total force structure level is not as practical. Thus, although countries such as France, Canada, Britain and the United States can employ

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Concerning the Swiss planning concepts, my primary source of information was a series of verbal briefings provided by the Federal Military Administration in Berne on 5 November 1975. However, many details have been published in English by Paolo Urio in 'Decision-making in National Defence in Switzerland: How a Fighter Plane is Chosen', in S. Sidjanski (ed.) Political Decision Making Processes (Amsterdam, Elsevier Scientific Publishing Company, 1973), pp.183-203.

analysis in an extensive fashion to determine the most effective force structures for operations in individual theatres, these studies can really only be combined in a loose fashion to guide total force structure planning.

In the past, the employment of analysis at the highest levels of Australian force structure planning has been constrained by similar considerations. During the forward defence era it was necessary for the Australian Defence Force to be prepared for many different types of operations in support of major power allies in a wide range of environments and against several different types of potential enemies. In these circumstances, the design requirements of the Australian security structure were extremely complex and, in important respects, difficult to define. But with the major changes in Australia's strategic situation during the past decade, the scope for employing advanced analysis has increased greatly. The country's prime security concerns are now related to the Australian continent and its maritime environment and there is a general recognition of the need for a high level of self-reliance. The major areas of uncertainty now remaining in Australia's strategic environment concern the types of pressures and threats which might conceivably confront the country, their likely timing, and the role of the United States.

These points were argued in some detail in Part I of the thesis.

The major question of exactly how it might be possible to manage this high level of threat uncertainty for long range planning purposes is discussed in some detail in Chapters 3, 4, 7 and 8 of the thesis. The processes elaborated there do not necessitate the derivation of numerical probabilities for particular threats, nor any attempt to predict the future with precision. Not surprisingly, both of these endeavours are criticised severely in the international literature. See, for example, Sidney Hook, *The Fail-Safe Fallacy* (New York, Schocken Books, 1969), pp. 101-104, and also Arthur Lee Burns *Of Powers and Their Politics: A Critique of Theoretical Approaches* (Englewood Cliffs, New Jersey, Prentice-Hall Inc., 1968), pp. 28-46. The concept of avoiding these difficulties by deriving a carefully designed series of representative scenarios, as outlined in Chapter 8, may contribute to a resolution of this problem in Australia's processes of security planning.
This rationale largely explains the form of the analysis in Chapters 7, 8 and 9 of the thesis. It is argued there that if means can be found to limit, or at least manage, the uncertainties in Australia's long-term threat environment, it should be feasible to develop adapted theatre level analysis techniques to guide the country's processes of force structure design.

It is not suggested that the development of analytical techniques to direct Australia's processes of total force structure planning would be simple or easy. But as can be seen from the experiences of the Swedes and the Swiss, the returns from such an effort can be very great. Australian security planners cannot afford to neglect the potential of these techniques at the highest levels of force structure design.
units and ground-based systems to be linked and coordinated with a variety of air and maritime forces. In response to this extensive requirement, a mix of specialised small unit, large unit and total battlefield systems is being developed. For illustrative purposes, the United States is developing an Artillery Battery Computer System (BCS) which will enhance gun survivability by permitting widespread gun displacement and, in addition, provide a much more rapid response capacity to forward observer fire requests.125 One level above BCS, the TACFIRE system coordinates the fire of several batteries and keeps a real time record of ammunition stores for all batteries.126 The French Army have gone one step further by matching the RITA tactical communications system to the ATILA artillery fire control system so as to produce a capacity to record battlefield positions, evaluate targets acquired and select the most rational choice of weapons, type of ammunition and the time to fire. This system is designed to provide a high level of surprise by permitting a flexible and rapid concentration of fire from dispersed emplacements.127

There are also other types of specialised command and control systems such as the TIPI and MAGIS systems. These are designed to collect and collate communications intelligence (COMINT), electronic intelligence (ELINT),

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125 This system will play a central role in reducing time lag and other problems likely to be experienced in the operational employment of cannon launched guided projectiles (COPPERHEADS-CLGPs). See statement of Dr Currie before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 4, 5 February 1976, p. 2164.


remotely emplaced sensor information and data from side-looking radars, mapping radars, infra-red mapping and target acquisition systems, verbal reports and photo reconnaissance. The output of these systems is precise up-to-date information to permit timely command and control decision-making.\textsuperscript{128} To back up this type of operation, there is an array of general purpose support systems such as the Tactical Operations System (TOS). This provides general purpose computer capacity to receive, process, store, retrieve, display and disseminate selected information.\textsuperscript{129}

At the very highest level of ground battlefield command and control, the United States is attempting to integrate the five major functions of land combat - mobility, firepower, intelligence, support and command and control - into a semi-automated coordinated system called the Integrated Battlefield Control System (IBCS). According to US Army Brigadier Wilson Reed, the IBCS:

\begin{quote}
... will electronically tie the sensors to the reactive means - the 'beep' to the 'boom' as it were - and have the soldiers free to do what they do best - think, co-ordinate and control. The potential seems limitless.\textsuperscript{130}
\end{quote}

Thus, it appears that new military technologies are not only improving greatly the capacity of individual military systems but also providing new and highly sophisticated means of integrating multiple battlefield systems. The overall effect is to produce a greatly enhanced structural capacity in mission performance. This development provides

\begin{enumerate}
\item\textsuperscript{128} For details on TIPI/MAGIS see the Defense Marketing Services, \textit{Market Intelligence Report on the systems under 'Electronic Systems'} dated January 1977.
\item\textsuperscript{129} For details see Defense Marketing Services, \textit{Market Intelligence Report on TOS under 'Electronic Systems'} dated November 1976.
\item\textsuperscript{130} Quoted in Paul Dickson, \textit{The Electronic Battlefield}, p. 171.
\end{enumerate}
great potential scope for the orientation of complete defence systems on a more directly functional basis.

7. New Weapons Concepts

Rapid advances in a large number of military technologies are expanding greatly the technical capacities of many traditional types of weapons systems. For example, modern precision guidance, propulsion, and warhead technologies have revolutionised long range bombardment capacities by making it possible to produce very compact cruise missile systems which can be launched from standard torpedo tubes, aircraft pylons, shipboard canisters and ground vehicles to hit fixed targets up to 3,200 kilometres distant with accuracies of a few metres. Shorter range systems, especially those designed for the anti-ship function, are limited more by the problems of precise target acquisition than those of range and accuracy.

Developments of comparable significance are underway in the field of tank gun systems. New types of propellant, cartridge, projectile, gun barrel and automatic loading concept have been applied to produce both liquid and solid propellant automatic tank guns of the future. It has been found that, because of the greatly increased muzzle velocities and firing rate of these weapons, an armour

131 For details see the testimony of Captain W.M. Locke, Project Manager for the TOMAHAWK missile, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 17 March 1976, pp. 6214 ff.

132 For details see the testimony of Dr G.H. Heilmeier, Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 11 March 1976, p. 5777.
piercing fin-stabilised discarding sabot (APFSDS) round of only 75mm calibre is sufficient to penetrate all types of conventional and spaced armour which are currently deployed. An additional bonus is that the same guns can also be equipped with infra-red homing rounds to perform a supplementary anti-aircraft function. This type of rapid fire, high penetration capacity should increase greatly the combat effectiveness of armoured forces in the first few seconds of combat. Historical analysis suggests that action in this period is frequently decisive in determining battlefield outcomes.134

Technological advances in other fields are having the effect of reducing greatly the costs of lightweight weaponry. The United States' Improved Light Anti-tank Weapon (ILAW-VIPER) programme, for instance, has produced a weapon with a capacity considerably superior to that of the current M-72, for less than US$100 per unit. Cost-effectiveness is being raised in other fields by the design of weapons with a multi-purpose capacity. For example, there are strong indications that the missile which will eventually replace DRAGON and TOW in the United States' inventories will have very high flight speed, be laser beam riding and be effective not only against armoured vehicles but also aircraft.136

The new technologies have also expanded greatly the scope for decreasing costs with the adoption of modular

133 Ibid., p. 5780.
134 Ibid., p. 5777.
135 For details of this system see the testimony of Dr Malcolm Currie, the former US Director of Defense Research and Engineering, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 19?? Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 4, 5 February 1976, pp. 2156, 2157.
concepts. Perhaps the best example of this development is the GBU-15 family of guided glide bombs. This system is to have three interchangeable warhead types initially - a conventional high explosive, a minelet and bomblet cluster and a hard structure munition. A fuel air explosive warhead is likely to be added in the early 1980s. All of these warheads will be designed so that they can be fitted with either a cruciform medium range wing guidance kit or a planar long range wing guidance kit. Any combination of the above will also be compatible with television, laser designator homing, imaging infra-red or distance measuring equipment guidance heads. All possible combinations will be fitted with the same aerodynamic control and data link modules. In other words, it is now becoming possible to construct inexpensive from these alternative components an aircraft weapons load to suit the lighting, weather, terminal defence and target characteristics of a specific mission. A modular guided glide bomb has even been equipped with rocket boosters to demonstrate the potential for short range ground and ship launched applications.

Rapid advances in technology are also making completely new weapons concepts feasible. One of the more important developments is that of sensor-weapons. These are being developed in many forms, for many different operational environments. In the air, miniature unmanned drone aircraft have been produced which can be programmed to fly into enemy air space and loiter there for up to six hours waiting to acquire the emission of an enemy radar. When this is


done, it can fly into the target automatically and, with its integrated warhead, cause severe damage. In the future, advanced, discriminating, non-imaging infra-red and other sensors may be employed aboard these aerial loitering mines for the attack of armoured vehicles and other targets.¹³⁹

A similar ground-based development called the Self Initiated Attack Missile (SIAM) can be left or dropped unattended in enemy territory. When the missile detects a pre-programmed enemy aircraft 'signature', it is capable of automatic launch and target homing.¹⁴⁰

At sea, the United States has developed a new family of mines to largely replace the aging stock which was compromised during operations in Vietnam. The CAPTOR (encapsulated torpedo) mine is essentially a Mk46 homing torpedo coupled with a complex anti-submarine detection system. It is designed for operation in a variety of water depths and in practice would be air-, surface- or submarine-dropped outside harbours, or in straits and narrows, to await the specific sensor signature of its assigned categories of target, whence it can launch automatically.¹⁴¹ For shallower and intermediate depths and for generalised anti-submarine and anti-ship purposes, the CAPTOR mine is to be complemented by the Propelled Rocket Assisted Mine


¹⁴¹ For details see the testimony of Vice Admiral D. Murphy, US Navy Director of Anti-Submarine Warfare and Oceans Surveillance Programs, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 4, 11 December 1975, p. 2009.
(PRAM) and the QUICKSTRIKE mine. All of these sensor-weapon mines possess an area coverage several orders of magnitude above that of conventional mine systems.

Finally, developments in technology have produced some completely original types of weapon systems. The most notable and potentially the most significant of these may be high-powered laser weapons. There are many different types of laser, each of which possesses particular attributes. However, the technical complexities are immense and the barriers to practical employment for military purposes very great. The most notable problems arise in precision pointing and tracking, the development of durable high power optics, high energy propagation through the earth's disturbed atmosphere, thermal blooming (overheating of the air in transit causing laser refraction) and penetration of the vaporised cloud that often forms when a beam initially strikes a target. For many applications, there are additional environmental problems such as laser attenuation in fog, rain, sleet, snow, smog and in the high levels of humidity which are common in coastal and sea environments. These limitations can also be exploited in countermeasure systems such as smoke screens and aerosol sprays.

Recent research and development efforts have, however,

142 For details see the testimony of Rear Admiral R.J. Blount, the Director of the Undersea and Strategic Warfare Development Division, US Navy, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 6, 26 February 1976, p. 3358.

143 See these described at length by Philip J. Klass, 'Advanced Weaponry Research Intensifies' in Aviation Week and Space Technology, Vol. 103, No. 7, 18 August 1975, pp. 35-38.

overcome some of the more serious technical difficulties. For instance, the thermal blooming problem can be overcome by careful laser focusing and pulsing the beam to prevent the air through which the laser transits from overheating. The very large adaptive optics programme which has been undertaken in the United States has demonstrated a capacity to overcome most of the problems caused by atmospheric disturbances and aircraft slip-streams.\textsuperscript{145}

Thus, despite a number of continuing difficulties, there remain several potentially promising military applications for high power lasers. Lasers as a bomber defence system are attractive because they work particularly well in the clear atmosphere of high altitudes.\textsuperscript{146} However, despite the relatively large carrying capacity of these aircraft, the power sources which are available with current technology remain too bulky and heavy to be practical.\textsuperscript{147} In the ground based air defence role, the US already has a test unit fitted

\textsuperscript{145} For details see Philip J. Klass, 'Advanced Weaponry Research Intensifies' in \textit{Aviation Week and Space Technology}, Vol. 103, No. 2, 18 August 1975, pp. 35, 36.

\textsuperscript{146} The employment of lasers in this role is discussed by Philip J. Klass in 'Current Systems Still More Cost-Effective', \textit{Aviation Week and Space Technology}, Vol. 103, No. 10, 8 September 1975, p. 53.

\textsuperscript{147} For details of these difficulties see Philip J. Klass, 'Pentagon Seeks to Channel Research' in \textit{Aviation Week and Space Technology}, Vol. 103, No. 9, 1 September 1975, p. 54. However, early in 1977, Dr Kumar Patel, the inventor of the high-energy carbon monoxide laser, was reported as saying that:

... with recent technology, his laser had the potential size, efficiency and power to be packaged in a transport aircraft from which it could knock other aircraft from the sky "at long ranges".

aboard an amphibious armoured assault vehicle.\textsuperscript{148} This system has destroyed unmanned aircraft in flight but has also been plagued by reliability problems in simulated operational conditions.\textsuperscript{149} In shipboard air defence applications, many of the power problems can be overcome, but in this environment laser transmission attenuation problems caused by atmospheric humidity are accentuated.

Much of the current high powered laser research and development effort is centred upon space based applications which fall beyond the purview of this chapter. However, in addition, a variety of tactical applications are being pursued actively. In contrast to a decade ago, there is now no question that very high powered lasers can be built. The major uncertainty remaining is whether they can be developed successfully into reliable and effective military weapons which can compete in cost-effectiveness terms with more conventional weapons systems.

8. New Weapons Platforms

Developments in a wide range of technologies are providing a very much broader array of transport and weapon platform options. For example, in the area of heavy lift air transport, there are several proposals for very large transport aircraft with between three and four times the load carrying capacity and twice the range of the largest aircraft now operational. Flying wing concepts carrying lightweight cargo containers,\textsuperscript{150} very large conventional

\begin{itemize}
  \item \textsuperscript{148} This system is described in detail and illustrated with photographs by Philip J. Klass in 'Current Systems Still More Cost-Effective', \textit{Aviation Week and Space Technology}, Vol. 103, No. 10, 8 September 1975, p. 55.
  \item \textsuperscript{149} For details see \textit{Flight International}, Vol. 110, No. 3525, 2 October 1976, p. 1016 and also \textit{Aviation Week and Space Technology}, Vol. 105, No. 7, 23 August 1976, p. 9.
  \item \textsuperscript{150} This concept is elaborated by W.C. Wetmore in 'Lockheed Details "Flying Wing" Concept', \textit{Aviation Week and Space Technology}, Vol. 102, No. 20, 19 May 1975, pp. 30 ff.
\end{itemize}
transport aircraft\textsuperscript{151} and new types of hybrid heavy-lift airships\textsuperscript{152} have all been proposed for this function. The United States National Aeronautics and Space Administration (NASA) has predicted the introduction of such aircraft by 1985.\textsuperscript{153}

A second and possibly related type of aircraft development which can be expected to appear in approximately the same time frame is a very long endurance ocean surveillance and patrol aircraft.\textsuperscript{154} This concept may be fulfilled by the deployment of a combination of existing technologies - an already deployed civil airframe, an AWACS radar system, a long range FLIR, other surface surveillance and advanced ASW sensors and an array of stand-off precision guided weapons systems. This type of aircraft will possess a capacity to perform many of the tasks which are currently undertaken by carrier-borne aircraft.\textsuperscript{155}

\textsuperscript{151} See, for example, the Japanese proposal for a 1,200 passenger flying boat in R.G. O'Lone, 'Japanese Pushing Flying Boat Designs', \textit{Aviation Week and Space Technology}, Vol. 106, No. 20, 16 May 1977, pp. 45 ff.

\textsuperscript{152} For details see B.M. Elson, 'Hybrid Heavy-Lift Airships Under Study' in \textit{Aviation Week and Space Technology}, Vol. 104, No. 25, 21 June 1976, pp. 48 ff.

\textsuperscript{153} See \textit{Aviation Week and Space Technology}, Vol. 103, No. 19, 10 November 1975, p. 23.

\textsuperscript{154} \textit{Ibid.}

\textsuperscript{155} \textit{Ibid.} See also a detailed report of a major US study of this type of aircraft in \textit{Aviation Week and Space Technology}, Vol. 105, No. 16, 18 October 1976, p. 91.

There may be yet other applications for this type of large long endurance aircraft. Dr Malcolm Currie, the former US Director of Defense Research and Engineering, emphasised their potential flexibility in the following terms:

\begin{quote}
On the USAF's horizon also are multi-purpose aircraft, in the multi-million pound class and with long range and endurance, that are being made possible through new technologies in materials, propulsion, and aerodynamics.
\end{quote}

The United States is developing a new generation of medium weight V/STOL aircraft for naval aircraft carrier and general purpose shipboard applications as well as to overcome some of the airfield vulnerability problems of land based aircraft. The first of these systems will be subsonic or transonic with a multi-role capacity to perform ASW search and attack, surveillance, surface ship attack, ground strike, troop transport, resupply and general logistic support and utility functions. The second aircraft will be a supersonic strike fighter, possibly a development of Rockwell's XF-12A prototype design or the McDonnell Douglas AV-8B.

A range of advanced fighter programmes is also underway with the emphasis upon improvements in agility, speed and survivability. Some new fighter concepts, such as those employed in the US High Maneuverability Aircraft Technology (HIMAT) programme, are being tested in small scale remotely piloted vehicles. Others, such as Boeing's micro-fighter


158 See this discussed in Defense Marketing Services, Market Intelligence Report on the Advanced Tactical Fighter (ATF) Program under 'Military Aircraft' dated March 1976.

concept, have been the subject of very extensive paper and wind tunnel study. This particular experimental aircraft programme, which has received extensive encouragement from the United States' Air Force and Navy, employs very advanced 'supercruiser' wing technology in a small aircraft, several of which could be carried aloft, launched and retrieved by a host airborne aircraft carrier.160 All of the new fighter aircraft concepts involve the extensive use of stealth technologies. Composite materials, special design techniques and paints are being employed extensively in an effort to reduce optical, radar, acoustic and other signatures to a minimum.161

There are, in addition, several more radical aircraft proposals under active study. For example, the United States is actively experimenting with an X-wing concept aircraft whose wings can rotate in the manner of a helicopter at slow speeds, but at high speeds can lock and perform the lift function of conventional wing surfaces.162 Much attention has also been directed towards advanced research on a possible aerodynamic successor to currently deployed swing-wing aircraft. Instead of altering the angle of both wings so that they move symmetrically in relation to the aircraft fuselage, oblique wing aircraft simply pivot a single rigid wing so that one end swings forward and the other rearwards. This highly-simplified technique has already been proven aerodynamically feasible and displays great


potential in a number of aircraft applications.  

The final major area of development in airborne technologies is that concerning remotely piloted vehicles (RPVs). There appear to be three distinct categories emerging. Mini-RPVs weigh under 100kg and can be readily carried by two people. Medium sized RPVs weigh up to 2,000kg, are frequently air launched and normally possess a relatively long range multi-mission capacity. The largest RPVs are of conventional aircraft size and normally require full-sized aircraft ground facilities. The most notable example of this last category is the COMPASS COPE system which has a 30 metre wingspan and is designed to cruise at an altitude of well over twenty thousand metres for up to thirty hours, primarily for electronic and communication intelligence, data link and ground and sea reconnaissance missions.

Mini RPVs derive the greatest proportional benefit from the absence of an on-board pilot. They are normally of model aeroplane size, although not necessarily of model aeroplane configuration, can be made of fibreglass and plastic for low radar reflection (comparable to a bird), have a very low infra-red signature, can be made very quiet and very hard to see and, even if sighted, are very difficult to hit with small arms fire. Even if hit, small calibre rounds can harmlessly pass through large portions of their structure. The proximity fuses of medium and large calibre rounds, 30mm and above, are normally insensitive to targets with such a small signature. Yet with a capacity for launch and recovery from the back of a truck, with radii of action approaching 160 kilometres, the capacity to perform reconnaissance, kamikaze


hard target killing, radiation homing, defence suppression, data relay, electronic jamming and laser designation tasks and with a price tag under US$20,000, the future widespread employment of mini-RPVs appears assured.\textsuperscript{165}

Seaborne platforms may be transformed dramatically during the next quarter century by the extensive employment not only of small but also medium and perhaps even large sea-going hydrofoils, hovercraft and other unconventional hull concepts. The United States ocean-going Patrol Hydrofoil (PHM) programme has been a technical and operational success but the costs of the very short production run currently envisaged appear excessive.\textsuperscript{166} In Britain, similarly sized and armed hovercraft systems are being actively studied which have a 1,600 kilometre range capability.\textsuperscript{167} In a separate development, the United States is actively pursuing the utility of large sea-going hovercraft in its construction of a 3,000 ton rigid side-wall surface effect ship.\textsuperscript{168} These types of systems have already proven to be technically reliable and economic in many environments. They promise surface speeds of between 40 and 100 knots in all but the worst weather, reduced vulnerability to mine, torpedo and missile attacks, greatly improved standards of platform stability and a quantum jump in overall mission flexibility.

A third type of unconventional hull configuration is


\textsuperscript{167} See \textit{Aviation Week and Space Technology}, Vol. 106, No. 10, 7 March 1977, p. 11.

under development, primarily for small and medium sized, long endurance deep ocean missions. Called the semi-submerged hull concept, it consists of two torpedo-shaped underwater propulsion systems arranged in a catamaran configuration and attached to an above-surface hull platform by aerofoil shaped pylons. The advantages of this concept are its naturally high propulsion efficiency, the very high levels of stability it provides to small platforms and the minimal degradation of speed it suffers in heavy seas.169

The new technologies are also enhancing greatly the capacities of both nuclear and conventional submarines. As was discussed earlier, new propulsion systems show promise of enhancing range, endurance and speed capabilities while at the same time reducing platform signatures. But in addition, laminar flow technology is reducing greatly the underwater drag of submarines and torpedoes and hence also contributing significantly to advances in range and speed.170

The increasingly frequent employment of plastics and other non-metallic materials is reducing submarine acoustic and magnetic signatures while, in some instances, providing deeper diving capacities at low cost.

Transport and weapons platforms in the ground environment are generally being developed by a process of evolution rather than revolution. However, there are two new technology developments which may have a very great impact upon a range of ground battlefield platforms. The first of these is a new type of composite armour plating called CHOBHAM Armour. Believed to be composed of layers of plastic, ceramic and metal armour plating, CHOBHAM armour


170 See the testimony of Dr G.H. Heilmeier, the Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1979 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, p. 5898.
can be bolted onto some existing heavy armoured vehicles to provide a capacity to survive attack from all currently deployed ground-fired anti-armour munitions.\textsuperscript{171} As this armour is only expected to add approximately 1-2 per cent to the cost of new armoured vehicles, it can, in time, be expected to be deployed widely on the ground battlefield.\textsuperscript{172} This, in turn, will necessitate the development of a new range of anti-tank weaponry and probably a considerable modification of anti-armour techniques and tactics.\textsuperscript{173}

The second major technology advance in ground battlefield weapons platforms is somewhat related to the first. The development of rapid-firing, very high velocity tank guns of 75mm calibre, which was discussed earlier in this chapter, means that new generation tanks may not need to be constructed to withstand the very great weight and recoil forces of current 105mm and 120mm tank guns. As a consequence, the United States is actively pursuing, through the High Mobility Agility (HIMAG) programme, the possibility that new generation tanks may be relatively light (i.e. between 20 and 40 tons), have low profiles, be very agile

\textsuperscript{171} For details of the development of CHOBHAM armour see \textit{International Defense Review}, Vol. 9, No. 4, August 1976, p. 641.

\textsuperscript{172} \textit{Ibid.}

\textsuperscript{173} There is a secondary development in armour technology which is of some significance. This concerns the employment of thick ballistic blankets woven from commercially produced synthetic fibres. This type of flexible armour can be used inside conventional light armoured vehicles (APCs, MICVs etc.) to greatly reduce the spall damage caused by the penetration of medium and large calibre projectiles. Alternatively, it can be used to protect personnel, weapon teams or objects of military significance in the open from the majority of shell fragments and small calibre direct-fire projectiles. For details see Survivability Office, US Army Material Systems Analysis Activity, Aberdeen Proving Ground, Maryland, \textit{Survivability Primer} (Alexandria, Virginia, US Army Material and Readiness Command, 1976), pp. 37-46.
and be relatively inexpensive. Current indications are that this type of tank concept may be deployed in the late 1980s.

Summary

It is difficult to summarise the overall impact of recent developments in conventional military technology. On the one hand, they provide a greatly increased potential to acquire, identify and track targets, to deliver ordnance over both long and short ranges with high accuracy and speed and to destroy a wide range of objectives with a single hit. But, on the other hand, the new technologies also provide greatly enhanced capacities for a range of countermeasures.

Certainly the nature of conventional warfare as it has been known in the past is being changed fundamentally. In the words of Dr Malcolm Currie, the former US Director of Defense Research and Engineering:

A remarkable series of technical developments has brought us to the threshold of what I believe will become a true revolution in conventional warfare.175

However, the practical implications for particular strategic environments are not easy to determine in advance. A wide range of non-technological variables, such as the

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174 See the testimony of Dr G.H. Heilmeier, the Director of DARPA, before the Research and Development Subcommittee of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 11, 9 March 1976, pp. 5886, 5887.

degree of superpower involvement and the levels of constraint applied by local financial, political, bureaucratic, social, geographic and climatic conditions, can all influence the consequences of new technological developments in specific regions. Further, and at least as importantly, a great deal will always depend upon local human capacities to perceive the broad consequences of the new developments, to choose selectively from the greatly expanded range of technological options, to operate effectively those systems which are procured, to service and maintain them efficiently and to derive strategies, tactics, structures, doctrines and operational procedures which exploit the potential of the new systems fully. Primarily because of the number and variability of these factors, the practical impact of the new technologies upon particular military structures can be expected to differ greatly. However, despite these qualifications and difficulties, it is possible to derive a series of broad consequential trends which possess a degree of general applicability. These are elaborated in the following discussion.

Some Implications of New Technology Developments

1. The Increasing Vulnerability of Large and Obvious Weapons Platforms and the Degradation of their Cost-Effectiveness

Military platforms which have large radar, magnetic, heat, acoustic, electronic or other media signatures are becoming much easier to detect, identify and acquire as targets as a result of significant advances in long range surveillance and target acquisition technologies - satellite-borne optical, radar, infra-red and electronic intelligence sensors, OTH radar, long range passive sonar systems, AWACS aircraft and long range electronic warfare interception systems, etc. Once acquired as a target, the new precision guidance, propulsion and warhead technologies are increasing greatly
the ease with which targets can be attacked and destroyed at both short and long ranges.

However, in reality, this greatly increased capacity for large target destruction or active attrition represents only a portion of the total impact of the new technologies upon aircraft, large surface ships and armoured vehicles. In addition, these large and obvious weapons platforms are being forced to adopt expensive defensive equipment fits and elaborate defensive operational tactics in attempts to ensure their continued survivability on the modern battlefield. These defensive reactive measures are very complex and expensive and many imply a very great degradation in total system cost-effectiveness in the performance of traditional functions.

The Increased Vulnerability of Large and Obvious Platforms in the Air

In intense battlefield environments, aircraft are now subjected to an array of advanced ground based systems. New generation light man-portable surface-to-air missile (SAM) systems, such as BLOWPIPE, STINGER, SABRE and RBS-70, not only possess a greater range capacity and more effective warheads than their predecessors, they also possess an all-aspect multi-directional attack capability. Mobile radar-controlled rapid-fire gun systems like the Soviet ZSU-23-4 SHILKA and the West German FLAKPANZER are likely to retain important battlefield functions. Similarly, larger vehicle-mounted SAM systems like ROLAND, RAPIER and SAM 8, medium range systems like ADVANCED HAWK and SAM 6 and medium to long range systems like SAM-D PATRIOT can be extremely effective in providing a high level of twenty-four hour all-weather security against air attack. However, it should be noted that the greatly increased lethality of ground based air defences is not due simply to the vastly increased performance capabilities of individual systems. In order for ground based anti-aircraft defences to be maximised over the tactical battlefield, it is necessary to integrate a coordinated mix of individual surface-to-air systems, each
of which has high performance capabilities within its assigned parameters.

The vastly increased lethality of coordinated anti-aircraft defences has forced tactical aircraft to adopt a wide range of measures to improve their survivability and maintain their mission effectiveness. The response of many Western European air forces is to fly through such areas at extremely low altitudes and very high speeds. This tactic has been designed so that aircraft can penetrate below the coverage of most ground based surveillance and target acquisition sensors. The speed of penetration gives the few ground based systems which can acquire targets flying at that altitude insufficient time to react effectively. However, mission profiles requiring high speed flight at low levels effectively limit range capability and encourage aircraft configurations which are not optimised for the secondary task of air-to-air combat at low and medium altitudes.176

A second response, which is most notably practised by the United States Air Force, is to fly at medium altitude within the coverage of area air defences where necessary, but to do so only with the assistance of large numbers of air superiority fighter aircraft and also specialised electronic warfare and defence suppression systems. This involves a direct air superiority confrontation. Specialised

176 This concept of air operations is described at length by Steven L. Canby in *Tactical Airpower in Europe: Airing the European View* (Santa Monica, Technology Service Corporation, 1976). It should also be noted at this stage that those US squadrons equipped with A-10 aircraft are being trained to employ similar low-level terrain following flight profiles in attacks involving shallow penetrations of enemy airspace. For a detailed elaboration of A-10 tactical doctrine see Donald E. Fink, 'A-10 Survivability in Attack Role Shown' in *Aviation Week and Space Technology*, Vol. 106, No. 25, 20 June 1977, pp. 88-93.
fighter aircraft cover the fighter-bomber formations and engage in air-to-air duels where this is necessary. In attempts to foil anti-aircraft surveillance, tracking and guidance systems, parts of fighter-bomber weapon loads are frequently sacrificed to permit the carriage of defensive underwing electronic countermeasure pods. In some intense environments, supplementary aircraft are required specifically to perform the task of electronic suppression.\textsuperscript{177} In addition, in areas where air defences are well coordinated and controlled, it is frequently necessary for attacking or specialised supporting aircraft to concentrate firstly upon the destruction and suppression of surface-to-air systems before the primary targets can be attacked with an acceptable degree of security.\textsuperscript{178} The gradual addition of a large number of essential supporting aircraft to those required to make close support or interdiction strike missions in the intense European environment has prompted one prominent United States defence analyst to describe planned US Air Force operations as air convoys.\textsuperscript{179} The complexity and expense of mounting this type of operation is clearly much greater than that which was required to perform a similar function in the past.

A third type of air force response to the growing lethality of integrated ground based anti-aircraft networks involves a partial abandonment of the traditional close air support function and its replacement by strengthened ground based tube and rocket artillery systems. Under this concept, where air delivered ordnance is still required in intense

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\textsuperscript{178} The United States has developed aircraft units (F-105Gs and F-4Gs) which are specially configured to destroy ground based air defence systems under the WILD WEASEL programme.

\textsuperscript{179} This point is made by Steven L. Canby in *Tactical Airpower in Europe: Airing the European View*, p. 37.
battlefield environments, it is delivered at extended ranges by stand-off air launched precision guided munitions. In practice, however, this does not overcome all of the difficulties which are associated with traditional types of close air support operations. The acquisition of many categories of ground target from tactical strike aircraft is extremely difficult at stand-off ranges. In order to overcome this problem, at least partially, extensive support technologies are required to provide a remote target acquisition and designation capability. The other major difficulty of stand-off precision guided munition delivery into intense battlefield environments is that weapon launch points may not always be placed beyond the range of components of an enemy's integrated air defence system. As I have argued elsewhere, the fluidity of intense modern battlefields may make the accurate identification of secure launch areas extremely difficult. 180

Following the Middle East War of October, 1973, General Herzog, the prominent Israeli military correspondent, reflected on the significance of these developments:

The role of the plane in war has changed, and new strategies and uses of airpower will have to be evolved. To a degree air power will obviously not be as influential as it has been and will affect the battlefield less than it did. The proliferation of light, portable missile launchers in the front line means that close support will be the exception to the rule in the future, with the air force being forced to concentrate on isolating the field of battle, maintaining supremacy in the air and destroying the forces in or near the battlefield. 181


The new military technologies are also increasing greatly the vulnerability of large and obvious surface ships. They too are becoming easier to acquire at long range and much more vulnerable to a wide range of short and long range anti-ship weapon systems. William H. Pickering, Head of the Naval Studies Board of the United States Academy of Sciences and a former Director of the Jet Propulsion Laboratory, outlined the two major themes in surface ship passive attrition in the following terms:

As the world moves into an era of widespread, inexpensive precision-guided weapons, the vulnerability of all ships increases. This will require either that the Navy develop an effective defense to protect a small number of high value ships or else deploy large numbers of low value ships to perform the same mission.\(^{182}\)

In response to the increasing anti-shipping threat, most modern navies have concentrated their resources on a five-element programme to enhance the security of their major surface platforms.\(^{183}\) The overall effectiveness of this effort is, however, the subject of serious doubt.

The first element of the programme is to seek to destroy weapon launch platforms before weapons are released. If the defending naval unit, task force, convoy or fleet contains an aircraft carrier, it may be possible for its aircraft to strike cruise missile-equipped patrol craft, surface shipping and aircraft at short and medium ranges before weaponry can be launched. However, for a variety of reasons this might not always be possible. Firstly, carrier


\(^{183}\) Describing naval reaction in terms of such a five-phase programme involves a large degree of oversimplification. Many other areas of naval activity may, in reality, have been changed in response to the increased anti-ship missile threats, training programmes, operational procedures etc. However, for the purposes of this discussion, it is sufficient to argue mainly within the bounds of these five elements.
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aircraft may not always be available to perform this function. Secondly, even if they are available, they may not be authorised to launch this type of pre-emptive attack.\(^\text{184}\)

Thirdly, even if carrier aircraft were on regular patrol, it seems likely that in many environments enemy aircraft and surface vessels could approach undetected within the maximum range of their weaponry. Fourthly, even if such a strike were authorised and effectively carried out, that would still not ensure the survivability of major surface shipping. Hostile submarines and mobile ground-based systems could still launch anti-ship missile and torpedo attacks. The capacity of surface shipping and their accompanying aircraft to attack submarine and ground based platforms is limited in most environments. Thus it can be concluded that it is unlikely that all anti-ship systems will be destroyed before they can be launched in any particular conflict unless some type of special circumstances apply.\(^\text{185}\)

The second element of the surface naval ship's defensive capability also involves the use of carrier-borne aircraft. Naval AWACS and fighter aircraft would attempt to destroy anti-ship missiles in flight. This capability assumes the propitious air deployment of naval AWACS and advanced fighter aircraft with a look-down, shoot-down capability at the time and in the area of missile flight. Even if all of these systems were deployed in advance in appropriate locations and were not saturated by a large number of incoming cruise missiles, they would still be ineffective against very high

\(^{184}\) These types of availability constraints might also confront attackers. But for them, the issue would not be nearly so critical because their survivability would not be at stake. In most environments the attacking forces would largely retain the prerogative to select the time, place and mode of attack. Obviously, these choices could be made in the light of any existing availability constraints.

\(^{185}\) Special circumstances may include an opponent's possession of very few anti-shipping weapons, their carriage in a few large, obvious and highly vulnerable platforms and missile system malfunctions preventing the launching of the attack, etc.
altitude Mach 2+ missiles\textsuperscript{186} and against submarine launched torpedoes. Again it seems that only in very particular circumstances could anti-ship strikes be expected to be defeated at this point.\textsuperscript{187}

The third element of the surface ship defensive concept is to employ long range ship-borne missiles to destroy approaching anti-ship weapons. Clearly there is no practical means of intercepting long range self-homing torpedoes although it may be possible for them to be spoofed. Wire guided torpedoes could be thwarted only if the launching platform's sensors or control systems could be confused or destroyed prior to launch or during running time. This would, however, be extremely difficult to achieve in practice.

The destruction of anti-ship missiles by long range ship-borne systems would be possible, although still not easy, if the incoming weaponry flew at medium altitude and moderate subsonic or transonic speed. However, in the more likely instance of a missile flying at very low altitude, it would be extremely difficult for it to be acquired and tracked, as most sea-skimming missiles have a very small radar cross-section and would need to be detected against the 'clutter' of the sea's surface.\textsuperscript{188} However, for the purpose of this discussion, if it can be assumed that advanced radar

\textsuperscript{186} This is the flight profile of the Soviet SS-X-12. See C.A. Robinson, Jr, 'Soviets Make New SALT Bid' in \textit{Aviation Week and Space Technology}, Vol. 104, No. 5, 2 February 1976, pp. 13, 15.

\textsuperscript{187} It should be noted that the operational capabilities of the latest Naval Carrier AWACS (E-2C) have been overrated by many commentators. See the account of an E-2C operator in \textit{US Naval Institute Proceedings}, Vol. 103/3/889, March 1977, p. 82.

\textsuperscript{188} For the flight profiles of all Soviet designed anti-ship missiles, see C.A. Robinson, Jr, 'Soviets Make New SALT Bid' in \textit{Aviation Week and Space Technology}, Vol. 104, No. 5, 2 February 1976, pp. 13-16.

This part of the argument also assumes that the defending ship will be operating with its surveillance radar system actively emitting. Operating in this manner makes targeting of the ship very easy as it can be identified
techniques and a high state of crew alertness largely resolve the clutter problem, there would still be serious difficulties arising from the very limited reaction time which would be available. If the incoming missile were detected the instant it broached the horizon (which seems highly improbable) and if it were travelling at between Mach 1 and 2, between 1\(\frac{1}{4}\) and 2\(\frac{1}{2}\) minutes would remain before impact. If the ship were in a high state of alert, long range weaponry could probably be fired within that time. But even then, directing interception against the clutter of the sea of a very fast missile, which may well be taking evasive countermeasures, would be extremely difficult. Even if this were possible, specialised proximity fuses would be required to be fitted to prevent premature missile detonation in response to the interference of the sea's surface. The problems would, of course, be compounded in the event of a simultaneous, multi-directional attack by several weapons. The long range interception of very high altitude anti-shipping missiles presents yet another series of extremely complicated problems. The success of a ship-borne defence system against this type of threat would depend upon the attacking weapon's speed, its long range detectability and a wide range of other factors.

The fourth element of the surface naval ship's defence is its electronic countermeasure capability. Some active radar homing missiles can be spoofed with chaff and electronic jamming; some infra-red homing systems can be decoyed with flares; electro-optical systems can be disrupted with smoke screens; laser designation systems can be foiled by aerosols and smoke and some magnetic and acoustic

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and located from very long range. However, if the ship's surveillance radar is not operating, an incoming missile may not be detected at all, unless it emits an active radar signal during the terminal homing phase. New types of highly sensitive ship-borne infra-red scanning systems may provide a passive missile detection system for surface ships in the 1980s.
homing torpedo systems can be defeated by trailed decoys and jammers. However, it should be noted that some wire and inertial guided weaponry is not susceptible to electronic countermeasures at all. Moreover, the incorporation of many counter-countermeasures in anti-ship weaponry is reducing greatly the effectiveness of a wide range of current shipborne electronic warfare (EW) systems. Frequency-agile homing radars, infra-red tuning, infra-red imaging, improved data links, multi-sensor terminal guidance and many other techniques are being employed to decrease anti-ship missile susceptibility to EW.

The final defence element available to surface shipping is that of close-in weapons systems (CIWS). Against submarine-, coastal- or aircraft-launched torpedo systems, guns and short range missile systems are completely ineffective. In order to provide surface ships with a 'last ditch' defence against anti-ship missile attack, the United States has developed the PHALANX automatic gun system and the British the SEA WOLF short range missile system. However, senior United States officials have already admitted that, against some types of existing anti-ship missiles, the yet to be deployed PHALANX system will not be effective. 189

The SEA WOLF system, on the other hand, has a minimum reaction time between the acquisition and tracking of successive targets, but before firing, of six seconds. The time for missile launch to intercept would have to be added to this figure to calculate the time required for each engagement. 190 For a very short range system which may be confronted with coordinated multiple supersonic missile attacks, this time delay may be critical.


190 For details see 'Seawolf/GWS25, the Royal Navy's Anti-Missile Missile System' in International Defense Review, Vol. 9, No. 5, October 1976, p. 792.
While in one-only non-manoeuvring or jamming target situations the capacity of both PHALANX and SEA WOLF appears credible, they are both potentially susceptible to external jamming, spoofing and decoying. Further, because of the very short range nature of these systems, many of the intercepts they have achieved, even in ideal circumstances, have taken place at ranges of 500 metres or less. It should be noted that if an anti-shipping missile carrying a 550kg third generation fuel air explosive warhead is detonated at 300 metres range, the blast effect would be sufficient to destroy most types of ship-borne radio, radar, EW and other external antennae. This would effectively render a ship defenceless to a following missile attack. If detonation occurs at 170 metres or less, the blast effect would be sufficient to sink a moderately sized ship.

Thus, despite the fact that all of the major naval powers have expended very large sums of money on anti-ship missile defence systems of various sorts, their effectiveness in realistic wartime multiple attack conditions is highly questionable. By far the most sophisticated, elaborate and expensive anti-ship missile defence system in existence is the United State AEGIS system. In February and March 1975, the first complete and fully tested AEGIS system, which is...

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191 Ibid., and see also the testimony of Commander G.R. Meinig, the US Navy's PHALANX Project Manager, before the Subcommittee on Tactical Air Power of the Committee on Armed Services, US Senate, Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civilian Personnel Strengths, Part 10, 17 March 1976, p. 5574.


mounted on the USS NORTON SOUND, was subjected to simulated wartime operations for a continuous period of six days. At the end of this period, the AEGIS system's project manager and the Naval Systems Technical Representative could not report that the ship's systems had 'defeated' all simulated attacks. The best that they could state was that none of the manned aircraft raids had penetrated within missile range undetected. 194

In an even more candid statement of surface ship vulnerability, the former United States Director of Defense Research and Engineering, Dr Malcolm Currie, pointed to the extreme difficulty of providing an effective defence even against currently deployed anti-ship missile systems. When discussing the capacity of the new Soviet aircraft carrier KIEV, he stated that it was not so much its V/STOL aircraft which made the ship so formidable:

... rather that it is so heavily armed (with) SS-M-12's, a supersonic cruise missile that can come in (at various) angles and ... from a naval point of view - not a strategic nuclear point of view - is next to impossible to defend against. 195

The technology struggle between the offence and defence on and above the surface of the sea is likely to intensify further. On the one hand, high energy laser point defence systems might be available to supersede PHALANX and SEA WOLF by the late 1980s. But on the other hand, there are already Mach 2+ integral rocket/ramjet sea-skimming cruise missiles

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under development in both Europe and the United States and torpedo-carrying surface skimmers may be developed to avoid close-in weapons systems altogether. In this environment, the survivability of major surface ships in the face of modern multiple anti-ship missile and torpedo attacks appears by no means assured.

In addition, it should be realised that the increasing vulnerability of large and obvious surface shipping and the defensive reactive measures which have followed have caused a severe degradation in the operational effectiveness of individual platforms performing their primary assigned roles. In some cases, self defence considerations have driven the elaboration and expansion of originally simple ship designs into larger and more complex platforms. Yet even when these extremely sophisticated ships are deployed into high threat environments, they must be operated in closely coordinated teams if their survivability is to be maximised. However, this tactic serves to reduce their capabilities to perform most of their originally intended functions to an even greater degree, be they anti-submarine warfare, convoy escort, shore bombardment, the attack of surface shipping or some other task.

As a result of these accumulating pressures of active and passive attrition, a second and more long term reaction to large surface ship vulnerability is now beginning to display itself in a definite shift away from the largest, most elaborate and expensive types of ship. Where the sponsoring nation's economy can afford to replace aging large surface naval platforms, they are frequently being superseded by larger numbers of smaller, less conspicuous and less expensive craft. In many instances, this represents a deliberate attempt to reduce the wartime possibility of losing rapidly a significant proportion of total capability.

with the destruction of a small number of ships.\textsuperscript{197}

Submarine survivability varies greatly depending upon a large number of factors. Older, large, metallic submarines which are poorly shaped and emitters of great amounts of noise are much more easily detected than new, smaller, tear-drop submarines constructed primarily of reinforced plastic and employing laminar flow technology. Current types of conventional submarines will retain an additional source of vulnerability because of their requirement to cruise for significant periods with their snorkels above the surface of the sea. New types of non-nuclear propulsion systems are likely to reduce this requirement greatly.

The second major determinant of submarine survivability is the intensity with which their area of operations is seeded with passive sonar sensors and patrolled by opposing anti-submarine warfare forces. There is a far higher probability of submarines of all types being detected, targeted and in a wartime situation destroyed in the North Atlantic and the Sea of Japan than in the Antarctic or the Southern Indian Oceans. In the future, the balance of the offence/defence struggle in this field is likely to depend heavily upon the ocean environments within which submarines are deployed.

The Increased Vulnerability of Large and Obvious Platforms on the Ground

The vulnerability and cost-effectiveness of major units of defence capital in the ground environment is also in a state of flux. The immediate reaction of many countries' armoured units to the proliferation of light, highly accurate

and inexpensive anti-tank weapons has been an intensification of combined arms tactics. As a consequence, it seems extremely unlikely that in the future armoured units will manoeuvre and attack fixed positions in isolation, as occurred during the first hours of the Yom Kippur War. Rather, infantry will travel in close proximity to tanks in mechanized infantry combat vehicles or open-topped armoured personnel carriers, spraying likely missile team vantage points with machine gun and mortar fire. In addition, self-propelled rocket and/or tube artillery will travel in strength in reasonably close proximity so as to be able to add weight to the curtain of suppressive fire. If enemy surface-to-air systems can be suppressed effectively in the local region, close air support aircraft can be expected to operate in coordination. The final integrated component of the modern all-arms ground battlefield team is a mobile gun and/or missile anti-aircraft capability. Thus, in order for modern armoured forces to be effective and survivable, a large number of supportive systems are required to act in coordination in most environments.

The second major reaction of armoured units to the proliferation of light anti-tank weaponry has been to improve standards of armoured protection. Vehicles equipped with conventional solid armour (AMX 30, LEOPARD I A1 and I A2, M-60, T-62, T-64, etc.) are likely to remain susceptible to a very large number of ground and air launched anti-tank weapon systems. Those vehicles which are equipped with spaced armour (eg. LEOPARD I A3, CHARIOT) gain a degree of protection from the smaller man-portable shaped charge weapons. However, CHOBHAM 'special' or layered armour, which is currently being fitted to XMI, LEOPARD II and the latest CHIEFTAIN tanks, offers a much greater degree of protection. This armour effectively resists all but the largest artillery and air launched shaped-charge warheads and all currently deployed tank gun rounds. The most effective ground weapon penetration against this new armour appears to have been achieved by a British experimental, very high velocity, 120mm, armour penetrating, fin stabilised, discarding-sabot (APFSDS),
kinetic energy (KE) tank gun round and a United States experimental very high velocity 105mm, KE depleted uranium tank gun round.\textsuperscript{198}

The implications of these new developments in armour plating are very great indeed. It appears that, because CHOBHAM armour is not excessively expensive, it may eventually be deployed widely on a variety of armoured vehicles. This, in turn, will impact heavily upon the types of anti-armour weaponry which will be effective in the future. In terms of warheads, there appears to be the option of either very large shaped charge or very fast KE penetration rounds. As was discussed earlier in this chapter, the United States is developing a 75mm anti-tank gun which fires very high velocity APFSDS rounds. As yet it remains to be seen whether this medium calibre weapon can generate sufficient penetrator velocity to be effective against CHOBHAM armour.

Another consequence of the widespread introduction of new armour is that it may be extremely difficult to develop an effective new-generation man-portable anti-tank system. The size of the shaped charges needed would almost certainly require vehicles to transport a missile system as a whole. Another alternative might possibly be available if the terminal accelerator technology developed for air launched runway penetration bombs can be extended and applied in the anti-tank field.\textsuperscript{199} This would require the development of an extremely rapid flight acceleration capacity for a light man-portable or vehicle-mounted KE round.

The vulnerability of major ground battlefield weapons platforms in the future will depend at least partly upon the extent of CHOBHAM armour deployment and the speed with which


\textsuperscript{199} See this technology described in \textit{NATO's Fifteen Nations}, Vol. 21, No. 2, April-May 1976, p. 97 with regard to the Thomson-Brandt 100mm tactical support bomb and in R.T. Pretty (ed.), \textit{Jane's Weapon Systems 1975}, p. 502 with regard to the DURANDAL penetration bomb.
Effective ground launched direct fire anti-tank systems can be developed and deployed. However, it should be realised that, even before new types of anti-tank systems are developed, all tanks, regardless of the composition of their armour plating, will remain vulnerable to many air- and artillery-launched precision guided munitions, fuel air explosives and anti-tank mines and mineslots.

There appears to be a clear, identifiable trend emerging from the nature of the battlefield situation which is confronting large and obvious weapons platforms. Although their offensive capabilities are rising, large surface ships, aircraft and conventionally armoured vehicles are becoming increasingly easy to detect, target and destroy on technologically advanced battlefields. Many of the weapons systems which can effectively damage and destroy these platforms are relatively cheap to procure and hence are likely to be proliferated in the armed forces of many states. Thus, in intense battlefield situations, all of these large and obvious concentrations of defence capital are likely to be subjected to multiple coordinated attacks by new generations of anti-systems. In order to enhance their survivability, aircraft, ships and tanks are requiring the support of increasing numbers of supplementary systems and technologies and the development of more protective and elaborate operational tactics and doctrines. Even with heavy supportive technologies and tactics, there are now some tasks which are extremely difficult and expensive for traditional platforms to perform at all. Therefore, the overall impact upon large and obvious weapon platforms performing their traditional battlefield functions is to degrade their survivability, stimulate a quantum jump in their costs and in many cases cause a drastic reduction in their operational effectiveness.

For example, it is becoming extremely difficult and expensive for tactical aircraft to perform close air support tasks in intense battlefield environments. The same can be said of large surface ships performing conventional gun fire support missions adjacent to coastlines occupied by well equipped enemy forces.
2. The Increasing Utility of Small Units

Because large and obvious weapons platforms are being subjected to higher levels of both active and passive attrition in intense battlefield environments, it is becoming increasingly desirable to disperse military capacities. It is becoming preferable to force an enemy to try to find and destroy many relatively inexpensive platforms rather than a few high value ones. This development is being reinforced by the fact that the range capabilities of many small weapons platforms are being extended greatly and most forms of effective guided firepower are becoming increasingly light and compact. In combination, these factors are having the effect of making small units viable for a much wider range of tasks than has hitherto been the case. Small units are not only able to threaten and destroy larger units in more situations, but they themselves are frequently more survivable because of their lower all-media signatures and their high level of natural agility. Add to this the relatively low cost of these small units and it becomes clear that in many battlefield environments in the future small unit proliferation will be a major feature.

The proliferation of small, relatively independent military units will have a large number of secondary implications for military structures. Most notably, research and development and equipment priorities are likely to change. Further, tactical doctrines and operational procedures are likely to require heavy modification if the potential offered by the new technologies is to be exploited fully. One likely change in tactical doctrine will be a reduced requirement for the highly vulnerable close concentration of military units in many environments. Concentrations of precisely directed firepower launched from remote locations will be able to provide much of the capability which in the past has been available only from closely deployed forces in the immediate battlefield area. However, at the same time, it is important to realise that high levels of force dispersion are likely to increase reliance upon high capacity command, control and communications facilities. In many situations the span
of effective command is likely to be reduced severely. This, in turn, will place very greatly increased authority and responsibility in the hands of small unit commanders. Personnel training systems will need to be adjusted to ensure that military personnel filling key positions within this type of structure are equipped adequately to meet the very intense demands which may be made upon them in battlefield situations.

3. The Increasing Importance of Remaining Untargeted

Because precision ordnance delivery at both short and long ranges is becoming increasingly easy and the destructive capacity of conventional warheads much greater, it is clear that one's capacity to remain untargeted is becoming an increasingly central determinant of battlefield outcomes. As has been discussed above, this is stimulating a high level of force dispersal, but it is also encouraging the rapid development of a wide array of stealth technologies and tactics. In terms of equipment, it means the extensive deployment of visual, radar, sound, heat and electronic suppression and camouflage systems. In the field of tactical doctrine, the primary effect will be to accentuate the requirement for dispersed and coordinated movement undertaken in the cover of vegetation, built-up areas, darkness and poor weather. Where a battlefield function regularly requires a high level of battlefield visibility, remotely controlled or remotely emplaced automatic systems are likely to provide the most desirable means of task performance.

4. The Increasing Importance of Target Detection, Identification and Localisation System Survivability

In order for one's target acquisition sensor systems to remain untargeted by the enemy, it will be important for them to operate in as covert and passive a manner as possible. Thus, in the ground environment, intensified activity is already apparent in the development of advanced acoustic, seismic, optical and imaging infra-red systems. Imaging
infra-red scanners can already provide a completely passive 24-hour medium range target acquisition and tracking capability.\textsuperscript{201} New generations of remotely emplaced passive battlefield sensors are also under development for both the ground battlefield and maritime applications. Where active radiation emitting target acquisition sensors are required, it is highly desirable that they be mobile and operated as far away from intense battlefield environments as possible. Hence, airborne target acquisition radars of various sorts are mostly designed to be operated from areas well behind the FEBA. OTH radar transmitters are also likely to be sited at remote locations and may, in the future, be provided with a degree of mobility.

5. The Accelerating Pace of Tactical War

A rapidly decreasing proportion of target acquisition and weapons guidance systems rely upon unassisted human optics. As a consequence, much of the security hitherto derived from darkness, bad weather and light camouflage is being removed. The gradual lifting of this target acquisition constraint is having the effect of making modern tactical war a more intense and an almost non-stop round-the-clock operation. This has different implications for different people in different situations, but on the general level it has obvious significance in purely human endurance terms. Patterns of sleeping, eating and general human activity are likely to be far more subject to modification to fit the new military requirements. Various forms of drugs may be dispensed to improve peak efficiency, extend human endurance or assist personnel to rest and sleep even in noisy and uncomfortable environments.

In a broader sense, the intense and non-stop nature of future war will have significant force structure implications.

This will perhaps be most noticeable in its encouragement of a modular concept of rapidly replaceable self-contained small units. Depending upon the nature of the battlefield environment, these might be of battalion, company or even platoon size.

6. Changing Logistics Requirements

The non-stop nature of modern war and the proliferation and wide dispersal of mobile small units will require the development of a new logistics support concept. The delegation of a larger amount of authority to lower command levels on this type of continuously active battlefield could be expected, in many environments, to stimulate an increased rate of ammunition expenditure. On the other hand, because of dramatically improved weapon accuracies and warhead efficiencies, far less ordnance should be required to destroy a given number of acquired targets than has been the case in the past. The balance between these competing factors is likely to vary considerably according to operating doctrines and the nature of the local battlefield environment.

In those battlefield situations where it is possible for small units to be withdrawn in a modular fashion from the major areas of intense battlefield activity at 48 or 72 hour intervals, it may be sufficient for the logistics system to concentrate upon refurbishing forces at these locations. However, it can be anticipated that the practical difficulties of this concept will necessitate the provision of a large amount of logistics support directly into intense battlefield areas. In most situations this is likely to be provided with conventional means of transport. However, in very intense environments in the future, it will be possible to deliver relatively compact high value goods in simple, re-usable terminally guided rocket-powered canisters. These could be ground-, sea- or air-launched to home onto the desired location and be restrained in the final seconds of flight by an integrated parachute system.

In an overall sense, conventional components of battlefield logistics systems are likely to become much more
vulnerable to direct attack. Roads, bridges, railways, tunnels, storage and transit areas are likely to be relatively easy for an enemy to acquire and destroy, even if they are located deep behind the FEBA. As a consequence, centres and routes of logistics support will need to be concealed where possible, but certainly duplicated and dispersed. It will thus become increasingly important for logistics support vehicles to possess an off-road rough terrain capability.

7. The Survivability of Camouflaged and Dispersed Land Based Systems

The camouflage potential of the environments within which military platforms currently operate varies greatly. The contrast between a target's natural signature and its surrounding background is much more difficult to disguise artificially in the air and, to a lesser extent, in the sea than it is in the ground environment. Hence, military platforms in the air and on the surface of the sea, in particular, are much more readily acquired by a series of short and long range surveillance and target acquisition sensors than platforms which can operate in the naturally dense ground environment.

The increased relative survivability of ground based systems will be reinforced as new generations of long range surveillance sensors, precision guided munitions and ground based aircraft are developed and deployed. In combination, these systems will make the performance of a much wider array of military functions from ground based locations feasible and economic. For example, in many environments, much of the traditional close air support task is likely to be performed in the future by a mix of terminally guided rocket and tube artillery systems of various calibres. Tactical airpower's traditional long range interdiction function against fixed targets in the enemy's rear is likely to be performed far more cost effectively in the future by ground launched terminal homing cruise missiles. Where there is a requirement
for mobile targets to be hit, particularly in the immediate battlefield area, RPV systems will be capable of either direct ordnance delivery or target designation for remotely launched munitions. Further, in many battlefield environments, it seems likely that the degree of air cover required by one's ground forces will be provided effectively by ground based air defence systems on their own. In intense battlefield environments, manned aircraft are likely to become decreasingly competitive in cost-effectiveness terms with an array of new technology options.

The cost-effectiveness of medium and large surface shipping is also suffering a rapid decline. In many future environments, surface ship and submarine detection, identification and localisation is likely to be most efficiently performed by a mix of satellite sensors, long range passive sonar arrays, OTH radar systems and electronic detection and identification systems. In some situations, the accuracy of these systems is likely to be sufficient to permit long range ground launched conventional cruise missile, torpedo carrying missile or RPV designated missile attacks. In relatively benign maritime environments, very large multi-mission, land based, long endurance aircraft will be available to prosecute contacts, particularly submarine contacts, from closer range when this is desirable. These aircraft will also be able to launch multiple long range stand-off attacks against surface shipping and perform the coastal bombardment role by launching very large numbers of relatively cheap precision guided munitions from extended stand-off ranges. This type of aircraft would not be designed for operations in high intensity environments.

As was noted earlier in the chapter, satellite systems are likely to play an increasingly important role in this function for the major powers. See Aviation Week and Space Technology, Vol. 105, No. 18, 1 November 1976, p. 19 for an elaboration of the satellite's role by W.H. Pickering, Head of the US National Academy of Sciences Naval Studies Board and a former Director of the Jet Propulsion Laboratory.
However, in marginal or potentially hostile situations, they could be given a degree of protection through their capacity to refuel and vector a small number of accompanying manned or unmanned, ground or air launched fighter aircraft.

In summary then, the overall trend is likely to be towards larger numbers of ground based systems. Part of the stimulus for this development is likely to come from the lower procurement and operating costs of most of these systems when compared with traditional manned aircraft and ship based systems. But the major reason for the move to ground based systems will be their very much greater survivability in intense battlefield environments when compared to alternative systems in the air or at sea. It is re-emphasised that this is simply because it is becoming much easier to detect targets in the air and sea at both short and long ranges than targets which are concealed in the land environment. When this is considered in conjunction with the fact that the costs of accurate ordnance delivery over long ranges are falling rapidly, many of those functions which can technically be fulfilled by ground based systems will be most cost-effectively performed by them. This is particularly the case when the major evaluative criterion in the relative assessment of alternative systems is cost per kill.203

8. The Increasing Vulnerability of Large, Fixed, Obvious and Unprotected Base and Support Areas

Unless base structures are designed, constructed and maintained in a highly dispersed, camouflaged and covert fashion, their acquisition for targeting is normally relatively easily undertaken in times of peace from public documents, through diplomatic channels or foreign agents. However, despite

203 This assessment criterion is most applicable to struggles which might reasonably be expected to be lengthy. If one could be sure that a conflict would necessarily be of very short duration, it might be more appropriate for economic factors to be given less emphasis.
the ease with which they can be acquired as targets, base
structures and essential elements of the national infra-
structure are highly vulnerable only if precision guided
weapons can penetrate to the areas in which they are
located. As long as an effective and affordable anti-
ballistic missile system is not developed, intercontinental
ballistic missiles (ICBMs) can probably reach any target
on the earth's surface. However, because of their enormous
complexity and expense, ICBMs are likely to be possessed
in the future by only a few major powers. Cruise missiles,
on the other hand, represent a much simpler technology which
will be significantly less expensive to acquire and
proliferate. The new surveillance and target acquisition
technologies should make the detection of cruise missile
carrying platforms (aircraft, ships, submarines, etc.) a
feasible proposition in many environments even at long
range. However, the detection, identification, localisation
and interception of long range cruise missiles in flight may
be a much more difficult proposition. Large, relatively
unsophisticated cruise missiles possess many of the
signature characteristics of conventional aircraft and
hence should be detected relatively easily by satellite
sensors and OTH and AWACS radar systems. However, the
stealth technologies employed in the latest cruise missiles
(e.g. the US Sea Launched Cruise Missile (SLCM) TOMAHAWK
and the Air Launched Cruise Missile (ALCM)) effectively
reduce the radar signature of these systems to a degree
where it is comparable to that of a seagull. It has yet
to be demonstrated conclusively whether these missiles can
be detected and tracked consistently by the new generation
long range surveillance systems.

The radar cross section of SLCM [TOMAHAWK]
is said to be the equivalent of a seagull's,
while the Navy is attempting to reduce it to
that of a sparrow by the use of surface coatings
which at low altitudes would break the typical
Soviet ground radar's ability to lock on.

Cited from J.P. Geddes, 'The Sea Launched Cruise
Missile' in International Defense Review, Vol. 9,
No. 2, April 1976, p. 201.
A country's capacity for intercepting incoming cruise missiles would also depend heavily upon the length of cruise missile flight from an undetected launcher to the target. For example, it is unlikely that satellite, OTH radar or AWACS vectored air defences would be capable of preventing a surprise cruise missile attack upon coastal installations from an undetected submarine cruising close offshore. However, if cruise missile flight time to target was in the order of twenty minutes or more, it is possible that this might permit successful interception by fighter aircraft stationed nearby. 205

The essential point to be made here is that in some environments it may be possible to provide a defence against some types of long range cruise missile attacks. However, such defences would be vulnerable to saturation in the circumstances of a multi-missile attack and they would be very sensitive to the degradation or destruction of the long range defensive vectoring capability, whether this is provided by satellite sensors, OTH radar, AWACS, a very elaborate ground control intercept radar system or a combination of the four. Extensive efforts would be required to ensure the survivability of this essential command and control capacity in the face of a wide range of threats.

Given that effective defences against long range cruise missiles and precision guided weapon-equipped strike aircraft may not be available or effective in all circumstances and in all environments, there will be an expanding requirement for the vulnerability of base and support facilities to be reduced.

205 This assumes, of course, that the AWACS or OTH radar systems can actually detect incoming cruise missiles which incorporate stealth technologies and also that fighter aircraft radars and other systems are sufficiently sensitive to make close range interception feasible. This may be extremely difficult, especially if the cruise missiles are flying low and hence are heavily camouflaged by ground clutter from some types of downward-looking sensors.
The vulnerability of military support facilities can be decreased by dispersing and hardening facilities within local base areas. However, it should be realised that in an era of precision guided fuel air explosives and hard structure munitions, local dispersal and sheltering alone may not provide a very effective solution. Moreover, the vulnerability of military facilities represents only a proportion of the total problem. There are many elements of national economic infrastructures - bridges, factories, warehouses, railways, tunnels, etc. - which play central roles in supporting military capacities. Because of the scope of military support vulnerability, both inside and outside immediate base areas, this particular problem is not amenable to any single, simple solution. Rather, a variety of measures is likely to be required if a high degree of endurance is to be provided to overall military capacity. Many types of military operational systems can be dispersed and concealed to prevent targeting. Some can be made mobile and prepared with alternative operating sites. However, factories, transport networks, power stations and other key facilities are difficult to conceal and many are expensive to harden. In these categories, it may be necessary to design selectively and construct a degree of system redundancy to ensure the provision of services which are vital in wartime situations.

The most sophisticated and expensive defence equipment is of very limited value in military terms if its base and operating support system is highly vulnerable to attack.

Air, Naval and Army base refuelling and rearming facilities can be given a large degree of protection in this manner. European practice is most notable in this regard. See, for instance, The Defence Forces of Switzerland (A supplementary booklet published by The Army Quarterly and Defence Journal, Tavistock, U.K., 1974), pp. 29, 30 and D. Chopping, 'In Fighting Trim - The Swedish Air Force' in International Defense Review, Vol. 6, No. 3, June 1973, pp. 303 ff.
9. The Role of Surprise Attack

If there is a means by which a country's long range surveillance and target acquisition sensors can be degraded or destroyed in an effective manner, then that country is becoming increasingly vulnerable to powerful surprise strikes. If, in addition, that country has not concealed, dispersed and protected key elements of its defence structure, then new generations of precision guided weapons are making it increasingly susceptible to rapid and decisive defeat. If ships, aircraft, armoured vehicles, artillery pieces, communications, command and control facilities and other units of defence capital are grouped in unconcealed and unprotected concentrations, it is becoming very easy for them to be targeted and destroyed by long range terminally guided weaponry.

However, if long range surveillance and target acquisition sensors are concealed, dispersed, protected and, where possible, duplicated and made mobile, it will be extremely difficult for an opponent to mount a surprise attack. Further, if key elements of the defending country's support base and national infrastructure are also concealed, dispersed, protected and provided with a degree of system redundancy, this will serve to enhance defensive endurance greatly in a manner which is not likely to be sensitive to an opponent's development of new conventional military capacities.

10. The Increasing Necessity for Total Defence Planning

One consequence arising from developments in long range missile, RPV and conventional warhead technologies will be to increase greatly the ease with which large numbers of countries will be able to target and, if they wish, attack the economic infrastructures of opposing states from bases within their own national boundaries. Thus modern conventional warfare, even between relatively minor states, is likely to threaten the existence of all aspects of the societies involved. As a consequence, it seems probable that
many states will strive to reduce the vulnerability not only of key elements of the national infrastructure which support the military defence effort in the most direct sense, but also a much wider array of targets, including the major centres of population. These broad national security considerations are likely to surface as a significant influence in many aspects of national development policy and planning.

11. The Stimulation of Greater Selectivity in Technology Choices by the Rising Costs of Many Military Systems

In the case of many new and improved conventional military systems, unit costs are rising rapidly. This is particularly the case regarding complex multi-purpose systems which involve numerous integrated technologies. For instance, Desmond Ball makes the case that the costs of US fighter aircraft increased between 50 and 80 times from 1940 to 1975. S.J. Dudzinsky and James Digby support this general view by arguing that the costs of US aircraft carriers doubled in real terms in the decade to 1975 and that the average unit costs of US main battle tanks rose by a comparable proportion.

207 For a detailed discussion of the costs of an array of new weapons technologies see J.P. Large, 'Notes on Costs'; an appendix to S.J. Dudzinsky, Jr, and James Digby, Qualitative Constraints on Conventional Armaments: An Emerging Issue (Santa Monica, Rand Corporation Paper R - 1957, 1976), pp. 87-91.

208 See the discussion in Desmond J. Ball, 'Australia's Tactical Air Requirements and the Criteria for Evaluating Tactical Aircraft for Australian Procurement' in Desmond Ball (ed.), The Future of Tactical Airpower in the Defence of Australia, pp. 61-65.

209 See their argument in S.J. Dudzinsky, Jr, and James Digby, 'The Strategic and Tactical Implications of New Weapons Technologies' in Robert O'Neill (ed.), The Defence of Australia: Fundamental New Aspects (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 49-56. This case can also be substantiated by reference to the cost escalation of a number of other weapons platforms and systems. For example, with regard to attack aircraft, see William D. White, US Tactical Air Power: Missions Forces and Costs (Washington D.C., The Brookings Institution, 1974), pp. 55-59.
Certainly the operational capacity of almost all of the new technology systems surpasses that of their predecessors by a significant margin. Because of this, the cost-effectiveness of some of the new systems in some operational environments is difficult to dispute. For instance, while a guided glide bomb may cost thirty times that of an unguided iron bomb, it may, in effect, be able to accomplish tasks which would otherwise require hundreds of iron bombs, multiple aircraft sorties and greatly increased risks to both aircraft and aircrews.

Cost/performance trade-offs in terms of high/low technology mixes are already accepted practice in many national security structures. However, the magnitude of the current capital equipment cost expansion is likely to place even greater pressure upon the processes of selecting new technology elements in total force structures.

12. The Increasing Cost-Effectiveness of Medium Technology Defensive Structures

Whereas most current defence structures are designed to perform both offensive and defensive functions, this situation may change as a consequence of new technology developments. In particular, there is now increased scope for the development of relatively inexpensive specialised structures for tactical defence.

The most desirable selection of defensive technologies is likely to vary greatly according to local conditions. However, in many countries, it should be possible to procure a small number of carefully selected high technology early warning, identification and long range target detection systems.

210 The concept of a high-low cost equipment mix has been the subject of an intense debate in the United States ever since the original proposals of this type were made for the US Navy by Admiral E.R. Zumwalt. For an elaboration of the issues involved see the article by him entitled 'High-Low' in *United States Naval Institute Proceedings*, Vol. 102/4/878, April 1976, p. 46, and also the discussion in subsequent issues of the same journal.
and a large number of medium technology weapons systems which, when structured into appropriate military units, should provide a highly survivable capacity to defend in depth.

In practice, the selective exploitation of the potential which the new technologies provide is likely to have the effect of enhancing greatly the deterrence and tactical defensive capacity of a wide range of states. For countries whose potential enemies are equipped substantially with new technology weaponry, the utility of war, as distinct from the threat of war, will be reduced greatly. However, it should be noted that, if a small or medium state is confronted by a major power opponent, its possession of advanced defensive technologies, while greatly increasing its power of deterrence and tactical defence, will do little to increase the effectiveness of that country's strategic defences (ie. to protect its total economic infrastructure).

13. The Enhanced Capacities of Terrorist Groups

Although national governments will retain a clear superiority in conventional military power, the increasingly light and compact nature of guided firepower will provide stateless groups with a means of inflicting violence in a highly discriminatory manner from stand-off ranges. Terrorist groups armed with modern anti-aircraft, anti-tank and anti-shipping weaponry will pose a threat of quite a different type to that of the past.211

14. The Partial Replacement of Tactical Nuclear Weapons by Precision Guided Munitions

The effectiveness of advanced precision guided weapon systems of various sorts against small hardened and large unhardened targets will make them a viable alternative to tactical nuclear weapons in the performance of many battlefield functions. The precision accuracies of these weapons serve to reduce greatly the requirements for the enormous quantities of firepower which only nuclear weapons can effectively provide. Hence, precision guided munition equipped forces of moderate size can effectively deter major powers on the tactical level and, if deterrence fails, they can effectively destroy attacking forces, their immediate support and, in many environments, important parts of their national domestic infrastructures. As a consequence, precision guided munitions may be substituted for tactical nuclear weapons when major powers wish to destroy major enemy forces, when major powers wish to enhance a client's defensive capacity or when an independent state wishes to enhance greatly its self defence capacity.

Nuclear weapons (as well as chemical and biological weapons to some degree), because of their unsurpassed destructive capacity, are likely to retain a level of deterrence potential which exceeds that of any conventional munition. The requirement for this level of deterrence, as well as the prestige and other incentives which are always likely to accompany the possession of tactical nuclear weapons, will most probably thwart attempts to reduce non-superpower holdings of nuclear weapons. However, because the strictly military requirement for this type of highly expensive large hard target destructive capacity is becoming more limited in most environments, pressure for the acquisition of tactical nuclear weapons may be decreased in many countries.

212 The potential for precision guided munitions replacing nuclear weaponry is discussed in greater length in A. Wohlstetter,'Threats and Promises of Peace: Europe and America in the New Era' in Orbis, Vol. 17, No. 4, Winter 1974, pp. 1107-1144.
15. Multi-Party Mutual Deterrence

One significant consequence of the wider distribution of accurate long range bombardment capacities is likely to be the development of a complex web of mutual deterrence. Even where neighbouring states are in conflict over serious matters, if their long range precision guided munition capacity is comparable, it seems probable that in many situations each will be constrained from unrestricted deep infrastructure attack by the prospect of heavy retaliation.

Conclusion

Both civilian and military defence bureaucracies face a major challenge if they are to exploit fully the potentialities of the new technology environment. Forthcoming developments in conventional weaponry and the possibilities they offer are of an order of magnitude greater than anything experienced in the past.

However, the processes of adjusting to the new technology environment are extremely complex. As Dr Malcolm Currie, the recently retired US Director of Defense Research and Engineering, points out, appropriate adaption to the new technology environment involves much more than the simple placement of new technology items on defence equipment shopping lists:

... I want to make the point that technology per se is not enough ... Equally important to technology is its innovative use in the overall military context. That is why I believe that the development of tactics is every bit as important as hardware and must be made an explicit and implicit part of the design evolution and development process.213

However, the choice of new technologies and the most

appropriate tactics, doctrines and structures for their employment will vary greatly according to local terrain, vegetation, weather and other factors. The lessons which might be available from the experiences of others can be expected to provide only a generalised guide to the requirements of local conditions. Hence, for most countries, the only practical method of resolving the problem satisfactorily will be the initiation of an extensive programme of field trials and experiments in an effort to derive solutions most appropriate for the local environment. Flexibility of thought, a high level of originality and a willingness to encourage new ideas will be essential in this process.

In any society, the instigation of such a process of fundamental reassessment is certain to arouse the resistance of military, bureaucratic and political vested interests. However, as Dr Currie points out, this is an essential component of any process of serious re-evaluation and restructuring:

The main point is that ... [we] ... must ... tear down the barriers of tradition, of bureaucratic inertia and thinking, of service roles and missions, of familiar scenarios projected from the experience of the past. The world is changing fast. The opportunities are there and our failure to perceive them first could be fatal.214

Thus, for those countries with national security structures which are sufficiently flexible to accept the requirement for change and conduct a thorough reappraisal, the prospects are that significantly different defence concepts, postures, structures, operational concepts and equipment priorities will most probably emerge.

On the other hand, those countries which do not undertake to adapt their defence structures to meet the requirements of the new technology environment will suffer a significant

Ibid.
decline in their relative security, for it is certain that national security structures which have not mastered the new technology environment will become increasingly vulnerable to those which have.
PART II
THE CONSEQUENCES OF THE CHANGES

It is clear from the discussion in Part I that the nature of Australia's strategic environment and security function has changed fundamentally during the past decade. The task of securing Australia's local interests with a high degree of independence in the 1980s differs substantially from that of maintaining a capacity to deploy single service contingents to support the foreign commitments of major power allies in the 1960s.

In particular, Australia will in the future require a capacity to meet a completely different and much broader range of pressures and threats. It is the primary purpose of Chapter 3 to outline the character of the new threat environment and to discuss the extent of Australia's natural vulnerabilities.

A second implication of the changed strategic circumstances is that Australia's security response requirements have altered substantially. Some of those aspects of the current security system which are inappropriate for meeting the demands of the new environment are identified and analysed in Chapter 4.
CHAPTER 3

WIDENING DEMANDS UPON AUSTRALIA'S RESOURCES

Because of the changed character of the strategic environment, the range of security contingencies for which Australia requires a capacity to respond is clearly much broader than that of the 1950s and 1960s. Yet the exact nature of the pressures and threats to which Australia may be subjected in the future is very uncertain. This high level of unpredictability is the source of a large number of Australia's security planning problems. However, despite the imprecision which necessarily characterises the discussion of pressures and threats in this environment, it is possible to gain some valuable insights into the nature of Australia's future security task by examining systematically the breadth of the nation's susceptibilities.

For the purposes of the following analysis the full spectrum of international pressures and threats is divided into three categories.

1. The pressures of peace. These concern the mostly non-violent but also the sub-national violent pressures which are a product of the stresses and strains implicit in the world environment in the absence of open conflict between states.

2. The pressures of international crises. This category concerns the pressures which might be directed against Australia as an indirect result of a conflict or war overseas in which Australia is not directly involved.

3. The pressures of international aggression. This category includes those types of pressure which might be applied in the context of an external state mounting a direct attack upon Australia, employing economic, political, psychological and/or military means.

Before considering the types of pressure which might arise in each of these three sections, it should be noted that each category possesses a varying degree of applicability
when its relationship to the Australian environment is discussed. The pressures of peace are manifested in many types of activity which occur daily. The pressures of international crises, while not currently affecting Australia in a significant sense, have done so on several occasions during the post-war period (eg. during the Korean War 1950-53, Indonesian Confrontation 1963-66, the 1973-74 oil crisis, etc.). However, assigning a high level of relevance to the pressures of international aggression, especially concerning those threats which are very demanding in their response requirements, is far more difficult in the Australian environment. This is partly because of the limited historical precedent for this type of high level threat to Australia. But it is also caused by the fact that the current regional and global situation is structured in such a manner that it would be difficult for such threats to arise quickly. Dr O'Neill has argued that at least one of three major changes in the international environment would be necessary, although not of themselves sufficient, prior to the presentation of a major threat to Australia:

a. The superpowers change their attitudes to each other to the point where one or both consider the risk of a serious clash to be acceptable ...

b. World class struggle sharpens a great deal while at the same time Australia conducts herself in a manner which is viewed as extremely irresponsible by the less privileged nations ...

c. Regional and great power actors acquire both a high degree of military capacity for aggressive action at a long range and a high degree of strategic freedom to pursue selfish interests at the expense of others.¹

¹ Dr Robert O'Neill, Changes Required in the International Environment for the Development of Extreme Threats to Australia. (A paper prepared for a seminar entitled 'The Potential for Extreme Threats in the International Environment and Australia's Response Options' held by the Strategic and Defence Studies Centre at The Australian National University, Canberra, on 3-4 March 1977), pp. 5-7.
This is not to say that major international changes of these types could not take place rapidly. In some conceivable circumstances they could. But the sheer scale of the change which would be required serves to limit the potential for high level threats arising against Australia. Excepting possibly the circumstances where a superpower becomes Australia's opponent, much more change would be required in the international environment than a simple alteration of a single actor's intentions.

Despite the relative improbability of major direct threats arising against Australia in the short term, this does not negate the value of their study and serious consideration. If such a threat actually did arise, the implications for Australian national security would clearly be of a much higher order of magnitude than those of the lower level threat categories.

While it is difficult to speculate about the probability of major threats arising against Australia, something can be stated about their timing. For a high level threat to develop against Australia, a large amount of change would be required in the international environment. Where the change required is primarily that of perceptions and/or intentions, a major threat could develop quickly. However, where the change required in the international environment involves not only an alteration of intentions but also a substantial development of military capacities, the threat could not readily arise in a short period.

A similar argument can be made concerning the development of medium level threats. However, in their case, a lesser amount of change is required in the international environment in order for them to arise. Again, where this change does not involve a significant alteration of military capacities but merely a change in intentions, such threats could, in some circumstances, arise very quickly.
Diplomatic channels provide the venue for a wide range of low level pressures. These can range from the very casual, off-the-cuff ambiguous remark made at a cocktail party to a much more formal comment, suggestion, expression of opinion or protest. Most international actors, including the Australian Government, engage in elaborate and almost continuous processes of bargaining and negotiation over a very wide set of issues, such as relations with neighbours, international economic aid, disarmament measures, UN related activities and sea bed boundaries, to name just a few. From time to time these forums are used for minor trials of strength and for the management of disputes which threaten an escalation of tension.

Low level pressure can also be applied through a range of economic measures and to some of these Australia is unusually vulnerable. Because the normal peacetime economy is oriented towards very high levels of international trade, the variation of tariffs, import and export quotas, quality restrictions, currency values, foreign investment holdings and a host of other variables by trading partners can affect the prosperity of many sectors of Australian industry to a marked degree. The major consumers of Australia's export products are probably best placed to cause disruption in this regard. As can be seen from Table 1, Japan, the United States and the countries of the European Economic Community acquire nearly two-thirds of Australia's export product. Their restriction of imports, by whatever means and whether with the intention of applying pressure or merely attempting to solve domestic economic or political problems, can have

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2 International actors may be defined to include nation states, interstate organisations, multinational corporations and sub-national groups such as terrorist organisations. However, during the course of this discussion, references primarily refer to nation states.
### Table 1

**AUSTRALIAN EXPORTS AND IMPORTS, PROPORTIONS, BY COUNTRY OF CONSIGNMENT OR ORIGIN**

(Per cent)

<table>
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<tr>
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<tr>
<td>Arab Republic of Egypt</td>
<td>0.39</td>
<td>0.10</td>
<td>0.66</td>
<td>0.18</td>
<td>0.01</td>
<td>0.09</td>
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<td>0.07</td>
<td>0.23</td>
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<td>Bahrain</td>
<td>0.04</td>
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<td>0.22</td>
<td>2.90</td>
<td>0.02</td>
<td>0.23</td>
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<td>0.99</td>
<td>1.07</td>
<td>0.65</td>
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<td>0.08</td>
<td>0.18</td>
<td>0.12</td>
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<td>0.01</td>
<td>0.27</td>
<td>0.52</td>
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<td>0.09</td>
<td>0.10</td>
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<td>0.17</td>
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<td>3.03</td>
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<td>2.64</td>
<td>5.42</td>
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<td>1.60</td>
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<td>0.01</td>
<td>0.05</td>
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<td>0.58</td>
<td>0.01</td>
<td>0.04</td>
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<td>41.76</td>
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<td>18.63</td>
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<td>United States of America</td>
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<td>12.21</td>
<td>16.57</td>
<td>21.27</td>
<td>20.87</td>
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<tr>
<td>U.S.S.R.</td>
<td>0.19</td>
<td>1.36</td>
<td>1.99</td>
<td>0.14</td>
<td>0.05</td>
<td>0.07</td>
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<tr>
<td>Yugoslavia</td>
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<td>0.55</td>
<td>0.80</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
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<tr>
<td>Other countries</td>
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<td>6.00</td>
<td>5.36</td>
<td>8.98</td>
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<td>3.60</td>
</tr>
<tr>
<td>'For Orders' and Country of origin or destination unknown</td>
<td>0.72</td>
<td>0.08</td>
<td>0.06</td>
<td>0.10</td>
<td>0.46</td>
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</tbody>
</table>

| Total                            | 100.00          | 100.00          | 100.00          | 100.00          | 100.00          | 100.00          |

(a) Comparable figures not available.

a significant impact upon Australia.

The potential for applying low level pressure through the disruption of imports to Australia is much more restricted. The Australian economy is self-sufficient in essential foods and most basic materials required for its short-term sustenance.  

Probably the most notable examples of this influence in recent years have been the quotas on beef imports into the United States and Japan and the much broader restrictions on a wide range of primary products being imported into the European Economic Community.

Australia's dependence on imports is at present limited to a relatively small, although increasing, number of commodity areas. At present the list primarily comprises liquid fuels and lubricants, an array of chemical materials, some pharmaceutical products and a variety of medium and high technology manufactured goods - machine tools, transport equipment, motor vehicle components etc. The table reproduced below provides an indication of the quantities involved.

**AUSTRALIAN IMPORTS OF MERCHANDISE, BY ECONOMIC CLASS**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>1970-71 Value ($'000 f.o.b.)</th>
<th>1971-72 Value ($'000 f.o.b.)</th>
<th>1972-73 Value ($'000 f.o.b.)</th>
<th>1970-71 Proportion of value of imports (per cent)</th>
<th>1971-72 Proportion of value of imports (per cent)</th>
<th>1972-73 Proportion of value of imports (per cent)</th>
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<tbody>
<tr>
<td>Producers' materials for use in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Building and construction</td>
<td>146,947</td>
<td>135,533</td>
<td>167,084</td>
<td>3.6</td>
<td>3.4</td>
<td>4.1</td>
</tr>
<tr>
<td>Rural industries</td>
<td></td>
<td></td>
<td></td>
<td>1.1</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Manufacturing—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Motor vehicle assembly(a)</td>
<td>288,100</td>
<td>256,379</td>
<td>228,760</td>
<td>7.0</td>
<td>6.5</td>
<td>5.6</td>
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<tr>
<td>Other(b)</td>
<td>1,792,846</td>
<td>1,257,555</td>
<td>1,260,279</td>
<td>31.7</td>
<td>31.8</td>
<td>31.2</td>
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<td>Total producers' materials(b)</td>
<td>1,776,276</td>
<td>1,690,234</td>
<td>1,713,002</td>
<td>43.4</td>
<td>42.7</td>
<td>42.1</td>
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<td>Capital equipment(c)—</td>
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<td></td>
<td></td>
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<td>Producers' equipment</td>
<td>981,930</td>
<td>915,335</td>
<td>855,892</td>
<td>24.0</td>
<td>23.2</td>
<td>21.0</td>
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<tr>
<td>Transport equipment—</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Complete road vehicles and assembled chassis</td>
<td>155,285</td>
<td>159,533</td>
<td>193,853</td>
<td>3.8</td>
<td>4.0</td>
<td>4.8</td>
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<tr>
<td>Railway equipment, vessels and civil aircraft</td>
<td>137,780</td>
<td>90,072</td>
<td>69,382</td>
<td>3.3</td>
<td>2.3</td>
<td>1.7</td>
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<td>Total capital equipment</td>
<td>1,274,995</td>
<td>1,164,940</td>
<td>1,119,127</td>
<td>31.1</td>
<td>29.5</td>
<td>27.5</td>
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<td>Finished consumer goods—</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Food, beverages and tobacco</td>
<td>157,234</td>
<td>165,121</td>
<td>171,073</td>
<td>3.8</td>
<td>4.2</td>
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<td>Clothing and accessories</td>
<td>57,108</td>
<td>76,438</td>
<td>89,180</td>
<td>1.4</td>
<td>1.9</td>
<td>2.2</td>
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<td>All other(d)</td>
<td>580,210</td>
<td>628,298</td>
<td>736,561</td>
<td>14.2</td>
<td>15.9</td>
<td>18.1</td>
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<tr>
<td>Total, finished consumer goods(d)</td>
<td>794,552</td>
<td>869,857</td>
<td>955,814</td>
<td>19.4</td>
<td>22.0</td>
<td>24.5</td>
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<td>Fuels and lubricants(e)</td>
<td>61,405</td>
<td>69,406</td>
<td>68,933</td>
<td>1.5</td>
<td>1.8</td>
<td>1.7</td>
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<tr>
<td>Auxiliary aids to production(f)</td>
<td>99,823</td>
<td>100,515</td>
<td>93,505</td>
<td>2.4</td>
<td>2.5</td>
<td>2.3</td>
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<tr>
<td>Munitions and war stores</td>
<td>89,419</td>
<td>59,824</td>
<td>81,530</td>
<td>2.2</td>
<td>1.4</td>
<td>2.0</td>
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<tr>
<td>Grand total</td>
<td>4,098,560</td>
<td>3,954,775</td>
<td>4,071,911</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
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</table>

(a) Owing to insufficient information, it is not possible to treat unassembled tractors and other machinery in a similar manner to motor vehicles, and all such machinery and replacement parts therefor are treated as capital equipment whether imported in an assembled or unassembled condition.
(b) Includes a percentage for piece-goods to be sold at retail, and paper to be used solely for wrapping, which are recorded in Finished consumer goods, All other; and Auxiliary aids to production, respectively. (See footnote (h).) (c) Includes a percentage for piece-goods to be sold at retail; see footnote (h). (d) Excludes a percentage for piece-goods to be sold at retail; see footnote (b). (e) Includes crude petroleum, which is included in Producers' materials, Manufacturing—Other. (f) Includes a percentage for paper to be used solely for wrapping; see footnote (b). (g) The class fuels and lubricants consists of goods 'simply transformed', and the classes Capital equipment and Munitions and war stores entirely of goods 'more elaborately transformed'. The class Auxiliary aids to production is about equally divided between goods 'simply transformed' and 'elaborately transformed'.

This table is reproduced from Australian Bureau of
Moreover, the range of commodities which she does import, although increasing substantially, is available from a number of intensely competitive alternative suppliers. Hence, although the variation of imports by a major supplier such as the United States, Japan or the United Kingdom could cause severe inconvenience to particular sectors of the economy, Australia is not susceptible to long-term disruptive activities of this type undertaken by a single international actor. Australia's vulnerability to these pressures would only increase significantly if a number of commodity producer states combined to enforce trading restrictions. However, even this extreme action would probably only have a major and immediate impact upon Australia if the commodity involved was oil.

There are some low level international pressures to which Australia is vulnerable which could be applied with or without the sanction of a foreign government. For example, in the economic sphere, disruptive activities initiated by foreign-owned or multinational corporations could be the cause of serious difficulties in some circumstances. Their domination of a series of key Australian industries and their vast capacity to transfer funds, technologies and ultimately productive capacity and jobs between countries does impose a significant constraint upon governmental prerogatives.

4 cont'd


5 In recent years many areas of Australian secondary industry have declined in the face of greatly increased competition from imported products originating principally from newly industrialised Asian countries. This phenomenon is discussed at length in the report to the Prime Minister by the Committee to Advise on Policies for Manufacturing Industry, *Policies for Development of Manufacturing Industry*, (The Jackson Committee Report), A Green Paper, Vol. I (Canberra, Australian Government Publishing Service, 1975).

6 Most notably the petroleum, motor vehicle, chemical, pharmaceutical and cosmetic industries.
There are other types of government sponsored or non-government pressure to which Australia is particularly vulnerable because of her size, the length of her uninhabited coastline and the difficulties of maintaining effective control over activities in remote regions. Incursions by foreign fishing vessels into national territorial waters or declared sovereign fishing zones, illicit offshore mineral and oceanographic exploration and fishing surveys, coastal landings by individuals with contagious diseases, diseased animals or destructive plant parasites, the landing of illegal immigrants and the smuggling of narcotics, bullion and native fauna are of particular concern. During the past decade, Australia has been subjected to many of these pressures and there appears to be little reason to suspect that they will not be the source of further problems in the future.

In normal peacetime conditions, military capacities rarely dominate as a means of applying pressure. However, they can exert a very significant background influence upon the manner in which diplomatic, economic, political and other activities are undertaken. For example, if the Australian Government and Australian officials feel that the country is greatly inferior in military terms to an international actor or country with whom they are negotiating a sensitive issue, they may perceive that their freedom of action is limited for fear of unintentionally provoking the other actor to escalate the dispute into the military or some other media in which Australia is relatively weak. In some circumstances, the possession of military strength may be the only effective means of deterring a rival from escalating a dispute into a higher level of conflict. Thus, the possession of military strength can have a significant

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moderating or restraining influence upon the behaviour of international actors, even though it may not be exploited deliberately for this purpose. Australia may be particularly susceptible to the indirect pressures arising from perceived military inferiority because of the population's long and deeply held feelings of isolated vulnerability.

2. The Pressures of International Crises

(a) Global or Regional Resource Crises

As major industrialised countries of the world gradually exhaust local supplies of raw materials and many centres of world population become increasingly dependent upon external supplies of food, energy, fertiliser and other basic materials, increasing pressure is being brought to bear upon resource suppliers. The relative geographical concentration of a variety of key resources provides potential scope for the artificial regulation of supply by producers acting in concert.

This is a consistent theme in national opinion polls conducted in Australia on defence and security questions. For example, in the Australian Public Opinion Newsletter, Vol. I, No. I, September 1971 on page 20, the question was asked, 'What is the one thing you fear most in Australia's development over the next ten years?'. The second most popular response (after economic instability) on the very long list of answers, was 'war and invasion'.

On page 23 of that same survey, the question was asked, 'Do you think that Australia will be threatened from outside its borders in the next fifteen years?'. 45 per cent of the respondents answered no, 42 per cent answered yes, and 13 per cent were unsure.

In The Bulletin, Vol. 98, No. 5038, 8 January 1977 on page 41, an International Gallup Poll table was published which showed that amongst the populations of thirteen comparable countries, Australians gave the second most pessimistic response to a question which asked whether they expected 1977 to be a peaceful or troubled year. The most pessimistic response came from Spain, which might at least partially be explained by disturbances which accompanied domestic political changes at that time.
International crises over resource supply and distribution may not necessarily involve Australia directly. If, as a result of regional or global action, the flow of imports to Australia is restricted, this is likely to cause serious damage to the economy in a direct and immediate sense only if petroleum products are involved. However, it is possible that in an indirect manner, the impact of restrictions upon the flows of some basic raw materials may be more severe. Many of Australia's major trading partners are likely to be affected very heavily by an artificial restriction in their capacity to import fuels and other key raw materials. International shipping and air transport might be disrupted. As a result, the capacity of several of Australia's major trading partners to pay for, transport and consume Australian exports may be reduced significantly.

It would thus appear that while the survival and basic well-being of the Australian population is likely to be secure during the course of any international resource crisis, those sectors of Australian industry which depend heavily upon international trade for their prosperity may be vulnerable to severe reverses. A continuation of this type of indirect international pressure over a protracted period would be likely to imply a major reduction in Australia's living standards.

(b) Regional or Global Conventional Conflict with Australia Not Participating as a Combatant

A serious regional conflict, perhaps in North East Asia, on the Sino-Soviet border or in Korea, would be likely to have a significant impact upon Australian security. Depending upon the nature and scope of the hostilities, international sea and air transport might be disrupted severely. As was explained above, this could directly and indirectly affect the prosperity of those sectors of the Australian economy which are import- or export-oriented.

If regional hostilities were extended to, or initiated in, areas much closer to Australia, there would probably be
heightened demands upon the Australian Defence Forces to deter and, if necessary, resist violations of national sovereignty. Advanced methods of surveillance and air and sea patrolling of offshore possessions and the long coastline could be expected to be at a premium in this type of situation.

If conflict were to escalate to a global or major bloc level, the impact upon Australia would probably be greater, but not necessarily more damaging. For example, while most of the world's shipping might be expected to be transferred to satisfy wartime requirements, the combatants on one or both sides of the conflict might seek to draw upon Australian agricultural, mineral and perhaps also secondary industrial resources to help meet their needs. In other words, it is possible that this type of conflict could actually serve to boost the Australian economy, as was the case during the Korean War.  

3. The Pressures of International Aggression

(a) Demands and Threats Which are Directed Against Australia and Supported by Political, Military and/or Economic Measures

Demands and threats can be made in a highly specific manner, outlining detailed diplomatic, economic, political and/or military consequences of particular activities. Alternatively, they can be introduced in vague and ambiguous terms in an effort simply to lend weight and draw attention to one's strongly held views on a particular matter. For whatever motives they are issued and whatever form they may take, the receipt of a demand or threat is normally followed by an intensive evaluation of its significance. What factors

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prompted the demand to be made? What are the chances that the threat would be carried out if the dispute continues? Exactly what type of action would be most likely? How vulnerable is the recipient? Can any support be gained in the circumstances, either domestically or abroad? How do the possible gains from the dispute compare with the possible consequences in the light of the new developments? etc. The answers to these questions will depend essentially upon assessments of the relative power, past practices and perceived intentions of the actors concerned in those fields which are considered most critical.

The issuing of demands and threats is not without its risks and costs. Unless a threat is issued in secret and with some kind of guarantee that it will never become the subject of international discussion, the threatening actor's credibility will be affected by the reaction and the outcome. If a demand or threat is widely held to be clumsy, the nation's or the government's reputation for finesse may decline and subsequent threats given little credence. If a threat is widely regarded as unjust or illegal because of some kind of international convention or agreement, again reputations may suffer. It is also possible that the delivery of a demand or threat may stimulate retaliatory action, possibly in a series of counter-threats. If a demand is made in specific terms, the risks of it being defied have also to be considered. The very act of defiance may do damage to the threatening state's reputation. In addition, the problem would remain of facing the costs of carrying out the threat with whatever consequences that may imply, or having one's credibility suffer further damage by simply accepting that one's bluff has been called. The risks implicit in the issuance of threats, at least of those which are expressed in specific terms, tends to reduce their diplomatic utility to well planned psychological campaigns and to situations where they are seen as alternatives to the initiation of the threatened action.

The issuing of a series of demands and threats may signal the adoption of a strategy of confrontation. The
objective here is normally to wear down, by a process of diplomatic, political, economic and/or military measures, the willpower of the opponent concerning a particular issue. Because of the relatively open nature of its society, Australia might prove to be vulnerable to this kind of pressure, particularly when the issue at stake is regarded as being of marginal significance by a large proportion of the population. In such circumstances, an opponent may be able to conduct a sustained campaign of subversion to weaken national willpower. It would probably be relatively easy for an external actor to introduce propaganda into the processes of internal debate in such a way that it would be difficult for it to be distinguished from legitimate internal criticism. The problem of discerning between hostile propaganda which is externally sourced and legitimate internal debate which is simply exploited by outside powers would be very difficult to solve in the Australian environment.

If the external actor initiating the confrontation campaign wished to apply further pressure through a campaign of organised violence, it would be extremely difficult for any ambiguity or disavowability to be retained. Even if a small portion of the Australian population sympathised with the external actor's cause, it seems improbable, in current circumstances, that they would be prepared, of their own volition, to take up arms and attack their fellow citizens and government employees. As a result, it would be difficult for an external actor to attempt to disguise a rash of sabotage, hi-jacking, bomb attacks and isolated violent assaults as being merely an expression of internal support for his cause or a sign of extreme inner social tension.

The geographic nature of the island continent would also mean that external agitators or terrorists and their arms, supplies and equipment would have to be transported by some means across the surrounding water barrier. If air, sea and under-sea surveillance and patrolling of these regions is undertaken in a sufficiently thorough manner and international civil transport is monitored closely, the task of penetration
may itself be difficult. However, once this has been achieved, a multiplicity of targets would be presented. In Australia's remote periphery, along the coast and on offshore islands, a large number of relatively isolated small population centres are within easy reach of air and/or seaborne attackers. Communications lines, microwave links, telecommunication cables, road bridges, etc. are readily accessible in the more remote parts of the continent and their systematic destruction would be an effective means of applying a large amount of pressure at little risk and cost.

The economic and military implications of this type of violent harassment would be immense. Certainly the normal pattern of life in remote parts of the continent and on offshore islands would have to alter and economic productivity could be expected to decline significantly. An enormously disproportionate Australian military response would be required in order to patrol the coastal and continental expanses which might be involved. In addition, and at the same time as attempting to prevent attacks and violent incidents, the installations which are damaged or destroyed would have to be replaced or supported by additional facilities. The economic drain upon the national economy, even of these very direct response requirements, could be expected to impact heavily upon the national budget. Yet in most circumstances, this would, in effect, be but one of the forms of pressure applied by an external actor in this type of confrontation. The overall design of the campaign would most probably be structured to incur the maximum possible theatrical value from the effort. By a multiplicity of means and over an extended period, a large amount of publicity might be gained, the authorities may be discredited, the security forces may be provoked to take excessive countermeasures and large portions of the population may be demoralised and even terrorised. Over a protracted period, when the issue at stake is of marginal significance to the nation as a whole, it might be expected that Australian willpower and resilience could be gradually eroded to a point where major compromises would be politically feasible.
It is possible to conceive of circumstances in an external confrontation situation, where, because of a foreign actor's limited success or his impatience with very low level violent harassment activities, he may decide to escalate the pace and scope of attacks. The character of the operations might continue to be similar to those elaborated above, but they may be expanded in number and scope, they may be better planned and perhaps also be executed in a more professional manner by regular military forces. The depth of penetration of this type of force would probably be significantly greater than that achievable by irregular harassment forces. In addition, the higher standards of training and technical skill which could be expected would probably mean that the new generations of light and compact, but extremely accurate, high firepower weaponry could be made available to enhance greatly the destructive capacity of these small units. The targets for this type of campaign might also be expanded to include not only isolated population centres and their lines of communication, but also centres of Australian reactive capacity, airfields, base structures and perhaps portions of Australian industry. In addition to violent raids, pressure might also be exerted by deploying small bodies of troops to demonstrate temporary control of relatively remote positions of high political, economic or strategic importance, eg. one of the islands in the Torres Strait, Cocos Island, or perhaps even the joint US-Australian communications facility at North West Cape.

It should be noted, however, that if an external actor maintained an intransigent negotiating stance and at the same time escalated the level of conflict, it seems improbable that any Australian government would be content merely to maintain

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10 Examples of this new light weaponry in the anti-tank field are MILAN and DRAGON and in the anti-aircraft role STINGER, SABRE, BLOWPIPE and RBS-70. The significance of these modern technological developments is discussed in detail in Chapter 2.
a defensive position. In the international sphere, for instance, it can be anticipated that efforts would be made to mobilise the diplomatic support of allies and others to pressure the opponent to compromise. The United Nations and other international forums would almost certainly be used in attempts to arouse world-wide opposition to the opponents' action. In addition, Australia could move to discriminate against the state concerned in its trading relationships and may also be able to organise broader regional economic, diplomatic and other sanctions. The success of these retaliatory activities cannot be expected to be very great in all circumstances because the opposing state and its international supporters would almost certainly be attempting similar strategies which, depending upon the issue at stake and the relative balance of forces, may more than offset Australia's capacity in this field.

An escalation of violent activities by Australia's opponent may also stimulate an offensive military response. Air or surface raids of various sorts could be launched in reply, subversive activities could be fostered and dissident groups within the opposing state might be encouraged and actively supported from Australia. Depending upon the nature of the country concerned, these counter-offensive activities may present an even worse disproportionate response problem for the opponent than he is capable of inflicting upon Australia.

There is one other major category of influence which might be employed by external actors to support demands and threats - that of economic pressure. Variations in tariffs, quotas, investment rules and even wholesale embargoes and sanctions might be employed, but, as was mentioned earlier in this chapter, unless Australia's opponent happens to be a major trading partner, or alternatively, major trading partners support the opponent's cause, any restrictions of this kind are likely to be marginal and manageable. Even if Australia's opponent were able to coerce some major trading partners to apply sanctions, unless petroleum products were involved, the effects would fall primarily upon non-essential
export sectors of the economy. The major implication of this situation would be a reduction in economic prosperity which would threaten national security only in so far as it reduced Australia's capacity to respond to other pressures.

(b) Economic Warfare Against Australia

In a situation where an external actor or group of actors decided to conduct economic warfare against Australia, tariff and quota regulations, embargoes, sanctions and a range of other weapons would be available. Australia's vulnerability to this type of pressure has already been discussed in earlier parts of this chapter.

Any attempt to use a military blockade to isolate the Australian economy would appear to offer doubtful potential gains and be extremely difficult to implement in practice. The country's relative self-sufficiency implies that, while major disruptions to its trade flows would affect national prosperity seriously, they would not represent, in themselves, an extreme threat to national security. The prospects for an external actor gaining substantial rewards from the imposition of a blockade would appear to be limited.

The physical difficulties which would be experienced by an opponent who attempted to blockade Australia would be considerable. Firstly, because of the country's geographic position, there are a very great number of alternative approach routes to Australian ports. In order for an external actor to mount a distant blockade against the country, all of these approach routes would have to be controlled effectively or at least threatened. In reality it would be extremely difficult, if not impossible, for any power to undertake such a task at the Cape of Good Hope, Suez, the Straits of Hormuz, the Indonesian Straits, in the Coral Sea and across the expanses of the Pacific and Antarctic Oceans. Even if this level of surveillance were achieved, for it to be effective in the facilitation of a traditional form of blockade, every ship passing through these areas, which are some of the busiest in the world, would have to be boarded
so that their manifests could be inspected. However, even if this were done, there would still be major problems. For example, an obvious and immediate countermeasure would be to forge ships' manifests.

Historically, blockades have been used by major maritime powers or alliances of maritime powers against significant adversaries and in the course of major wars. An attempt to blockade Australia from distant narrows and waterways would be an instance of a power, or group of powers, attempting to isolate a relatively minor state in the course of a limited dispute and in several of the world's most heavily travelled seas. The danger and nuisance to innocent shipping could be expected to evoke resistance from the great powers, particularly if the hindrances persisted over many months.

The difficulties of attempting to blockade Australia from distant transport 'choke' points and the almost innumerable alternative approach routes to the country would appear to make the option of blockading from close in-shore a relatively attractive proposition. This option would, in addition, possess potential for the disruption of Australian coastal shipping. However, this type of action would necessitate the stationing of large numbers of ships at very long distances from their home bases to cover the numerous and widely spaced Australian ports. Minefields might be laid directly outside ports or in their entrance channels as part of the campaign, but these would have to be protected to prevent clearance by helicopters or mine counter-measure vessels operating from the ports concerned. This close patrolling would almost certainly make effective Australian counteraction a simple proposition. Blockading

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11 For a background analysis of this subject in a different geographical context see S.J. Rosen, Military Geography and Military Balance in the Arab-Israel Conflict. (An unpublished seminar paper presented at the Strategic and Defence Studies Centre, The Australian National University, Canberra, on 22 April 1976).

12 This argument assumes that these mineclearance forces are available in the Australian Defence Force.
ships could be attacked directly by land-based artillery and missile units, by short range attack aircraft and by a variety of light coastal defence vessels.\(^{13}\)

The problems, difficulties and expense of attempting to impose a total blockade against Australia, either from a distance or from close in-shore, would appear likely to more than offset the possible gains in terms of the impact upon the Australian economy. However, it should be noted that there may, in fact, be alternative, more cost-effective means of applying severe pressure on Australian trade and international transport. For instance, the surveillance problem could be reduced by employing modern technologies, satellites, high-flying long-range remotely piloted vehicles (RPVs) and towed and fixed long-range passive sonar arrays.\(^{14}\) The scope of the problem could also be narrowed by concentrating attention upon vessels leaving Australian ports. This might mean that attempts would be made to intercept only the small numbers of ships known, with a high degree of certainty, to be involved in trade with Australia. In this type of campaign, the resources required would be relatively limited and its effectiveness would depend more on the deterrent effect created by uncertainty in the minds of ship owners and neutral actors than on the physical severance of all lines of seaborne communication. This type of campaign might also lend itself to extension in the form of harassment attacks upon aircraft and air transport facilities involved in trade with Australia.

Thus, it does appear that, in some circumstances short of a major conflict, the volume of Australian trade could be reduced significantly and at limited costs to an opponent by

\(^{13}\) This argument assumes that coastal attack forces are available.

\(^{14}\) These surveillance systems are discussed in greater length in Chapter 2.
a carefully orchestrated application of economic warfare techniques. However, they would almost certainly not take the form of an attempted water-tight blockade. A more attractive option might bear more resemblance to a well-designed and coordinated terrorist or pirate campaign against international transport carriers and facilities.

(c) Assault With a Limited Objective

This type of operation could take the form of an extended raid involving no more than one or two hundred troops or, at the other end of the scale, it could concern a multiple division assault aimed at permanent occupation of a major geographic section of the continent. Such an assault could thus be defined to be limited either in the sense of the scale of the geographic area occupied, the time period of occupation, or the magnitude of the assaults underlying political objective.

In one sense, any assault upon Australia is difficult simply because armies are unable to walk or drive across a land border. Ships and/or aircraft are an essential pre-requisite for any assault. The resources currently held by several regional powers would be sufficient, at least in theory, for an assault which was very limited in scale and/or length. However, no power in Australia's region currently possesses a capacity to deploy division-sized forces onto Australian territory. The acquisition of such a capability


16 It should be noted that several regional states possess multi-divisional armies, but none possess the air and/or naval capacity to readily transport and support their deployment onto the Australian continent. Ibid. For a discussion of the numbers of ships and aircraft which have been required to transport major military forces across sea/air gaps during recent history, see my A Strategy for the Continental Defence of Australia. (An unpublished M.Ec. thesis, University of Sydney, Sydney, 1974), pp. 22, 23.
would presumably be readily detectable by Australia's intelligence organisations.

Australia offers a plethora of possible geographic objectives. Those which are most commonly mentioned in the context of this type of attack include areas of the North and North West coasts and various off-shore islands, eg. the Pilbara, the Northern Territory, Cape York and various islands in the Barrier Reef, Torres Strait, Gulf of Carpentaria, Arafura Sea and the Indian Ocean. However, other conceivable objectives have occasionally been mentioned. Dr O'Neill, for instance, has suggested that Tasmania could represent an attractive target for a high technology major power, perhaps prior to an invasion of the mainland itself.

The scale of any assault could be expected to vary primarily according to the size of the area to be attacked and the length of time it is to be held. Some of the offshore islands could probably be assaulted and then defended by a force of one or two battalions. However, any attempt to attack and hold the Pilbara, the Northern half of the Northern Territory or Cape York would certainly be a multiple division operation.

The achievement of surprise would, in many circumstances, be a pre-requisite for the success of such an operation, for if an assault were contested seriously during the initial crossing of the sea-air gap, it might fail completely. Even if the assaulting forces arrived on their objective relatively unscathed, they would still be vulnerable to continuous interdiction of their lines of communication and supply across the water gap. Short of major preliminary attacks upon Australia's reactive capacity, an opponent

17 See these geographical targets discussed by Colonel J.O. Langtry, 'Ground Defence of the Australian Continent' and Dr Robert O'Neill, 'Australia as a Target for International Violence' in United Service, Vol. 28, No. 2, October 1974, pp. 55, 12.

18 See Dr Robert O'Neill, 'Australia as a Target for International Violence', ibid., p. 12.
mounting this type of operation would have no simple means of providing a high level of security to these links.\textsuperscript{19}

Once landed on any objective along or adjacent to Australia's northern coastline, an enemy would be confronted with a naturally inhospitable environment. The weather pattern throughout Australia's tropical north is monsoonal. During the summer 'wet', cyclones are common and frequently cause extensive damage. Overland travel during this season is extremely difficult and the human efficiency rating falls to very low levels.\textsuperscript{20} Because almost all of the annual rainfall is concentrated into a relatively short season, the vegetation cover on nearly all of the west and northern coasts is relatively open woodland. During the dry season, water can become very scarce in some areas and dust clouds tend to betray any vehicle movement.

In the north of the continent, transport resources are rudimentary except in the immediate Darwin area, the east coast south of Cairns and on a few of the offshore islands. While there are many airstrips, few are sealed and most are not supplied with fuel. Almost all of the major round-Australia highway is sealed with at least one trafficable lane but, with very few exceptions, other roads are simply graded from the natural earth. General purpose port facilities in a developed form exist only at Townsville and, to a lesser extent, Cairns and Darwin. However, in addition, there are many specialised port facilities serving mining installations. The most notable of these are at Dampier,

\textsuperscript{19} Some of these questions are addressed in detail in Robert O'Neill, 'The Strategic Guidelines' and J.O. Langtry, 'Army Aspects of the Tactical Airpower Requirements' in Desmond Ball (ed.), The Future of Tactical Airpower in the Defence of Australia, (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 8-24, 106-123.

\textsuperscript{20} Details of Australia's geographic environment, and particularly its climate and ground cover characteristics, are illustrated in the Appendix. A more complex and comprehensive elaboration of these matters appears in Australian Bureau of Statistics, Official Yearbook of Australia 1974, pp. 27-75.
Karratha, Wickham, Port Hedland, Gove and Weipa.

In general then, it can be said that if surprise is achieved, at least in timing, it should be possible for a small assaulting force to cross the sea-air gap and occupy a localised area. On the assumption that such an assault were made in isolation, it would be vulnerable to rapid air and naval counter-strikes and the disruption and possible severance of its lines of communication. However, if the assaulting force were reasonably self-contained and protected, it might well be able to maintain its position until major Australian land forces were mobilised and deployed for a direct confrontation.

In the case of a much larger assault, the achievement of surprise would probably be far more difficult. But if it could be assumed that surprise could be gained and a relatively secure air and sea crossing of the water gap were possible, an extensive range of objectives would be available for an enemy's consideration. Once landed, the relative paucity of local facilities in most areas would be a major liability and the continued vulnerability of supply and communications lines an ongoing problem. As pointed out above, as long as Australia's air and maritime strike forces were not destroyed in an initial coordinated attack, any foreign landing could be bombarded and harassed at an early stage. But the distances involved and the openness of terrain in much of the northern continent would most probably mean that an assaulting force would not be confronted by major Australian land forces for several weeks at least. This might mean that the invading forces would have sufficient time to methodically prepare extensive ground defence positions. However, Australian air, sea and small-scale land harassment could almost certainly preclude the full-scale exploitation and export of major on-site resources.

(d) Full-scale Invasion

Similar considerations to those discussed above would apply to any country attempting a full-scale invasion through
the north or west of the continent. Achieving surprise in the landing of the massive forces which would be required for this type of operation would be very difficult. Assuming that Australian air and maritime strike forces survive any initial attack, the invading forces would be extremely vulnerable if their initial crossing of the sea-air gap could be intercepted. This would be the stage at which the assaulting forces would be most susceptible to attack, i.e. when they are packaged in a highly concentrated form aboard large and relatively vulnerable ship and aircraft platforms.\footnote{21} When landed and relatively dispersed they would almost certainly be less vulnerable, but still susceptible to aerial bombardment and to the interdiction of their lines of communication and supply.

The difficulties of moving large land forces across the long and, in most places, relatively open expanses of the continent could also be expected to inhibit severely the expansion of invasion bridgeheads in isolated areas. The distances are immense and in most areas the routes available for rapid advance are restricted and predictable. Even without a well coordinated Australian ground, sea and air harassment of enemy forces, the logistics problems of a major force advance across the continent would be immense.

With these considerations in mind, a very attractive option for a major power high technology invader might be a direct assault upon the south-east coast of Australia. This type of operation would demand the allocation of very substantial ground, naval and naval-air forces. Because such a force would need to operate from bases in the archipelago to Australia's north, the North West Pacific Ocean or the Indian Ocean, their passage to the south coast of the continent would necessitate long transit routes adjacent to, although probably a substantial distance from, the Australian coast.

\footnote{21} This matter is discussed in J.O. Langtry, 'Army Aspects of the Tactical Airpower Requirements' in Desmond Ball (ed.), \textit{The Future of Tactical Airpower in the Defence of Australia}, p. 111.
This might provide Australia's maritime strike forces with an extended opportunity to extract a heavy rate of attrition should they survive to do so. However, if an invader could successfully thwart such plans, possibly by mounting a preliminary surprise strike against Australia's reactive capacity, this type of direct assault would hold great potential for the conduct of a rapid and decisive campaign.

(e) Australian Involvement in a Global or Regional Nuclear, Biological or Chemical Exchange

The escalation of a superpower conflict into a nuclear exchange, even if it were on a limited restrained level, would present a very high degree of danger for Australia. The presence of several important United States defence facilities on Australian territory could make some parts of the country vulnerable to direct attack at an early stage. The immediate implication is that, in the event of a limited or an unlimited nuclear exchange, the populations of Alice Springs and Exmouth, which are situated close to Pine Gap and North West Cape respectively, may be subjected to a nuclear assault. Depending upon the nature of the weapons used, the manner in which they are detonated and the pattern of the weather at the time, a much larger proportion of the Australian population might be threatened by the subsequent fallout.

In the event of a general uninhibited global nuclear exchange, as long as further installations on Australian territory were not targeted by the major combatants, the prospects for the survival and continued well-being of the Australian population would appear to be favourable. Because in this situation most of the nuclear weapons would be detonated in the northern hemisphere, the world weather pattern would ensure that Australia would be relatively free from fall-out contamination. Other conceivable

effects, such as a diminution of the ozone may, in time, affect the whole globe but current research indicates that Australians would certainly be better placed to survive these indirect effects than populations situated in the northern hemisphere. For similar reasons, the effects of chemical and most types of biological warfare attacks which take place in the northern hemisphere are also likely to be concentrated within that half of the globe.

Finally, it should be noted that because of the country's high level of population and industrial concentration, Australia is extremely vulnerable to any form of nuclear, chemical or biological bombardment on these centres. The identification of various categories of superpower and regional state motivation for this type of attack has been undertaken by various writers. However it is extremely difficult, if not impossible, to evaluate their potential or probability.

Conclusion

One of the major consequences of Australia's changing strategic environment is that the prime national security requirement has become the development of a capacity to deter and, if necessary, meet a wide range of possible threats independently.


25 It is assumed here that deterrence and defence should be the primary goals of national security doctrine. A means of determining these objectives and an elaboration of their possible nature appear in Chapter 4.
conceivably be deterred by Australia's independent actions. If Australia can prevent serious pressures and threats arising, this is clearly preferable to reliance upon purely defensive measures. However, many potential pressures and threats are likely to be beyond Australia's capacity to deter. This applies most notably to many of the pressures of international crises and some of the more demanding pressures of international aggression. Australia's capacity to prevent these types of threat arising in the flow of world-wide events would, in nearly every conceivable circumstance, be marginal at best. Hence, if Australia is to have a security option in these types of situations, it has little choice but to develop an independent capacity to meet many different types of pressure and threat.

This broadened defensive requirement must be evaluated in the context of the limited resources which Australia can afford to devote on a full-time basis to national security tasks in times of peace. A significant multiplication of the current full-time military and diplomatic resources maintained by Australia is not politically feasible in the absence of a clear and obvious major threat. But even if this type of force expansion were possible, it is doubtful that it would be a highly effective means of meeting many of the types of pressure and threat with which Australia may be confronted in the future. A large number of the pressures and threats which have been identified in the discussion above are primarily economic, political, social and psychological in character. Their effect upon Australia would not necessarily heavily involve the military and diplomatic sections of the community at all. Many pressures and threats would impact far more directly upon much broader sectors of the total community, rural and secondary industry, and, in the case of the more demanding pressures and threats, the total community may be directly threatened, if not with destruction, by a substantial reduction in living standards.

The increasing complexity of modern societies, such as that in Australia, serves to increase their vulnerability
to serious disruption should normal peacetime international interactions be disturbed. New possibilities are being provided for international actors to pressure and threaten advanced countries through the exploitation of these susceptibilities. Certainly the dangers from military pressure and threat are still present and in some areas may be increasing. But in order to have a capability to deter effectively and, if required, meet the full range of potential pressures and threats, it may be necessary to extend national security preparations beyond the long-institutionalised military and diplomatic spheres and into much broader areas of the total Australian community.
It is clear from the discussion in Chapter 3 that in the future the range of security problems which might conceivably require a response from Australia will be much broader, and in many respects more demanding, than that of the forward defence era. Many potential pressures and threats might most properly and effectively be met through the employment of resources and capacities which have not normally been engaged in the past for national security functions. But even in those instances where the more traditional types of military and diplomatic responses would be appropriate, the nature of the new requirements in terms of scale, timing and type is likely to impose demands of quite a new character.

However, despite the greatly altered nature of Australia's strategic environment, the security concepts and structures which are currently employed are primarily those which have been inherited from the forward defence era. Thus, it is perhaps not surprising that, in the context of the new environment, they are characterised by a series of fundamental weaknesses and contradictions. In the discussion which follows, those established security concepts and structures which appear to be most directly challenged by the new requirements of Australia's changed strategic situation are discussed in turn.

1. The Requirement for an Independent National Security Strategy Formulation and Evaluation Capacity

Because of the nature of Australia's historical experience, it has never been necessary for the nation's security planners to derive a completely independent strategic policy, concept and structure. Almost all of Australia's military history involves single service operations with comparable allied units in foreign environments. Thus, in the past, Australia has been heavily dependent upon allies for commitment
decisions, operating doctrines, tactics, many types of procedures, equipments and logistic support services. Consequently, there has never been a need to independently develop, test and modify a complex national security strategy and structure to meet the specialised requirements of defending the Australian continent and its vital interests. However, now, with a wide range of environmental factors changing the fundamental nature of Australia's security problem, there is a clear requirement for the nation's security policy, strategy and structures to be derived independently from first principles.

The general nature of Australia's changed strategic environment has been recognised by both the present Government and the Opposition. However, the strategic assessment and planning system which has been inherited from the forward defence era appears to be incapable of the level of adaption which the new environment requires. The underlying problem appears not to be one of personal failings or intellectual weakness on the part of those government employees involved in this area of policy development. Rather, the most serious planning difficulties have arisen as a result of the retention of the established system and structure to perform functions of a much more complex and demanding nature than those for which they were originally designed and intended.

The basic foundation for all current security planning is a document entitled The Strategic Basis for Australian Defence. As an official explanatory paper expresses it, 'the genesis of all significant defence decisions is the

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1 The general nature of some of the more important dynamic influences in Australia's strategic environment is outlined in both Australian Defence, A White Paper presented to Parliament by the Minister for Defence, the Hon. D.J. Killen, November 1976 (Canberra, Australian Government Publishing Service, 1976), pp. 1, 2 and also in an address by Mr W. Hayden, MHR, then Opposition Spokesman on Defence to the Joint Services Staff College at Canberra on 10 May 1977, pp. 13, 14 (the address had no formal title).
The former Defence Minister, Mr W.L. Morrison, elaborates the significance of the document in the following terms:

Within the Department, the Strategic Basis paper is used as a reference document in the preparation of the Force Capabilities paper which informs policy proposals on force levels and weapons procurement.3

However, there appears to be a general recognition both inside and outside the Department that the Strategic Basis paper is an imperfect means of performing this task. For instance, Rear Admiral Synnot, the Chief of the Naval Staff, has stated that in his opinion:

At a time of low or intermediate threat, strategic guidance [in the form of the Strategic Basis] cannot be expected to be sufficiently specific to enable us to determine the force structure; if there were a clear threat this problem would of course be much easier.4

Mr Morrison appears to support this view:

The Strategic Basis paper read in the light of the Government's response forms the parameters of defence policy. What it really amounts to is an informed account of the current situation and a useful perception of


future trends. It is not an immutable major premise from which to deduce all manner of policies.\(^5\)

Certainly a great deal can be learnt from a systematic study of foreign actors' economic, technological, social, political and military capabilities. Some of this information can be used to extrapolate present trends into the future. Yet in the absence of knowledge concerning the future intentions of foreign actors, the further one attempts to predict events, or even the development of trends, the less credible the process becomes.\(^6\) No matter how skilled the analysts may be, and no matter how many analysts may be available for the task, this type of predictive study is incapable of providing, on its own, a sufficient basis for coherent long term security planning in the Australian environment.

Many of the weaknesses of the Strategic Basis document are a direct consequence of the processes of its formulation.

The draft [of the Strategic Basis] is prepared in the Strategic and Force Development Organization drawing on the information and judgements of the Department of Foreign Affairs, the assessments of the Joint Intelligence Organization which in turn draws on US and UK intelligence sources, the military judgement of the CDFS [Chief of the Defence Force Staff] and the Chiefs of Staff and the technological advice of its defence scientists. The draft is considered and finalized by the Defence Coordination Committee, comprising apart from the Defence component, the Secretaries of the Departments of Prime Minister and Cabinet,


Foreign Affairs and Treasury. The Strategic Basis is certainly derived from the best advice available and assessed by experienced people. It represents the best judgement that can be made at the time. But by its nature it is a committee document and has all the failings of such a document, particularly as it represents a consensus and necessarily involves compromises. Furthermore it deals with perceptions of future trends and is subject to the uncertainties, unknowns and variables of prognostication.7

As a consequence, it appears from the accounts of experienced observers that the final document lacks the precision and clarity required for detailed security planning.8 According to Dr Mediansky:

A common complaint about the present Strategic Basis is that it is too vague and too generalised; that it is written so as to mean all things to all men. As such, it is of little use to defence planners.9

In support of this view, Dr O'Neill has written:

The Strategic Basis document is one obvious source of general guidance but, in the light of what has appeared recently in some newspapers purporting to be extracts from earlier versions of this document, one hopes that more precise guide-lines have been generated and


8 It is difficult, if not impossible, to write comprehensively and with complete clarity concerning the problems and difficulties of the current security planning system because official information concerning anything but its formal structure is unavailable on the public record. As a consequence, it has been necessary to rely heavily in the following analysis upon the accounts of those who have been involved personally in the current system, those who have studied its operations in detail and those who have observed its performance from an external vantage point over a long period.

disseminated in some other form. 10

The consequences of this apparent absence of clarity, coherence and direction in the basic foundations of defence planning are far reaching and of very great significance. It impacts directly upon the quality and integrated nature of nearly every important aspect of Australia's processes of strategic analysis - security planning, the generation of operational requirements and procurement options, judgments concerning the security significance of civil industries and other components of the national infrastructure, the options considered in the processes of manpower planning, the development of doctrines, tactics, operational procedures, etc., etc.

The fundamental weakness and inappropriate nature of the existing system can best be illustrated by citing the accounts of a number of experienced observers concerning specific system failures. For example, in discussing the reasons for the apparent lack of clear procurement priorities, Dr O'Neill has stated:

If there currently existed clear policy guidelines, setting forth priorities in the light of threat assessments and required response strategies, one could be optimistic.

However to the best of our knowledge such clear guidelines do not exist as a formal policy.

No doubt they exist in different forms in the minds of different individuals at senior levels within the Department of Defence but much remains to be done. 11

Dr Ball has cited an instance where the weakness of the current security planning system has seriously inhibited long-term decision-making in Australia's defence-related industries:


In 1974, for example, during the Industries Assistance Commission's inquiry into the Australian aerospace industry, a number of the principal aircraft manufacturers, whose forward planning depends upon a clear statement of such a policy, in their submissions frequently lamented 'the lack of any real policy guidelines ... from the Government' regarding defence procurement. The IAC report itself states that the Department of Defence was unable to provide any specific list of Australian defence equipment requirements. And a study by a Defence (Industrial) Committee Panel which provided much of the detailed background material for that IAC inquiry noted that the panel had sought guidance on the relevant strategic considerations, but that 'authoritative guidance could not be given by the Department of Defence'.

T.P. Muggleton points out that the absence of clear strategic guidance has also had the effect of undermining seriously the Defence Department's own analytical research:

The consequences of such a vacuum on the economic efficiency of subsequent analyses of a force structure are marked. First, analytical groups develop their own operational scenarios which may, or may not represent the most likely future threat environments. The validity of subsequent analyses rests therefore on dubious premises. The Naval Air Power and Tactical Air Weapon System study, completed in mid-1975, provides an example of the possible adverse effects of inadequate guidance. The NAP/TAWS study was relevant only as long as the seven scenarios on which it was based were relevant. These scenarios however were not created by the higher defence machinery but by CSE [the Central Studies Establishment] itself. The scenarios are in fact no longer legitimate reflections of the most probable future states of the world. Thus just fourteen months after its completion, '... the general feeling in the Defence Department is that the NAP/TAWS study is now invalid'. As the NAP/TAWS study incorporated the equivalent of fifty man-years of analysis, a lack of guidance leads to a wastage of analytical resources on

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projects of doubtful relevance and to a misallocation of resources.\textsuperscript{13}

The inappropriate nature and basic weakness of the present system can be elaborated further by examining the manner in which the Strategic Basis document is used within the Department of Defence. According to official explanatory papers:

The Force Development and Analysis Division of the DoD derives from the Strategic Basis the Defence (as opposed to Service) Capabilities Guidelines Paper which is issued to the Services for assessment. From this paper the Services prepare their individual Service Capabilities Papers which 'indicate areas in which the present capabilities are least consistent with guidance'. The individual Capabilities Papers are synthesized by Defence Central into a single Defence Capabilities Paper. It is by this process of articulating endorsed guidelines that Defence Central directs and integrates Service planning efforts.\textsuperscript{14}

Although this statement clearly describes the formal structural processes, because the Strategic Basis documents have proved to be generally unsatisfactory for defence planning purposes, the manner in which they are actually employed appears to be quite different. As T.P. Muggleton points out, in practice:

Services develop their own long term force structure philosophies. The Army, for example, has produced a 'Basis for Army Development' paper which is a perspective document aspiring to a twenty-year validity. It is at present only in a draft form but its existence is indicative of the Services belief that a strategic guidance vacuum does exist in areas in which it should not. Whereas the Services in theory should justify any bid for

\textsuperscript{13} T.P. Muggleton, \textit{An Evaluation of the Analytical Infrastructure for Force Structure Decision-Making in the Australian Defence Department}, pp. 52, 53.

\textsuperscript{14} This passage appears in T.P. Muggleton, \textit{ibid.}, pp. 25, 26. It is composed almost entirely of phrases and short sentences taken from Department of Defence, \textit{The FYRP System New Major Equipment Component} (Canberra, June 1975), p. 2 and also Programmes and Budgets Division, Department of Defence, \textit{Making Defence Decisions} (Canberra, August 1975) p. 6.
a weapons system in terms of the Strategic Basis, because the Strategic Basis is too general a document, ... the Services in practice develop their own conceptions of what the force posture should be. The Services disjointed programmes are then submitted to higher defence committees. Defence Central has therefore accepted the limited role of arbiter ...15

Some of the more obvious difficulties arising from this situation have been raised by Dr Foley:

But although those [strategic] assessments explicitly recognized change, they have been so scant, general and qualified that, for reasons different from those prevailing in the past, the planner has remained without a basis for rational selection of roles, missions and weaponry. In those situations the Defence Department, Army, Navy and Air Force have been in a position of virtually 'writing their own scenarios'.16

In these circumstances, it is perhaps not surprising that Muggleton can quote middle-ranking Service officers as saying that the Strategic Basis is 'not a professional military document', is 'irrelevant for force-structure decision-making' and that 'the Strategic Basis can be used to justify the procurement of any weapon system'.17

It appears that, on the evidence of many of those who are active participants in the system as well as on that of a number of experienced external observers, clear strategic concepts, planning objectives and guidelines have not been derived. One of the most important consequences of this structural failure has been that the performance of the current security system and of possible future alternatives cannot be tested and evaluated. As Muggleton points out:

15 Ibid., pp. 35, 36.


The ultimate measure of defence expenditure utility is how well it achieves strategic objectives, however, given little operationally meaningful articulation of strategic objectives utility has no basis for measurement.\(^{18}\)

Dr Foley supports this view:

> Without explicit objectives ... no management group can have meaningful evaluative criteria or performance indicators.\(^{19}\)

Thus, primarily because 'Australia's basic national security policy is too vacuous and inchoate ...',\(^{20}\) realistic input-output analysis is impossible. Mr Morrison elaborates this point further:

The purpose of program and performance budgeting is not simply what forces cost, but also what they do - to measure outputs as well as inputs. To do this effectively there must be program categories which are largely mission-oriented and whose purposes are defined. This is not an easy task, which to a large extent explains why it has not been attempted. It involves a much clearer concept of roles and missions and will cut across individual Services. Maritime surveillance could be a program involving as it does both Naval and Air Force inputs. The output is not merely measured in terms of nautical miles steamed or flying hours achieved but in results such as the apprehension of vessels illegally fishing, interception of smugglers or the role that the program plays in inhibiting such activities. By teasing the data, judgements could be made as to the desirable mix of air and surface operations. This type of analysis

\(^{18}\) Ibid., p. 38.


has not, as the Tange Report reveals, been carried out.\(^{21}\)

From this discussion, it appears to be clear in the minds of several of those who have been directly involved and who have studied the present system closely that it has not only failed to conduct any meaningful input-output analysis but it has also proved to be incapable of deriving any clear strategic concept, preferred national security structure or long term planning criteria.

Mr Morrison once described his view of a departmental manager as one who 'muddles through purposefully'.\(^{22}\) In the view of many critics the present system is one which encourages muddling through, with the purpose and direction varying from time to time according to the relative power and influence of the bureaucratic actors involved with the issue at stake.\(^{23}\) To many external observers and to at least some participants, the system appears to be distinguished by a long succession of loosely structured ad hoc decisions which almost always involve a perpetuation or supplementation of existing processes, structures and programmes. Dr Foley and others have claimed that this essential characteristic of the system is clearly evident from the Defence Department's public documents:

> The recent White Paper, (Australian Defence), in spite of its pathbreaking character and substantial stimulus to public debate, does little to allay the concern of those who argue that planning for Australia's defence lacks coherence and as a result more closely approximates

\(^{21}\) W.L. Morrison, 'The Role of the Minister in the Making of Australian Defence Policy Since the Re-Organization of the Department of Defence' in Robert O'Neill (ed.), \textit{ibid.}, pp. 84, 85.

\(^{22}\) \textit{Ibid.}, p. 71.

\(^{23}\) The bureaucratic forces brought to bear in national security decision-making are discussed in detail in Chapter 6.
a model of disjointed incrementalism than one of rationality.24

It is notable that Muggleton summarises his extensive work by emphasising this same characteristic:

The principal conclusion is that although rejecting in theory a strongly pragmatic approach to decision-making the DoD has, in practice, adopted a permutation of the pragmatic approach, namely, disjointed incrementalism ... individual weapon systems are evaluated not in terms of how they contribute to the preferred force structure, as no such force structure exists, but simply as additions or alterations to the existing force structure.25

He continues by quoting Derek Woolner:26

'... our planning processes are biting around the edges'. The NAP/TAWS study, for example, limited the scope of its analysis to a consideration of only those option elements that were possible 'future additions to the current force structure'. Analysis in Australia is not being utilized to determine a preferred force structure ... Analysis in the Australian DoD is in fact a constraint on rational decision-making as it has been used extensively within a framework consistent with a disjointed incremental planning philosophy.27


26 Derek Woolner was Research Advisor to both Mr L.H. Barnard and Mr W.L. Morrison during their terms as Minister for Defence.

It would appear from this discussion that the security analysis and planning system inherited from the forward defence era is unsuited to, and possibly incapable of, the task of developing and testing an independent security structure appropriate for Australia's new strategic environment. However, although the requirement for major change is appreciated widely, it is not recognised universally. The last major reassessment of the system's efficiency was conducted in 1973, by the Secretary of the Department of Defence, Sir Arthur Tange. In his discussion of the current system, he failed to mention the existence of any serious problem:

In the reorganization it is important to preserve and preferably improve the processes by which the strategic assessments are made for the Government. There appears to be no need to change the basic machinery.28

As a primary consequence of Australia's changed strategic environment, it would appear that the judgments of 1973 now deserve thorough re-examination.

Australia requires a coherent and integrated system of strategic analysis, assessment and both long and short range planning. The detailed complexities and practical difficulties of developing such a system are discussed at some length in Part IV. However, it is important to note at this stage that the primary function of such a system would be to evolve strategies, structures, technologies, tactics, doctrines and operating procedures to employ the limited resources which can be allocated consistently to the national security task in the most efficient manner possible.

The basic foundation for this type of extremely complex and demanding process of security planning would need to be a clear expression of strategic goals or objectives. In practical circumstances, these would necessarily be determined, or at least agreed, by the government of the day. However, in order to simplify and clarify a large amount of the discussion which follows in this thesis, it is desirable that a series of primary goals for national security doctrine be defined in a tentative fashion at this point.

1. To prevent the development of pressures and threats.
2. To deter pressures and threats.

It should ideally be the government's task to determine clearly what are to be the supreme goals of the national security structure. Is the system to be designed so as to prevent threats arising, to avoid conflict, to deter or defer an opponent, to defeat an enemy, to compel a disproportionate response, to extract a favourable exchange ratio or to achieve some other objective? It is conceivable that a government may wish to apply all of the above criteria in various situations. But if this is the case, in what types of situations and in what order of priority?

It is also important to note here that it would be highly desirable, if not essential, for a large degree of political agreement to be reached between the major parties concerning the general strategic objectives to be adopted. Changes of basic national security objectives with changes of government would present major difficulties of a fundamental nature for the total system.

It is a very complex matter to derive appropriate background assumptions for the determination of the capacities required for deterrence to be successful. For example, should it be assumed that an opposing state could devote its total mobilisable resources against Australia (i.e. the absolutist approach)? If not, what assumptions is it appropriate to make concerning the resources which an attacker may be able to make available? It can be argued, for instance, that Australia's national security structure should have the capacity to deter only those forces which an opponent could 'reasonably' be expected to spare from other tasks (i.e. the marginalist approach). Hence, it can be reasoned that, if the costs to an opponent of mounting this type of marginal action can be raised above the marginal benefits which are imputed, the opponent would be theoretically deterred. These matters are discussed by Kevin J. Foley in 'Selecting an Australian Tactical Fighter Force: Marginal Strategies, Rationality,
3. To defer those pressures and threats which are undeterrable.

4. To provide a national capacity to withstand non-deterrable pressures of peace and pressures of international crises in such a manner that their impact upon the total society is minimised.

5. To provide a capacity to defeat regional power attacks at short notice.

6. To deprive a great power of the potential for rapid victory.

7. To assist other government agencies in the apprehension of persons or vehicles infringing

30 cont'd


The major problem with this type of theory is simply that it is too far divorced from reality. Statesmen rarely make careful cost-benefit analyses in deciding on a course of action. As Adam Roberts points out:

In some cases where states are concerned as much with face, reputation or high principles as with more mundane and measurable values, and where they pursue their interests by threatening or using force, cost-benefit analysis quickly becomes irrelevant. It is well to remember that most wars result from a process of commitment and counter-commitment, threat and counter-threat, claim and counter-claim, perception and mis-perception: not from a single calculation by one side that a war of military occupation would be worthwhile.

Australian territorial rights in a manner which does not constitute an attack.31

The determination of a firm series of doctrinal goals for the national security structure would provide a basic foundation for strategy formulation and evolution. From this beginning, it should be possible to evolve planning structures within which alternative strategies and force structures could be tested, modified and retested, with effectiveness being judged according to the degree of role fulfilment. Eventually, the characteristics of an optimising strategic concept and force structure might be determined. This, in turn, would make it possible to derive clear priorities in operational tasks and provide a rational basis for the allocation of total national security resources. Alternative means of technical task performance could then be evaluated within the allocated resource constraints. Manpower, equipment, technology and other choices could be made so as to optimise not only individual task performance but also the efficiency of the total national security structure.

Many of these processes of conceptual testing and experimentation could be expected to be on-going. Not all questions would be amenable to rapid or simple solutions. In the military sphere, new technologies, equipment, tactics, procedures and structures would require testing modification.

31 These tentative doctrinal objectives for the Australian national security structure have been developed from a series of roles outlined for the Australian Defence Force by Robert O'Neill in 'The Development of Operational Doctrines for the Australian Defence Force' in Robert O'Neill (ed.), The Defence of Australia: Fundamental New Aspects, pp. 129, 130. This list of objectives has intentionally been limited to those related specifically to the defence of Australia. Other less essential functions could also be mentioned, such as the provision of disaster relief, the capacity to contribute to UN peacekeeping forces and the training of allied forces, etc.
and retesting in the search for optimal solutions. 32

These processes of system re-evaluation, strategy and concept reassessment and thorough restructuring would be extremely complex and demanding. Dr O'Neill described the personal qualities of those required for this type of task when discussing the means by which adaptation must be made to new technology developments:

This process of experiment should be carried out in a rigorous and daring manner, by people who have a burning desire to master the challenges of the new technologies, who are fruitful in their own ideas and whose imagination can lift them out of the groove of their past experience without forgetting what that experience has taught them along the way. Otherwise we might as well not bother. Feeble or timid experimentation is unlikely to bring in any knowledge that we do not already have. 33

Similar personal characteristics are likely to be required at all levels of the structural reassessment, strategy formulation and evaluation process. If this task were to be performed in a half-hearted fashion, or perhaps not undertaken at all, it would be likely that the security assessment and planning structure inherited from the forward defence era would be retained with only minor alterations, to meet the requirements of Australia's new strategic environment. This would imply a willingness to permit the suitability of the country's national security system for the requirements of the 1980s to be left more to chance than design.

32 A possible means of undertaking this process of experimentation to meet Australia's requirements is discussed by Dr Robert O'Neill in The Influence of Recent Developments in Conventional Weapons Technology on Strategic and Tactical Doctrine: Consequences for Australia. (An unpublished paper presented to the United Service Institution of the Australian Capital Territory, Canberra on 5 May 1976), pp. 1-6.

33 Ibid., p. 4.
2. The Requirement for a Surge Capacity Sufficient to Deter, Defer and, if Necessary, Meet a Wide Range of Violent Threats

Australia's current 'core force' rationale, depending heavily upon small numbers of regular service personnel, made considerable sense when Australia's forces were designed primarily for deployment in support of major ally commitments overseas. In that situation, although the expanded forces were frequently required urgently, the direct physical security of Australia was never heavily dependent upon the speed and efficiency of core force expansion. The Australian Government was always in control of the timing in the expansion process. It largely determined the rate at which force expansion was attempted and decided exactly when Australian units would be deployed to the war zone. In peacetime, there has thus never been an over-riding incentive to adopt unusual measures to optimise force expansion (surge) capacity.

But now, with the Australian Government accepting prime responsibility for the defence of the continent and its territories, there may be little choice as to whether and when Australia's armed forces are committed to undertake defensive operations. Far more than in the past, that basic decision-making prerogative will be dependent upon the opponent's activities. Thus if, in the future, Australia is vulnerable to a certain type of attack with little warning, the Defence Force will have to be designed to react effectively within the same time span. In such situations, a rapid force expansion capacity is likely to be crucial.

34 The 'core force' concept is very difficult to explain satisfactorily in a few words. However, in its most elementary sense, it refers to the forces maintained during periods of peace, which would form the 'core' or basis for expansion at mobilisation. This, and other related concepts, are elaborated and discussed in greater detail in Chapter 7.
But it is extremely doubtful whether the present core force structure has the capacity to expand fast enough to meet effectively the types of threats which Australia may face in the future. If one were to attempt to justify the retention of the present core force structure to meet the demands of the new environment, a range of highly questionable assumptions would need to be accepted. For example, in the area of army manpower, it would be necessary to accept that for any scenario requiring the response of an Australian army larger than 150,000 men, between 2½ and 5 years defence preparation time would be available. Similarly, it would need to be assumed that for any scenario requiring the response of an Australian army larger than 250,000 men, between 4 and 8 years defence preparation time would be available.\textsuperscript{35} It is

\textsuperscript{35} It has been calculated for this discussion that between 2½-5 years active preparation time would be required in order to expand the present 33,000 man regular army with its 20,000 man poorly trained reserve to a well-trained 150,000 man army and between 4-8 years defence preparation time for it to be expanded to a well-trained 250,000 man army. For the time to approximate the lower figures, it needs to be assumed that there are no problems experienced in rapidly expanding the training facilities, that there are no problems in providing the equipment requirements of the expanded force, that the peacetime forces have an over-preponderance of long lead time middle ranking officers and specialists already in their ranks, that nearly every newly trained soldier can be immediately used to train others and that during the expansion process army units are not required for operational or active security duties. If it is assumed, however, that during the expansion process significant forces would be required for active security duties, that not all newly trained personnel could be used to train others, that the normal levels of middle rank officers and specialists were apparent in the core force, as at present, and also that difficulties are experienced in establishing the expanded training facilities and in equipping and housing the greatly expanded forces, the time requirements tend to lengthen towards the upper estimates. It should be also noted here that the times required to expand the present Air Force and Navy by a similar percentage increase would almost certainly exceed those for the Army by far. This is primarily because of the long lead time character of the many highly skilled officers and technicians who play central roles in Air Force and Naval activities and operations. Major items of Air Force and Naval equipment are also likely to be more difficult to acquire at short notice.
important to realise that this defence preparation time would only begin when the Government perceived the existence of a specific threat and ordered the full scale mobilisation of Australia's resources in response. Several important evaluative decision-making processes would have to be completed before any government could take such extreme action.

Firstly, political, diplomatic and perhaps military pre-warning signals would have to be received by the country's intelligence services. But actually perceiving such signals as pre-warning indicators may be very difficult against the background of a confused international environment, especially if, as must be assumed, the potential enemy attempts to disguise or conceal his real intentions. The meaning of the pre-warning signals, even if they are correctly identified and perceived, is almost always open to alternative explanations. The consistently accurate interpretation of these signals to deduce the goals and intentions of other countries at the pre-warning stage is extremely difficult, if not impossible. But if we assume here that the Australian intelligence services actually do perceive the pre-warning signals and then interpret them in a fairly accurate manner, they would need to be convinced and united on the matter for it to be taken to the Cabinet. But again, assuming the most favourable outcome, the Cabinet would then have the choice of deciding whether to wait and study the matter further or, alternatively, of making a decision to institute some type of preliminary or precautionary military response. Even if the latter course were decided upon, a wide range of possibilities would be open, such as the ordering of greater numbers of long lead time equipment items, the strengthening

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36 The problems experienced by the Israelis are noteworthy in this context. See Agranat Commission of Inquiry into Yom Kippur War, Partial Report, Israel Government Press Office, 2 April 1974 and A. Shlaim, 'Failures in National Intelligence Estimates: the Case of the Yom Kippur War' in World Politics, Vol. XXVIII, No. 3, April 1976. This question is discussed further in a later part of this chapter.
of domestic defence industries or ordering the partial expansion of the manpower strength of the armed forces, to name just a few. But it is implicit in the expansion theory concerning the present core force that not only all of the early pre-warning decisions are made in a positive manner by all of the parties concerned, but that when the matter is actually taken to the Cabinet, a decision is made to order a full national mobilisation to meet the threat as it is then perceived. Defence preparation time can only begin at the successful conclusion of this long and complicated chain of decisions. The length of time which lapses between the initial perception of pre-warning signals by members of the intelligence community and the Cabinet decision to mobilise may well be weeks, months or perhaps even years. And yet, even when a decision to mobilise is taken, it must currently be assumed that no threat requiring an army response greater than 150,000 men could arise within $2\frac{1}{2}$ to 5 years and that no threat requiring an army response greater than 250,000 men could arise within 4 to 8 years.

But exactly what type of threat would require the response of an Australian army of these dimensions? Certainly an army of 150,000 men would not be required to meet normal peacetime surveillance, maintenance of sovereignty, civil aid and rescue tasks. Nor would it be required to meet and defeat isolated low level terrorist attacks. But if a well-organised campaign of widespread terrorist attacks against scattered and remote installations and population centres was organised by a sub-national organisation, with or without the direct support of a foreign government or a small section of the Australian population, the present Australian Army could find itself overstretched. When it comes to a foreign national organisation or a foreign government conducting an intensive campaign of small scale raids on a continuing basis throughout large parts of the continent and against offshore territories and coastal shipping, an army of at least 150,000
and possibly 250,000 might well be required.\textsuperscript{37} If the raids were intensified further and were conducted by battalion-sized units, the response requirement would probably heavily press a 250,000 man army.\textsuperscript{38} Certainly if an attacking state undertook a limited land-grab or lodgement operation with multiple brigade or division-sized forces co-ordinated with widespread raids, a response capacity of over 250,000 is likely to be required. If multiple lodgement or larger, more numerous sustained enemy operations of various types were considered, it can be assumed that the manpower requirements of an effective Australian response are likely to be even greater.\textsuperscript{39}

But can it be assumed realistically that none of these terrorist, raid, confrontation or lodgement threat possibilities

\textsuperscript{37} This would depend heavily upon assumptions which are made concerning the numbers of men required to secure vital installations, the numbers required in supporting roles, logistics, etc., the numbers required in the training structure to provide a capacity to expand further if needed and the numbers of men required to be held in reserve to guard against a possible escalation by the enemy. In raid-type scenarios, the overall manpower requirements would also depend heavily upon the effectiveness of the air, ground, sea and undersea surveillance systems which Australia possessed to monitor enemy activities across the vast expanses of its continental space, offshore maritime zones and the enemy's home waters. If these systems were highly effective, the requirements for army personnel on the ground could be reduced significantly.

\textsuperscript{38} It should be noted that the addition of very meagre resources to those which would be required for raids would permit an enemy to exacerbate greatly the problems for the defender. Thus in some situations, a raid-bombardment or raid-mining scenario may be more likely than a simple raiding campaign. While these more complex campaigns would require very little additional effort from the attacker, the impact upon the manpower requirements of the defence could be very significant.

\textsuperscript{39} During the period of mobilisation, it is most likely that the enemy would also be expanding his forces, possibly at a rate which is faster than that of which Australia is capable. Thus, even in the event that a decision were made to mobilise very early during a period of heightening tension, there could, of course, be no guarantee that the final force ratios would be favourable to Australia.
could arise and physically confront Australia less than 2\(\frac{1}{2}\) years from the government decision to mobilise to meet such a threat? In other words, can it be taken for granted that Australia's intelligence organisations will receive preliminary warning signals, that they will be interpreted correctly, that the Cabinet will be alerted, that the Cabinet will then decide to order general mobilisation and that, even at that stage, there will still be 2\(\frac{1}{2}\)-8 years time to prepare a response before an enemy could attack?

If an analysis is made of the major conflicts which have occurred during and since the Second World War, the precise length of perceived governmental warning time and defence preparation time is, in many instances, difficult to determine exactly. But it can be concluded that in only one instance which has been brought to the author's attention has defence preparation time exceeded seventeen months. In most instances, it was well under twelve months and in many instances it was under three.

Is there any reason to expect that in the future Australian defence planners can anticipate effective defence preparation time of an order of magnitude five to twenty-five times greater than that which has been available to others in

40 The exception is in Australia's active defence preparation prior to the onset of hostilities with Japan in 1941. The defence preparation time in that instance was approximately two years and six weeks. The details of other individual cases are, of course, open to dispute. However, the major point to be made by this discussion is more difficult to question seriously, i.e. the order of magnitude of defence preparation time available in recent historical experience. There appears to be no evidence to suggest that defence preparation time in a future conflict situation involving Australia is likely to be an order of magnitude several times greater than that which has been available to other countries in recent history.
the recent past? There have been those who have argued that Australia's remoteness from the major world centres of power would serve, to some degree, to insulate it from strategic surprise. They tend to argue that, for a nation

It should be noted that assumptions of this nature are not uncommon in the Australian defence establishment. For instance, in the Interim Report of the Joint Committee on Foreign Affairs and Defence, *Industrial Support for Defence Needs and Allied Matters* (Parliament of Australia, June 1977), it is stated without any supporting argument or attempted justification that:

> It has been assessed by the Committee that it would take him [a potential enemy] three years to build up the capability to mount a major raid on Australia and five years to mount an invasion.

(See paragraph 2.10).

It is upon these highly contestible assumptions that the primary objectives for Australia's industrial support capacity are determined for this important study:

Recognizing that a high-level threat to Australia could arise in a situation of world chaos and that there would then be a strong likelihood that overseas supplies would not be available during either the build-up or the combat period, the Committee has concluded that:

(a) Australia's defence industrial base, in R & D, design, production overhaul and repair, should be maintained in peacetime at a level of capability and capacity from which, given five years warning, expansion to self reliance in the provision of equipment of moderate complexity could be achieved. Such achievement could require stockpiling now in those areas where current deficiencies could not be overcome within the five year time frame;

(b) The planned rate of expansion should be such that, within three years from go-ahead, industry would be capable of providing the Services with the level of support needed to resist a major raid.

(See paragraph 2.12).

The weakness of the background assumptions of this important report undermines seriously the value of its conclusions.

to attack over such long distances, extensive preparations would be required which could be detected many years in advance. This would depend very much upon the characteristics of the country concerned and the nature of the attack intended. For example, it would certainly take considerable time for a close regional neighbour to develop the armed forces, transport and logistics capacities which would be required to mount a conventional multiple division over-the-beach assault against continental Australia. Sections of that country's domestic economy would need to be mobilised and extensive foreign assistance would be required. All of these preparations would be readily detectable by Australia's intelligence services. However, it must not be assumed that the detection of a neighbour's developing capabilities would imply a rapid and automatic Australian mobilisation in response. The regional state's long term intentions may be far from clear. If, in reality, they are detrimental to Australia's interests, they are almost certain to be concealed in an elaborate disguise. In order to decoy Australia, a dispute might be fostered with a relatively minor regional power. Alternatively, newly raised and equipped forces may be exercised in quashing a series of artificially stimulated internal revolts. Diplomatic assurances of all types might be freely available. In this sort of environment, despite the development of a clearly superior regional military power, the reactive response of Australian politicians may be very limited. It is quite conceivable that full scale Australian mobilisation would be ordered only when the regional state's intentions were unambiguously identified. It is difficult to judge at what stage before the mounting of an assault a potential enemy's intentions would be sufficiently clear to justify a mobilisation order. However, it is an implicit

43 It needs to be emphasised that the process of identifying the general nature of an opponent's intentions may in itself be very difficult. However, even when this is determined in fairly unambiguous terms, there may be great doubt and uncertainty concerning the nature of the intended attack, its objectives, its timing, its location, the technologies and tactics to be employed etc. Australian uncertainties concerning these matters might, in many circumstances, affect the nature and vigour of the Government's response.
assumption of the current Australian national security structure that, from the time that full mobilisation is ordered, between 2½-8 years would still be available before a regional opponent could attack. The validity of this type of institutionalised presumption ought to be the subject of considerable scepticism.

In discussing this subject, there are a number of related matters which should not be taken for granted. For instance, it ought not to be assumed that, in order for Australia to require the response of a 150,000 or 250,000 man army, it would be necessary for an opponent to transport forces of a comparable size onto Australian territory. On the contrary, in the circumstances of a regional dispute stimulating armed confrontation, Australia may need to deploy forces of this size in order to meet satisfactorily the threat posed by forces which number less than 20% of their own strength.44 The length of time which would be required by the regional state concerned to prepare to mount an extensive confrontation campaign of raids and possibly local bombardment and mining operations against isolated Australian installations and population centres might be a matter of days, weeks, or, at the most, a few months. The degree of warning and, more importantly, the length of active defence preparation time which Australia might receive in these circumstances could conceivably be limited to a few days. In this type of situation, Australia could obviously not afford to wait 2½-8 years for appropriate response forces to become available.

44 This type of situation would represent a classic illustration of the strategic principle of disproportionate response. The opponent's great advantage could be gained because in normal circumstances the attacking forces would possess the initiative for attack. They would be free to choose the time, place, mode, method and duration of operations. In most respects, the demands of these circumstances are analogous to the widely held requirement for a 10 to 1 force ratio to defeat guerilla insurgencies. See this discussed in John S. Pustay, Countersurgency Warfare (London, Collier-Macmillan Ltd, 1965) pp. 86, 87.
Either significant concessions or losses of sovereignty would have to be accepted or, alternatively, major escalations in the scale of conflict would have to be made. Both options would be inimical to Australia's short and long term national security interests.

The warning times likely to be received prior to the onset of many types of threats are also being affected heavily by new developments in technology. As was discussed in Chapter 2, there is a major trend developing in weaponry and transport technologies towards the effective reduction of the significance of distance as a constraint upon the rapid application of force. The proliferation of jumbo aircraft, remotely piloted vehicles and long range precision guided munitions is having the effect of cutting deployment times for powerful units of military capability over long distances in a dramatic fashion. Hence the capability of major powers to project rapidly different types of force in a precise fashion over long ranges is being transformed. At the same time, their capacity to supply this potential to client states at short

45 The most potent and readily available means of conflict escalation would be the threat, and possibly the use, of Australia's long-range air and naval bombardment and interdiction capacity against the opponent's homeland and surrounding waters. At least in theory, these units could be employed for the performance of two types of offensive function - to attempt to destroy the opponent's offensive forces in their home bases or to attack a much broader range of infrastructure targets, ports, support shipping, railways, roads, centres of industry and possibly major cities. The first option may be militarily difficult if the opponent's strike forces take the form of medium and low technology surface vessels and aircraft. These can be readily dispersed and are difficult to detect in many types of coastal environment. The second type of retaliatory option would have a limited utility in this type of situation because of its very great diplomatic ramifications. But, in addition, it is possible that, in the future, regional states will be able to deter this type of deep infrastructure retaliatory strike through their acquisition of highly survivable long-range counter-bombardment capabilities in the form of air-, ground- or sea-launched cruise missile forces.
notice is also increasing markedly. In this highly dynamic strategic environment, Australia's retention of the national security response concepts of a previous era is difficult to justify.

If Australia is to maximise its capacity to deter and defer the development of threats and, at the same time, optimise its capacity to meet a wide range of potential security problems, it needs to develop a surge capacity which can produce satisfactory force levels within the minimum warning times for particular threats. This is not an argument for the simple multiplication of the current regular manpower force structure. Such a proposal would be politically and economically unrealistic. However, there are several alternative means of expanding surge capacity. The changed nature of Australia's strategic environment serves to increase greatly the desirability of considering their adoption seriously.

3. The Need for an Independent Intelligence Capacity Oriented to the Requirements of Australia's Changing National Security Environment

Australia's national security interests will not always coincide with those of its great power allies. Hence, reliance upon foreign intelligence services for significant components of the country's priority requirements is highly undesirable. Institutionalised dependence upon foreign sources of intelligence may render Australia vulnerable to a large number of potentially damaging influences. To illustrate the point, there is considerable scope in this type of relationship for the dispensing country to regulate or modify the flow of information in its own interests. Misinformation might be supplied either unintentionally or otherwise. It must be anticipated that, in addition to flows of valuable objective information, foreign countries will channel their own value judgments, philosophies and concepts into senior levels of the national security structure. Over an extended

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46 Alternative means of developing surge capacity are discussed in some detail in Chapter 11.
period of time, this influence could have a significant impact upon the attitudes and reactions of Australia's national security decision-makers. Further, in some types of situations, foreign sources of information could be suspended arbitrarily or made the subject of bargaining pressures which would not be in Australia's interests.

The policy implications of these misgivings were expressed clearly in Justice Hope's third report of the Royal Commission on Intelligence and Security:

Australia's intelligence interests do not and cannot coincide with those of any other country. Therefore, although we can and should benefit from exchanges of information and views with friends and allies we need our own intelligence collection and assessment capabilities. We also need constantly to re-assess the benefits to Australia from intelligence relationships with other countries against the costs.47

From Australia's point of view, one of the continuing enticements of close intelligence relationships with major power allies is likely to be that those countries alone will be able to afford the full range of sophisticated intelligence collection and analysis facilities.48 The heavily restricted and constrained passage of material from these sources is likely to be of continuing interest to Australia. However, it should be noted that, in the context of Australia's reorientated national security requirements, most of these highly specialised areas of allied intelligence activity are likely to become relatively less important. As Australian intelligence organisations restructure their


activities to meet the requirements of the new security environment and strategic concept, an increasing proportion of high priority information should be available from indigenous intelligence gathering facilities based on Australian territory. Some increased intelligence gathering capacity may be gained as a consequence of long range surveillance systems of various types being deployed primarily for other purposes.\footnote{Over-the-horizon radar and long range passive sonar sensors could be expected to have significant potential in this field. See the discussion in Chapter 2.} Other more specialised methods and means of intelligence collection are likely to be required if a high degree of autonomy and self-sufficiency is to be gained and these will require special attention and funding.

An expansion of Australia's independent intelligence gathering capabilities would need to be matched by a more sophisticated capacity for intelligence analysis and interpretation. This area is highly complex and difficult. The derivation of meaningful intelligence assessments from the almost overwhelming background 'noise' of spurious information in the international environment requires the employment of advanced techniques and high levels of technical skill.\footnote{There is a detailed discussion of the difficulties of deriving accurate intelligence assessments in an environment characterised by high levels of 'noise' in Roberta Wohlstetter, *Pearl Harbor: Warning and Decision* (Stanford, California, Stanford University Press, 1962), pp. 71-169.} In the key area of interpreting and foreseeing foreign actor intentions, the experience of several foreign countries suggests that the intelligence assessment structure should be designed in such a manner as to facilitate the expression of alternative opinions.\footnote{See this discussed in A. Shlaim, 'Failure in National Intelligence Estimates: The Case of the Yom Kippur War' in *World Politics*, Vol. XXVIII, No. 3, April 1976.} The suppression of dissenting views in the normal decision-making processes of a conventional bureaucratic structure serves to generate and perpetuate theories, views and concepts which become conventional wisdom within the structure but which have, on
several occasions, proved to be misleading, inaccurate or incorrect in important respects. The structural incorporation of alternative assessment staffs, at least in key areas, would provide an important means of encouraging the expression of non-conformist views and potentially a method of sharpening the value of the total intelligence assessment staff.

The changed nature of Australia's security strategy is likely to impact directly upon the tasking of the intelligence services. Much greater attention will need to be applied to intelligence which is likely to be of specific significance to Australia. Perhaps most importantly, a very close monitor will have to be maintained upon all variables relating to pressure and threat lead and warning times. It would be upon the basis of detailed material in this field that many important characteristics of Australia's response capacity could be determined.

Another important consequence of Australia's strategic reorientation will be a much greater requirement for detailed 'general intelligence' relating to Australia's immediate security environment. Much of the Australian

52 These matters are discussed at length in a series of unpublished papers delivered to a Conference on Strategic Issues, The Leonard Davis Institute for International Relations, The Hebrew University of Jerusalem, held from 7-9 April 1975. In particular see A. Ben-Zvi, **Surprise Attacks: Theoretical Aspects**; A.L. George, **Warning and Response: Theory and Practice** and B. Whaley, **The Causes of Surprise in War**.

53 The types of variables which would need to be monitored are discussed in the papers cited above. **Ibid.** In addition, see M.I. Handel, **Perception, Deception and Surprise: The Outbreak of the Yom Kippur War** a paper delivered at the same conference.

54 The term 'general intelligence' is defined by Norman Gelb in the following terms:

General intelligence deals with such matters as a country's topography, the character of its shores, beaches and tides (if it borders the sea) and of its rivers and other inland waters; details of its economy and of its transportation and communications systems; the character of its people; and a wide range of other general areas of information.
continent has yet to be mapped in detail and large portions of Australia's coastal and offshore waters have not been charted in any but the most generalised manner. If Australia's security forces are to have the capacity to operate effectively in all parts of the continent and its surrounding environment, much more detailed information will be required on terrain, weather patterns, vegetation, land use, human occupation, man-made structures etc.

On the local level, a great deal might be gained from a more active involvement of the local population in the collection of routine tactical intelligence - the sighting of unusual shipping and aircraft movements, the presence of strangers acting in a suspicious manner etc. This type of activity could be expected to be particularly valuable and generally accepted in the more remote parts of the country where it might conceivably be coordinated by local police

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The entire Australian continent has now been mapped in 1:250,000 scale, but only approximately 40 per cent of these maps are contoured and many are over fifteen years old. In 1965, a programme was commenced to provide a complete coverage of the continent in the more detailed 1:100,000 scale within ten years. However, because of budgetary cut-backs and rigidly imposed staff ceilings, the programme was only approximately 50 per cent complete at the end of 1977.

The lack of up-to-date knowledge and detailed charts on much of Australia's coastline and adjacent waters is also a serious problem. Some areas of Australia's northern coastline remain essentially uncharted and for others the most recent material was produced in the nineteenth century. The difficulties of navigation in such conditions are highlighted in United States Defense Mapping Agency, Hydrographic Centre, *Sailing Instructions for the North and West Coasts of Australia* (Washington D.C., United States Defense Mapping Agency, Revised Edition, 1976).
forces. 56

Australia's requirements for intelligence in the 1980s can be expected to differ considerably from those of the past. Many types of information relating to Australia's immediate environment can be expected to gain increased significance. There is also likely to be a broadened intelligence requirement in non-military national security areas concerning economic, social, political, and other developments. It is clear that it would be preferable for all areas of intelligence which are centrally important to the national security structure to be satisfied in the future from purely indigenous means of collection, processing and assessment. This cannot be expected to be simple or inexpensive. However, it is unavoidable if Australia's national security structure is to be provided with independent intelligence assessments of central relevance, timeliness and high quality.

4. New Command, Control and Communications (C^3) Requirements

One major consequence of Australia's changed security environment is a greatly increased requirement for the security forces to prepare for operations on and from Australian territory. The Australian continent, its offshore islands and maritime approaches need to be considered, for long term planning purposes, a potential battle zone. This has major implications for the Australian C^3 structure.

56 In some coastal areas, this type of assistance is already provided by the Voluntary Coastal Patrol, the Voluntary Coastguard and on an ad hoc basis by Australian commercial fishing and other vessels operating in coastal waters. There is, in addition, the remnants of the wartime coastwatcher organisation. However, because of its classified nature, it is difficult to evaluate the strength and/or operational capacity of this structure. There would appear to be considerable scope for rationalising and integrating the intelligence gathering capacities of these disparate groups and individuals.
At present, the Australian armed services exist as three separate organisations. They are organised internally on functional principles consisting of an operational element - the Fleet, the Army Field Force Command and the RAAF Operational Command - and one or more support elements. As Dr R.J. O'Neill has pointed out, this structure is not well suited to the requirements of operating flexibly and at short notice in Australia's immediate environment:

Each service can ... readily make contributions to a joint force if required to do so. However, the joint force structure into which such contributions would have to be fitted does not exist and so if the Australian services are to be used jointly to defend Australia, there would be appreciable delays until the framework was set up. Given that the Department of Defence is now integrated, that the post of Chief of Defence Force Staff has been created giving its incumbent command over the three services, it seems only logical that a joint service force structure should be established also.57

Dr O'Neill has argued in detail the case for a command structure more appropriate for the requirements of security operations in Australia's immediate environment.58 Probably the simplest type of system would involve the establishment of regional Maritime Defence Commands comprising air and naval forces and regional Continental Defence Commands comprising ground and air forces. For instance, there might be two Maritime Defence Commands, one for the East and one for the West. The continental land mass adjacent to each of the maritime commands might best be divided for the purposes of command into two, in such a manner as to produce a North East and a South East Continental Defence Command adjacent to the Eastern Maritime Defence Command, and a North West and a South West Continental Defence Command adjacent to the


58 Ibid.
Western Maritime Defence Command. The ideal boundaries for each command area are not easy to identify. It is notable, however, that overseas experience testifies to the great advantages of closely coordinating military command boundaries with those already existing for state and local community administration. This facilitates meaningful civil-military cooperation of all types and at all levels. 59

Ideally, the military support structure might be divided into a logistics command, a training command and a reserve command, each of which would have centralised and regional tri-service and single service elements. However, in addition to this military support structure, there would be a requirement for a small coordinating body to communicate centrally determined national emergency priorities with the broader sections of the total community - a range of Federal Government departments, state and local governments, civil defence organisations, industry, trade unions, medical authorities, the media, churches, social welfare agencies etc. 60 Peacetime planning in this field would need to be comprehensive with ultimate authority resting at the highest levels of national government.

Inevitably, this level of change to the national security command structure would disturb Australia's military establishment during the period of transition. However, the compensating advantages would be of very great value. Most importantly, this type of regional tri-service command structure would provide a suitable basis for rapid reaction to security problems of all types in Australia's environment.

59 The Swedes have employed these principles in the development of their national command and control structure. They claim considerable benefits from the coordination of civil and military areas of authority. Interview with Major-General Nils Sköld, Commander of the Eastern Military District, Stockholm, 27 October 1975.

For the military sector, it would encourage a degree of regional specialisation which, when combined with increased familiarity with local terrain, weather, population and other factors, could be expected to increase greatly the efficiency of local operations. Additional economies of effort might be forthcoming from the regional integration of service activities and particularly support facilities. Tri-service operations would become daily practice and operational procedures, doctrines and tactics could be tested regularly and inexpensively in the areas of likely future operations. Finally, it can be noted that the institution of an integrated regional command structure would entail a significant degree of geographical dispersion. Depending upon the effectiveness of supporting concealment, mobility and hardening measures, this level of dispersion should have the effect of increasing significantly the potential survivability of the total command structure. This in turn may serve to encourage further efficiencies through the integration of service communication systems.  

An efficient, reliable and secure command, control and communications capability is crucial to the credibility and effectiveness of the total national security structure. Much remains to be done if Australia's capacity in this field is to be optimised for the new strategic environment.

5. Expanded Requirements for Australia's Industrial Support Capacity

The need for greater self reliance impacts upon the industrial sector's capacity to support national security policy in three categories of situation - in meeting peacetime

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61 Effective integration of service communications may make the employment of high data rate, jam resistant, highly secure, time synchronised frequency agile techniques an economic proposition. A modified form of the United States Joint Tactical Information Distribution System (JTIDS) would appear to have very great potential in Australia's contental environment. For details of this system see Chapter 2.
requirements, in meeting the pressures of international crises and in meeting the pressures of international aggression.

In normal periods of peace, the national security structure is likely to be organised on the basis of an anticipation that industry will have the capacity to provide three different types of support. The first requirement is likely to be for industry to supply equipment and support to meet those specialised requirements which cannot be met by systems already in low cost production overseas. The second peacetime requirement is likely to be for industry to produce high usage ordnance and parts for a large range of equipments held in the national security structure. The third and, most probably, increasingly important peacetime requirement will be for Australia's total civil industrial sector to prepare a flexible capacity to produce a wide range of national security requirements in crisis situations.

In the face of pressures of international crises, Australian industry will almost certainly be expected to reduce the vulnerability of the total society. In practice, this would involve the institution of active measures to compensate for those areas of essential resource and commodity production which Australia currently lacks. Some critical resources may have to be stockpiled in advance and in other instances alternative means of production may have to be established to substitute for critical imports.

The third major area of greatly increased importance will be in the development of a highly survivable industrial capacity sufficient to provide essential civil and military commodity requirements in the face of pressures of international aggression. Ensuring the survivability of essential components of industry in the face of a wide range of pressures and violent attacks could not be expected to be

62 The major areas of domestic production deficiency are outlined in Chapter 3 and possible means of instituting compensatory measures are discussed in Chapter 10.
easy. Some production capacities may need to be dispersed and others of very high priority may need to be duplicated, concealed and hardened. However, it must be recognised that, even if it were well protected and highly survivable, Australian industry in its present state could not be expected to provide all the support requirements of the current security structure. Nor would it be easy to expand industrial capacity in such a way as to provide a capability to support fully a mobilised version of the current force structure. Even with heavy stockpiling of imported raw materials, equipment components and fully built-up pieces of equipment, the very wide variety of systems currently deployed in the service structure would make long-term support extremely difficult.

In order to increase Australia's independent operational capacity in serious crises of international aggression, a degree of equipment rationalisation may be required. One approach might be to adopt a carefully calculated high-low mix of military equipments.\(^{63}\) In the case of large, very high technology equipments - advanced combat aircraft, large sophisticated warships, main battle tanks, etc. - it may be possible to retain a capacity to produce high usage parts and to undertake minor overhauls and repairs from purely indigenous resources. However, the capacity to replace or heavily modify this type of equipment without extensive foreign support needs to be recognised as being beyond Australia's current capabilities.\(^{64}\) In a crisis situation, the development of an indigenous capacity to undertake these demanding tasks

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63 The concept of a high-low equipment mix has been the subject of intensive debate in the United States ever since original proposals of this type were made for the US Navy by Admiral E.R. Zumwalt. See the article by him entitled 'High-Low' in US Naval Institute Proceedings, Vol. 102/4/878, April 1976, p. 46, and also the discussion in subsequent issues of the same journal.

64 This point is elaborated in the Interim Report of the Joint (Parliamentary) Committee on Foreign Affairs and Defence, Industrial Support for Defence Needs and Allied Matters. In particular see the discussion in paragraphs 5.63 and 5.64.
would be technically impossible in some areas and extremely
difficult and expensive in others. In the absence of a
major peacetime government initiative to encourage large
scale high technology developments in a significant number
of industrial sectors, it may be preferable to withdraw
from all but the production of a very carefully selected
number of small high technology systems, high usage parts and
the general support of large high technology equipments.

Foregoing aspirations to produce locally large warships,
advanced combat aircraft and main battle tanks would serve to
weaken the Australian security structure in two main
categories of situation. Firstly, in the circumstances of a
threat arising which provided Australia with a very long
defence preparation time, the Australian security structure
would not possess an independent capacity to proliferate
large high technology systems. In the second situation, of a
very prolonged high intensity conflict, battlefield losses
could not be replaced by similar large high technology
systems.

However, in compensation for the lack of production
capacities for major sophisticated items, very significant
resources of all types would be freed to concentrate on
Australia's small system high technology and medium and lower
technology requirements. In these fields, Australia already
possesses most of the industrial capacities required to
design and produce small arms, light and heavy wheeled
vehicles, small ships, light and medium missiles, remotely
piloted vehicles, many types of communication equipments etc.

There exists great potential scope for exploiting
imaginatively these already acquired technologies to satisfy
many of the new emerging high-priority national security
equipment requirements.

65 The Interim Report of the Joint (Parliamentary) Committee
on Foreign Affairs and Defence also discusses this
question. ibid.

66 Australia's capacity in these fields is discussed in the
Interim Report of the Joint (Parliamentary) Committee on
Foreign Affairs and Defence. ibid.
This is not intended to be an argument for the peacetime production of all low and medium technology systems, all high usage parts for high technology systems and a carefully selected number of small high technology systems within Australia. It would certainly be desirable for a large number of them to be produced domestically. However, in peacetime conditions, the small quantities of equipment required may make such production extremely expensive and unacceptable politically. Perhaps even more important than full-time small-scale domestic production would be the possession of a capability to transfer rapidly large portions of civil industrial capacity to meet those national security requirements not normally supplied by domestic industries. Because of the scope of local civil production capabilities, the potential currently exists to produce a wide range of low and medium technology and some specialised high technology systems in a fully mobilised domestic economy. However, in practice, for this potential capacity to be exploited at short notice, elaborate peacetime preparations would be required. Firm and detailed decisions would need to be made concerning those types of equipment which would be required in the circumstances of particular national security crisis situations. Comprehensive equipment designs would need to be finalised in peacetime and prototypes tested thoroughly. Production dies and jigs could then be made so that volume manufacture could commence at short notice. The processes of converting civil industrial facilities to produce national security requirements might even be tested in key areas. The potential benefits from this type of close and detailed civil-military interface can be expected to be very significant. According to FordAustralia's Chief Engineer, Mr J.A. Tweeddale, the normal lead time for a new vehicle production line exceeds three years from the decision to commence. However, he has assessed that this time could be reduced to well under twelve months if preliminary planning
for the transfer of productive capacity is comprehensive.\textsuperscript{67} The time which might be saved in other production processes - in the electronics and ship-building industries, for example - might be far greater.

The development of a high degree of self reliance in national security capacity will necessitate a greatly improved working relationship between political leaders, their national security advisers and large components of civil industry. A much greater degree of cooperation and consultation will be required over a wide range of matters, but most particularly concerning procurement policy.\textsuperscript{68} The design of the national security structure will need to be determined, at least partly, by the capacities of domestic industry to produce and support important equipment. Significant trade-offs would be involved in this process. For example, an imported heavy armoured vehicle \( X \) may be considered to provide the most appropriate technical means of performing an important offensive ground force function. However, \( X \) may be extremely expensive to support with purely domestic resources and impossible to produce locally. This may make the option of an alternative domestically produced lighter armoured vehicle \( Y \), which is \( \frac{1}{3} \) the unit cost and \( \frac{1}{4} \) the life cycle cost of \( X \), much more appropriate. Larger numbers of a lighter domestically produced and supported vehicle may optimise overall national security capacity in the face of a wide range of potential threats for a given resource input. Many of the trends arising from recent military technological

\textsuperscript{67} This matter was raised in the discussion following Mr J.A. Tweeddale's address to the United Service Institution of the Australian Capital Territory on 1 June 1977. For the text of his address see J.A. Tweeddale, 'The Defence Capability of the Australian Vehicle Manufacturing Industry' in The United Service Institution of the Australian Capital Territory, \emph{The Defence Capability of Australian Industry} (Canberra, The United Service Institution of the Australian Capital Territory, 1977) pp. 8-31.

\textsuperscript{68} The Parliamentary Joint Committee on Foreign Affairs and Defence is critical of some aspects of the current situation in this area. See \textit{Interim Report of the Joint (Parliamentary) Committee on Foreign Affairs and Defence, Industrial Support for Defence Needs and Allied Matters}. In particular see the discussion in paragraphs 3.27-3.29.
developments may add further support to options involving larger numbers of smaller, medium technology dispersible equipments, not only in the ground but also in the sea and air environments. If Australia requires a high level of self sufficiency in crisis situations, it will be necessary for the country to develop a capacity to produce a large proportion of its national security equipment requirements at short notice. With many types of equipment, arrangements might be made for foreign designs to be produced under licence in Australia. In some areas, there may be scope to undertake joint research and development programmes with foreign countries with which Australia shares important technical requirements. However, it will be necessary to realise that, because of Australia's changed strategic situation, there are likely to be an increasing number of technical requirements and specifications which are peculiarly Australian. There are also likely to be some technical concepts which may not warrant foreign development but which, because of Australia's unique national security environment, may be particularly suitable for local employment. It would be primarily to these latter areas that Australia's research and development capacity would need to be directed. The development of successful prototypes would make domestic peacetime production

69 See this matter discussed in Chapter 2. The impact of volume upon the relative cost disadvantage of Australian versus foreign production is elaborated by Desmond J. Ball in 'Australia's Tactical Air Requirements and the Criteria for Evaluating Tactical Aircraft for Australian Procurement' in Desmond Ball (ed.), The Future of Tactical Airpower in the Defence of Australia, pp. 88 ff.

70 This matter is raised in the Interim Report of the Joint (Parliamentary) Committee on Foreign Affairs and Defence, Industrial Support for Defence Needs and Allied Matters, paragraph 3.34.

of some equipments feasible. Other systems might be readied for rapid production by mobilised civil industries in crisis situations.

Most of the desirable trends in national security industrial policy which have been discussed above are far removed from current experience. At present, many areas of Australian secondary industry are declining and this in turn is impacting directly upon Australia's future national security industrial support capacity. In those industries which are heavily dependent upon defence contracts in periods of peace, there is an urgent requirement for defence equipment procurement to be phased in a long term planning structure. This would exert a stabilising influence upon work loads and permit production processes to be integrated and made more efficient. In addition, active measures are required to ensure the continued viability of those civil industries whose supporting role would be critical in a range of pressure and threat situations.

6. Greater Involvement of Civil Society in National Security Crises

The introduction of new weapons and weapon platforms following the industrial revolution had the effect of making armed forces far more dependent upon the comprehensive support of the civil sections of society. During periods of war it became necessary to divert the greater part of total national resources to supply the requirements of the armed forces.

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73 These matters are discussed in the Interim Report of the Joint (Parliamentary) Committee on Foreign Affairs and Defence Industrial Support for Defence Needs and Allied Matters. In particular, see paragraphs 4.47, 4.65, 4.70, 5.66, 5.75.
forces. Australia experienced the draining effect of modern conflict during the two world wars. However, a related consequence of modern developments in warfare did not immediately impact upon Australia. During the nineteenth and twentieth centuries, larger parts of civil societies became important military targets in their own right. Cities, towns, industrial concentrations, transport modes, etc., all became the subject of direct attacks in major wars. However, in contrast to the experience of most of the modern world, Australia's support structure and population remained relatively immune from direct experience of the pressures of international crisis and war. Primarily because of their remote location, Australia's major centres of population have never been the subject of serious pressure or attack.

This situation may alter as a result of the transformation in Australia's national security environment. In the future, Australia will need to manage the pressures of international crisis and many of the pressures of international aggression independently. Its armed forces will be orienting their capacities more towards operations on and from the Australian continent. As a consequence, the potential for the Australian population mass to be affected directly and in a significant way by national security crises is rising considerably. The major implication of this development is that the direct involvement of the total population and society in future national security crises must be recognised and, as far as possible, managed.

Conclusion

The Australian national security establishment is confronted by a series of critical challenges. During the past decade, Australia's strategic situation has changed significantly. Mainly because of the altered nature of the United States' regional role, Australian forces are unlikely to be deployed again for long periods of time into Asia. Because of the stated US intention to support allies with its
full resources only when they are threatened by a superpower rival, Australia now needs to mobilise its own resources to develop an independent capability to meet a wide range of lower and medium level problems.

Many of the pressures and threats with which Australia may be confronted in the future may be primarily economic or political and be beyond Australia's capacity to prevent or deter independently. In other situations, Australia may be subjected to serious pressures as an indirect result of disputes and conflicts in other parts of the world. In the future, many of these threats as well as some types of direct military attacks may develop within a very short timespan. In this situation, the Australian national security structure requires a rapid response capacity sufficient to deter, defer and, if necessary, meet such threats independently. But Australia's current strategy formulation, force expansion, intelligence, command, control and communications, industrial and total civil support capacities have been evolved during a long history of foreign commitments in support of major power allies. They were never designed to be appropriate for, nor are they suited to, the type of national security environment likely to confront Australia in the 1980s.

What is required in this radically altered strategic situation is the evolution of a new Australian national security strategy from first principles. It is necessary to question what really should be the functions and priorities of the national security structure in the new environment. What types of contingencies should it be designed to meet? What are the most efficient and economic technical means of providing the capabilities desired? And how might the existing structure best be transformed to satisfy the new demands? Nothing less than a fundamental re-examination is required if Australia's national security strategy is to be viable in the 1980s.
PART III
CONSTRAINTS ON RESPONSE TO CHANGE

The major conclusion to be drawn from the discussion in Parts I and II is that many of the concepts, doctrines, structures and operational procedures which were evolved during the forward defence era are inappropriate for the new strategic environment. As a consequence, there is now an important requirement for the Australian security system to be reassessed and adapted to meet the demands of the new situation.

However, there are important practical limits to change in Australia's security system. Because of the nature of the parent society and its position within the international environment, there are a large number of physical, economic, social, diplomatic and political factors which effectively constrain the scope for alterations. The nature of those restraining influences which are essentially non-bureaucratic in character is discussed in Chapter 5.

Bureaucratic constraints on adaptation are analysed separately in Chapter 6. This division of the discussion in Part III serves to emphasise the importance of the restraining influence exerted by the large number of organisations and people who are already engaged in the performance of national security functions.
CHAPTER 5

NON-BUREAUCRATIC CONSTRAINTS

The potential to change Australia's national security structure and policy is limited by two major categories of non-bureaucratic constraint - those which are essentially domestic and those which are international in character. In this chapter, these two types of non-bureaucratic restraining influence are discussed in turn.

Internal Constraints

The major domestic non-bureaucratic restraints on change in Australia's national security system flow largely from the general characteristics of its parent society. For instance, the size of the overall national economic 'cake' effectively restricts the dimensions of the budgetary 'slice' which can be allocated for national security expenditure. It is important to realise that Australia's economy is comparatively limited in size, its national income being US$44,397 million in 1972. In a total world environment, this can be related to US$92,538 million for Canada, US$139,637 million for the United Kingdom and US$1,040,860 million for the United States. Local regional comparisons tend to be more favourable to Australia. For example, in that same year of 1972, the national income figures for Indonesia and the Philippines were US$13,655 million and US$9,975 million respectively.

Australian national security policy is not only constrained by the scale of the domestic economy but also by its character. For instance, the capacity of Australia's secondary industry

2 Ibid.
3 Ibid.
to produce the quantity and quality of goods required by the national security force within acceptable time and cost parameters is limited. Writing in 1974, Brigadier P.J. Greville summarised Australia's capabilities in a rather optimistic fashion in the following terms:

A perusal of our present capacity indicated:

a. that we could manufacture all the vehicles (A, B and C)\(^4\) needed by the Services. To do this, however, we must develop or get a licence to build one or more diesel or multi-fuel engine and transmission sets for the vehicles;

b. we have the capacity to produce our own communications systems, and some at least of our electronically controlled weapons systems;

c. we have the capacity to produce our own transport aircraft and some of our needs for first and second line aircraft;

d. we can produce our own ships;

e. we can produce most small arms, conventional weapons and munitions;

f. we can produce special foods, shelter, clothing.\(^5\)

In fact it is doubtful whether Australia possessed all of these capacities in 1974. It certainly does not possess them in 1978.\(^6\) For instance, in order for Australia to acquire

\(^4\) A, B and C vehicles can be defined as follows:

A vehicles are fighting vehicles which are armed and/or designed to carry weapons. eg. tanks, armoured personnel carriers, mechanised infantry combat vehicles, certain recovery vehicles, etc.

B vehicles are non-fighting vehicles of all types which are not specifically designed to carry offensive weapons and do not fall within the C vehicle category.

C vehicles comprise equipment designed for construction, excavation, highway maintenance and other types of plant and equipment of predominantly engineer usage.


\(^6\) The defence support capacity of the munitions, aircraft, ship building and related industries is discussed at length in the Interim Report of the Joint (Parliamentary) Committee on Foreign Affairs and Defence, Industrial Support for Defence Needs and Allied Matters (Canberra, Parliament of Australia, June 1977).
the capacity to produce all of the components required for the construction of A vehicles, transport aircraft and warships, a major and highly specialised expansion of industrial capacity would be essential. In the current economic and national political environment, this type of development appears highly unlikely. In fact, in recent years, it has been made clear by a variety of sources that the national security support capacity of Australia's secondary industry has suffered a relative decline. This appears to be primarily because the rapid growth in Australia's mining sector has raised the domestic costs of labour and capital to new heights and, as a consequence, weakened the competitive position of the rural and manufacturing sectors. These problems have been exacerbated by the processes of rapid industrialisation in South East Asia. The developing countries of this region have been very successful in producing low technology, high labour intensity manufactures which have commanded a widening price advantage as Australia's labour costs have continued to rise. Consequently, many manufacturing processes which were formerly undertaken within Australia have been transferred offshore or replaced by those overseas.

The current developments in Australian mining and Asian manufacturing both appear to be of a long term nature. As a consequence, in the future there is likely to be a further decline in Australia's manufacturing industry and hence in the country's independent defence support capacity. The trend is already firmly established. Between 1962-63 and 1972-73, the proportion of gross domestic product derived

7 Ibid.


9 This relationship between the mining and manufacturing sectors has been termed the 'Gregory thesis'. For details see Glenn Withers, 'Economic Futures and Australian Defence Policy', The Australian Journal of Defence Studies, Vol. 1, No. 2, October 1977, pp. 122, 123.
from the manufacturing sector fell from 27.6 per cent to 24.2 per cent.\textsuperscript{10} Perhaps an even more significant indicator is that in that same decade the proportion of private fixed capital expenditure directed to the manufacturing sector fell from 25.7 per cent to 19.7 per cent.\textsuperscript{11} As the Jackson Committee Report points out, it appears that Australia's manufacturing industries have attempted to maintain their earnings and profitability by running down capital stock.\textsuperscript{12} The overall implication of these trends has been described by Sir Ian McLennan in the following terms:

> I think it can be said that Australian industry is now at a lower stage of relative technology, that is relative to overseas countries, than it was in 1939 and, similarly, I think it can be said that the development of new equipment requires much more sophistication than it did then.\textsuperscript{13}

These considerations constrain heavily the levels of domestic industrial support which can be assumed in emergency situations.

Australia's manpower strength is also limited in both quantity and quality. The Borrie Report emphasised that Australia's post-war population growth rate is declining to a very low level.\textsuperscript{14} During the 1980s and early 1990s, there is expected to be an almost constant 130,000-140,000 males


\textsuperscript{11} \textit{Ibid.}, p. 62.

\textsuperscript{12} \textit{Ibid.}, p. 61.


reaching the age of 18 each year. Moreover, the limited scale of this potential civil and military workforce is likely to be eroded further by the changing occupational patterns of young people. Most notably, there is now a strong tendency for a larger proportion of young adults to attend tertiary educational institutions full-time and to remain there for longer periods. These trends are having the effect of reducing significantly the size of the 17-25 year-old male workforce available for recruitment by both domestic industry and the armed services.

These developments may have the effect of exerting a constraining influence on an array of strategic options. The demanding nature of the minimum aptitude selection criteria for military service already means that substantially more applicants are required than the number of vacant recruit positions. Yet with the pool of young potential recruits being restricted to an almost static level and civilian incomes rising continuously, it may prove to be much more difficult and expensive than in the past to retain and expand current regular service manpower strengths.

The relative ease with which current service ceilings are being met appears to be primarily a consequence of the high rate of domestic unemployment. As Glenn Withers has pointed out:

At present unemployment is permitting some gradual build-up of force strength without increasing relative pay. The crunch will come

15 Ibid.
16 See a table of actual and projected rates of enrolment in tertiary institutions, ibid., p. 396.
17 Actual and projected male work participation rates for the age groups 15-19 years and 20-24 years are presented in diagramatic form, ibid., p. 334. A similar point is made with earlier statistics by Darcy McGaurr in Conscription and Australian Military Capability (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1971), p. 2.
if the unemployment problem is successfully resolved...\textsuperscript{18} 

The means available to overcome this problem of restricted regular manpower supply in the long term are very limited. The most controllable variable determining enlistment rates is that of service pay.\textsuperscript{19} However, the price elasticity of supply for military manpower in Australia appears to be low, particularly in comparison to that in the United States.\textsuperscript{20} Withers has calculated that, in Australia, a 10 per cent increase in service pay would only invoke a very moderate 10 per cent rise in enlistment applications.\textsuperscript{21} This limited supply response together with the reduced scale of the available manpower pool constrains heavily the levels of regular professional service manpower which can be maintained in Australia within the currently accepted budgetary parameters. Any proposals for greatly expanded full-time military manpower would need to depend on either a vastly increased budgetary allocation or some form of national manpower mobilisation or conscription.

The limited availability of manpower for part-time military service further restricts Australia's future security options. However, it is important to note that the apparent reluctance of Australians to perform part-time military service is a product not only of their failure to enlist, but also of their high rate of withdrawal and resignation. The very low retention rate, and hence the


\textsuperscript{19} In the long term there are, of course, other variables which are amenable to manipulation. For example, alterations to the minimum selection criteria might be expected to increase manpower supply and changes to conditions of service and to social relationships within military structures may serve to reduce the rate of manpower wastage.

\textsuperscript{20} This point is discussed by Darcy McGaurr in \textit{Conscription and Australian Military Capability}, pp. 14-16.

\textsuperscript{21} This was discussed by Darcy McGaurr in a lecture on manpower policy to the Australian Army Staff College, Queenscliff, Victoria, May 1977.
modest strength of part-time military forces, would appear to be due more to the unfavourable conditions of part-time service than to any deep-seated social or political attitudinal constraint. 22

The potential for change in Australia's national security system is also restrained heavily by the values and attitudes of the domestic population and its political representatives. 23 As we have seen in Chapter 3, Australians are generally apprehensive about the potential for future national security crises and many fear Australian involvement in a major war. However, expressions of strong opinion and concern by the Australian public concerning national security issues have been by no means continuous or consistent. As Dr W.H. Smith points out:

... it is all too evident that interest in defence is largely spasmodic. True there is a continuing concern over vaguely defined perils which are seen to originate in the

22 Several factors contributing to the unsatisfactory strength of part-time military forces in Australia are discussed in Committee of Inquiry into the Citizen Military Forces Report (The Millar Report), (Canberra, Australian Government Publishing Service, 1974), pp. 49, 50. The opinions of those individuals who were serving or had served in the Citizen Military Forces in the early 1970s are recorded in Appendices C and D of this same report. Several specific areas of dissatisfaction are identified in these analyses.

23 One important means by which the values and attitudes of the Australian population and its politicians are manifested is the manner in which the country's national security forces are tasked in periods of peace. To the extent that politicians and the public desire the national security system to perform subsidiary ceremonial, display and other functions to the detriment of deterrence, deferment and defensive functions, the system is constrained from optimal efficiency in resource allocation and in adapting to meet changing strategic requirements.

It is interesting, in this context, to note an international comparison of the functions for which national security forces are employed. For details see a table by James Bayrs reproduced in J.C.M. Baynes, The Soldier in Modern Society (London, Eyre Methuen Ltd, 1972), p. 9.
Asian hordes, world communism, global population pressures and the like; and it may be that some of these fears have basis in fact, particularly if the West is considered to be a spent force in world politics. When in the past direct threats to Australia have been identified - Russia in the nineteenth century, Japan after the raid on Darwin, the communist thrust in Southeast Asia - public opinion has usually greatly exaggerated the degree of danger. But currently, at least, there is widespread scepticism about potential specific threats to Australia.24

The propensity of Australians to overreact to both menacing and peaceful international developments is no doubt due to a large number of factors. Certainly one important influence is the gross inadequacy of foreign news coverage and interpretation in the Australian media. As Henry Albinski has pointed out; 'Historically the Australian press has, by common consent, been disgracefully deficient in this area'.25 It is a reflection of the importance placed upon national and, indeed, international security issues by the Australian media and public that there are only two journalists acting as essentially full-time defence correspondents in the domestic mass radio, television and newspaper media.26

Dr Smith has identified a second major reason for the tendency of Australians to overreact in response to national security issues:

On the one hand, Australian society does seem largely uninterested in defence except in extreme situations and tends to leave matters


26 Major Peter Young (a former Regular Army Officer) is defence correspondent for The Australian and Frank Cranston is defence and aviation correspondent for The Canberra Times.
to the experts and the military professionals. On the other hand, governments have encouraged the idea they are the repository of wisdom in such matters and have been pre-disposed to keep defence questions out of the arena of public debate.27

In this type of environment the public is rarely informed in a well-balanced routine manner of developments in the national security sphere. When the passage of unusual, newsworthy and possibly potentially threatening events captures widespread attention, the reporting is frequently sensationalised and the poor state of the public's background knowledge tends to facilitate an attitudinal overreaction. In the current situation, a high level of expertise in national security affairs is attained by only a small and select group of bureaucrats, military officers, diplomats, politicians and academics.28

27 W.H. Smith, The Determinants of Defence Policy, p. 11.

28 The high degree of concentration of specialised human capacities in security and strategic affairs is perpetuated by the long term neglect of these subjects in Australia's military colleges, universities and colleges of advanced education. Australia's situation contrasts markedly in this respect with nearly every other advanced western state. For instance, in the United States, there are numerous military, academic and corporate organisations which teach and conduct research in the field. Most of these are listed as Corporate Members in The International Institute for Strategic Studies (IISS), List of Members (London, The International Institute for Strategic Studies, 1974), pp. 86-89. In the United Kingdom, there are several military colleges and university departments dealing explicitly with strategic studies. For details see the IISS Corporate Membership list. In Canada, apart from the National Defence College, there is a very strong Canadian Institute of International Affairs and Strategic Studies as well as ten universities with military professorships. For details see Richard A. Preston, 'The Study of War and Its Causes', Canadian Defence Quarterly, Vol. 7, No. 1, Summer 1977, pp. 46-50.

By contrast, in Australia, there is no Department of Strategic Studies at the Royal Military College at Duntroon. (The subject was first offered as an undergraduate option only in 1977.) Nor is a Department of Strategic Studies planned for the new Australian Defence Force Academy (ADFA). For details see Paul Mench, Education and Officers: Changing Concepts of Officer Education (A paper delivered to the Conference on Armed Forces and Australian Society at the Royal Military College, Duntroon,
Despite fluctuations of interest, especially government interest, concerning the seriousness and probability of external threats, Australian attitudes towards military service have been remarkably consistent over the past thirty-five years. The most precise records in this area concern public opinion poll results to questions regarding compulsory military service. For instance, as can be seen in Table 1, from 1943 to 1973 more than 73 per cent of the Australian population has consistently expressed its approval of compulsory military service for young men. However, it is notable, in Table 2, that public approval is moderated somewhat when poll questions concern selective or non-universal enlistment and the possibility of conscript service overseas.

The poll figures also display a significant divergence of opinion on conscription between those in an age group liable

28 cont'd

Canberra, 20-22 May, 1977), pp. 28-33. In the universities the situation is little better. There is a small number of isolated academics holding teaching positions in various universities who occasionally contribute to debates on global, regional and national strategic issues. The only academic structure in Australia which is specifically tasked with the full-time study of strategic matters is the Strategic and Defence Studies Centre at The Australian National University. Despite the energetic efforts of all who have been associated with this body since its inception in 1967, its size remains miniscule. It is still without a single tenured academic position and its Head is on loan from the Department of International Relations. This long term neglect of defence and strategic studies in Australia accounts in no small way for the quality and quantity of the expertise in strategic affairs which is apparent in the Parliament, the Public Service, the military structure, in academia, the media and in the general community.

29 The information contained in Tables 1 and 2 was obtained directly from the card files of The Roy Morgan Research Centre Pty Ltd, 77 Pacific Highway, North Sydney. A detailed analysis of the 1971 poll results, displayed in Table 2, was published in The Sun Herald, 3 October 1971, p. 27.
### Table 1

**Australian Attitudes to Compulsory Military Training (Percentage Response)**

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Questions -

(a) Should compulsory military training for young men continue after the war?

(b) After the war, would you favour compulsory military training for young men of 18?

(c) Do you favour or oppose, compulsory military training for young men of about 18?

(d) Do you favour, or oppose compulsory military training?

(e) Do you favour or oppose compulsory military training for young men?

(f) If a referendum were held, would you vote for, or against, compulsory training?

(g) In your opinion should compulsory military training continue or stop?

(h) Would you favour or oppose again having compulsory military training?

(i) Would you favour or oppose - all young men going to military camp for several months?

Source: See footnote 29.
Table 2

Australian Attitudes to Two Years Full-Time Military Service, with Possible Overseas Deployment, for a Randomly Chosen Minority of Men Aged Twenty (Percentage Response)

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<td>21-25</td>
<td>30-49</td>
<td>50-69</td>
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<td>6</td>
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Questions -
(a) The government plans to register all young men of 20, and to call up about 7,000 a year for two years full-time service - overseas if necessary. Do you favour or oppose that?
(b) Each year about 8,400 20 year old men are called up for two year's military training, with possible overseas service. Are you for, or against that call-up?
(c) Each year about 8,000 20 year olds are called up for two year's military training with possible overseas service. Are you for or against that call-up?
(d) Election Issue: End Conscription for national service [ie. say no] or continue two year's national service, with possible overseas service [ie. say yes].
(e) Of all young men aged 20, 1 in 12, selected by ballot is called up each year for 2 years military training with possible overseas service. In your opinion, should that call up be continued [ie. say yes] or ended [ie. say no].
(f) In your opinion, should compulsory military training continue or be ended?

Sources: See footnote 29.
for call-up and those who are older. In Table 2, the figures for both 1964-65 and 1971 show a significant divergence of opinion according to age, although in both cases a majority of potential conscripts still supported the call-up even though it was selective and entailed possible overseas service. It appears that while a very large proportion of the population perceive a general need for national security forces and are even prepared to support universal conscription, they are significantly less keen to be involved individually as participants. No doubt there are many reasons for this, such as the perception by individuals that full-time military service is a potentially disruptive influence to civil careers and normal patterns of social behaviour. However, an important influence may also be an apparent divergence between publicly perceived military attitudes, practices and social mores and the changing nature of those values held in the wider community. The broad nature of the attitudinal changes taking place in civilian society are summarised in the Jackson Committee Report in the following terms:

The long standing ethic of delayed gratification has far less weight than before; individuals in today's affluent society want opportunities for pleasure and relaxation now ... Since governments now assume more responsibility for caring for aged and sick people, there is less incentive to accumulate funds to maintain a standard of living in retirement ...

Current attitudes include the belief that a complete person should show independence of mind and make his own personal choices.

It is widely accepted, at the same time, that individuals have the right to be well informed about decisions affecting them, to be involved in making the decision if they choose, and to accept or reject the outcome. Open education is reinforcing such attitudes.

Some emerging values question the rationale of the exercise of authority and power in any form. At one time older people derived authority from accumulated experience and wealth. But the pace

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30 This question is discussed briefly by W.H. Smith in *The Determinants of Defence Policy*, pp. 13 ff.
of change within one generation has made experience look less relevant, property and wealth less authoritative ...

The decline of the work ethic is now an accepted thrust of change in the affluent society ... Affluent, better-educated workers are asking for work to have meaning in itself, and to have purpose to which they can subscribe. But there is no clearcut evidence that people do not want to work at all. Rising educational standards and the demands discussed above are simply incompatible with a large pool of people willing to do dirty, unpleasant, monotonous work.31

It may be that the values and culture of the Australian military establishment and, most particularly, the public's perception of them may not be completely compatible with the changing values of the total society. The essentially hierarchical and authoritarian nature of the armed forces and the high level of discipline which is implicit in service membership may lose much of its appeal as young people seek more independence of mind, more control over their work environments and more participation in decisions affecting their employment. If the perceptions of military life held by young Australians clash with their developing aspirations, their propensity to accept the current type of regular military service either voluntarily or compulsorily is likely to decline.

In the face of an expanded range of potential difficulties in recruiting regular service manpower, it is possible that the public may be prepared to ameliorate the problem by sanctioning substantially higher levels of funding. Certainly public opinion poll results show that Australians are in favour of larger armed forces.32 They also show that


32 In 1971 ANOP asked the question, 'Should the size of Australia's armed forces be increased or reduced?' 59 per cent replied that they favoured an increase, 19 per cent a reduction and 22 per cent were unsure. Australian Public Opinion Newsletter, Vol. 1, No. 1, September 1971, p. 29.

It is difficult to evaluate this type of result because opportunity cost factors are not introduced into the question. If, alternatively, it was asked whether the size of the
the public desires at least the current levels of defence expenditure, with nearly half favouring a definite budgetary increase. However, the views of the public appear to be less clear when the specific financial consequences and opportunity costs are displayed in poll questions.

It is notable that, should there be a broadly perceived serious threat to Australia, there is scope for a significant increase in defence expenditure. During the Second World War, national security spending reached 40 per cent of the national product. However, during the past thirty years, the balance of social, political, military and bureaucratic forces in Australia has meant that the country has devoted a relatively stable proportion of its resources to national security. As can be seen from Figure 1, Australia has consistently spent approximately 3 per cent, or slightly less,

32 cont'd

armed forces should be increased even though it would require an increase of taxes or a cut in education or social security expenditures, a more accurate gauge of public opinion could be derived.

33 In 1971 ANOP asked the question, 'Should Australia increase, decrease or leave as it is its defence spending?' 46 per cent replied that they favoured an increase, 40 per cent that it should be left as it is, 10 per cent favoured a decrease and 4 per cent were unsure. Australian Public Opinion Newsletter, Vol. 1, No. 1, September 1971, p. 31. As with the case cited in footnote 32, it is difficult to interpret this result in the absence of opportunity cost factors.

34 The only clear example of this which is available is the response to a question asked by Roy Morgan Research Centre Pty Ltd in October 1952. 'Compulsory military training now puts 34,000 youths into camp each year. Soon 60,000 youths will become 18 each year, and to train them all would cost another $10 million a year. Do you favour training them all, or exempting some?' 66 per cent responded that they favoured training them all, 29 per cent favoured exempting some and 5 per cent were unsure. This result displays a significant softening of attitude from the responses given to questions concerning the desirability of compulsory (i.e. universal) military training. (See Table 1).

35 Details are given by Brigadier P.J. Greville, 'Infrastructure Requirements for a Self-Reliant Defence Policy' in United Service, Vol. 28, No. 2, October 1974, p. 81.
Figure 1

Defence Outlay as a Percentage of Total
Government Outlays and Gross Domestic
Product 1965-66 - 1975-76

Defence outlay as a percentage of total government outlays.

Defence outlay as a percentage of gross domestic product.

of Gross Domestic Product (GDP) on defence. Since the height of the Vietnam war, this has implied a steadily decreasing percentage of total government outlays. At a time when serious pressures and threats are perceived to be notably absent from Australia's strategic environment, it is not difficult to justify continuing expenditure at this low level. In fact, in the current circumstances, it can and has been argued that increased expenditure upon the defence forces is detrimental to Australia's long range security interests. The case can be made that if finance which would otherwise be expended on defence were to be allocated in the short and medium term into industry, education and the development of national infrastructure, in the long term this investment might serve to expand the capacity of the country's mobilisation base. When forcefully put, this argument cannot be dismissed readily. Certainly it places little emphasis upon the requirements of maintaining both continuous deterrence and the capacity to expand deferment and defensive potential rapidly. But on the other hand, it does serve to highlight the fact that decisions to determine the allocation of total government resources inevitably involve political compromises which, in nearly every circumstance, will act to constrain the level of resources available for national security purposes. However, it is by no means clear that present allocative decisions are made by any systematic process of rational decision-making. Desmond Ball paraphrases Bernard Schaffer to explain his perception of the processes of budgetary allocation:

Do we really have here a policy that has to be met by an expenditure of 3% of GNP, or do we have a compromise between a series of impulsive or instinctive decisions on the one hand (eg. that Australia must have some sort of defence forces) and a purely extrinsic decision that the expenditure will be fixed at no more and no less than 3% of GNP? It is possible that we have the worst sort of compromise: a defence system that has

36 This case was argued in some detail by Mr Bill Hayden, MHR (then Opposition Spokesman on Defence) in an address to the Joint Services Staff College at Canberra on 10 May 1977, pp. 3-5.
stabilized at a particular level of expenditure, high enough to be a burden on the economy but not high enough to provide a worthwhile defence at all.\textsuperscript{37}

In the simple terms of social and political realities, it would appear that in the absence of an obvious and generally perceived national security threat, there are limits to the levels of defence expenditure which governments will sanction. However, as far as the public itself is concerned, opinion poll results indicate that, in the current environment, it may be prepared to support defence expenditure levels higher than those of recent years.

**External Constraints**

There are three major external influences which may act to constrain seriously changes to Australia's national security strategy and structure.

First, it should be noted that those countries which supply high technology equipments to Australia can also determine, to a degree, the nature of the technologies which are to be made available. President Carter's arms sale policy is largely illustrative of this potential.\textsuperscript{38} In practice, the transfer of arms to those countries which do not have major defence treaties with the United States may be restrained significantly by the President's initiative. While this particular set of restrictions does not currently apply to Australia, it should be noted that the transfer of


many advanced technologies is already heavily constrained. It is not inconceivable that, in some circumstances, the United States may decide that it is in its own interests to restrict the flow of technologies and equipments further. Alternative suppliers might be available for most types of low and medium and some types of high technology equipment. However, if Australia required access to the most sophisticated and advanced technologies, particularly those which could be employed in long-range strategic roles, it is extremely doubtful whether these would be made available, either in normal times of peace or in crisis situations.

The second major external constraining influence may arise in the form of greatly extended international disarmament agreements and regulations. The St Petersburg Declaration, the Hague Convention and the Geneva Protocol formally limit the acquisition and use of weaponry which has indiscriminate effects, which causes unnecessary suffering or superfluous injury and which can kill or wound individuals in a treacherous manner. In recent years, the International Committee of the Red Cross and the General Assembly of the United Nations have sponsored major international conferences in an attempt to reach agreement on the prohibition of a wider range of weaponry. Those systems which have been under the most intense discussion include incendiary, time delay, blast fragmentation and small-calibre projectile weapons as well as new potential weapons developments (such

39 The United States holds the details and results of most advanced research and development programmes and many production programmes very closely for both national security and commercial reasons. Australia and other close allies of the US gain access to some of this information through a number of international agreements and exchange programmes. Many of those in which Australia participates are listed in Department of Defence: Australian Defence Scientific Service, Weapons Research Establishment Annual Report 1975-76 (Canberra, Australian Government Publishing Service, 1976), p. 55.

as high-powered lasers). In the field of conventional weaponry, it is very difficult to foresee the type of agreement which might eventually be reached, the timescale likely to prevail and the potential impact upon Australia's security options. However, in a broader sense, it is notable that Australia's signature and ratification of the Hague Convention, the Nuclear Non-Proliferation Treaty and the Biological Weapons Convention already limit effectively the scope for consideration of a wide range of security concepts involving nuclear, biological and chemical weaponry. Future arms control agreements may serve to restrict Australia's strategic options to an even greater degree.

The final major area of external constraint upon change in Australia's national security strategy involves consideration of the reactive response of neighbours, allies and potential enemies. It is possible that Australia's adoption of certain types of security options may lack credibility in the view of several important external actors. For instance, if Australia's capacity to operate jointly with the United States declined significantly and was not replaced or compensated for by an increased self-defence capability, the US might view its own interests in the regional environment to be more vulnerable as a result. Diplomatic and possibly other forms of pressure might be applied in an effort to achieve a reversal of policy. Because of the historically close alliance relationship with the United States, any major alteration of Australian security policy is likely to necessitate a judicious and sensitive process of detailed explanation.

Australia's adoption of other types of security concepts might stimulate reactions of a different kind. Some external actors might view particular options as being offensive or aggressive. It is conceivable that, in some circumstances,

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41 For details of Australia's signature and ratification of the Biological Weapons Convention, see Department of Foreign Affairs Backgrounder, No. 109, 7 October 1977, p. 9.
important global and regional actors may be alienated and hence respond in a hostile fashion. Unfavourable diplomatic reactions might even serve to offset any purely military advantages which particular strategic concepts might promise. Regional and global reactions could effectively undermine Australia's primary strategic goals of preventing conflict and deterring and deferring its occurrence. Sensitivity to these constraining external influences needs to be regarded as an essential element of any process of national security strategy formulation.

Conclusion

Non-bureaucratic constraints on change play a major role in determining the boundary between proposals which are practical and those which are impractical. Some of the non-bureaucratic factors which heavily influence the position of these bounds of practicality may be very similar in the 1980s to those of the 1960s and 1970s. For instance, it can be stated with some confidence that, in the absence of a serious international crisis, the level of national security expenditure is likely to be in the same general order of magnitude (in real terms) as at present.

On the other hand, there are some dynamic non-bureaucratic factors which are likely to force substantial alterations to the bounds of practicality in the future. For example, in the 1980s the support capacity of domestic secondary industry is likely to decline and there may be increasing restrictions on external equipment supply. These factors may serve to constrain heavily Australia's future technology options. In the area of regular service manpower, it is clear that the maintenance of current numerical ceilings will become increasingly expensive and the potential for regular manpower expansion will be limited severely. In another sphere, changing civilian values and attitudes may have the effect of undermining, to some degree, the attractiveness of traditional military life styles. This is likely to impact
not only upon the propensity for young people to enlist for the conventional type of military training but also upon the status of civil-military relations in general. Thus, while some non-bureaucratic constraints on Australia's processes of national security formulation are likely to remain relatively unaltered in the 1980s, there are others which will magnify existing policy limitations.

Perhaps the primary conclusion to be drawn from this discussion is that, in the future, the processes of strategic and structural adaptation will need to be very selective. While it is possible that the altered nature of Australia's strategic circumstances may stimulate the requirement for a radical change in defence posture, any such proposal will need to be considered carefully in the light of the limited scale and flexibility of the nation's security resources.
CHAPTER 6

BUREAUCRATIC RESISTANCE

How the System Works

In Australia, national security policy is formulated through the interaction of a large number of autonomous or semi-autonomous actors. Many of the actors are organisations or cohesive groups, but some are individual persons. At the very top of the structure are the Minister for Defence, the Chief of Defence Force Staff (CDFS), the Secretary of the Department of Defence and a handful of senior military and civilian officers. The influence and power-base of each of these major actors varies in both formal and informal senses. In terms of legal power and responsibility, it is clear, under the Defence Act, that the Minister is pre-eminent. However, in practice, his power is constrained by a variety of factors. For example, the tenure of a Minister is frequently short and of an uncertain duration, his expertise in defence matters is often very limited and the demands of the Cabinet, Parliament, public appearances and electoral duties serve to reduce effectively the time which he can devote to departmental matters.

1 The labelling of institutions as 'bureaucracies', their personnel as 'bureaucrats' and their processes as 'bureaucratic' has often carried pejorative connotations. This is not intended here. In this thesis these terms are used to describe governmental institutions that are organised hierarchically, the personnel that are in their employ and the ways in which they typically behave.

2 The absolute and relative powers of the Defence Minister, the Chief of Defence Force Staff and the Secretary of the Department of Defence are discussed at greater length by W.L. Morrison in 'The Role of the Minister in the Making of Australian Defence Policy Since the Re-Organization of the Department of Defence' in Robert O'Neill (ed.), The Defence of Australia: Fundamental New Aspects (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 71 ff.
The formal powers, authority and responsibility of the CDFS, as principal military adviser to the Minister, appear in the Defence Act and in the Ministerial Directives. In practice, the CDFS and his staff are the undisputed providers of military judgment and a major source of military information for civilian actors in the system. As a consequence of the Tange reforms, the CDFS has been given the right of direct access to the Minister. However, in practice, the powers of the position have been degraded by a relatively high turnover of personnel.

The legal powers of the Secretary of the Department, as principal civilian adviser to the Minister, are outlined in the Public Service Act and also in the Ministerial Directives. In practice, the Secretary not only has direct access to the Minister but all of the advantages of a potentially long tenure. The Secretary can devote himself full-time to the most important tasks at hand, he can gain extensive experience, accumulate knowledge and coordinate the generation of centralised policies.

The differing nature of the formal and informal power held by each of the three major actors serves to prevent a complete dominance of the system by any one of them. However, it also means that all three possess independent capacities to resist change by mobilising their own individual and organisational sources of influence and authority.

Depending upon the nature of the matter at hand, a number of other actors can play important roles in the processes of national security policy formulation. Most notable are the Prime Minister, the Ministers and Departments of Finance, Treasury and Foreign Affairs, Cabinet itself, Parliamentary committees and pressure groups, such as industry bodies and the Returned Services League. Possessing a much lower level of influence are individual parliamentarians,

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3 Ibid., p. 75.
4 Ibid., p. 75.
medium level bureaucrats and military officers, ministerial advisers, journalists, academics, etc. All of these actors manoeuvre, pressure and bargain in an effort to influence the shape of the national security policy which is adopted and implemented. Their motivation in most instances is a genuine concern for the country's national security. However, as Morton Halperin points out from US experience, this concern can be manifested in a variety of forms:

Their problem is to determine what is in fact in the national security interest. Officials seek clues and guidelines from a variety of sources. Some hold to a set of beliefs about the world which provide strong clues, e.g. the Soviet Union is expansionist and must be stopped by American military power. Others look to authorities within the government or beyond it for guidance. Many bureaucrats define what is necessary for the nation's security by a set of more specific immediate interests. For some these may be personal: "Since, in general, I know how to protect the nation's security interests, whatever increases my influence is in the national interest". For others the immediate interests relate to domestic political interests: "since a sound economy is a prerequisite to national security I must oppose policies which threaten the economy"; or "since only my party knows how to defend the security interests of the United States I must support policies which keep my party in power".

For many participants the immediate objectives which provide strong clues for what is in the nation's security interest are the interests of the organization to which they belong. Career officials come naturally to believe that the health of their organization is vital to the nation's security. So also do individuals who are appointed by the President to senior posts in Washington foreign policy bureaucracies. This tendency varies depending on the individual, the strength of his prior conviction, his image of his role, and the nature of the organization he heads.5

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Hence, although there may be agreement, in the most general sense, concerning overall long term national security objectives, the variety of attitudes possessed by the multiplicity of actors within the government policy-making system means that short range, immediate objectives differ greatly.

It is perhaps not surprising that those with an overwhelming experience in economic matters tend to see solutions primarily in economic terms, that those with diplomatic backgrounds frequently place undue emphasis upon those techniques and that those with experience in advanced tactical aircraft, ships or armoured vehicles tend to concentrate upon military solutions and usually in the context of those systems with which they are most familiar. As Darcy McGaurr points out, individual bureaucratic actors or coalitions of actors working within their own value systems seek to optimise functions which they subjectively view to be of primary importance:

Anti-submarine and maritime surveillance capabilities are each contributed to by both the RAAF and the RAN. Each can be expected to propose expenditures which promote a more effective operation of the forces which it contributes. i.e. each can be expected to attempt to sub-optimize. It is unlikely that the result would be the best combination of forces from the two services considered together.6

The divergent views of the participating actors are subjected to a complex process of evaluation, bargaining and compromise. Some actors are likely to concentrate upon setting the scene and the parameters of debate, others may make firm proposals and others again may have the power to react, modify, delay, determine the method of implementation, veto, etc. The eventual outcome will depend heavily upon the relative power of the actors involved and their individual

capacity to influence the matters at stake.

In this type of environment, it is frequently in the interests of individual actors to attempt to form coalitions or alliances to enhance the prospects of successful action on matters which they consider to be important. Some of these coalitions tend to be of an almost continuous nature, as, for example, that between the former Department of Supply and the local defence industries. Others may be short term alliances, sometimes between policy-making actors who normally share a strong adversarial relationship. For example, Desmond Ball cites the case, in July 1973, of the RAAF supporting a Cabinet decision to postpone the replacement of the MIRAGE III fighters. Their apparent motive was to increase the prospects of an eventual decision being made in favour of the McDonnell Douglas F-15.

It seems clear that, as Graham T. Allison points out, the final product of the national security decision-making process should not be viewed as a completely rational and consistent response to objectively determined requirements.

The decisions and actions of governments are intranational political resultants: resultants in the sense that what happens is not chosen as a solution to a problem but rather results from compromise, conflict and confusion of officials with diverse interests and unequal influence; political in the sense that the activity from which decisions and actions emerge is best characterized as bargaining.

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8 This relationship is described in Desmond J. Ball, The Politics of Defence Decision-Making in Australia - The Mirage Replacement (Unpublished paper), (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1975), p. 43.

9 Ibid., p. 42.
along regularized channels among individual members of the government. Following Wittenstein's employment of the concept of a "game", national behaviour in international affairs can be conceived of as something that emerges from intricate and subtle, simultaneous, overlapping games among players located in positions in a government. The hierarchical arrangement of these players constitutes the government. Games proceed neither at random nor at leisure. Regular channels structure the game; deadlines force issues to the attention of incredibly busy players. The moves, sequences of moves, and games of chess are thus to be explained in terms of the bargaining among players with separate and unequal power over particular pieces, and with separate objectives in distinguishable subgames. 10

The policies which emerge from this type of system are frequently difficult to predict with certainty. As Allison explained it, '... internal politics is messy'. 11 Because of the very nature of the system, policy outcomes and reactions cannot be expected to be internally consistent or in any sense rational from an external objective point of view.

The workings of national security bureaucracies are made even more confusing by many of the methods which are employed by actors in the system to further their interests. For instance, the policies advocated by many parties may not necessarily represent their view of the ideal outcome so much as a calculated bargaining stance which they perceive to maximise the probability of an ideal outcome being derived. As Desmond Ball notes:

This may mean that the initial proposals presented to the bureaucracy could bear little resemblance to the desired policy; but it is only the outcome of the decisional process which is important. 12

11 Ibid., p. 146.
In practice, this activity can effectively warp the basis for judgment in several key areas of the decision-making process. It is frequently difficult to distinguish between objective scientific, military and analytic information which is provided to support the decision-making process and bureaucratic political viewpoints shrouded in the same language and format.

While distinctions between bureaucratic political statements and real opinions and objectives are frequently difficult to make, the problem can be eased to some degree by the fact that bureaucratic interests tend to follow recognisable patterns. Halperin argues that bureaucratic actors strive primarily to maintain or improve their autonomy, organisational morale, functional 'essence', roles and missions and their budgets.\(^{13}\)

Autonomy is most commonly sought because individual actors and organisations tend to believe that their specialist skills and/or experience qualify them ideally for determining the optimum method of task performance and the scale of resources required.

A high level of personnel motivation and morale is sought not only because it generates work efficiency but also because it tends to raise the status of the organisation's leadership. Hence, bureaucrats are frequently prepared to resist changes and efficiencies if they suspect that the morale of the organisation will be affected detrimentally.

Career officials are usually keenly aware of what the essence of an organisation is and should be in terms of its characteristics and tasks. Although in large organisations there are inevitably differences of view, in national security structures these seem to be somewhat limited. For instance, in the RAAF the almost universally regarded essence or core of the structure is its high performance combat aircraft and their functions. In the Army it is the 'sharp

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end' armoured units and infantry battalions. In the RAN the essence is represented primarily by the frigates and destroyers and the Navy's carrier and strike aircraft. Support aircraft, support shipping and minority specialist forces in all services tend to be accorded a lower priority and are frequently regarded as being of more marginal significance.

The intensity with which organisations will act to safeguard those roles, structures and equipments which they regard to be central components of their essence can be highly dysfunctional if altered external circumstances produce a requirement for significant organisational adaptation. As Roger A. Beaumont points out, this form of institutional conservatism is readily apparent in many military structures:

Weapons systems have a social function for the professional, and those new ideas which suggest turmoil, or too much emphasis on youth or on new bodies of expertise, are naturally suppressed in the same way that pioneer physicians like Jenner, Semmelweiss and Freud were opposed in various fields. The professional system has more involved than merely performing a mission. It is a community with social needs. Professional soldiers and sailors, starved for budgets and rank in peacetime through most of Anglo-American history, have been steadily on guard against upstarts. Until the nuclear era, only wartime instability brought on growth, sudden rich resources and anxiety produced dramatic change, and victory tended to lull the successful.14

Thus, in the absence of substantial wars or other traumatic disturbances, there is a very great tendency for national security systems to retain the general form, structures, equipments and practices which were derived from the previous major conflict. Despite a changing external environment and altered operational tasks, large military bureaucracies tend

to continue heavy commitments to traditional systems and functions. Darcy McGaurr illustrates this point from his experience of the Australian national security structure:

Since each service consists largely of groups whose careers involve the operation of particular items of equipment, it is not surprising that a motive for many equipment proposals is simply the replacement of existing equipment at the end of its operational life. If HMAS Melbourne is not replaced by another platform for fixed wing aircraft, a way of life which has been a source of satisfaction and pride to present senior RAN officers and which is the aspiration of many young servicemen may vanish. To the extent that a service can be expected to seek replacement for aging equipment rather than promote new capabilities which have no existing interest group to support them, the system is conservative.

In this respect, the goal of maintaining a national security organisation's perceived 'essence' is closely related to the concept of militarism as defined by Alfred Vagts:

Every war is fought, every army is maintained in a military way and in a militaristic way. The distinction is fundamental and fateful. The military way is marked by a primary concentration of men and materials on winning specific objectives of power with the utmost efficiency, that is, with the least expenditure of blood and treasure. It is limited in scope, confined to one function, and scientific in its essential qualities. Militarism, on the other hand, presents a vast array of customs, interests, prestige, actions and thought associated with armies and wars and yet transcending true military purposes. Indeed, militarism is so constituted that it may hamper and defeat the purposes of the military way. Its influence is unlimited in scope. It may permeate all society and become dominant over all industry and arts. Rejecting the scientific character of the military way, militarism displays the qualities of caste and cult, authority and belief.


The follow-on imperative or replacement complex is thus a natural product of large national security bureaucracies.\textsuperscript{17} It is a mechanism which effectively secures key elements of the perceived essence of military structures.

The fourth major goal for bureaucratic actors concerns the acquisition, possession and maintenance of roles and missions. Functional divisions between competing bureaucracies are rarely clear and incontestable. Hence, the development of new or varied roles and missions frequently provides a basis for bureaucratic conflict.\textsuperscript{18} An organisational actor is most likely to seek new roles and functions if it perceives that it would be placed in a disadvantageous position by new areas of responsibility being conceded to a bureaucratic rival. This was the general nature of the bureaucratic squabble between the RAN and the Army over control of the new heavy landing craft in the early 1970s.\textsuperscript{19}

In other instances, an organisation may judge a new function to be peripheral to its essence and to represent a potential source of resource diversion from areas of higher priority. This has been the attitude of both the RAAF and the Army to airfield surface-to-air missile (SAM) defence

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\item \textsuperscript{18} In national security policy, as well as in a number of other important areas of government responsibility (education, health, social welfare, etc.) Australia faces major political and bureaucratic problems because of the division of powers under the Australian Constitution. In theory, the centralisation of defence powers should provide the Commonwealth with unquestioned authority in national security affairs. However, in practice, even in times of national emergency, the federal structure of Australian government can, and has, constrained national action. See this detailed in S.J. Butlin, War Economy 1939-42 (Canberra, Australian War Memorial, 1955), p. 353.
\item \textsuperscript{19} For an account see 'Navy to Run the Army's Landing Craft', The Sydney Morning Herald, 4 January 1973.
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systems since the early 1960s. It is perhaps not surprising that the obsolescence of the BLOODHOUND airfield defence SAMS has not been heralded by the clamour for a replacement system.

The fifth and final area of competing bureaucratic interest relates to budgetary stimuli. Bureaucrats naturally prefer budgets of large dimensions because the factor of size impacts directly upon relative power and bargaining strength. Hence, proposed changes in policy or patterns of action are usually scrutinised laboriously for their potential effects upon budgetary allocations. Halperin cites one US example where an armed service was prepared to subordinate concerns of organisational essence to those of potential budgetary gain:

... the Army was interested in acquiring responsibility for the deployment of MRBM [medium range ballistic missiles] in the 1950s, in part because this would give the Army a strategic nuclear role. The Army hoped that this would justify its getting an increased share of the over-all defense budget, since the existing allocation was based on the Army having no strategic function.

In other situations, when bureaucrats perceive that additional functions under consideration are unlikely to be accompanied by supplementary funding, their adoption is almost certain to be opposed, regardless of the function's objective significance for overall national security capacity.

The Problems of Bureaucratic Adaptation

The partially non-rational nature of the decision-making processes in large national security bureaucracies impacts directly upon the prospects for appropriate and systematic change when this is required because of variations in external

See the discussion of this issue by E.P. Esmonde in 'Air Defence Artillery', Army Journal, No. 324, May 1976, pp. 45 ff.

circumstances. Bureaucratic structures which are designed specifically to perform a particular type of function and become well-practised in it are constrained very little by institutional behaviour patterns. However, when requirements change, organisations normally find it extremely difficult to restructure their form, operating procedures and equipments to meet the new situation. R.W. Korner noted this institutional inflexibility in the application of US policy in Vietnam:

Each organization inevitably tended to make policy to conform in practice to that with which it was most familiar - to play out its standard organizational repertoire. Each reflected that fact of institutional life cited by an anonymous White House aide who wrote that "bureaucracy as a form of organization tends to contort policy to existing structures rather than adjusting structures to reflect change in policy".22

National security bureaucracies have strong vested interests in the status quo.23 In some respects this is not very surprising, as there are strong motivations for this type of decision-making to be undertaken in a conservative manner. Most notably, it must be recognised that an alteration of national security policy can have momentous consequences for the outcome of future international events. Clearly, national security bureaucracies bear a very heavy responsibility for decisions which are, or are not, made in their area of authority. To some degree, at least, individuals,


23 Janowitz elaborated this point in the following terms:

The dependence of the military on the status quo - whether that status quo is industrial capitalism or communism - reinforces traditionalism. Traditional attitudes are institutionalized by the requirements of military organization and planning. When war-making becomes more technical, the military establishment requires years of preparation and advance thinking. Sudden developments are resisted as disruptive, for it takes years to translate ideas into weapons systems.

groups and organisations can be held accountable for any judgments which prove to be seriously in error. Thus, in many environments, the stimuli to entertain radical new ideas, to experiment or to rapidly adapt are very weak. A major consequence is that in many national security structures, institutional conservatism itself becomes a way of life. Well-established social mores, patterns of behaviour, types of equipment, work locations and levels of activity frequently become relatively easy to perpetuate indefinitely. In this type of environment, little imagination, skill and effort is required for individual bureaucrats to avoid making the sort of mistakes which might damage their career progression. Komer discusses his perception of the problem under the heading 'institutional inertia':

Bureaucrats prefer to deal with the familiar. It is more comfortable and convenient to continue following tested routines, whereas to change may be to admit prior error - a cardinal bureaucratic sin. So, whether private or public, civilian or military, organizations typically like to keep operating the way they are operating, and to shift only slowly in response to changing situations. And the more hierarchical and disciplined they are - military organizations are almost archetypes - the greater the built-in institutional obstacles to change except slowly and incrementally. Even a cursory review of the fate of many military innovations and innovators would be sufficient to illustrate the point. Dr Vannevar Bush, World War II head of the Office of Scientific Research and Development, has described some of the obstacles to technological innovation in the military services even during wartime. To him, military organization "suffers from a disease that permeates all governmental ... organizations - the daft belief that if one does nothing one will not make mistakes, and the drab system of seniority and promotions will proceed on its way".24

As a consequence of these factors, when large national security structures are required to change, they tend to react in highly conventional ways and usually according to precedent.

24 R.W. Komer, Bureaucracy Does It's Thing, pp. 65, 66.
The balance of well-established competing interests almost always means that decisions are made and actions implemented which will not disturb institutionalised practices and structures. Policy agreements tend to follow the line of least bureaucratic resistance.25

When national security structures are confronted by an altered external environment and a clear requirement for change is evident, it cannot be anticipated that the processes of adaptation will be simple or easy. Some bureaucrats prefer to ignore the requirements for change and concentrate on meeting the pressures of ongoing activities. Other bureaucrats prefer to support existing systems on the basis of their capacity to perform in previous environments. As Beaumont points out, bureaucratic defence by reference to historical precedent is not a new theme in military affairs:

There were peacetime battles over the introduction of rifles, ironclads, breechloaders, battleships, airplanes, tanks, aircraft carriers and on and on. One reason the old guard fought hard against novelty was that the old systems worked in war - even if the war may have been fifty years earlier.26

Other bureaucrats tend to feel a high level of institutional loyalty to an organisational structure with which they have been associated over an extended period. These individuals frequently brand proposals for significant change as unworkable. Senior bureaucrats also often perceive the challenge of new ideas, concepts, technologies and structures to represent a threat to their well-established personal positions. Beaumont describes this type of reaction following the First World War:

The swiftness with which the "old guard" returned to pre-1914 military systems and traditions of soldiering in America, France, Britain, Italy and Germany has been described by those who saw the rejection of armour,

25 Komor illustrates this point at length in his discussion of US and GVN policy in Vietnam, ibid. See especially, pp. lix, xi, and 14 ff.

aviation and shock troops as blindness to military necessity. But the guardians of the old way knew the new weapons were a young man's game, and that more than tactical advantage was implicit in their use. Real reform, they sensed, would put too much power in the hands of junior officers, as it had in Turkey and Italy. And so from 1918 until the middle of World War II, the battleship dominated naval tactical thought in all major fleets. Young George Patton and Dwight Eisenhower were warned that their enthusiasm for armour would hurt their careers. 27

Even when the requirement for change is accepted in strategic policy, military bureaucratic structures are adept at warding off the disturbance which would be implicit in meaningful adaptation. A wide array of bureaucratic 'games' can be played to defer and modify policy proposals and even firm government directions to change. For example, one tactic is to institute studies of the new requirements. If it is considered that their conclusions are likely to be disturbing, those conducting the work can be given poor direction, inadequate resources and insufficient time. The preliminary reports which result can then be either rejected as unsatisfactory or alternatively accepted in a qualified manner for subsequent analysis. Working groups can then be established to examine particular aspects in greater detail over an extended period of time. The results of widely dispersed semi-autonomous working groups can be expected to become available progressively. This permits piecemeal shelving of individual specialised proposals on various grounds or, alternatively, the qualified acceptance of those proposals which are more broadly supported by bureaucratic actors. Actual implementation requires the passage of an even more complex bureaucratic mill. 28 The final result is usually a verbal acceptance of the changing nature of the external environment and the mouthing of a generalised

28 Some of the specialised problems of implementation are discussed later in this chapter.
requirement for change, but the substance of what is actually done concerning operating concepts, procedures, doctrines, equipments, etc., is frequently of marginal consequence, if indeed it can be distinguished at all. As Halperin points out, large bureaucracies are ideally equipped to absorb pressures for change with a minimum of disturbance.

In many cases ... officials reach consensus by designing an ambiguous policy which avoids substantial costs to the different interests of the participants, including the interests of the organizations involved. The compromise avoids making choices on priorities and leaves organizations free to continue operating as they have in the past and to control their own operations. Once a decision is made, the organizations themselves shape the way in which it is implemented.29

In national security structures, these processes of comfortable accommodation normally provide adequate scope for individual actors and organisations to pursue their own entrenched interests. For highly institutionalised special interest groups, such as the armed services, this has particular significance. As James Thompson remarked "... the military mind develops its own momentum in the absence of clear guidelines from the civilians".30

Factors Acting to Perpetuate Bureaucratic Inertia

There are at least five major factors which serve to perpetuate institutional inertia in Australia's national security bureaucracy. The first concerns the inadequacy of political direction and oversight; the second, the misdirection of personal and organisational incentive patterns; the third, the absence of meaningful analyses of structural performance; the fourth, the relative rigidity of the Australian Public Service system; and the fifth, the intensity of bureaucratic secrecy.

30 Quoted in R.W. Komor, Bureaucracy Does It's Thing, p. 66.
The entire Australian Government bureaucracy suffers from ministerial control which is highly variable and frequently incoherent. Limited ministerial involvement and direction of departmental activities makes it possible for large sections of the bureaucracy either to lose a sense of policy direction or to develop their own. The report of the Royal Commission on Australian Government Administration (The Coombs Report) emphasises the vital role of clearly stated government objectives in determining the efficiency of administrative bureaucracies:

Of primary importance to efficiency in the bureaucracy, then, is clarity in the objectives of the government and in the priority which is to be attached to them. Clear and effective processes will be required by which the government establishes and reviews its objectives and their priorities. To provide an adequate base for administrative performance, such objectives must be more than general directions for a department or agency as a whole. They must be capable of expression in sufficient detail to provide a program of work not only for the department or agency but also for sections and units, functional and geographical, within it. Only if this is possible will departments and agencies receive adequate political direction on which to base their administrative processes, or will individual officers receive an adequate stimulus to effort and an ability to relate their individual performances to group objectives.

However, the derivation and expression of such clear policy objectives is not always easy. As Dr H.C. Coombs has pointed out:

Of course, ministers do not always have clear objectives and frequently lack the capacity to formulate them. Ministers are chosen from a limited field by processes which give little


32 Ibid., pp. 33, 34.
weight to administrative and executive competence. 33

In this respect, the absence of provisions for the appointment of non-parliamentary members as Cabinet ministers can be seen as an inherent weakness of the Westminster system of government. Means must be found to increase the minister's capacity to direct bureaucratic activity effectively.

The second major influence supporting bureaucratic inertia is derived from the fact that personal career incentive patterns in large Public Service bureaucracies tend to be dominated by the pressures for conformity. Adaptive response on an individual or a sub-group organisational level is likely to rouse peer group resistance as well as to clash with the institutional norms embodied by senior bureaucrats. The penalties for questioning the system may include transfers to areas of mechanical routine work and restricted promotion. Progression is gained by working within the system and accepting its procedures, values and operational limitations.

The third major factor is the reluctance of Public Service structures to attempt to obtain a meaningful index of their operational efficiency. 34 As Komer points out, "organizations are usually neither long on self criticism nor very receptive to outside analysis of their performance". 35 In the specific case of Australia's security structure, the task is made doubly difficult by the absence of a clear political statement or uniform perception of national security goals. It is no doubt true that the uncertain nature of Australia's strategic environment does not make this task easy. However, as is argued elsewhere in this thesis, this

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34 This point is emphasised in the Royal Commission on Australian Government Administration Report, pp, 54, 55.

35 R.W. Komer, Bureaucracy Does It's Thing, p. 73.
does not make its performance impossible. In its absence, there can be no means of conducting even the most simple test of functional efficiency and many pressures for significant structural change are effectively constrained.

The relative rigidity of the Australian Public Service system represents a fourth contributing factor in the perpetuation of institutional inertia. Restrictions on lateral recruitment, personnel exchanges and post-graduate study and research effectively limit the potential to develop expertise to optimal levels in important functional areas. In those sections of the Australian bureaucracy which deal with national security issues, contact with domestic and international research bodies and organisations is particularly restricted. This contrasts markedly with the policy and practice in nearly every other western democracy.

The very limited nature of bureaucratic incentives to be highly efficient and adaptive is discussed at length in the Coombs Report. Great emphasis is placed in these findings upon the limited accountability and scope for initiative in the system, particularly for senior public servants. The stultifying impact of the system upon personnel is described most graphically by H.C. Coombs:

... I found the younger members of the bureaucracy impressive. Those recruited to what might broadly be called policy work generally are intelligent, educated and socially involved ... The raw material with which the system has to work is of good quality.

But what does it do with it? Corresponding discussions with older officials who have experienced twenty or so years of its impact left me with a profoundly different impression. Years of involvement in routine and ritualistic processes, an inability to see the outcome of

36 See the discussion of this issue in Part IV.

37 The nature of these restrictions and their impact upon the efficiency of the Australian Public Service is discussed at length in the Royal Commission on Australian Government Administration Report, pp. 145, 146, 165-181.

38 Ibid., pp. 36-55.
work done, a sense of isolation from those with whose affairs government administration is concerned and a prevailing flatness in the quality of life, official and unofficial, generally has destroyed much of the vitality and concern which no doubt were as evident twenty years ago among them as it now is among their successors ...

It is of course from those who have gone through these experiences that, predominantly, the top echelons of the bureaucracy are chosen. Fortunately there are some of exceptional capacity and resilience who have come through relatively undamaged and some who by good planning, good management or good luck have evaded the routine and the ritual. Nevertheless, many of those at the top reflect the flatness and unimaginativeness which years without stimulus have imposed upon them. For them the cardinal sin is 'to rock the boat'. It was of them that John Osborne wrote in Look Back in Anger saying, 'They spent their time mostly looking forward to the past' ... There is I believe something seriously wrong with a system which so stultifies worthwhile human beings.39

National security structures are endowed with a fifth and extremely powerful means of perpetuating their institutional inertia in their capacity to restrict the flow of bureaucratically sensitive information. In the national security field, there are naturally a large number of matters which are properly held under a high level of security classification. While Australia's governmental bureaucracies in general have a reputation for over-secrecy,40 it is therefore


40 This case is made in H.V. Emy, Public Policy: Problems and Paradoxes (Melbourne, The Macmillan Company of Australia, 1976), p. 51. It has also been the source of frequent comment by defence correspondents in the Australian media. For example see 'An Obsession With Secrecy' in Pacific Defence Reporter, Vol. 3, No. 8, February 1977, p. 2 and 'Defence Must Move to Improve their Public Image if they are to Retain the Present Levels of Government and Financial Commitment' in Pacific Defence Reporter, Vol. 3, No. 9, March 1977, p. 2. This issue is discussed in a very formal and limited manner in the Coombs Report. See Royal Commission on Australian Government Administration Report, pp. 345-353. As P.N. Troy has remarked:

... the report glosses over the secrecy of decision-making and the monopolization and
not surprising that the Department of Defence is most noted in this regard. General operating philosophies, concepts, doctrines and a wide range of bureaucratic actions and inactions are consistently and effectively shrouded from public view. One obvious and most important consequence is to limit enquiry and investigation by the media, academics, members of the public and even members of Parliament. 41

Means of Encouraging Adaptation

Because of the natural bureaucratic characteristics of Australia's security structure, its capacity to adapt to meet the requirements of the country's changing strategic environment is limited. As a consequence, a sustained effort is required to encourage and, if necessary, compel bureaucratic adaptation. This must be done in a realistic manner. It is, for instance, not possible to prohibit the processes of bureaucratic politics, bargaining and compromise. As James Forrestal, the first US Secretary of Defense, pointed out, bureaucratic politics is an integral part of any government decision-making process:

I have always been amused by those who say they are quite willing to go into government but they are not willing to go into politics. My answer ... is that you can no more divorce government from politics than you can separate sex from creation. 42

Rather than to seek their abolition, the processes of bureaucratic politics require redirection, with active measures

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manipulation of information at senior levels of the bureaucracy.


41 This matter was the subject of discussion following the presentation of a paper by T.B. Millar, 'Some Indicators and Conclusions', at a Seminar of the United Service Institution of the Australian Capital Territory in September 1974. See United Service, Vol. 28, No. 2, October 1974, p. 94.

42 Forrestal is quoted by Graham T. Allison, Essence of Decision, p. 147.
being taken to counteract the institutional disincentives for flexible change. Six tentative proposals are made in the discussion which follows.

1. More Effective Ministers

Firstly, there is an urgent requirement to strengthen ministerial capacities to direct the bureaucracy with clarity and, where necessary, precision. An array of possible measures could conceivably contribute to this process. For instance, in theory at least, political parties could intentionally select parliamentary candidates who possess high levels of expertise in vital areas of government responsibility and seek to groom such individuals for ministerial duties. Ministers themselves could make more active efforts to educate themselves concerning the vital issues in their portfolios. To some degree, ministers could also seek much broader assistance from external advisers and sources of information. Yet, in practice, the scope for all of these possibilities is constrained severely by a number of conflicting pressures which characterise the real world. For example, a wide range of occupational, social and political forces effectively prevents all but a few experts entering Parliament and gaining ministerial control in their area of specific interest. As was mentioned earlier in this chapter, the demands of Parliament, the constituency, public speaking and other commitments absorb a very large proportion of the time available to ministers and reduce effectively their capacity to direct departments and authorities which come under their control. Furthermore, the tenure of individual ministers in particular portfolios is also frequently relatively short and hence much of their time tends to be taken up by basic familiarisation and learning functions. Ministerial advisers of an appropriate calibre can be very useful but they are frequently difficult to recruit and their relationship to the government bureaucracy as a whole has been the source of many difficulties and disputes in the
In these circumstances, it may be desirable to redefine the responsibilities of ministers and senior bureaucrats so as to retain the authority of ministers undiminished, but to concentrate their attention on the determination of a series of centrally important and readily definable policy issues. This would be an effective means of increasing the level of bureaucratic accountability for the performance of clear ministerial directions. This was a major recommendation of the Coombs Report.

2. Bureaucratic Incentives to Adapt

Civil and military training and incentive systems need to be restructured so as to place a much higher premium upon flexibility and adaptiveness. The simple regurgitation of conventionally accepted solutions and responses needs to be questioned at all levels. Organisational conformity and submission needs to be replaced as a criterion of career progression by a preparedness to question, to innovate actively and to experiment. When discussing the requirement to exploit fully the potential of the new military technologies, Dr Malcolm Currie, the US Director of Defense Research and Engineering, argued for a review of personal incentive patterns in the following terms:

... we must remove barriers to innovation which often exist. Innovation that might alter a service's role or mission is often resisted as are

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43 The potential and problems of employing external Ministerial advisers are discussed in considerable detail by W.L. Morrison in 'The Role of the Minister in the Making of Australian Defence Policy Since the Re-Organization of the Department of Defence' in Robert O'Neill (ed.), *The Defence of Australia: Fundamental New Aspects*, pp. 79-83. There is also a useful discussion of the matter in the *Royal Commission on Australian Government Administration Report*, pp. 78-81.

44 For details see *Royal Commission on Australian Government Administration Report*, pp. 95-98.
concepts that might "threaten" support to a program that has already been "sold". Stronger incentives for innovation and risk must be supported in terms of retaining ownership of proprietary rights. Fixed price R and D contracts often discourage innovation. We must more clearly recognize the right and the need to fail. Too often those in DoD feel that they cannot afford a "failure" with Congress and the news media ready to second guess everything. Too often today's bureaucrats substitute research for insight, management for leadership and experience for guts - because it's the safe thing to do. We must move together to strengthen the innovation which has been our nation's hallmark.45

The same problems were recognised in the Coombs Report and a large number of its recommendations are directed towards their solution:

A persistent theme of this Report, underlying many of its recommendations, is the need for adaptability, for those in the administration to be aware of and responsive to the facts of social change. We have made it clear that an effective response must be preceded by analysis of the nature of the changes occurring, examination of the alternative responses in the light of the government's objectives, and further analysis of the means available to make the response. We have also emphasised that adaptability implies a readiness to take risks, to experiment, in the interests of finding the right means to achieve greater efficiency. If the spirit of these recommendations infuses the attitudes of officials, adaptation is more likely to become a continuous, self-generating process. It would not, however, be wise to rely wholly on such internal sources of self criticism and adaptability. External stimulus is from time to time necessary, as is the 'lateral thinking' of persons with wide but different experience.46

The commissioners then proceed to recommend the more frequent institution of studies and inquiries into the


functional performance of sectors of the public service. These might be expected to have a very important role to play. However, in practice, they could be supplemented by a much broader range of initiatives, some of which are outlined on the following pages.

3. Flexible Bureaucratic Task Forces

When the requirement arises for a new programme which does not readily fit the practised organisational repertoire of existing bureaucratic structures, it may be best to establish an autonomous ad hoc task force for its development, implementation and management. This would not involve an expansion of the bureaucracy, but rather the introduction of a larger amount of structural fluidity. Under this concept, personnel, funding and resources would be made available for reallocation from existing structures to perform specific functions within task force programmes. For each new programme, there would normally be an initial requirement for a small central task force staff to be established around which specialists could operate at particular stages of each project. This would mean, for example, that once the detailed planning for a particular programme was completed, individual planners could frequently be reallocated directly to new task forces. If the autonomy of individual actors from their parent organisations could be increased, a higher level of objectivity in decision-making might be facilitated.

4. A Total Programme Role for Task Forces

If a primary objective of bureaucratic restructuring is to achieve a high level of objective rationality in policy adoption and implementation, it would be necessary to reduce the current gap between stated policy intentions and actual achievement. General Taylor has stated the nature of the problem as he experienced it in Vietnam:

One of the facts of life about Vietnam was that it was never difficult to decide what should be done but it was almost impossible to get it done, at least in an acceptable period of time.48

The problems of implementation have been studied in considerable depth by J.L. Pressman and A.B. Wildavsky.49 They concluded that one of the major reasons why programmes are rarely carried out in the manner their designers intend is the number of decision points structured into the processes of implementation. Desmond Ball summarises the particular case that they studied in the following terms:

An oversimplified schematization of the programme shows that there were 15 principal participants, with differing perspectives and objectives and senses of urgency, some 30 decision-points, and about 70 separate "agreements" necessary. Even if the probability of agreement was 99% at each clearance point, the overall probability of programme success could be less than half after 70 clearances. As Pressman and Wildavsky remark, "the remarkable thing is that new programmes work at all".50

The general integrating processes of the recent reorganisation in Australia's Department of Defence have had the effect of reducing significantly the number of organisational actors and, to some extent, the number of decision points for the implementation of many types of policies.51 However, through the application of the integrated task force concept, there would be scope for even greater advances. Task forces

48 Quoted by R.W. Komor, Bureaucracy Does It's Thing, p. 8.

49 J.L. Pressman and A.B. Wildavsky, Implementation: How Great Expectations in Washington are Dashed in Oakland; or, Why It's Amazing that Federal Programs Work at All, This Being a Saga of the Economic Development Administration as Told by Two Sympathetic Observers Who Seek to Build Morals on a Foundation of Ruined Hopes (Berkeley, University of California Press, 1973).


51 For details of the reorganisation see Sir Arthur Tange, Australian Defence: Report on the Reorganisation of the Defence Group of Departments (Canberra, Department of Defence, Presented to the Minister for Defence, November 1973).
which are created to develop a programme concept and
determine an optimum solution would ideally also be provided
with the authority and resources required to manage the
programme's detailed implementation. This would serve to
reduce drastically the number of decision points which would
confront individual programmes and might be expected to
encourage better decision-making because of the extended
period of time which would be available for the consideration
of each issue.

5. Flexible and Imaginative Bureaucratic Managers

The personnel characteristics required for highly original
conceptual development and analytical programme management
differ markedly from those required for routine line
management or for the satisfactory peacetime command of
operational service units. In a situation where major
changes in the country's environment demand flexible adaption
at all levels, there is a greatly enhanced need for both
civil and military personnel to be selected, trained and
retrained with these requirements in mind.

An array of measures could be instituted to facilitate
this process. For instance, much greater emphasis could be
placed upon the qualifications and training of both civil and
service personnel prior to, and in the years immediately

52 The existence of a problem in this area has been
recognised by Admiral Sir Victor Smith, a former
Chairman of the Chiefs of Staff Committee:

The problem here is that the more time
that an officer spends on courses or in
field postings the less time there is for
him to develop the special skills required in
policy formulation. One solution that comes
to mind is that a Service officer should be
selected relatively early in his career and
his future postings in the main, but by no
means exclusively, would be at Russell.
[i.e. the Department of Defence offices]

Admiral Sir Victor Smith, *Military and Civilian Inputs
into Defence Policy* (A paper delivered to the Conference
on Armed Forces and Australian Society at the Royal
following, their recruitment. In order to increase the general awareness, knowledge, flexibility and adaptability of young officers, much greater use could be made of staff colleges, universities and professional associations such as the United Service Institutions. During their periods of service, civilian and military officers could be encouraged to further broaden their thinking and experience through the provision of greater freedom to participate in, and contribute to, internal and external journals, conferences and other avenues of debate. Another possibility, which was recommended in the Coombs Report, would be to draw upon the very great benefits which could be gained through exchanges of personnel with other government agencies, large firms in industry and commerce, academic institutions and some types of voluntary agencies.\textsuperscript{53} This would permit not only a broadening of experience of those officials who temporarily vacate their normal positions but also an injection of new knowledge and expertise through those individuals temporarily transferred into the national security structure. In many areas requiring very high levels of conceptual adaptability, these characteristics could be fostered further through an expansion of short term appointments and an increased emphasis upon lateral recruitment.\textsuperscript{54} Only through such a wide range of complementary measures could the imaginative and adaptive capacity of the bureaucratic managers in Australia's national security structure be increased substantially.


At present in Australia, the closed nature of the debate on many national security issues appears to be a consequence more of bureaucratic convenience than security necessity. The contrast between Australia and nearly every comparable western country is most marked in this respect. The national

\textsuperscript{53} See this detailed in the \textit{Royal Commission on Australian Government Administration Report}, pp. 145, 146.

\textsuperscript{54} These matters are discussed in the Coombs Report, \textit{ibid.}, pp. 180, 181.
security structures of most western states make an active effort to disseminate information, to argue their case in detail and, in some instances, even to fund independently organised public conferences, seminars and discussions.\textsuperscript{55} The closed nature of the government institutions involved in national security affairs in Australia is undoubtedly a major factor contributing to the mediocre standard of press reporting, parliamentary debate and public understanding.\textsuperscript{56} However, it must also be a significant influence in determining the nature of the decision-making processes and the quality of the decisions made within the structure. As Desmond Ball commented:

> What is needed is more open argument. Positions of participants will still be reached subjectively, and the resultant decisions "irrationally" but at least the positions would have to be justified, and the decisions would be subject to expert and professional criticism.\textsuperscript{57}

Conclusion

Primarily because of its closed nature, it is extremely difficult for an external researcher to gain a comprehensive

\textsuperscript{55} Perhaps most notable in this regard is the Swedish Ministry of Defence. It allocates a small proportion of its budget each year to encourage public debate on national security issues through the subsidy of a wide range of conferences, seminars etc., and by funding the publishing of major discussion papers and reports written by prominent members of the national security structure. Interview with Lennart Grape, Head of the Secretariat for National Security Policy and Long-Range Defence Planning (SSLP), Swedish Ministry of Defence, 29 October 1975.

\textsuperscript{56} This matter was the subject of discussion following the presentation of a paper by T.B. Millar, 'Some Indicators and Conclusions', at a Seminar of the United Service Institution of the Australian Capital Territory in September 1974. See \textit{United Service}, Vol. 28, No. 2, October 1974, p. 94.

view of the functional efficiency of Australia's national security structure. However, the commentaries of experienced external observers and of those formerly involved in the system support the general contention that it shares many, if not all, of the bureaucratic weaknesses which are evident in foreign systems and, in some instances, has these weaknesses in a higher degree than other systems. The implications of this for the prospects of future change are very important. In particular, it means that the potential for adapting Australia's national security system is limited not only by a wide range of physical, economic, social, diplomatic and political factors, but also by major bureaucratic constraints. As a consequence, if proposals for change are to have any prospect of adoption and implementation, they must not only be structured to fit within the parameters of the non-bureaucratic constraints but also be formulated in such a manner as to manage or accommodate bureaucratic influences.

Certainly the processes of meaningful change are demanding and difficult. It is almost always easier for individuals and bureaucratic structures to repeat well-established operational repertoires. However, it is clear that, if Australia's security structure is to be adapted in the type of fundamental manner which is required, a wide range of measures will need to be employed to encourage a much higher level of flexibility than has been apparent in the past.

As has been discussed in earlier parts of this thesis, the future quality of Australia's security will be much more dependent upon the scale and character of her independent efforts. Perhaps the most vital element of this greatly enhanced requirement for self-sufficiency is the need to develop an indigenous capability to plan resource allocation coherently to satisfy efficiently derived and clearly defined national security priorities.

However, the task of independently planning Australia's security in the future is of quite a different character to that of the forward defence era. As has been discussed in Chapter 4, the security planning system which has been inherited from the past now appears to be deficient in several important respects. As a consequence, new conceptual processes must be found which provide a capacity to derive, evaluate, select and implement original solutions to satisfy Australia's unique security requirements. Only when clearly defined national security objectives, strategies, structures, doctrines and operational procedures are deduced in a coherent fashion in an unconstrained evaluative process can optimality be approached in the determination of priorities and the allocation of resources. The primary objective of Part IV is to outline and discuss an array of conceptual techniques which might provide a means of performing these important functions satisfactorily.

This area of analysis is inherently complex and to some degree the discussion in this part of the thesis reflects that characteristic. But despite the difficulties of dealing with this subject, its central importance to considerations of Australia's future security policy necessitates that it be discussed in some detail. In Chapter 7, the nature and most important deficiencies of the current security planning concept
are elaborated and a series of criteria for evaluating alternative concepts, strategies and structures is detailed and discussed. The four categories of planning criteria which are introduced in this analysis are contingencies, doctrinal objectives, constraining influences and those factors which serve to reconcile security concepts with national goals.

One of the most difficult obstacles to coherent security planning in Australia is the high degree of uncertainty which characterises its strategic environment. This problem is examined in Chapter 8 and a potential means of managing the plethora of conceivable pressures and threats for planning purposes is elaborated. This discussion is followed, in Chapter 9, by an analysis of a progression of planning concepts which might provide a feasible means of selecting strategies and force structures to optimise security capacity for a given resource input.

Thus, the overall thrust of Part IV is a search for concepts which would make the processes of security planning more efficient and coherent and, as a consequence, serve to clarify the priorities and direction of the entire security system.
CHAPTER 7

THE DERIVATION OF BASIC PLANNING CRITERIA

The Planning Problem

The security planning system which Australia has inherited from the forward defence era has not been designed for, nor does it appear to be suited to, the demanding functions which it is now required to perform. As was discussed in Chapter 4, the Strategic Basis documents have highlighted effectively the notable trends in the strategic environment. However, they have not provided an appropriate basis for the derivation of clear strategic concepts, planning objectives or expenditure priorities. As a consequence of this systemic failure, it appears that individual sections of the Defence Department and the armed services have been forced to develop their own structures, operational concepts, priorities and philosophies. 1

The major problems and difficulties of planning Australia's security appear to be recognised within the Department of Defence, but the conceptual manner in which they are managed is of limited effectiveness. 2 It appears generally to be appreciated that Australia's security forces must be capable not only of a satisfactory response to immediate pressures, but also of a rapid expansion to meet the requirements of more demanding contingencies. 3

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1 This situation is detailed in Chapter 4.

2 Many of the conceptual problems of planning Australian security in an uncertain strategic environment were discussed by Mr D.J. Killen, the Minister for Defence, in his review of Defence Policy following the announcement of the 1977-78 budget. See Commonwealth Parliamentary Debates, House of Representatives, Thirtieth Parliament, 22 September 1977, pp. 1478, 1479.

methods which have been adopted in an attempt to achieve these objectives can be explained simply as follows.

First, in order to meet the immediate response requirement, the existing force structure (the force-in-being) is constructed in such a manner as to provide a basic capability to react quickly to a number of low level pressures and threats. But, in addition, in order to provide the key elements of a capacity to meet the requirements of more demanding pressures and threats, the force-in-being is modified gradually as Australian perceptions of the strategic environment (expressed in the Strategic Basis documents) indicate the changed nature of the country's long term security needs. Thus, at least in theory, the structure of the force which would exist at mobilisation (the core force) gradually changes character over time to more closely satisfy those requirements which are identified in the Strategic Basis documents. 4

One of the major problems with this concept is that, because of the uncertain nature of the strategic environment and hence of future contingencies, it is impossible, in the Department's view, to determine the optimal shape of the fully mobilised force structure (the terminal force). In fact, because there is an almost infinite range of conceivable pressures and threats, the core force is designed in such a manner that it is capable of expanding relatively quickly into the size and shape of a large number of terminal forces. 5

4 The conceptual relationship between the force-in-being, the core force and the terminal force was the subject of a notable debate on the morning of 28 October 1976 at the 'Defence of Australia: Fundamental New Aspects' Conference, held by the Strategic and Defence Studies Centre at The Australian National University. The description of the current planning system appearing in the text is derived primarily from the explanations made by senior Department of Defence officers on that occasion.

5 This process of multi-path force expansion planning is described by Desmond J. Ball, in 'Equipment Policy for the Defence of Australia' in Robert O'Neill (ed.), The Defence of Australia: Fundamental New Aspects (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), p. 119.
order to maximise the potential speed of this multidirectional force expansion capacity for a given resource input, the core force is designed to include a very large number of high technology, high complexity, long lead time capabilities. It is in this context that a wide range of very advanced equipments and technologies can be justified in terms of the maintenance of the 'state of the art'. It is argued that if a particular type of capacity is important in meeting an array of potential contingencies, the development and maintenance of high levels of expertise in the field serves to reduce significantly the minimum time required to expand that capacity should it be necessary to do so. 6

The primary difficulty with this conceptual management process is that, because of the lack of clarity concerning the contingencies which are to be accepted for planning purposes, the system fails to perform any of its major objectives satisfactorily. The present security system possesses a basic capacity to meet a large number of contingencies but it is important to realise that the price of this multiple-contingency flexibility and adaptability is very high. In effect, it necessitates the procurement of small numbers of practically every conceivable unit and equipment type. This dilution of the limited resources which Australia can devote to national security functions over a wide variety of unit and equipment types limits heavily economies of scale in procurement, maintenance, training and practically every other area of national security activity. Moreover, because the combat personnel who can be mobilised readily are so widely dispersed, in a functional sense, the total structure's immediate response capacity is constrained severely. But perhaps the most important weakness of all is that this diffusion of expertise limits effectively the current security concept's surge capacity. As was discussed in Chapter 4, in order to meet the demands even of some

6 This requirement is described in the Defence White Paper as the 'military competence and capacity to absorb and operate high technology equipments'. *Australian Defence*, p. 13.
relatively minor harassment and raid scenarios, the current force-in-being requires periods of defence preparation time which are unrealistically long.

Thus, in summary, the utility of Australia's present security planning concept should be the cause of considerable concern. The limited immediate operational response and surge capacity of the current structure is justified primarily by the perceived requirement in an uncertain strategic environment of retaining a capacity to expand in almost any direction, however slowly, should the need arise. The practical effect of this planning concept upon the structure of the armed forces is particularly significant. Despite major changes to Australia's strategic environment and the nature of its security requirements, the current force structure and that which is officially postulated for the 1980s is almost identical in shape and form to that of the mid-1960s at the height of the forward defence era. Is it to be concluded that the force structure which was designed for and presumably was suited ideally to the demands of committing single service formations overseas to complement the foreign deployments of major power allies is also, by some extraordinary coincidence and good fortune, the structure which is ideally suited to the demands of securing Australia's immediate environment with a high degree of independence? It is difficult to avoid the judgment from the information available on the public record that, despite official recognition of the changes in Australia's strategic circumstances, their full implications and ramifications have not been identified and acted upon in any comprehensive manner within the current planning system. As long as Australia lacks

7 Although the shape of the force structure appears to be relatively static, significant measures are being taken to develop and adopt concepts, doctrines and procedures more appropriate to Australia's new strategic circumstances. This is discussed in detail by Robert O'Neill in 'The Development of Operational Doctrines for the Australian Defence Force', Robert O'Neill (ed.), The Defence of Australia: Fundamental New Aspects, pp. 138-143.
a rigorous and coherent security planning process, it seems likely that the bureaucratic inertia and well-entrenched vested interests which are manifested in the current security structure will perpetuate the status quo irrespective of the level of its functional efficiency in the new environment.

Deriving New Planning Criteria

1. Contingencies

The primary underlying cause of Australia's current security planning problem is the high level of strategic uncertainty with which the country is confronted. Thus, the nature of possible future pressures and threats is a logical starting point for the processes of coherent security planning. However, this major area of uncertainty is not easily clarified. As Darcy McGaurr points out, the almost imponderable nature of Australia's future security environment presents a much more severe planning problem than that faced by a wide range of advanced western states:

The lack of a foreseeable threat means Australia has no pressing defence problem. However, the same phenomenon is at the root of our defence planning problem. Paradoxically, a country like Israel with a far greater defence problem has a less complex defence planning problem. The threat is there. It can be measured and observed and planned against. All the NATO nations develop their force structure to counter those of the Soviet bloc. Australian governments realize that lack of threat in the short term does not eliminate the need for defence preparedness in the long term. The problem is one of allocating limited resources between a very large array of possible defence projects.8

Mr Killen has also emphasised the constraining influence of the uncertain strategic environment and hinted at a

conceptual solution:

If there was a perceived threat it would make defence planning ever so much easier because you know precisely where you want to spend your money, how you want to spend your money and when you want to spend your money. But there is no perceived threat, and so as a consequence of that one must take into account contingencies, and the contingencies again must be tinged with reality.9

But the questions arise of which contingencies should be considered and how they should be derived and expressed. It is argued in Chapter 8 that it is possible to reduce the wide array of conceivable pressures and threats into a form which is manageable for planning purposes without oversimplifying greatly its potential diversity. This is achieved by carefully selecting a set of scenarios which, in terms of its national security response requirements, is representative of the full range of future possibilities. The contingencies elaborated in these scenarios would provide an ideal initial foundation for the processes of detailed security planning. Their potential utility in this role brought Desmond Ball to conclude:

In strategic planning, there is no substitute for a contingency/options approach, i.e. making conscious decisions concerning the contingencies to be prepared against and those to be ignored, and then selecting options to fulfil the required capabilities. This, however, requires both more positive strategic guidance and stronger decisions than are seen today.10

In other words, a primary means of overcoming the current difficulties of planning in Australia's uncertain strategic environment would be to design and test in concept a wide range of strategic and structural options for their capacity

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9 Address by the Minister for Defence, the Hon. D.J. Killen, to the 62nd Annual Congress of the Returned Services League, Canberra, 7 September 1977, p. 8.

to meet the demands of a representative and agreed set of scenarios.

2. Doctrinal Objectives

It would be extremely difficult to determine those security concepts and structures which would most adequately meet the requirements of the agreed scenarios in the absence of any clear measures of efficiency. Strategic and structural options could be tested in the circumstances of the representative scenarios, but what would be the basis for their evaluation? Would the most efficient ones be those with the greatest capacity to deter an enemy, to defer the onset of hostilities, to defeat an opponent, to cause an opponent to institute a disproportionate response, to prevent wholesale defeat or perhaps a combination of the above? A clear statement of national security doctrinal goals would be central to any process of coherent security planning. As was discussed in Chapter 4, it would be most appropriate for this second planning criterion to be determined by the government of the day, although preferably in the context of a bi-partisan political consensus.

3. Constraining Influences

With the derivation of the first two categories of planning criteria, it would be possible to design and evaluate conceptually a wide range of alternative security strategies and structures for their capacity to meet the demands of the doctrinal objectives in the circumstances of the representative scenarios. Yet this form of evaluation would be largely removed from reality. There would be no explicit limits on finance, manpower, technology, social and diplomatic factors or many other restraining influences which are present in the real world. These multi-dimensional constraints would need to be integrated into any process of coherent planning. Many of those factors which restrain Australian security options - finance, manpower, public attitudes, industrial
capacity, technical skills, etc. - have been discussed in Chapter 5. However, for a comprehensive process of national security planning, they would need to be elaborated in much greater detail. In practice, this integration might best be done by the Department of Defence for approval by the Government.

4. Reconciling Security Concepts With National Goals

On the basis of the first three categories of planning criteria, alternative concepts and structures could be tested for their capacity to optimise doctrinal objectives in the context of the representative scenarios while not transgressing the bounds set by the elaborated constraints. However, the processes of planning on these bases alone would still be deficient. It would be possible to design alternative strategies and structures with a comparable capacity to satisfy the established criteria but which would differ markedly in their impact upon the nation at large. Great variations could be expected to be evident in the strength of domestic industrial support, research and development, intelligence, repair and maintenance capacities required by each proposal. Alternative security options may also differ markedly in the levels of their structural flexibility, adaptability and endurance. The nature of all of these characteristics would be of significance to any government because they impact in a major fashion not only upon the basic form of national security policy, but also upon a broad range of domestic and international political, economic and social concerns. As a consequence, it would be important for the government of the day to be given scope to select and define basic objectives for those categories of additionally stated planning requirements which it regards as being important, eg. the levels of Australian industry participation, procurement offsets, domestic research and development, dependence upon foreign sources of intelligence and upon foreign sources of equipment supply, etc.
The General Character of a Coherent Planning System

The provision of all four categories of planning criteria would provide a comprehensive conceptual basis for the construction and detailed evaluation of a wide range of alternative strategic concepts and structures in realistic circumstances. Alternative options could be tested for their capacity to maximise doctrinal goals in the circumstances of the selected scenarios while satisfying the additionally specified requirements of national policy and not transgressing the bounds set by the elaborated constraints. Through this process, it should be possible to make optimising decisions concerning the most efficient strategic concepts, structures and even details of the most efficient organisation and equipment types for a given financial input. The progression of this analysis is illustrated in a simplified form in Figure 1.

This pattern of testing in concept a wide range of security options offers great scope for overcoming many of the serious weaknesses of the present security planning system which were identified in Chapter 4. Most obviously, it would encourage greatly increased creativity in security structure design. But perhaps more importantly, the clarity of national security objectives and goals would make it possible for the entire planning processes to be more directly end-product or functionally oriented. A total-systems view could be adopted in the sense that all security resources could theoretically be available for inter-system trade-offs and interactions in order to maximise the achievement of the stated goals within given total resource constraints. In an economic sense, it should be possible to determine the optimal distribution of marginal resource inputs and also to undertake full input-output analysis.

Judgments on most of the matters in this process could be expected to be both complex and difficult to reach. Thus, in all decision-making in the planning system, and particularly in the derivation of representative scenarios and the evaluation of alternative security concepts and structures, it
FIGURE 1 - A SIMPLIFIED REPRESENTATION OF A POTENTIAL SECURITY PLANNING PROCESS

THE FOUR CATEGORIES OF PLANNING CRITERIA

1. REPRESENTATIVE SCENARIOS
2. OBJECTIVES OF SECURITY DOCTRINE
3. CONSTRAINTS ON SECURITY OPTIONS
4. SPECIFIED REQUIREMENTS OF NATIONAL POLICY

THE EVALUATION OF ALTERNATIVE CONCEPTS AND STRUCTURES

CONCEPTS WHICH OPTIMISE SECURITY CAPACITY FOR GIVEN LEVELS OF BUDGETARY INPUT

- OPTIMISING STRATEGIC CONCEPT FOR BUDGET LEVEL A
- OPTIMISING STRATEGIC CONCEPT FOR BUDGET LEVEL B
- OPTIMISING STRATEGIC CONCEPT FOR BUDGET LEVEL C

DETERMINATION OF THE RELATIVE PRIORITY OF MAJOR PROGRAMME COMPONENTS

- MARITIME STRIKE
- INTERDICTION STRIKE
- AIR DEFENCE
- GROUND ATTRITION

DETERMINATION OF THE RELATIVE PRIORITY OF SUB-PROGRAMME OPTIONS

- COUNTER-AIR STRIKE
- AREA DEFENCE
- POINT DEFENCE

PROJECT CHOICES

- AIR SUPERIORITY FIGHTER
- INTERCEPTOR FIGHTER
- STRIKE FIGHTER
- LONG RANGE MISSILE
would be highly advantageous to limit, as far as possible, the scope for purely intuitive judgments. The roles of analytical studies and research would be increased greatly. However, where intuitive decisions are unavoidable, it would be desirable for the questions involved to be structured carefully to ensure a high level of decision-making precision and to facilitate the application of the most advanced expertise which is available.

Ideally, the processes of generating and testing alternative security concepts which have been described above would produce a conceptual strategy and structure which approaches an optimisation of national security objectives for the level of resources which is available. However, because of heavy existing investments in equipment, personnel training, facilities, etc., it might prove impossible for the Australian security system to adopt any new security solution in the short term. As a consequence, it would be necessary to transfer the optimising strategy and structure to a long term planning framework so that clear and unambiguous guidance could be made available for the gradual adaptation of the existing security system. Detailed decision paths could be elaborated for system transformation and key decision points could be identified and phased so that the broadest possible array of options is kept open until the last possible moment. In practice, this approach would serve to increase the importance of long term perspectives, improve freedom of action in decision-making and optimise the system's capability to adapt rapidly to meet unforeseen developments. As a consequence, the need for ad hoc decision-making should be reduced to a minimum.

In summary, a well integrated coherent security planning system should improve the understanding and control of the decision-makers in those factors which are capable of rapid change. Risks and uncertainties should be identified, clarified and described at an early stage and unambiguous policy direction made available to all sections of the security structure on a continuous basis. In total, these developments could be expected to increase significantly the
potential for effective governmental influence on the essential elements of security planning.

Conclusion

Undertaking such a process of coherent security planning in Australia would be extremely complex and difficult in practice. Many serious problems can be anticipated. For example, exactly how could a series of properly representative scenarios be derived for planning purposes? How could the planning structure be integrated as a whole? Could such a planning system be evolved within the bureaucratic structure which already exists? How might such a system work in practice? It is not intended to provide adequate answers to all of the potential problems which could beset such an undertaking. Rather, the prime purpose of Chapters 8 and 9 is to discuss a number of conceptual techniques and tools which might conceivably be employed to overcome some of Australia's current security planning difficulties. Thus, although much of what follows is elaborated in the form of an operating process, the concern is not to argue the case for a particular type of structural solution so much as to introduce some general concepts in a logical fashion for wider discussion and debate.
As a consequence of Australia's changed strategic environment, it appears that, in the future, Australia's security will be much more dependent upon her indigenous capacity to meet the demands of a wide range of pressures and threats. But as was discussed in Chapter 7, the uncertain nature of Australia's strategic environment, with its almost innumerable theoretically conceivable pressures and threats, has complicated greatly the task of coherent security planning. If high levels of efficiency in resource allocation are to be approached, it is essential that the vast array of possible contingencies be reduced into a more manageable form.

What is required in these circumstances is a refining process to elaborate, test and select a series of contingencies which, in terms of their security planning requirements, would be representative of the full range of pressure and threat possibilities. As was briefly described in Chapter 7 and is elaborated in much greater detail in Chapter 9, the range of representative scenarios which might be produced by such a process would be well-suited to play a central role in the processes of security planning as one of the four basic design and evaluation criteria.

The discussion which follows represents an attempt to derive a conceptual progression which might be effective in performing the contingency refinement function. The total process involves twelve steps. These are best understood by progressive reference to the attached figures in addition to the main text. (Please fold out Figure 2 on page 291.)

Stage 1. The first stage involves a detailed analysis of the global and regional environment with a view to highlighting the more significant developing trends. It is generally
recognised that this function can be performed very effectively by the present type of Strategic Basis document. For instance, Sir Arthur Tange has written:

To assess Australia's strategic outlook for the purpose of defence decisions, we must distinguish between tides and eddies. There are types of violent events which, like eddies, are sometimes not predictable. They may well be injurious to others, but they will not necessarily be a threat to the security of this country. Events of this kind - outbreaks of religious violence, border disputes and the like - might contingently impose on Australia an obligation to contribute to a United Nations collective action; but experience suggests that this uncertain prospect, in itself, should not be a determinant of this country's defence effort ...

But if we can ignore the eddies, or at least not over-react to them, we must study the tides of international movements; and such things as the changes in the distribution of military and economic power in the world, and in the political power of groups of countries, and in their objectives towards countries in Australia's position. These I believe are the tides which, in their ebb and flow, increase or decrease the vulnerability of Australia to threats of real consequence. They do not flow regularly. Their movement is, however, discernible and their implications for our future security can, I believe, be estimated. This is what the periodic Strategic Surveys by the Defence Committee set out to do for the Government.

Ideally for the threat management structure being proposed, this basic environmental analysis would be reviewed and updated on a regular cycle, such as at one, one and a quarter or two and a half yearly intervals.

Stage 2. By extrapolating from the developing trends identified in Stage 1, a series of alternative futures could

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2 This timing has been selected so that the strategic assessment would fit easily into the long range planning phasing which is elaborated in detail in Chapter 9.
be constructed for a period fifteen years hence. Each of these possible future environments would describe a complete and coherent global and regional situation. For example, they might range from an environment fifteen years hence which was very similar to that of the present, through to situations with regional conflict close by, regional conflicts at distant locations, significant resource shortages, serious instability in the superpower balance, limited or unlimited superpower conflict, etc. The primary intention would be to derive a broad and reasonably representative range of possible futures without proliferating them in unmanageable numbers.

Stage 3. The next step would be to draw upon the environmental analysis in Stage 1 to identify a number of international actors which, because of their present or potential intentions or capabilities, could conceivably present a threat to Australia in the timespan fifteen to twenty years hence. Then, by drawing upon a relatively large number of

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3 The selection of this timespan might be justified by a variety of arguments but here the prime motivation was to obtain compatibility with proposed processes of long term security planning outlined in Chapter 9. A point fifteen years hence is particularly appropriate as a long range planning objective because it is sufficiently remote to make significant structural alterations feasible but, at the same time, is sufficiently immediate to make detailed proposals realistic.

4 An appropriate number might be somewhere between ten and twenty alternative futures. A number smaller than this would probably not provide sufficient scope for the analysis and a sufficiently broad range of possible alternative developments. A number larger than twenty would tend to become unmanageable because of the proliferation of paper work it would cause in the subsequent stages of analysis.

5 In this context, the timespan is broadened from the initial fifteen years to permit hypothetical pressures or threats to be developed over the time period which would be required for them to eventuate.
Australians who are experts concerning these countries (in a process elaborated later in this chapter), judgments would be made upon the likely actions of these countries in the context of each of the alternative futures outlined in Stage 2. In order to make this process as explicit as possible, a series of threat types (perhaps similar to those outlined in Chapter 3) would be introduced into the analysis at this stage. The experts would then be asked to pass judgment on whether country A, when placed in environment 1, might perceive aggression type p as a reasonable means of attaining its higher regional or global political objectives. What would be the possible benefits to be gained by country A in the circumstances? Then these same questions would be asked concerning country A in environment 1 but concerning aggression type q, etc.

These experts might be drawn both from within government service and from academic and business circles beyond. There are a number of precedents for the employment of external personnel for the provision of specialised expertise. Apart from the engagement of individual consultants from time to time, the Department of Defence has, on occasions, worked with specialised groups of academics in extended consultations with senior government officials. For details see Strategic and Defence Studies Centre (An information booklet prepared in Canberra for the Research School of Pacific Studies, The Australian National University, 1971), p. 3.

The types of pressure and threat employed might include the following:

a. Low-level pressures of peace, i.e. those consistent with a peaceful environment.
b. Pressures resulting from a regional or global resource crisis.
c. Pressures resulting from a regional or global conflict in which Australia is not a combatant.
d. Demands and threats supported by political, military and/or economic measures.
e. Economic warfare against Australia.
f. Surprise assault with a limited objective.
g. Full-scale invasion.
h. Australian involvement in a global or regional nuclear, biological or chemical exchange.

See this process depicted diagramatically in Figure 2.
FIGURE 1 - A DIAGRAMMATIC PRESENTATION OF THE THREAT EVALUATION PROCESS IN STAGE 3

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<th>Country A</th>
<th>Country B</th>
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<td><strong>What possible benefits?</strong></td>
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By an extended process of placing the selected countries in the full range of hypothetical alternative futures, the experts would make judgments concerning the complete set of accepted aggression possibilities. Eventually, all the possible combinations of country, environment and threat would be evaluated. Those combinations which are judged to be unreasonable propositions (probably the majority) would be abandoned.

In order to facilitate further evaluation by the experts, the remaining combinations would be elaborated into descriptive cases of aggression. These would simply trace the type of international situation which would give rise to the threat, the general preparations and precautions which the foreign actor would require and the form of aggressive action which might be employed.

Stage 4. The next step would involve a generalised evaluation by the country experts of the likely profitability of each case of aggression as it is likely to be perceived by the foreign actors. The first question might ask for an assessment of the likely perceived opportunity costs of undertaking the action against Australia. How profitable might alternative resource applications be when compared with the option of pressuring Australia? How much would the external actor's security in other spheres be reduced by mobilising and applying the resources involved against Australia?

A separate but related function to that of opportunity cost would be an estimation of risk costs. What would be the perceived risks of other external actors intervening? To what extent might the external actor fear that the resources calculated as necessary to achieve the objective against Australia might be understated? What would be the perceived risks to the external actor of other undesirable consequences, e.g. increased tension with other actors, superpowers, allies, neighbours, etc?

In addition, it would be necessary to attempt to evaluate the constraining force of perceived political costs, both
domestically and abroad.

The other side of the profitability equation would involve an estimation of the foreign actor's likely perceived value of the aggressive action. Questions asked here would include a rough evaluation of the foreign actor's perceived value of any physical resources expected to be gained by the aggression, the foreign actor's likely perceived value of any strategic positions or strategic advantages won in relation to its competitors, etc. Estimations of likely perceptions regarding the value of economic and both international and domestic political advantages would also need to be made. 9

Clearly, no matter how well qualified the experts, the judgments required of them in this field could not be expected to take any precise mathematical form. However, in order to gain a very generalised view of a foreign actor's likely perceptions in a given situation, basic order of magnitude evaluations would be sufficient. What is really required from this balancing of the likely perceived costs and benefits is a simple and relatively reliable means of culling out those cases of aggression which would clearly be unprofitable from the external actor's point of view. The remaining cases of aggression would progress to Stage 5.

9 Attempting to gauge the likely perceptions of foreign actors in hypothetical situations is obviously a highly speculative process. The employment of such estimations in this system of scenario refinement is not to imply that similar considerations necessarily occupy the minds of major actors in real-life situations. Calculations concerning the profitability of a given action are frequently made in only a shallow manner, if they are considered at all. The question of employing such calculations in a theoretical framework is discussed by Kevin J. Foley in 'Selecting an Australian Tactical Fighter Force: Marginal Strategies, Rationality and the Australian Aircraft Industry' in Desmond Ball (ed.), The Future of Tactical Airpower in the Defence of Australia (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 132-136.
Stage 5. The next step would be for the country experts to evaluate the cases of aggression in the context of their appropriate future environment and assess whether or not the foreign actor might have alternative means of attaining his overall politico-strategic goals and objectives. If, in fact, there do appear to be alternative methods, these would be elaborated in the form of generalised cases of action and passed to Stage 6. (There may be more than one alternative for each case of aggression.) On the other hand, if there are no alternative methods of foreign actor goal achievement apparent, the case of aggression would be transferred directly to Stage 7.

Stage 6. At this stage, the possible alternative foreign actor strategies would be evaluated for their cost-effectiveness using the same criteria and methodology which were applied to the original cases of aggression in Stage 4. Those alternatives which the country experts judge to be clearly unprofitable would be abandoned. The remainder would progress to Stage 7.

Stage 7. Where multiple alternatives to an original case of aggression progress to Stage 7, the experts concerned would be asked to pass judgment on which would be most likely to be perceived by the foreign actor as the most profitable. This most profitable alternative would then be compared to the original case of aggression against Australia from which the alternative was derived in Stage 5. If the profitability of the aggression against Australia appears to be equal to, or better than, the best alternative, it progresses to Stage 8. On the other hand, if the most cost-effective alternative actions clearly appear to be more profitable for the external actor in the light of the postulated future environment, that case of aggression would be discarded from subsequent analysis.

Stage 8. The cases of aggression which progress to this level of analysis would then be elaborated into full-scale scenarios. The actual process of describing the scenarios would be very important. While brevity would be essential, it would, at the
same time, be vital to transmit clearly the information needed by the security planners who would, in the final analysis, base much of their work upon those scenarios which are selected at the end of this threat managing process.

Essentially, a scenario is a description of a hypothetical chain of events commencing with the development of circumstances which serve to generate the external actor's aggressive intentions and terminating with the final features of the plan of attack or pressure. They would probably be best described in three distinct stages. The first, conflict phase would deal with the chain of international developments which lead to a situation where the conflict is imminent. The second, aggression stage would analyse whether it would be necessary or expedient for the foreign actor to move against third parties in the international environment, before it could pressure or attack Australia. If this were judged to be likely or probable, steps would be identified in the foreign actor's activity and these would be clearly outlined. At each of these points, the descriptions of the situation would include an account of the actor's current estimation of the profitability (gains versus risks) of the intended action.

The third, attack phase of the scenario would describe the main features of the aggressor's plan of attack or means of applying pressure. To simplify this process, it would

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11 This consideration would facilitate subsequent analyses concerning alternative methods of deterring, deferring, defeating or otherwise preventing the development of pressures and threats before they can be actively directed against Australia.

12 It is interesting to note that the Swedish defence planners have found by experience that in their situation the best method of scenario construction (as opposed to expression) is not chronological. In order to achieve a high level of internal consistency, they start by defining the international situation at the end of the conflict phase. From there, the entire aggression stage is designed. Only then is the conflict phase constructed and this is
need to be assumed that the external actor designed his aggression to impact upon the Australian security structure and the nation as a whole, as it existed at the time that the analysis was undertaken. 13

Stage 9. The newly completed scenarios would now be referred back to the country experts to check that the various hypothetical actions and moves of the participating international actors are in general accord with their expressed doctrines as outlined in the strategic analysis of Stage 1. It would be essential for objectives, methods and means of all the actors to be consistent with their current and/or anticipated patterns of behaviour. In those scenarios where there are found to be inconsistencies of a relatively minor nature, it may be possible to make corrections in such a manner that the established form of the scenario remains unchanged. However, where this proves to be impossible, because the inconsistencies are of a more fundamental nature, the scenario would need to be abandoned.

Stage 10. At this point, the scenarios would be considered from the viewpoint of one of the major users of the end product, the force structure planner. From his point of view, it would be necessary to limit the finally approved number of

12 cont'd

done by working backwards from the start of the aggression phase. When both of these processes are complete, the attack phase is designed and delineated in detail. For details see Ministry of Defence, The Defence Planning System - The Goal-Setting Procedure, p. 17.

13 This implicit assumption would be made in order to simplify the experts' evaluations of foreign actors' perceptions of Australia's reaction capacity. However, there may also be scope here to test the sensitivity of various cases of aggression to explicit changes in Australia's security structure. It may be possible, by a process of submitting further detailed questions to the country experts, to evaluate likely alterations to a foreign actor's profitability analyses resulting from changes to Australia's security capacity. However, this would be an aid to security planning rather than a means of assisting the management of uncertainty per se.
scenarios to a manageable level (perhaps ideally between five and fifteen). One primary means of reducing the numbers of scenarios remaining, without affecting significantly the value of the few that comprise the final product, would be to test them for response overlap.

It would not be very difficult for strategic planners to determine, in general terms, the types and levels of forces which might be required to meet most effectively the scenarios which reach Stage 10. In respect of their requirements for an Australian response, some of the scenarios are likely to dominate others. For example, a limited assault mounted by country A may require a very similar Australian response to an assault mounted by country B. If such were the case, one of these scenarios could be discarded. In addition, it is also possible that one scenario may dominate another of a quite different type, in terms of the response structure required. While the optimised response structures of the two scenarios concerned may differ in minor respects, it may be determined that the built-in flexibility of one of the optimised responses would be sufficient for it to meet effectively the demands of the other scenario. Thus, culling may again be possible. If this process of scenario discrimination is undertaken efficiently, it would be reasonable to assume that if a theoretical defence structure were designed and prepared to meet all of the remaining scenarios, it should also have a

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14 In any coherent and rigorous security planning system, there is a need for a group of specialist strategic planners. As is discussed in Chapter 9, one of their most important functions would be to elaborate and test alternative concepts and force structures in order to determine their functional effectiveness in meeting national security requirements in given situations. Because of the nature of their normal work, the elaboration of generalised force structures which would most effectively meet the requirements of the scenarios reaching Stage 10 would most probably not be very difficult.

15 Flexibility is defined here to mean a structure's capacity to meet uncertainty (or a non-design optimised threat) where the length of advance warning is insufficient to make structural alterations possible (ie. defence preparation time is zero).
capacity to meet any type of scenario with which Australia may be confronted within the fifteen year time limits of the planning structure. So, in summary, in terms of their response requirements, a wide range of scenario types is likely to remain for further consideration at the end of Stage 10.

Stage 11. At this stage, country experts and strategic planners would attempt to determine, in a conservative manner, the minimum defence preparation time which Australian security planners could expect to receive in the circumstances of each scenario. In other words, judgments would be made concerning the point of time in each scenario at which it could be expected with a high degree of probability that the Australian Government would authorise full scale security force mobilisation to meet the threat as it would then be perceived. From this judgment, it would be possible to determine, in general terms, the length of time likely to be available for changes to be made in the security structure before the external actor moves against Australia (i.e. the length of defence preparation time). In some scenarios, this time for structural alteration is likely to be zero, but in others it may be in the order of months or even years.

The hypothetical and generalised optimised scenario response structures of Stage 10 would now be resurrected to perform another function. The optimised response structure of those scenarios where the minimum length of defence preparation time is judged to be relatively long would be compared to the optimised response structure of those scenarios where the minimum defence preparation time is judged to be zero or relatively short. It may be found that between these two categories there are optimised response structures which are fairly closely related. Where this is so, analysis would be undertaken to determine the length of time which would be required to adapt the security structure optimised for the low minimum defence preparation time scenario to approximate that structure which is optimised for the scenario with relatively long minimum defence preparation time. Where
this time period is found to be shorter than the difference between the defence preparation times for the two scenarios, the scenario with the relatively long minimum defence preparation time could be safely abandoned. By using this process and making explicit and realistic assumptions about the defence preparation time adaptability of particular security structures, it would be possible for individual scenarios, with low minimum defence preparation times, to cancel more than one other scenario at this stage. However, it must be remembered that, as a result of these processes, it may be necessary to secure structural adaptability as a goal in its own right. This would need to be expressed explicitly in the additionally specified requirements of national policy.  

Stage 12. The final stage of the scenario culling process would be undertaken by politicians, probably by the Cabinet on the recommendation of the Minister for Defence. However, it should be noted that it would be highly advantageous if a politically bi-partisan approach was adopted concerning the criteria employed in this process. Basically, judgment would have to be exercised as to the political acceptability of the final set of scenarios. It is here that politicians would be expected to make explicit judgments if they felt that the security forces should not be designed to meet specific types of pressure or threat. For example, it may be decided that, in the case of a particular type of scenario, Australia's security forces, no matter what their strength, would be incapable of influencing the international development or even affecting significantly its impact upon Australia. In these circumstances, it might be decided that consideration of this type of scenario in the planning and design of Australia's security capacity would imply a misallocation of resources. By way of illustration, the politicians might, for instance, decide to abandon consideration

16 The additionally specified requirements of security planning are discussed in Chapter 7 and depicted in Figure 1 of that chapter.
of scenarios involving heavy nuclear, biological or chemical attacks by the superpowers upon Australia's population centres in the design of the country's security capacity.

Conclusion

One of the major obstacles to coherent security planning in Australia is the long-standing difficulty of dealing with the high levels of uncertainty which characterise the nation's environment. Australia urgently requires a means of reducing the wide range of conceivable pressures and threats into a form which facilitates rigorous security planning. The concepts elaborated in this chapter may contribute, to some degree, to the development of such a system.

Basically, the conceptual progression which has been outlined represents an attempt to avoid the dangers inherent in intuitive decision-making which is undertaken in the context of a very large number of highly dynamic and poorly defined variables. It systematises the processes of scenario evaluation into a logical sequence. It also demands that most judgments be made in an explicit manner on the basis of a clearly stated information source and in the light of coherently expressed criteria and assumptions. In addition, it provides well-delineated roles for system administration, specialised country experts, security planners and politicians.

Finally, and perhaps most importantly, this type of uncertainty managing process provides a basis for marshalling a high level of specialised expertise to make intuitive judgments when these are unavoidable. Implicit in Stages 3, 4, 5, 6, 7, 9 and 11 are a series of judgments on likely

17 It would clearly be important for politicians to command a high level of knowledge and expertise in order to make these judgments. Potential means of improving their capacity in this area are discussed in Chapter 6.
foreign actor reactions to a range of hypothetical environments. Obviously these evaluations would be susceptible to all of the problems of subjectivism. Yet these difficulties could be reduced to manageable proportions if a relatively large number of people were engaged for the task, each of whom possessed a high level of expertise concerning at least one of the foreign actors concerned. In practical terms, this could probably be done most effectively by employing some type of participatory polling technique. Where it is considered that it might be beneficial, some of the questionnaire results might also be tested in carefully constructed simulation games.

18 Judgments are also required of security planners concerning the nature of optimal security structures designed in response to specific pressures and threats (Stages 10 and 11), likely warning and defence preparation times (Stage 11) and the periods likely to be required to adapt optimal security response structures to approximate others (also in Stage 11). Finally, explicit judgments are required of politicians (Stage 12).

19 Many of these difficulties are discussed in detail in the chapters in the first two parts of Anatol Rapoport, *Strategy and Conscience* (New York, Schocken Books, 1969), pp. 3-175.

20 These techniques are discussed at length by H. Sackman in *Toward More Effective Use of Expert Opinion: Preliminary Investigation of Participatory Polling for Long-Range Planning* (Santa Monica, Rand Corporation, P-5570, 1976).

21 The potential utility of simulation techniques is discussed by Anatol Rapoport in *Strategy and Conscience*, pp. 125 ff. It is also important to note at this stage that a scenario derivation process, such as that outlined in this chapter, would need to be employed regularly if the end product is to be expected to retain its relevance. Changes in the international environment may alter considerably the scope for scenario construction. In addition, progressive changes to Australia's response capacity may have a significant impact upon the country experts' evaluations of foreign actors' profitability calculations. Neither of these considerations can be expected to remain static for extended periods. As a consequence, a cyclical process of regular environment and threat reassessment is likely to be justified.

This requirement is not to imply that each time the system is activated a completely new range of scenarios can be
It is important to realise that all of these techniques are, of course, imperfect means of prediction. A range of assumptions accepted in the process - extrapolated international trends, the absence of unforeseen dramatic happenings and foreign actor rationality, to name just a few - cannot be justified in absolute terms. As a consequence, it is fortunate that the major function of this type of system is not to predict the future. Rather, it is designed to provide a limited number of inherently consistent threat possibilities which, in terms of their non-time sensitive response requirements, would be representative of a much wider range of hypothetical, but clearly feasible, pressures and threats. The overriding aim of the exercise would be to provide a very useful and generally accepted tool to assist in the management of threat uncertainty for the processes of long term security planning.

21 cont'd

expected to emerge. Hopefully this level of change would not be encouraged. In order to create as large a degree of conceptual stability as possible in the planning processes, scenarios may be refined from time to time and individual scenarios might be abandoned or replaced. However, unless it is made necessary by dramatic changes in the international or domestic environment, wholesale variations to the total set of scenarios would ideally be avoided as far as possible.
CHAPTER 9
A CONCEPTUAL APPROACH TO RIGOROUS SECURITY PLANNING

The underlying assumption and basic foundation for the discussion in this part of the thesis is that the processes of Australian security planning should be directed to determining the means of allocating national resources to maximise clearly stated national security objectives. Possible methods for deriving the four categories of planning criteria have been described in Chapters 7 and 8. Perhaps ideally, the government itself would define both the objectives of the national security doctrine and the additionally specified planning requirements. It would also be appropriate for it to approve the representative scenarios and an elaboration of the domestic and international constraints on security options. With all four planning criteria provided, it would be possible to commence the processes of detailed security planning.

As was discussed in Chapter 7, the four planning criteria would provide a conceptual basis for the detailed testing and evaluation of a wide range of alternative strategic concepts and force structures in realistic circumstances. Options could be tested for their capacity to maximise doctrinal goals in the circumstances of the selected scenarios while satisfying the additionally specified requirements of national policy and not transgressing the bounds set by the elaborated constraints. However, because of the heavy constraining influence of the structures and concepts which already exist, this process would not provide an effective means of directly undertaking short term planning. In order to provide the concept and structure designers with sufficient freedom to search for optimal solutions, it would be important, in the early stages of the planning process, for them to be given scope to start with virtually a 'clean sheet'. In order to make this possible, alternative structures would best be designed for complete implementation at a point in time which
is sufficiently distant to make significant alterations feasible but which, at the same time, is sufficiently immediate to make detailed proposals realistic. For the purposes of the discussion in this part of the thesis, the long term planning period is assumed to be fifteen years.

Constructing and Testing Alternative Structural Options

Within the context of these considerations, the first theoretical security structures could be constructed. Initially, each structure would best be designed to optimise response capacity in the circumstances of only one of the accepted scenarios. The nature of the concepts and structures derived by this process could thus be expected to vary considerably. However, it might be anticipated that, in practice, many of the structures would contain common elements in different proportions and linked in different manners.

For the purposes of their subsequent analysis, the alternative structures would ideally be described in three distinct sections. The first would outline the major operational principles and concepts of the structure, the type of strategy and the type of manpower to be employed, the levels of technology required, an assessment of the structure's flexibility and adaptability and, finally, a generalised estimation of the costs of implementation in the three five-year periods leading to its completion.¹

The second section of each alternative structure proposal would elaborate the objectives of the structure's major component programmes. The programmes themselves would need to be defined in purely functional terms, eg. Long Range Surveillance, Maritime Strike, Interdiction Strike, Air Defence, Ground Attrition, Ground Strike, Command and Control, Economic Defence, etc. Goals for each of these programmes

¹ The concepts of flexibility and adaptability are defined and discussed later in this chapter.
would best be expressed in terms of generalised performance capabilities in specific situations drawn from the accepted scenarios. Finally, in the second section, the minimum level of budgetary expenditure required to meet fully the response requirements of the specific scenario under consideration would be determined and an attempt would be made to distribute this hypothetical financial allocation between the programmes contained within the proposal.

The third major section of each alternative structure description would postulate characteristics for the essential programme components or projects. This would be the most speculative part of the proposal for it would, in fact, involve detailing a generalised order of battle. By drawing upon the budget allocation in section two, each programme would be defined in terms of numbers and types of manpower, equipment, technology and support. An account of the assumed capabilities of the major individual project systems—ships, aircraft, vehicles, etc.—would also be included. Finally, the structure designers would express their expectations concerning the effectiveness of each programme structure to meet the requirements imposed by the scenario (or scenarios) which has dominated the structure's design.

When a broad range of alternative structures has been designed, they could be tested for flexibility. As was discussed briefly in stage 10 of Chapter 8, in order to meet uncertainty, it is desirable that a security structure possesses a capacity to satisfy effectively the demands of a wide range of future possibilities. When a threat arises for which the security structure has not been designed, if the advance warning is insufficient to make structural alterations possible (i.e. defence preparation time is zero), the basic structure's capacity to respond immediately is defined as flexibility.

2 The structure designers and those who might work in this type of long range planning system would clearly need to be very highly skilled and largely divorced from service rivalries and prejudices. Ideally, an organisation tasked to perform these functions would contain a mix of personnel from all three services as well as civilian analysts.
For illustrative purposes, let us assume that a security structure has been designed to maximise efficiency in meeting the basic doctrinal objectives in the circumstances of each of the scenarios described in Chapter 8, i.e. scenarios (A-G). It is further supposed that each structure's efficiency can be measured in generalised terms on a scale from 1 to 10 (with 10 being highly efficient). It should now be possible to plot diagramatically the relative efficiency of the structural alternatives in the circumstances of each scenario.

Table 1
Structural Efficiency

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<td>0</td>
<td>0</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

As can be seen from Table 1, each of the alternative structures is highly specialised in its performance. While each structure is very efficient in meeting the requirements of its specialised scenario, structural flexibility in meeting other scenarios is at best marginal and in most cases virtually non-existent. Because of uncertainty about the type of pressure or threat with which Australia may be confronted in the future, it would be extremely difficult to choose one of these seven structures to provide an overall capability. The consequences of preparing for the wrong type of threat
could be disastrous. Clearly a much greater degree of structural flexibility is required.

Table 2

<table>
<thead>
<tr>
<th>Accepted Scenarios</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Alternative Structures</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>4</td>
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<td>4</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

As can be seen from structures 8-11 depicted in Table 2, it is possible to re-design specialised alternatives to provide a more generalised response capability. Two factors which are implicit in this process should be noted at this stage. Firstly, a large degree of flexibility usually means a loss of specialised performance. Secondly, the higher the levels of flexibility which are required, the more expensive the security bill is likely to be.

The second process of structural testing and modification is related to the first. As was briefly discussed in Stage 11 of Chapter 8, structural adaptability is relevant where the length of advance warning received prior to the onset of a threat is sufficient to permit structural changes (i.e. defence preparation time is greater than zero). This point can be illustrated by reference to Table 2. In a situation where Australia possessed structure 9 and was suddenly confronted by scenario G, its response capacity would be limited by its marginal flexibility. However, if Australia receives sufficient advance warning of scenario G, there may be time to develop additional capabilities which would increase greatly the country's capacity to meet the demands of that threat. It may be possible, for instance, to boost rapidly the initial structural efficiency from 2 to 5 or 6, or perhaps even higher.
It is, in fact, possible to build a high level of adaptability into response structures by designing and constructing them in such a manner as to exploit defence preparation time fully and to minimise impediments to rapid structural change. In practical terms, these factors would imply the construction of an intelligence warning system of the highest efficiency and of a defence organisation and structure prepared and practised in speedy adaptations. But inculcating an entire security structure with the necessity for rapid adaptability could not be expected to be inexpensive or easy. It would, for instance, indicate a requirement for a very high level of interest and expertise in strategic affairs at the key levels of political and bureaucratic decision-making. It would also imply a requirement for an advanced standard of technical and analytical research and development, so that the detailed knowledge in those areas which would be needed to make rapid and efficient adaptations possible could be provided with a minimum of delay. In addition, in order to provide the equipment and hardware requirements of rapid structural change, defence industries of many types would have to be maintained at a high technical standard and at an advanced state of readiness to facilitate rapid starts or increases of production.\(^3\)

Clearly, the acquisition of high levels of structural flexibility and adaptability would be extremely expensive. Consequently, as was mentioned in Chapter 7 and in the early stages of this chapter, it would be necessary for the government to lay down explicit guidelines in the context of the additional requirements for security structure design.

Relating Financial Input to National Security Output

As a result of the processes so far described, a series of hypothetical response structures would be on hand, each of

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\(^3\) The means of incorporating the high levels of structural adaptability mentioned in this paragraph are elaborated in greater length in Chapters 4 and 7.
which would fulfil, to a greater or lesser extent, the planning design criteria. Every one of the structures would provide an acceptable degree of flexibility and adaptability to meet a range of the accepted scenarios and they would also satisfy the additionally stated requirements and be feasible in terms of the non-financial constraints of the real world. However, the alternative response structures could be expected to differ markedly in terms of their projected costs and also in terms of the types of scenario for which they would be optimised. What is really required in this situation is a means of relating the more capable response structures not only to the more demanding scenarios for which they were designed but also to the levels of financial input which would be required for their procurement. This is attempted in Figure 1.4 (Please fold out Figure 1 on page 307.) The hierarchy of scenarios (A-G) is illustrated on the right-hand side in the decreasing order of their response requirements. Adjacent to them are the alternative structures (22-28) which, in each case, have been designed primarily to optimise response capacity in the circumstances of the scenario which appears opposite. The alternative structures (22-28) are depicted in a decreasing order of overall capability and total procurement cost. In addition, a time scale has been introduced on the horizontal axis to the left of the scenarios. This makes it possible to plot alternative financial decision paths from the commencement of the 15-year long term planning period right through to its end with the completion of an alternative security structure at year 15. It is also possible to plot the relative adaptability of the structures at year 15 in the circumstances of receiving an effective defence preparation time of two years. As can be seen from the relationships depicted between the structures (22-28) at year 15 and the scenarios (A-G) at year 17, the adaptability of all structures tends to be limited in meeting

4 A 'decision-tree' analysis, which is related in basic concept to that of Figure 1, is elaborated in W.K.M. Brauers, Systems Analysis, Planning and Decision Models (Amsterdam, Elsevier, 1976), pp. 13-22.
those scenarios which are more demanding of security resources than in meeting those scenarios for which the structures were optimised in design. Thus, if at year 15 Australia were equipped with security structure 25 and it received two years effective warning of scenario A or B, it would not possess sufficient adaptability to effectively meet that threat. Alternatively, if, on the other hand, Australia possessed security structure 23 at year 15, it could effectively adapt within a two-year period to meet any scenario. In other words, Figure 1 displays the obvious point that it is always much easier to adapt a security structure to meet the requirements of scenarios which are less demanding than to meet the requirements of scenarios which are more demanding. In simple visual terms on Figure 1, adaptability upwards is much more difficult than adaptability down.

It is also possible to draw meaningful conclusions by studying the implications of the budgetary choices at the decision points (I-V) between years 0 and 12. By analysing the options at each of these decision points, it can be seen that, if the Australian Government decided to spend large amounts of money throughout the early parts of the planning period and was spending budget level 1 or 2 at decision point (DP) V, it would have the choice at that stage of acquiring structures 22, 23 or 24 by year 15. Hence, it would be quite feasible to proceed to a structure which would have a capacity to meet satisfactorily the requirements of all the accepted scenarios at year 17.

On the other hand, if the Australian Government decided to spend only moderate levels of expenditure on national security to year 12 and at DP V was spending budget level 4, the choice of year 15 structures would be limited to 24, 25 and 26 and it would not be possible to meet effectively the requirements of scenario A at year 17 no matter how much money was injected at that late stage. But if it were decided to proceed to structure 24, it would be possible to adapt to meet the requirements of scenarios B-G.

Alternatively, if the Government takes a low or fluctuating
spending path to financial level 6 at DP V, it would be impossible at that stage to procure a structure with a capacity to meet scenarios A, B or C by year 17. It would only be possible to develop a capacity to meet scenarios D-G. Moreover, if expenditure remained at comparable levels to that at DP V during the subsequent three years, the most effective structural option which would be financially feasible would be number 27. This would only possess an effective capacity to meet scenarios E, F and G.

At decision points I and II, judgments would need to be made concerning the types and numbers of high technology capital equipments required in the security structure at year 15. If it were decided at this stage that Australia should definitely possess a capacity to meet effectively all of the scenarios at the end of the planning period, it would be necessary to aim to provide structure 22 or 23. In order to retain the option of procuring structure 22, it would be necessary to pass through financial level I at DP's II and III. An essential part of structural options 22 and 23 would most probably be heavy expenditure on major items of capital equipment. At DP I, decisions would be required on exactly those types of systems which would be required and research and development funded where this is appropriate. At DP II, orders for advanced technology aircraft, ships and heavy armoured vehicles would have to be placed. Research and development into items with medium or short production lead times could continue.

However, it should be noted that, if at DP I the international environment appears to be relatively sanguine and a choice is made to spend at low levels for the first years of the plan, it can be seen that by moving to financial level 2 at DP II, the option of acquiring structure 22 by year 15 is already foreclosed. This is simply because a start must be made on the heavy capital equipment requirements of structure 22 at DP I if they are to be operational in time. However, if at DP II the Government feels less certain about the future, it could opt to move to financial level 2 at
This would leave open the structural options 23-28 in the hope that by year 6 clearer choices could be made. At financial level 2 at DP III, a firm decision would be required about whether structure 23 should be retained as an option. If it is to be retained, national security expenditure would need to be raised to level 2 at DP IV. On the other hand, if the Government feels that it cannot justify this type of expenditure, a choice would be necessary between financial levels 3 or 4 at DP IV. Financial level 3, at that stage, would retain the option of structure 24 at year 15 but financial level 4 would not.

The reason why it is impossible to move from financial level 3 at DP IV to structure 22 or 23, or from financial level 4 at DP IV to structures 22, 23 and 24, is that in the six years remaining in the plan, it would be impossible to procure the long lead time capabilities which those structures require. As a consequence of these factors, if Australia's security expenditure at DP IV is at level 4, even if a worsening security environment stimulates the Government to accelerate national security expenditure rapidly at every decision point from then onwards, at year 15 the country would still require two years' active defence preparation time in order to be able to meet the requirements of scenario C. The onset of more demanding scenarios of types A or B would find Australia's security response wanting. In this type of situation, the possession of only part of a required capacity is unlikely to provide an effective basis for the achievement of the Government's national security objectives.

In practice, the budgetary decisions of governments relating to national security expenditure in any one year frequently bear little relationship to perceptions of the probability of long term pressures or threats. Short term political considerations, the state of the economy, the competing demands of other categories of government expenditure, etc. frequently override simple national security considerations. However, this does not undermine seriously the discussion relating to Figure 1. Whatever reasons are used to determine the levels of the national security budget, the practical effect, in terms of options retained or foreclosed, remains the same and can be illustrated by this analysis.
A rapid expansion, such as that postulated above, from financial level 4 at DP IV to achieve structure 25 within 6 years, would involve cutting quite a few corners. Structure 25 might, for instance, include an x level maritime strike capability. In the originally conceived structural plan, it might have been decided that the most cost-effective method of obtaining this x level of maritime strike capacity was to procure P strike fighters, Q submarines and R ground-launched cruise missile systems. However, at DP IV and financial level 4, early preparations might have been put in train for only \( \frac{P}{2} \) strike fighters, \( \frac{Q}{3} \) submarines and \( \frac{R}{2} \) ground-launched cruise missiles. Thus, when at DP IV a decision is made to procure structure 25 by year 15, short lead-time substitutes would need to be found to provide the additional capability required. By refurbishing and re-arming old equipment already held or procurable overseas, some of the gap could be bridged. However, in the final structure at year 15, the required capability is likely to be provided by a different combination of component systems to that originally judged to be the most cost-effective. In other words, the final maritime strike structure might take the form of \( \frac{2}{3}P \) strike fighters, \( \frac{Q}{2} \) submarines and 3R ground-launched cruise missiles. It should be noted, in addition, that the basic inefficiency of this type of hasty expansion would be evidenced by the fact that the total costs of the completed structure would always be significantly greater than those which would be incurred by steady progress over the total planning period towards the ultimate structural goal. Moreover, although it is not discussed here, this type of rapid expansion might also

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6 The basic inefficiency and greatly increased costs which are associated with rapid force expansion are not effectively portrayed in Figure 1. For instance, it would appear that in procuring structure 25, it would be less costly to move through financial level 3 at DP III, rather than financial level 2. However, in reality, the rapid force expansion required from financial level 3 at DP III to achieve structure 25 by year 15 would imply the adoption of programme structures which are less cost-effective and, in total structural terms, more expensive than those which would be procured by passage through financial level 2 at DP III.
necessitate the adoption of unusual security concepts, doctrines and operational procedures. But perhaps the most important consideration of all is that, as the decision paths and adaptability functions in Figure 1 display, the scope for this type of hasty alteration of structural design and size will always remain relatively limited and be directly proportional to the amount of active defence preparation time received.

One of the most significant aspects of this type of long range security planning concept is that it effectively relates, in an explicit manner, the capacity of the force structure to meet the full range of potential pressures and threats to the Government's decisions on budgetary inputs. In the simplest of terms, it ties firmly the level of budgetary input with the level of security output, expressed in terms of national capacity to meet the demands of the accepted scenarios. The higher the budgetary input, the more numerous the scenarios which the security structure will have a capacity to meet effectively at the terminal stages of the planning period.

Detailed Planning - Determining an Optimal Mix of Programme Components

How might such a long range planning system operate in the real world? In practice, in year 0, once the non-financial planning criteria are established, the direction of the long range plan would most probably be dependent upon the level of security expenditure which had been determined for that year and the Government's expressed intentions for expenditure in the following four years. If the Government expressed an intention to expend large amounts on national security up to and beyond DP II, the more expensive (and capable) alternative structures could be studied as a basis for planning (structures 22-25). If, on the other hand, the Government expresses an

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7 The varying surge capacities of alternative force structure concepts are discussed at some length in Chapter 11.
intention to expend relatively low levels on national security during the course of the forthcoming five years, structures of less capability could be adopted for detailed long range planning (structures 25-28). The emphasis at this stage would be on that which would be financially feasible within the Government's budgetary expectations.

The alternative structures which are adopted at this stage for the processes of detailed planning would already be described in terms of their major programme characteristics and even their generalised orders of battle. The major programmes of the accepted structures would now need to be analysed and tested in much greater detail to determine the optimal project system mix to maximise programme efficiency and then total structure capability within the determined financial constraints.

As was discussed earlier in this chapter, programmes would best be defined in broad functional categories to permit an open analysis of a wide range of alternative project possibilities. A simplified array of options for the Maritime Strike and Air Defence programmes is illustrated in Figure 2.

For a given programme budget, hypothetical project mixes could now be tested for their effectiveness in the context of the scenarios for which the adopted planning structures have relevance. This could be done by an extensive process of simulated war-games. When it is possible to quantify, in generalised terms, the optimal project mix for all of the structures' programmes, they could be tested for cross-interaction. This process would determine whether or not there may be total capability gains by trading inter-programme project allocations against each other. It would also permit informed judgments on whether funds allocated to

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8 The processes of deriving these generalised alternative structures were described earlier in this chapter.

9 The term project is used here in a sense which is almost synonymous with the generally used term 'defence system'. The programme/project relationship is illustrated clearly in Figure 2.
FIGURE 2 - A DIAGRAMMATIC REPRESENTATION OF A MEANS OF DERIVING REPRESENTATIVE SCENARIOS

CASES
OF
AGGRESSION
ABANDONED

Analysis of the strategic environment deriving the major trends.

STAGE 1

STAGE 2

STAGE 3

STAGE 4

STAGE 5

STAGE 6

STAGE 7

STAGE 8

STAGE 9

STAGE 10

Cases of aggression accepted for development into full scenarios.

Be more profitable than the alternative in Box A?

YES

NO

YES

NO

NO

STAGE 8

Cases of aggression accepted for development into full scenarios.

Is it internally consistent?

YES

NO

YES

NO

NO

Is it politically acceptable?

ACCEPTED SCENARIOS

A B C D E F
FIGURE 2. PROGRAMME AND PROJECT RELATIONSHIP

POSSIBLE PROJECTS
- anti-aircraft guns
- short/medium/long range missiles
- specialised interceptors
- strike fighters
- air superiority fighters

SUB-PROGRAMMES
- POINT DEFENCE
- AREA DEFENCE

PROGRAMMES
- AIR DEFENCE
- SHORT RANGE (COASTAL) STRIKE
- LONG RANGE STRIKE (MARITIME)

APPLICATIONS
- conventional patrol craft
- surface effect ships
- adapted specialised interceptors
- corvettes
- destroyers
- air superiority fighters
- heavy strike aircraft
- hovercraft, hydrofoils
- short/medium/long range cruise missiles
- submarines
specialised programme capacities might not be better re-allocated to projects which would provide a useful capacity in several programme functions. For instance, it can be seen from Figure 2 that strike fighters are an optional project system for both the air defence and maritime strike programmes. Although not illustrated in this diagram, it is conceivable that strike fighters may also be an option in the interdiction strike, reconnaissance, and close air support programmes. Obviously, if strike fighters were to be a viable option in all of these programmes, great advantages could be won by re-allocating resources away from programme-specialised projects to enhance multi-programme capacity. Economies of scale would be evident in procurement, production, servicing, training and many other fields. An important additional bonus would be greatly increased operational and basing flexibility. Clearly there would be limits to the advantages which could be won by this type of trade-off. In some types of programme, highly specialised projects would still be required. Appropriate programme balances could be expected to emerge from processes of intensive gaming.

There would be an important additional value in undertaking these detailed evaluations of programme and indeed, total structure effectiveness. By thoroughly testing a wide range of structural possibilities in the context of clearly defined national security objectives, one is approaching a viable means of measuring national security output. It would, in this context, be measurable in terms of a structure's potential efficiency in meeting the hypothetical, but accepted, range of pressure and threat possibilities. However, as Dr Foley has pointed out, this type of output analysis is vulnerable to a series of weaknesses resulting from the arbitrary assumptions which are implicit in the techniques of simulation. For instance, the peacetime utilities which

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security forces can provide could not be taken adequately into consideration. Nor could goal achievement be quantified with precision. However, because this type of analysis is designed to provide a basis for alternative structural choices and relative structural effectiveness, it could be expected to provide consistent information relating to preferred options. As a consequence, it could be well suited to perform the major function of input-output analysis in the Australian national security structure, that of providing a framework for the rational allocation of marginal resource inputs.

**Integrating Long and Short Term Planning Requirements**

There remains a major conceptual difficulty with this type of planning system as it has been outlined thus far. In practice, no current defence establishment commences planning in year 0 without a defence structure in being and with a national security budget allocation, the sole purpose of which is to maximise national security goals in the time period 15+ years hence. In reality, Australia has a national security capacity of some significance already in existence. Large numbers of highly-skilled personnel and great quantities of specialised equipment are currently deployed in operational and support units. Even if the processes of long term planning determined that significant sections of the current structure were inappropriate to the needs of the future, the extensive investments already existing could not be abandoned arbitrarily. Serious consideration would have to be given to the maintenance of a significant and efficient national security capacity during the processes of structural transition. A great deal of skill would be required to determine the most appropriate allocation of national security resources between the three main areas of investment.

1. The first area of spending concerns maintenance of the current structure including the retention and training of personnel in traditionally accepted roles, the maintenance,
overhaul and upgrading of capital equipment already held in stock and the exercise of the total security structure in performing traditionally accepted functions.

2. The second area of expenditure involves procurement of supporting capital items which can be delivered within the current five-year defence programme (FYDP) for the development of the existing force structure.\textsuperscript{11} This category includes the training of personnel and the provision of new capital equipment to complete the development of partially developed capabilities.\textsuperscript{12}

3. The third area involves investment in research and development and in long lead-time capital equipment which cannot be delivered within the timespan of the FYDP.

In the preceding discussion, most of the year 0 decision-making which has been discussed has been that concerning structural optimisation for year 15 and beyond. While long range structural planning should clearly have a central role to play, it has yet to be explained adequately how the transformation could be made from the inherited security structure to approach the planned optimum several years hence, for a given financial input. How could appropriate levels of investment in areas 1 and 2 be determined?

\textsuperscript{11} The Five-Year Defence Programme (FYDP) is a statement of the major equipment and other priorities for the forthcoming five-year period. Its structure permits the sequence of annual expenditure to be phased over the five-year period so as to reduce the severity of budgetary peaks and troughs. See this elaborated in W.L. Morrison, 'The Role of the Minister in the Making of Australian Defence Policy Since the Re-organisation of the Department of Defence', Robert O'Neill (ed.), \textit{The Defence of Australia: Fundamental New Aspects} (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), p. 87.

\textsuperscript{12} This category might include the procurement of final equipment items for long lead time heavy equipments already delivered or close to delivery, eg. weapons systems for already procured aircraft, ships, etc. or it might include the procurement of additional equipment to complete the construction of effective units - eg. the procurement of additional fire units to complete a SAM battery or the procurement of additional aircraft to offset an unusually high wastage rate, etc.
Basically, the processes of force structure transformation would need to be undertaken progressively. This would be aided by the fact that, by their very nature, national security structures are rarely static in their characteristics or capabilities. The major capital equipment items - aircraft, ships, armoured vehicles, etc. - gradually age, become more expensive to maintain and relatively less effective when compared with other nations' holdings. In general terms, these processes of obsolescence are predictable. Thus, in the present Australian structure, a need for replacement or substitute equipments is usually recognised at an early stage by the parent service and this is structured into the FYDP with justification drawn from the Strategic Basis and the service capabilities papers as appropriate. There is, in addition, restricted scope for the services to bargain for the introduction of new capabilities to the FYDP.

However, in the type of coherent planning system being discussed here, it would most probably be necessary to adopt new, and possibly controversial, methods of determining FYDP input. In this type of system, the main initiators of procurement programmes would not be the services directly, but rather the organisation which performs the long range planning function. In practice, this would mean that when major pieces of equipment approach obsolescence or when additional financial resources become available, competing demands for new equipment would need to be examined carefully in the light of the requirements of the adopted long range structural plan. But as was discussed earlier, decisions in this area would also need to include considerations of the ongoing capacity of the security forces during the processes

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13 It is re-emphasised at this point that it would be desirable for the organisation which performs the long range planning function to be composed of civilian analysts and a mix of military personnel from all three services. As a consequence, there would be ample scope for the direct expression of service views at every level of the planning structure.
of structural transformation. In some areas, compromises in the long range planning structure may be necessary in order to lower the risks of unexpected conflict arising during the period of structural change.

Where there no longer exists a requirement for the original function of the obsolescing equipment to be performed, financial resources could be freed for re-allocation into areas where the long range plan indicates that new or increased capabilities are required. Where the original function of the obsolescing equipment remains an important requirement, the resources made available for the performance of this task could be allocated to those project systems which, in combination, are judged to provide the most cost-effective functional performance. Thus, by a gradual process of reassessing functions in the light of the requirements of the long range plan as major capital equipment items approach obsolescence, some would simply be replaced by better but comparable systems, others would be replaced by a more efficient mix of systems and others still would not be replaced at all, but instead provide resources for re-allocation into new areas of priority investment.

Once priorities are clearly established for project inputs, they could be incorporated into the FYDP in much the same manner as at present, so as to minimise financial peaks and troughs. However, in contrast to the present system, it would be most appropriate for projects, once they are introduced into the FYDP, to be relatively immune to dislodgement unless a significant change in the international situation or in levels of Government funding alters the nature of the long range plan.

The services would have the task of studying the projects introduced into the FYDP and making a selection from the brand-name contenders on the basis of the established project criteria. The timing of this decision-making and the subsequent processes of procurement, personnel training and service introduction would best be determined by the phasing of the FYDP.
Co-ordination of the long range plan (LRP) and the five-year rolling programme (FYRP) would be vitally important to the efficiency of the total national security planning structure.\(^{14}\) Probably the most effective means of achieving this objective in the Australian Department of Defence would be for the FYRP system and structure to be retained in a modified form. The LRP would probably best operate in phase with the FYRP on its five-year cycle. This would mean that the LRP cycle would begin every fifth year with the development of a strategic assessment. This would be the first step in LRP construction or revision. In brief summary, the following sequence of functions represents an outline of what might conceivably be undertaken in the subsequent months.

Firstly, from the completed strategic assessment via the processes outlined in Chapter 8, the scenarios could be reviewed and refined. At that stage, the Government might be expected to express its opinion concerning the acceptability of particular categories of scenario and also to outline and/or review the goals for national security doctrine and the additionally stated security requirements. At about the same time, a statement of internal constraints would be forthcoming from the Department of Defence for Governmental approval. Alternative long term structures could then be conceptually constructed, tested and modified. Final structural options could be derived for particular levels of financial input and response capacity and, in their light, the Government might be asked to indicate anticipated levels of funding for the forthcoming FYDP period. With this information at hand, decisions could be made concerning the most effective structure which could feasibly be procured. Once this choice is made, detailed project planning would then be possible and this, in turn, would provide inputs for the annual cycles of the FYRP during the subsequent long range planning period.

\(^{14}\) The Five Year Rolling Programme (FYRP) is the system by which the FYDP is updated. Each year, a programme for the pending twelve-month period is taken from the FYDP for implementation and a new year's programme is added at the other end, for tentative implementation five years hence. For details see D.H. Eltringham, 'Defence Procurement in Australia' in *Defence Force Journal*, No. 4, May/June 1977, p. 34.
An illustrative example may assist in demonstrating this ongoing process. If we assume that, in year 0, the LRP process begins with the derivation of a strategic assessment, the final project mix for the selected structure should be available by year 3. By carefully trading-off the requirements of the LRP which are concerned primarily with capacities judged to be desirable for years 15 and onwards, against the short and medium-range requirements of years 5-14, it would be possible to determine the procurement priorities for years 5-9. In years 3 and 4, analyses of the lead time requirements and financial implications of the projects to be procured in years 5-9 could be completed and this would facilitate the construction of a properly phased FYDP for the next five-year period (years 5-9). This in turn would mean that the services could make final brand-name choices, according to the stipulated project criteria, for those systems which are to be procured during year 5.

During the course of year 5, the first procurement and structural choices forthcoming from the planning processes in years 0-4 would be translated into procurement decisions. But at the same time, the processes of LRP revision would have commenced once more in the new five-year cycle, starting with the derivation of a new strategic assessment. 15

It should be noted that in practice some of the present 'rolling' nature of the FYRP would be removed in this system. At the beginning of year 5, for example, a full five years of FYDP would be decided and structured within the system. However, in year 6, only four years' definite decision-making regarding structural implementation would remain. In year 7, this would shrink again to three, in year 8 to two, and in year 9, theoretically only one year's detailed decisions

15 The Government may judge that, because of broader intelligence requirements, strategic assessments need to be produced more frequently than the LRP five year cycle provides. If this is the case, the ideal timing of the strategic assessments would be at 1, 1\(\frac{1}{2}\) or 2\(\frac{1}{2}\) yearly intervals. Phasing at these periods would ensure that a new or revised strategic assessment would always be available at the commencement of the planning cycle.
regarding planning implementation would remain. This would be because the results of the current five-year long range planning cycle probably would not be available until year 8. As a consequence, the year 5 FYDP would, in fact, be run down until the new requirements derived from the LRP revision became clear. It would then be possible to structure in detail the FYDP for the years 10-14 in years 8 and 9. Thus, in practice, the FYDPs would only be changed (and hence 'roll') once every five years.

An obvious result of this system would be to raise gradually the level of procurement uncertainty until the results of the LRP are available in the fourth year of each cycle. However, it is doubtful that this would cause any serious problem within the Department in practice because continual internal exchanges of information could be expected to take place and a minimum of two years would always be provided for the services to make brand-name decisions. In the case of major equipments which are phased into the later years of a FYDP, the services could receive between five and seven years to make final brand-name decisions.

A second and not insignificant consequence of reducing the 'rolling' nature of the FYDP would be to cut drastically the requirement for FYRP construction, management and review. The workload required for these functions would be concentrated heavily in the final two years of the LRP cycle and in overall terms could be expected to be reduced greatly.

But by far the most important potential benefit to be

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16 In practice, by the latter half of year 8 and during the course of year 9, it would be possible for status reports to be made available detailing developing trends in the LRP. These could be expected to provide sufficient information to facilitate meaningful but tentative planning.

17 In a figurative sense, it could be said that, the current system 'rolls' like a 'pentagonal cylinder'. By contrast, the type of planning system described in this chapter would be prised up like a 'flat slab of concrete' and dropped down again, its own width away, every five years.
gained from this type of integrated planning concept would be the approach to an optimisation of national security goals for a given resource input. Total resource allocation could be made highly efficient and, in a relative sense, it could be measurable through input-output analysis. The importance of long term considerations would be increased greatly. In addition, nearly all intuitive judgments could be made on the basis of an extensive information resource base and at the conclusion of a process of detailed gaming and testing. In normal peacetime circumstances, the scope for ad hoc decision-making could be reduced significantly.

Because of the systematic nature of the processes which would be involved in this type of security planning concept, clear guidelines could be provided automatically for a large number of supporting elements. For example, for those tasked with the responsibility for detailed manpower planning, the structure of the LRP would itself provide a brief discussion of manpower types and numbers. Important additional manpower planning processes, such as those to determine the types of training and skills required to maximise structural flexibility and adaptability, would be assisted greatly by the Governmental statement on these matters in the additionally stated planning requirements and also by the conceptual framework provided by the analysis of alternative structural options.

Further, because an integral part of this type of planning structure would be a clear elaboration of a set of accepted scenarios, response structures and concepts, the services would be provided with precise guidance concerning the types of situation they are expected to meet. As a consequence, strategy, tactics and doctrine could be developed in a cohesive, integrated and harmonious fashion by all sectors of the security structure.

Thus, in summary, it would appear that this general type

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18 This would be derived from the detailed description of the alternative structure which is adopted to form the basis of the LRP.
of conceptual planning sequence could provide clear direction and cohesion to the entire national security system. Unambiguous guidance could be derived for the development of strategy, structures, equipment priorities, manpower and training systems, doctrines, operational procedures, research and development programmes, defence-related industries and a wide range of other security system components. Objectives could be defined with precision, alternatives could be tested thoroughly and a sound basis could be provided for the maximisation of national security capacity for a given financial input.

Conclusion

The security planning system which Australia currently possesses has been inherited from the forward defence era. It has not been designed to perform satisfactorily the functions which it is now required to undertake. In operation, the current force-in-being - core force - terminal force planning rationale is an effective means of retaining most security response options open indefinitely. But this cannot be done without substantial costs. Attempting to maximise structural flexibility and adaptability has, in practice, encouraged weak planning criteria, induced indecision and militated against the development and retention of strong immediate response and surge capacities.

To some degree, these weaknesses were tolerable in the forward defence era. In that environment, combat deployments were rarely time-urgent and they were made almost exclusively to supplement the much larger capacities of major power allies. However, in the new strategic environment, with Australia's security dependent primarily upon its indigenous capacities, the loose planning concepts of the past appear to be grossly inadequate.

With the requirements of meaningful change becoming increasingly obvious, the processes of Australian security policy formulation are likely to be the subject of much
closer political, bureaucratic, academic and public attention. The alternative planning concepts discussed in Chapters 7, 8 and 9 may broaden the scope of the debate and stimulate a more intense search for practical solutions.
PART V

A BROADENED RANGE OF SECURITY OPTIONS

Australia's national security system represents a conceptual and structural continuation of that which was evolved during the many decades of forward defence commitments. But, as has been argued in Chapter 4, the historical requirement of sending single service contributions to support the foreign commitments of major power allies differs markedly from that of securing the Australian continent in the last quarter of the twentieth century. Australia now requires a capacity to deter, defer and, if necessary, meet a much broader range of military, diplomatic, economic, political, social and psychological pressures, and it needs a capacity to perform many of these tasks independently. It is by no means clear that the concepts and structures inherited from the previous era will provide the most cost-effective means of performing these more demanding functions in the future. Indeed, in the first three parts of this thesis, it was argued that in the context of the new strategic environment the current security concepts and structures suffer from a series of major weaknesses. Thus, when discussing future long range planning requirements in Chapter 9, it was suggested that an extensive series of strategic and structural options should be constructed conceptually and tested for their functional effectiveness in satisfying Australia's new national security requirements.

It is important to appreciate that this structured process of rigorous analysis of options would be quite new to Australia's experience. In the past, the relatively uniform character of Australia's strategic policy and operational experience has limited severely the relevance of many alternative strategic concepts and structures. But now, because of the greatly altered nature of Australia's strategic environment and the new requirements which flow
from it, the range of conceptual options which deserve serious consideration is much broader than that which has been available realistically in the past. In these circumstances, the primary function of Part V is to outline and evaluate briefly some elements of this range which might be suitable to meet Australia's new security requirements. In Chapter 10, a series of strategic and structural themes is discussed. This is followed in Chapter 11 by an analysis of an array of new manpower options.
In the discussion concerning future long range planning requirements in Chapter 9, it was argued that a series of alternative conceptual options should be generated and evaluated for their functional efficiency in fulfilling carefully evolved planning design criteria. The primary purpose of this chapter is to introduce and briefly discuss a series of strategy themes which might be viewed as being potential components or 'building blocks' in constructing these alternative conceptual options. The individual strategy themes do not all offer the prospect of a coherent and complete solution to Australia's national security requirements. They have different objectives, employ different types of resources, hold the potential to secure different aspects of Australian society and are designed primarily to meet different types of pressure and threat. Each has the capacity to combine with other themes to produce a variety of alternative conceptual options for evaluation in the processes of long range planning.

Theme 1: A Nuclear Weapons Capability

Australia might conceivably develop nuclear weapons for a wide range of reasons. However, one of the most obvious motivations would be to provide a new dimension to Australia's deterrence capacity. While nuclear weapons would have a capability to perform this function, it is important to realise that their credibility in this role would be limited. They could only be expected to provide effective deterrence against a relatively small category of pressures and threats. For instance, they would not constitute a credible deterrent, nor an effective response or defensive capacity, against a wide range of pressures of peace, international crises and
It is important to note at this stage in the argument that, in evaluating various strategy and structural options, the requirements of optimising deterrence capacity may be of a quite different nature to those which would optimise defensive capacity. This point is elaborated and illustrated clearly by Desmond Ball:

... it is an axiom in the strategic literature that the criteria for deterrence and for defence are not only different but could even be quite incompatible. The objective of military deterrence is to reduce the probability of enemy military attacks, by posing for the enemy a sufficiently likely prospect that he will suffer a net loss as a result of the attack, or at least a higher net loss or lower net gain than would follow from his not attacking. Deterrence in this sense is a process of influencing the enemy's intentions. The strategic policy and associated force structure required for this process may be quite unsuited for the conduct of military operations in the event that deterrence fails.

It is much more difficult to illustrate this defence/deterrence dichotomy at the tactical level than at the strategic level, but one example relating to the use of strike aircraft will be outlined here. Equipping the Australian F-111C strike force with nuclear weapons could, at least perhaps under some circumstances, provide a quite formidable deterrent force. But that same force would have many inadequacies for actual defence operations. It would, for example, lack credibility in situations of relatively low level threats, probably even up to the point of rather extensive lodgements on Australian territory. Even for larger scale threats it would lack credibility if the notional adversary also possessed a nuclear strike force; in this situation a nuclear stalemate would pertain and conventional airpower would be required in actual force engagements.

pressures of international aggression, the value of such a
deterrence capacity would be limited severely if Australia's
potential opponents already possessed a similar force with
a retaliatory capability.

A second potential reason for Australia acquiring
nuclear weapons might be to gain international prestige and
bargaining power. Certainly Australia's diplomatic actions
are likely to be given more attention if the country
possesses nuclear weapons. Yet the international value of
this attention could not be expected to be very pronounced,
for even the major powers have found it difficult to translate
their nuclear capabilities into concrete political gains.
Moreover, if Australia's acquisition of a nuclear weapon
capability spurs a regional power to follow suit, the net
result might be a reduction in the country's overall security
because of Australia's high levels of population concentration
and its consequential vulnerability to nuclear attack.

A third possible motive for developing nuclear weapons
would be to acquire greatly increased tactical battlefield
firepower. Certainly the area blast effects of most nuclear
explosives are of an order of magnitude greater than any
conventional munition. However, there are limits to the
utility of firepower per se. For instance, even if it
were politically feasible to do so, it would not be appropriate
or cost-effective in military terms to employ nuclear
weapons against terrorist groups or small-scale raiding
parties. Furthermore, as is discussed later in this chapter,
their military utility in even the more conventional large-
scale battlefield situations is limited.

All nuclear weapons options are also constrained
heavily by a broad range of cost factors. Because of their
technical complexity, nuclear weapons and their associated
delivery systems are not procured readily. Their development
in Australia would not only be expensive financially but it
would also impose a heavy drain upon skilled manpower. In addition, because of their highly controversial nature, the diversion of scarce natural resources to their procurement would, in most circumstances, by a highly sensitive and potentially divisive political issue.

In practice, there are three distinct categories of nuclear weapons options available to Australia. The first is to attempt to develop a global strategic deterrence capacity. This would be designed, in De Gaulle's phrase, 'to tear a limb off' or cause unacceptable damage to even a superpower aggressor. The acquisition of this type of system would entail the development of an extremely sophisticated launch-on-warning or survivable second strike capacity. Even if it is assumed that this would only require the development of comparatively simple plutonium warheads, these would have to be miniaturised and fitted to a highly survivable and reliable delivery system. There are several alternative modes of delivery potentially available. An intercontinental ballistic missile (ICBM) or sea-launched ballistic missile (SLBM) system, even of a

2 A detailed analysis of the costs to the Australian community of a series of nuclear weapon/delivery system options appears in United Service Institution of the Australian Capital Territory, An Australian Nuclear Weapons Capability (The published reports of syndicate deliberations on this subject). (Canberra, United Service Institution of the Australian Capital Territory, 1975), pp. 3-11. (The author participated as a syndicate member in the preparation of the first of these reports.)

3 Ibid., pp. 2, 3.

4 Exactly what level of damage might be viewed as unacceptable by a superpower is discussed at length by Geoffrey Kemp in Nuclear Forces for Medium Powers, Parts I, II and III (London, The International Institute for Strategic Studies, Adelphi Papers 106 and 107, 1974).

5 The problems of warhead miniaturisation for the purposes of satisfying the space and weight constraints of military delivery systems are highly complex and not amenable to ready solution without extensive testing. See this discussed by Ted Greenwood, George W. Rathjens and Jack Ruina in Nuclear Power and Weapons Proliferation (London, The International Institute for Strategic Studies, Adelphi Paper 130, 1976), p. 4.
comparatively crude nature, would cost billions of dollars and take many years to develop.\textsuperscript{6} The range of Australia's strike aircraft, even with multiple refuelling from aerial tankers based in Australia, would be insufficient to provide a credible deterrent against a superpower opponent. By far the most attractive option would appear to be a submarine- and/or air-launched cruise missile system. The most advanced cruise missiles currently under development have a range of approximately 3,200 kms.\textsuperscript{7} In order for multiple, high value targets to be reached by such a system, either the range capability would need to be extended or the launching platforms would need to release the missiles from vulnerable positions close to the opponent's borders. In addition, the type of highly accurate cruise missile guidance system needed would be difficult to develop domestically, even if it were only required to be sufficiently precise for counter-city strikes. It would probably need to be assumed that the Global Positioning Satellite (GPS) System would not be always available in crisis situations.\textsuperscript{8} TERCOM, MAGCOM and MICRAD systems and operational data might also be difficult to obtain. However, if all of the above options are foreclosed, it is possible that the new types of gyros currently becoming available may be sufficiently accurate.

\textsuperscript{6} The costs of these options and the relative potential of an array of similar options is discussed in United Service Institution of the Australian Capital Territory, \textit{An Australian Nuclear Weapons Capability}, p. 8.

\textsuperscript{7} For details of recent developments in cruise missile systems see Chapter 2.

\textsuperscript{8} In a crisis situation, the United States would have the option of closing down the non-secure navigation signals of the GPS system. It is also possible that, in a world crisis, the Soviet Union might attack and effectively destroy many of the United States satellite systems which have global strategic functions. For details of their developing capability in this field see Clarence A. Robinson, 'Soviets Push for Beam Weapon' in \textit{Aviation Week and Space Technology}, Vol. 106, No. 18, 2 May 1977, pp. 16-23; and also 'Soviets Launch Another Killer Satellite Test' in \textit{Aviation Week and Space Technology}, Vol. 106, No. 26, 27 June 1977, p. 18.
to perform cruise missile guidance for counter-city attacks.  

In short, it is conceivable that Australia could develop a marginal global strategic nuclear deterrent but only after the investment of vast national resources over an extended period and at the expense of a considerable disturbance to international, and possibly also internal, political relationships.

A second and more frequently discussed nuclear option would be the development of a regional strategic deterrent.  

For this type of system, a plutonium warhead mounted on a sea- or air-launched cruise missile would again appear to provide the most cost-effective solution. However, because the requirements for range, survivability, early warning and quantity would be relaxed considerably from those required for the global deterrent option, the overall expense and drain on resources could be expected to be of an order of magnitude lower. These considerations could not, in most circumstances, be expected to moderate significantly the strength of the international and domestic political reaction.

The final nuclear option for Australia would be the development of a weapon system for purely tactical battlefield firepower purposes. The most likely delivery candidates for this task would be air-, sea- or ground-launched short or medium range cruise missiles. However, it is important to note that the battlefield utility of tactical nuclear weapons would be limited. Despite their enormous firepower potential, nuclear weapons do not reduce greatly the requirements for precise target acquisition and delivery accuracy in most tactical situations. For instance, in the maritime environment, a twenty kiloton warhead must be delivered to within $\frac{3}{8}$ kms of a ship if it is to be

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9 For details of these cruise missile navigation and guidance systems see Chapter 2.

10 This option is discussed at length in the report of the first syndicate in United Service Institution of the Australian Capital Territory, An Australian Nuclear Weapons Capability, pp. 1-12.
destroyed, and a 200 kiloton bomb within 4 kms.\textsuperscript{11} In land warfare, in most types of terrain, nuclear attacks against armoured formations require an even greater degree of accuracy to be effective.\textsuperscript{12} Thus, for tactical battlefield purposes, nuclear explosives really substitute for the new forms of highly accurate terminal guidance. The destruction of multiple targets with one warhead is likely to occur only if the targets are highly concentrated. Yet even in this type of situation, cheaper and less politically sensitive conventional weapon options are likely to be available.

In the ground environment, terminally guided sub-munition dispenser weapons can destroy or disable large vehicle formations. At sea, relatively inexpensive terminally guided anti-ship missiles have proved to be extremely effective. In fact, as was discussed in Chapter 2, a range of other developments in weapons technologies are already encouraging a high level of force dispersal and hence reducing the prospects of destroying multiple targets with a single nuclear strike.

There is a final major difficulty in Australia acquiring nuclear weapons for tactical purposes. If an opponent also possesses nuclear weapons, he may be tempted to respond to their use by retaliating against Australia's small number of highly concentrated and very vulnerable population centres. The realisation of this danger may effectively deter Australian governments from exercising the tactical nuclear option.

\textsuperscript{11} These figures are given by Ian Bellany in \textit{Australia in the Nuclear Age: National Defence and National Development} (Sydney, Sydney University Press, 1972), p. 96.

\textsuperscript{12} This is partly because of the masking effect of undulating terrain and vegetation cover and also because of the relatively good protection provided by armoured vehicles themselves.
Theme 2: Adapted Conventional Military Systems

For Australia this is essentially a status quo option. In the absence of an international or domestic political crisis which might reveal its fundamental inadequacies, the present conventional military concept represents a very attractive political and bureaucratic option. It basically permits a continuance of Australia's inherited force structure with slight modifications to accommodate the more obvious requirements of continental defence. In general terms, the Army would probably retain its conventional division structure and the Navy would still be dominated by destroyers, frigates, a few submarines and an appropriate number of support ships. The Air Force would be equipped with basically the same types of strike, fighter, transport, maritime and trainer aircraft as at present, although there may be scope for rationalising the number of airframe types operated.\(^\text{13}\)

The greatest advantage of an adapted conventional military structure is that in most respects it already exists. Many of the equipments and doctrines are familiar to the Australian armed forces and most of the skills and personnel are already held. Thus, in terms of political and bureaucratic realities, its relatively undemanding nature makes it realistically achievable. This is important because, while the civilian and military personnel in Australia's national security structure have learned to accept change over the years, this has been limited primarily to that which has been designed to improve their performance of traditional functions. Thus there has, for instance, been a general acceptance of a degree of integrated defence management and the level of change associated with the introduction of new types of equipment. The scale and type of change required for the adapted conventional force

option would be of a comparable nature to that required in the past and, hence, would be unlikely to cause excessive disturbance to entrenched vested interests and lifestyles.

Conventional military structures are also relatively easy for the public to understand and accept. During the course of this century, a large proportion of the Australian population has served actively in these types of military units. This basic familiarity is reinforced by the readiness with which mass publics can comprehend the relatively simple concepts by which conventional operations can be explained. Units are frequently deployed in concentrations and, on the ground, the progress of linear fronts is relatively easy to plot and understand.

Another factor which further reinforces public acceptance of conventional military forces is the fact that they are possessed by most advanced western states with whom Australia normally compares herself. In reality, this represents another practical advantage of some significance because it means that conventional force options automatically possess a high degree of equipment and conceptual operational compatibility with Australia's major allies.

The adapted conventional military force option possesses yet other significant advantages. For instance, the major equipment components of the concept - large surface ships, tactical aircraft and conventional army formations - are, by their very nature, highly visible. If these equipments possess a credible operational capacity in crisis situations, they are likely to be well-suited to perform the deterrence function.14

Another great advantage of conventional military forces is their operational flexibility. They are generally

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14 A major consequence of the discussion in Chapter 2 is that the credibility of the major equipment components of the adapted conventional option is falling, especially when they are confronted by a sophisticated, well-equipped and-trained opposing force. In the future this is likely to impact in an adverse manner upon the deterrence capacity of this type of force.
adaptable to nearly any type of terrain, climate and vegetation and they are capable of effectively performing both offensive and defensive tasks against a wide range of enemy forces.

However, for Australia's continental defence requirement, it is doubtful whether an adapted conventional military structure can provide an appropriate solution on its own. It suffers from a series of important practical and conceptual difficulties.

Firstly, for a large number of reasons, it is a very expensive option. It requires high levels of technical and conceptual skill to be effective both on the micro (platoon, squadron and vessel) level as well as at the macro (operational command) level. High levels of skill imply not only high performance manpower, mostly operating full-time, but also extensive training time and complex training facilities.

Conventional military options also require complex and expensive capital equipment items at or close to the 'state of the art'. Bearing in mind Australia's limited budgetary resources, this factor causes major problems. As is discussed in Chapter 2, large surface ships, conventional tactical aircraft and main battle tanks now require a host of supporting units and equipments if they are to be survivable and effective on the modern battlefield. However, for a country with Australia's resources, the procurement of all of these mutually supporting battlefield elements means that only very small quantities of each type of equipment can be bought. This may provide a capacity for small numbers of people to maintain contact with the current 'state of the art' but it limits heavily effective operational capacity. For this to be developed to a level which would be appropriate to meet any serious pressure of national aggression, an elaborate process of rapid force expansion would be required. Yet, as is discussed in Chapters 4 and 9, while manpower may be difficult to raise and train rapidly, the types of complex conventional equipments required - ships,
tactical aircraft and armoured vehicles - may be even more difficult, if not impossible, to obtain at short notice. Thus, for countries with national security problems and budgetary allocations of a comparable size to Australia, the adapted conventional military concept raises a very serious dilemma. For conventional units to be effective on the modern battlefield, a large number of mutually supporting equipments and technologies are required. However, in order to maintain expertise in them all, the total structure's capacity to meet meaningful pressures and threats independently is very limited.

There are several other important difficulties with adapted conventional forces. For instance, because such forces are composed of relatively small numbers of high technology units which are frequently employed in concentrations, they are particularly vulnerable to technological obsolescence in the face of an innovative opponent. As was discussed in Chapter 2, most of the important equipments held by conventional military forces - tactical aircraft, surface ships, armoured vehicles, etc. - are all becoming increasingly vulnerable to new generations of relatively inexpensive but highly effective counter-systems. Thus, it is conceivable that, in some environments at least, conventional unit equipments may, in the future, be rendered completely obsolete by the introduction of new weapons technologies. But even further than this, these high technology concentrations of defence capital are also vulnerable to an opponent's imaginative employment or exploitation of the new technologies through the introduction of new strategic concepts, tactical doctrines or operational procedures.15 Conventional military forces

15 This theme was raised in his congressional testimony by the former US Director of Defense Research and Engineering, Dr Malcolm Currie:

I note that the acceleration of technological change has increased the danger of technological surprise. I am less concerned about the appearance of new weapons, per se, than with innovative uses of technology based on a superior understanding of technology's ultimate significance to future warfare.
are thus particularly vulnerable to rapid obsolescence and decisive defeat at the hands of a technically advanced, innovative opponent.

A further practical difficulty arises from the fact that the possession of small numbers of highly capable conventional units effectively limits deployment options when enemy intentions are unclear. For example, in the circumstances of major raids by a regional power or a multiple battalion attack by a major power on Australia's northern coasts, it may be very difficult to commit immediately the bulk of Australia's conventional defence force to that area for fear of a secondary, more serious attack in the populous and strategically important south-east or south-west of the continent. The possession of small numbers of high technology conventional forces tends to complicate deployment options seriously.

The commitment of only token conventional forces to resist these types of remote attacks would be of restricted utility because of another major limitation on conventional force capability - their relatively high vulnerability to adverse force ratios. Certainly, a very large number of factors determine success on the conventional military battlefield - terrain, vegetation, weather, morale, equipment and leadership, to name just a few. Yet conventional military units, because of their relatively concentrated battlefield formations and large and relatively obvious support structures and facilities, are frequently susceptible to rapid defeat by conventional forces of comparable expertise but larger dimensions. For Australia, the most important implication is that, while conventional forces may be appropriate to meet lower and medium pressures of national aggression, if confronted by numerically superior conventional forces they may be susceptible to rapid defeat.

Theme 3: Territorial Defence

Territorial defence structures are designed specifically to provide nations with an independent means of defending their own territory in depth. The primary aim is to raise an opponent's costs and risks, not only of entering, but also of residing in, the host country. This is done by refusing to fight a superior enemy on his own terms, depriving him of rapid victory and forcing him to conduct a protracted and expensive campaign. As a group of Rand Corporation analysts described it:

The intent is not to hold territory in the initial stages of an invasion but ultimately to bog down an invader by making continued occupation of the country too costly to be worth while.

Territorial defence is not simply another term for guerrilla warfare. Although territorial defence in some environments may involve a substantial element of reliance upon guerrilla techniques and variants of them, it may also involve some reliance upon heavy weapons (eg. tactical aircraft, small offensive surface ships, submarines, armoured vehicles, etc.), which are not normally regarded as being part of the guerrilla's armoury. In essence, territorial systems usually possess a guerrilla-type capacity to survive and to strike almost continuously from multiple directions and in multiple dimensions. Territorial units have a capacity to disperse and operate for long periods in small 'packets' in such a way that for the enemy they represent an intangible target which is very difficult to

16 The relative ease with which the costs of entry and residence can be raised in particular national environments is discussed by Major-General Nils Sköld in Defence Policy for the 1970's and 80's (Stockholm, The Secretariat for National Security Policy and Long-Range Defence Planning, Ministry of Defence, 1974), pp. 10 ff.

acquire and destroy. However, territorial defence forces may also have a capacity to perform 'frontal' defensive operations for short periods. This normally involves activities more akin to those of conventional forces at state frontiers or along clearly defined military fronts, whether they be static or mobile, thin or deep. The coexistence of the more irregular aspects of territorial defence doctrine with those of frontal defence can be seen most clearly in the military structures of Sweden, Finland and Yugoslavia.18

The most important component of territorial defence forces is the large numbers of well-trained, dispersed but coordinated small units. As was discussed in Chapter 2, the operational capacity of this type of unit is being enhanced greatly by developments in conventional military technology. But there are other important advantages which can be derived from this type of structure. The nature of the manpower required means that the vast majority can be supplied in the form of locally based part-time forces. This tends to be not only a very economic means of providing large military forces but it also means that units can be mobilised rapidly to operate in familiar terrain and hence are not readily susceptible to either

regional or nation-wide surprise attacks.19

Because of the nature of the Australian land mass, its status as an island, its continental time and space, its variations of terrain, vegetation and climate and its small but generally nationalistic population and their relatively limited financial resources, it can be argued that the territorial defence option is particularly well-suited to Australia's national security requirements.20 It would appear to provide the basis for developing a very formidable deterrence capacity which was both regionally and globally inoffensive. However, for Australia in the 1980s, there are a series of factors which serve to undermine heavily the concept's political, military and social acceptability.

The most serious difficulty in employing the territorial defence concept is that it would require the mass involvement of civil society. If the public commitment required was limited simply to an acceptance of conscription for service within Australia or even increased financial expenditure, it can be deduced from the poll results displayed in Chapter 5 that these measures might conceivably be accepted by the community. But adoption of territorial defence would necessitate public acceptance of a concept which requires active mass preparations for war fighting within the nation's borders.21 The implications for mass public involvement and probably great suffering in wartime situations tends to deter governments from the ready adoption of territorial defence strategies. The human and social costs of such a

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19 The relative costs of territorial defence forces are discussed by Horst Mendershausen in *Territorial Defense in NATO and Non-NATO Europe* (Santa Monica, Rand Corporation, R-1184, 1973), p. VII.


21 The political difficulties of accepting the prospect of combat on a country's own territory is discussed at length in the West German context by Horst Mendershausen in *Territorial Defense in NATO and Non-NATO Europe*, pp. 12 ff.
struggle would be far more bearable if a firm prospect of achieving early victory could be promised. But it is implicit in the nature of a territorial defence struggle that the issue is not decided in a single battle, or even by a single criterion. In fact, the true complexity of such a defence posture is difficult for many mass publics to comprehend fully. It is perhaps not surprising then that the territorial defence concept appears to be most readily accepted and entrenched in those countries which have suffered the ravages of invasion and have a history of mounting protracted partisan resistance. Certainly, the prerequisites for the successful adoption of a territorial defence concept include a high level of social cohesion and a very deep and almost universal national commitment to the country's defence. It is possible that these conditions might be satisfied in Australia if the country were confronted by a serious threat which was readily apparent to the entire community. In these circumstances, domestic political constraints might conceivably be overridden by the cohesive forces of nationalism and ideology.

There are, however, several further problems with the territorial defence concept. One major difficulty is that large urban populations appear to be particularly vulnerable because of their ready accessibility and vulnerability to terror campaigns and reprisals. As Adam Roberts points out:

Despite all such possibilities the urbanization of societies undeniably adds to the problems of territorial defence, and inevitably modifies its character. This is particularly true in countries such as Switzerland and Sweden [and Australia], whose cities are near land or sea frontiers and hence immediately vulnerable. The Swiss in the Second World War, when they envisaged the possibility of abandoning their towns and villages to the enemy and continuing the struggle from mountain strongholds, knew they would be running the risk of vicious and extensive retaliation. The situation in Finland in the Second World War was different and much more favourable to protracted struggle. As an eye-witness observer of the war in Finland wrote at the time: 'A nation which is concentrated in towns is most vulnerable from the air; 83 per cent of Finland's population was rural ...' There is an obvious significance in the fact that the three European countries which proved
most adept at conducting defence in depth in the Second World War - Yugoslavia, Albania and Finland - were relatively underdeveloped, not heavily urbanized, and covered with large expanses of forest.22

Although Australia has a strong rural tradition, the reality of the situation is that nearly 86 per cent of the population is now concentrated in urban areas.23 Its vulnerability to an opponent's countermeasures may serve to weaken seriously the utility of territorial defence strategy in Australia's environment.

Another potential difficulty for the territorial defence concept is that its flexibility in the face of a wide range of scenarios is limited. Certainly it can provide a formidable deterrent and defensive capacity against the threat of a major assault. It can also provide a localised ready reaction capacity to meet a large number of minor pressures and threats. However, because of its inherently defensive character, territorial defence structures are not normally well-equipped to rapidly mount conventional ground force counter-offensives against limited assaults or lodgements, particularly at remote locations. The air and naval components of such a structure might be able to respond quickly with a concentration of defensive firepower but, in a country the size of Australia, territorial defence forces are unlikely to possess the ground force mobility required to confront an opponent quickly with major forces in areas remote from the primary centres of population. This relative absence of strategic mobility and concentration also means that territorial defence forces are not readily adaptable to contingencies requiring their deployment overseas.

The final major conceptual difficulty of territorial defence strategy is the requirement to rationalise the need

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22 Adam Roberts, Nations in Arms, p. 237.

for tactical ground force mobility with the necessity of maintaining and protecting aircraft and ship support and maintenance facilities which are inherently fixed in character. Air and naval facilities can, to some degree, be duplicated, dispersed, camouflaged and protected but, in the final analysis, if continued air and naval activity is to be regarded as central to the struggle, the defences surrounding air and naval bases and support facilities must necessarily become somewhat more frontal and conventional in character.24

In summary, the territorial defence concept represents a specialised means of independently maximising a country's technological, economic and political deterrence capacity in the face of extreme threats. However, primarily because of its limited capacity to provide an effective response to the full range of potential pressures and threats, it is unlikely to satisfy Australia's security requirements on its own.

Theme 4: Civilian Resistance

The civilian resistance concept is a non-violent means of undermining an opponent's willpower. It is not a camouflaged form of defeatism. On the contrary, civilian resistance strategists argue that the invasion and occupation of a country represent merely the beginning of an extended struggle.25 Far from signifying defeat, they point out that the presence of large numbers of occupation forces provides an ideal environment within which the


opponent's willpower can be undermined. By employing a wide variety of means, civil resistors aim to demonstrate to an opponent that his view of the issue at stake is unrealistic and that the forces of repression brought to bear are not only ineffective but also counter-productive.

Civilian resistance strategy can be viewed as having two distinct dimensions. On the one hand, it involves non-cooperation and active non-violent resistance to the opponent's activities. In practice this may mean a refusal to obey directions and laws, a refusal to pay taxes, a refusal to accept changed work directions and perhaps, at least for short periods, a refusal to work at all. Civilian resistance can also involve a wide range of disruptive activities which go beyond simple non-cooperation. Attempts may be made actively to interfere with the opponent's activities by occupying administrative centres, staging sit-downs to prevent vehicular movements, disrupting transportation centres, etc. In perhaps its most extreme form, civilian resistance can involve the organised demolition of major infrastructure items—bridges, factories, mines, tunnels, etc.—before they can be brought under an invader's control.

The second dimension of civilian resistance activity involves a deep and probing moral and intellectual appeal to the opponent's representatives in the country, the members of his armed forces, administrative services, etc. Through mass public involvement, continuous attempts can be made to persuade individuals to defect from the opponent's regime, either overtly or passively. Over time, the many components of this strategy can produce an environment of defiant resistance and subversion which, in many circumstances, can effectively deny an opponent many of the fruits which would otherwise be available to a military victor.

The concept of civilian resistance should not be confused with the principle of pacifism. Attachment to pacifist principles is only one of many possible reasons for rejecting violent means of applying pressure to an opponent. Legal considerations, attachment to particular beliefs or an
objective and practical assessment of the crisis situation at hand can all be appropriate and reasonable motivations for adopting non-violent methods in a given environment. However, it should not be implied that the adoption of a non-violent stance needs necessarily to be absolute. In many situations, civilian resistance techniques can and have been combined effectively with more violent activities carried out either in other regions or, alternatively, undertaken within the same region but by different sectors of the community.26

During the course of this century, there have been many civilian resistance campaigns which have reduced significantly the control which an invading state has managed to establish over a subject country. Perhaps the most notable instances emerged from the French occupation of the Ruhr in 1923 and

26 Magne Skodvin, an authority on Norwegian resistance during the German occupation, has emphasised the interaction of violent and non-violent activities in that struggle:

My own view, based mainly on the experience of the German occupation of Norway, is that violent and non-violent resistance need to co-exist and supplement each other.

See Magne Skodvin, 'Norwegian Non-Violent Resistance During the German Occupation' in Adam Roberts (ed.), Civilian Resistance as a National Defence, p. 181.

Jeremy Bennett illustrates the same point when discussing the effectiveness of the Danish resistance movements:

Sabotage precipitated the crisis and caused the fall of the Government. It provided encouragement to the civilian population which was already seething with unrest but needed a spark to set it off. The fact that the resistance groups were in touch with the strike leaders meant that the disturbances were to a certain extent controlled and the Germans were faced with a united front employing both violent and non-violent means of resistance simultaneously. A member of the staff of General von Hanneken, the German Commander in Chief, wrote at this time that, with the outbreak of strikes and sabotage, 'the reputation of the German Army sank and, in a menacing way reached rock bottom'.

the many forms of civil resistance which were organised in countries occupied by the Axis powers in the Second World War. The well-executed evacuation of most of Denmark's Jews and the non-cooperation which the Norwegian teachers displayed to prevent the introduction of Nazi ideology into Norwegian schools are perhaps the best known examples from the latter struggle. However, one must be realistic in evaluating the effectiveness of civil resistance techniques in pressuring invading powers to withdraw. While in several instances such activities have undoubtedly contributed in a significant way to the invader's problems, in no historical case have they alone been responsible for the expulsion of an invading force. This can be explained, at least partially, by the fact that, in the past, civilian resistance techniques have been grasped in desperate situations as a final 'last ditch' means of continuing organised opposition. It might be expected that with the development of proper planning, organisation and training prior to the onset of hostilities, the effectiveness of civilian resistance techniques could be enhanced greatly.

However, the concept of civilian resistance also suffers from several other fundamental problems. Firstly, by its very nature, it is most effective where and when the enemy requires extensive local contact and cooperation to achieve his objectives. While these conditions would apply if an opponent wished to occupy and exploit Australia's extensive urban environments, they most certainly would not apply in the strategically valuable but remote and sparsely occupied regions adjacent to Australia's north and north-west coasts. In these areas, civil non-cooperation, even if it took the extreme form of destroying local facilities before


28 For details of these non-violent actions see Jeremy Bennett, 'The Resistance Against German Occupation of Denmark 1940-45' and Magne Skodvin 'Norwegian Non-Violent Resistance During German Occupation', *ibid.*, pp. 162-203.
an enemy could arrive, would be effective for only a limited period. Thus, if it were an opponent's intention not to invade the whole country but merely to occupy a valuable but sparsely inhabited portion, civilian resistance techniques, on their own, could not be expected to provide a credible deterrent or response capacity.

In reality, civilian resistance techniques can be effectively applied only in the most defensive situation, when a nation's major population centres are occupied by enemy forces. In these circumstances, an enemy can be inconvenienced seriously and possibly, over time, even threatened by this activity. Thus, it follows that, if it is possible to demonstrate an effective civil resistance capability before hostilities begin, the deterrence potential of such a stance could be considerable. Adam Roberts has expressed this view in the following terms:

An important element in military deterrence is making it clear to an enemy not simply that he cannot gain by aggression, but also that he will positively lose. Civilian defence might involve such a threat - that the enemy will, if he attacks the civilian defence country, run the risk of losing control over his own troops and officials, or over his allies or dependent nations, or possibly even have to face an organized revolt in his own country.29

In practice, there can be expected to be major difficulties in developing and exercising, during a period of peace, the type of highly efficient civilian resistance structure which could conceivably hold some deterrence value. To do this, a government would need to admit publicly that more conventional security options might be inadequate on their own to prevent occupation of large parts of the country. The expression of this type of governmental realism is rarely viewed as being politically palatable, even in the most threatening of international environments.

Theme 5: Economic Defence

Increasing global economic interdependence implies increasing national vulnerability to interruptions in world trade. As a consequence of this realisation, the United States, Britain, France, Japan, Sweden, Switzerland, South Africa and a number of other states have instituted a variety of economic defence measures to safeguard national economic capacity, both in periods of international crisis and in the face of pressures of national aggression. 30

Comprehensive economic defence strategies have three major components; a reduction of import dependence, detailed planning to facilitate the transformation of the national economy to meet the demands of international crises and the contribution of economic defence considerations to the processes of planning and evaluating new industry and infrastructure developments.

As was discussed briefly in Chapter 3, Australia's dependence on imports is limited to relatively few commodity areas. Australia produces more than its own requirements in foods and basic metallic minerals. However, in the fields of liquid fuels, an array of chemical materials and several

high technology manufactured goods, Australia is currently dependent to a large degree upon foreign sources of supply. In some of these instances, external dependence may not be permanent. For example, it is quite possible that new import substituting natural resource deposits will be discovered. In the case of some raw materials which are currently imported, Australia does possess significant deposits but at present they are uneconomic to exploit. 31 It is conceivable that, in the case of some of these materials, fluctuations in world prices could make their exploitation economically feasible during the coming decade.

Economic defence planners can encourage a higher degree of material self-reliance through a number of policy initiatives. Firstly, in those instances where Australia possesses limited but fast diminishing supplies of readily accessible materials of strategic importance, active measures can be instituted to conserve remaining stocks. 32 Secondly, in many industries it is feasible to encourage the substitution of readily available domestic resources for some imported materials. The scope here is particularly notable in the substitution of natural gas, coal, solar and wind energy for imported oil in many industrial and domestic heating and some transport applications. A third

31 For example, there are large quantities of low grade phosphate at Duchess in North Queensland, which are currently marginally economic. Feasibility studies into their possible exploitation have been undertaken in recent years. For details see A.J. Driessen, 'Fertilizer Materials' in Bureau of Mineral Resources, Geology and Geophysics, Australian Mineral Industry 1973 Review (Canberra, Australian Government Publishing Service, 1975), p. 141. (This review includes information to June 1974.)

32 By far the simplest and least expensive means of ensuring a future supply of scarce strategic materials is to leave a proportion of those resources which are currently exploited in convenient locations in the ground. The conservation of a proportion of the remaining Bass Strait oil stocks might be justified on these grounds.
category of economic defence policy initiatives is the development and exploitation of new domestic resources to expand even further the processes of import substitution. Oil from coal processes, ethanol from plants, the reprocessing of industrial wastes to derive hitherto imported chemicals and the development of marginally economic import substituting mines and chemical processes might all play an integral part in such a programme. 33

Despite extensive processes of import substitution, there are still likely to be some resources of strategic importance which Australia lacks – fuel oil, some chemical raw materials (sulphur, mercury, esters, amino compounds, etc.) and some specialised high technology manufactured goods. 34 With little prospect of domestic supplies becoming available in quantities sufficient to satisfy national demands in crisis situations, there may be little choice but to stockpile. With many of the commodities involved, the quantities used are very small. In these instances, stockpiling using conventional facilities is unlikely to cause serious difficulties. However, in the case of some chemical raw materials and fuel oil, specialised storage programmes are likely to be required.

Most solid chemical materials can be stored safely in above-ground stockpiles. Where large quantities are required for long periods, abandoned open cut mines or quarries might be filled, with the final surface being revegetated or sealed.


By far the largest storage problem likely to confront Australia would be that of fuel oil. Fortunately, many other countries have an even more extreme problem in this regard and the technology of bulk storage is now highly developed.\footnote{The relative costs and utility of various oil storage techniques in Australia is discussed by Alex Hunter in 'Oil and Defence' in H.G. Gelber (ed.), Problems of Australian Defence (Melbourne, Oxford University Press, 1970), pp. 178-180.} Although above-ground metal and rubber tanks can be employed, by far the most economic and environmentally safe technique is bulk storage in underground excavations or abandoned mines.\footnote{See this technology described and discussed at length by John G. Trotter and Michel Pachet in 'Underground Storage' in Petroleum Review, November 1974, pp. 727 ff. See also an article entitled '21 Million Barrel Underground Storage Capacity Planned for Sullom Voe' in Petroleum Times, 1 November 1974, pp. 9, 10. For details of the US strategic oil reserve programme, which involves the underground storage of 500 million barrels of crude oil by 1980, see S. Terry Atlas and William J. Cook, 'Energy: Salt Domes' in Newsweek, Vol. XC, No. 5, 1 August 1977, p. 55.} As Australia is well supplied with the latter, it would appear that the prime physical means of undertaking such a programme are already available.\footnote{One fringe benefit provided by stockpiling programmes is a capacity to hedge against fluctuations in the international prices of strategically important commodities. This factor could be expected to facilitate long range industry development planning.}

The second major component of economic defence strategy involves detailed planning for the transformation of the national economy to meet the demands of particular types of international crises. Basically, this involves the development of a range of highly detailed contingency plans so that all components of the national economy can be mobilised quickly and efficiently. Means of rapidly transforming industrial production were discussed in Chapter 4. In addition, the details of national resource reallocation for both military and civil purposes would need to be derived in advance. Manpower, transport, fuel and power, communications, construction, food and water would all need to be incorporated...
into the economic defence planning system. These processes of detailed planning would not only identify potential problem areas and permit their solution in advance but would also provide a basis for informing the general public of economic defence priorities.

There is a third element in comprehensive economic defence planning. This involves the evolution and expression of economic defence considerations and constraints in the processes of industry and governmental economic and infrastructure planning. It would be desirable for economic defence considerations to be evaluated seriously in the planning, design, siting and construction of new facilities, plants and projects of all kinds. Economic defence considerations might not be overriding in many instances but deliberations on their significance could be expected to impact in a major way upon the form of the national economic infrastructure in the long term.

Economic defence programmes are not without their costs. By their very nature they represent an additional constraint upon the free flow of market forces in the international economy. Developing a capacity to satisfy a higher proportion of demands from domestic resources involves additional economic expense because of its contravention of the economic laws of comparative advantage. Meaningful economic defence measures also incur a diplomatic cost because of the unfavourable reception which such a policy is likely to receive from those countries which have traditionally exported strategic materials and goods to Australia.

In addition, economic defence programmes require a significant budgetary allocation from the national security vote to cover the costs of administration and detailed planning, the development and management of resource stockpiles and the subsidy of conservation and other measures in private industry. In Australia's current situation, the structural and bureaucratic constraints upon the development of an economic defence structure are unlikely to be surmounted in the absence of any strong political lobby perceiving such a programme to be in its interests.
Theme 6: Civil Defence

There are four major developments in Australia's national security environment which serve to heighten the requirement for an effective civil defence structure. Firstly, in the absence of a comprehensive programme for international nuclear disarmament, it is difficult to dismiss the long term potential for either a regional or global nuclear war. In the history of warfare, very few weapons, once they have been developed, deployed and actually used in combat, have then been reserved permanently from further use in international conflicts.

A second and related development is that the conventional destructive potential and long range delivery capacities which are becoming available to both the superpowers and to regional states are of an order of magnitude greater than those of the past.\(^{38}\)

These first two factors impact directly upon the third. As was discussed in Chapter 4, Australia's strategic reorientation towards meeting the pressures of international crises and international aggression independently requires that the Australian Defence Force direct its resources primarily towards operations on and from the Australian continent. One major consequence of this development is that service installations and centres of population and production capacity within Australia are likely to be involved far more directly in future national security crises. The significance of this factor is further compounded by the fact that Australia's population is extremely vulnerable because of its very high levels of geographic concentration.

In other words, international capacities to direct destructive firepower over long ranges are increasing markedly. In this environment, if Australia participates in future conflicts, it is not only likely to be more intimately involved but it will also be more vulnerable to enemy counteraction. Active population protection and

\(^{38}\) This matter is discussed at length in Chapter 2.
damage limitation measures would appear to be of increasing importance to Australia's overall national security.

The civil defence concept is not new to Australia. During the 1950s and 1960s, a small group of civil defence and state emergency service specialists formulated operational procedures and doctrines specifically to fulfil Australia's requirements. Moreover, active state emergency service organisations were developed in each state and territory. But despite the initiative of the experts and the dedication of a large number of volunteers, these organisations have experienced extreme difficulties in developing any more than the most basic of frameworks.

The most significant problems have arisen directly as a result of a notable absence of political and bureaucratic interest. This has been manifested most obviously in the levels of federal, state and local government funding. The overall neglect is reflected clearly in nearly every aspect of Australian civil defence activity; full-time and part-time personnel strengths, training activities, local facilities, equipment holdings, civil defence research, etc. The levels of current equipment holdings have been discussed in detail by the Director-General of the Natural Disasters Organization, Major-General Stretton. He has pointed out that 'it is estimated that of the 618 local units ... over

39 The civil defence planning which was undertaken in this period is summarised by Air Vice-Marshal W.E. Townsend, Director of State Emergency Services in New South Wales, in Overseas Developments in Civil Defence (An unpublished paper delivered at the National Emergency Services College, Mount Macedon on 24 May 1977), pp. 30, 31.

40 There are currently over 30,000 active members of state and territory emergency service units. For details of the current membership see a paper prepared by the Director-General of the Natural Disasters Organization, Major-General A.B. Stretton, The Role of the Natural Disasters Organization (An unpublished paper delivered to the 1977 Industrial Mobilisation Course), p. 10.

41 Major-General Stretton has also discussed the financial status of civil defence programmes in Australia, ibid., pp. 10-25.
half have only 10% or less of their equipment requirements. The blast and fallout shelter programme has been limited almost completely to studies, the dissemination of information to interested parties and planning the emergency conversion of selected city sites for shelter purposes.

The current state of Australia's civil defence system compares most unfavourably with the majority of advanced and many underdeveloped states. In these circumstances, it is worth considering the potential of a comprehensive civil defence programme in Australia.

In well-integrated civil defence systems overseas, there are usually four categories of mutually supporting activity - evacuation, shelter, rescue and relief and warning.

One of the simplest, most effective and least expensive civil defence measures is to provide facilities for the controlled dispersal of concentrated urban populations across the expanses of sparsely occupied, but readily accessible, 

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43 The inadequate condition of Australia's evacuation planning is detailed in the Summary of Discussions and Conclusions (An unpublished paper produced following a Seminar on Civil Defence held at the National Emergency Services College, Mount Macedon on 3-6 August 1975), pp. 2, 3, 6.
44 The limited scope of Australia's shelter programme is cited ibid., p. 1, but see also a paper written by a member of the Natural Disasters Organization's National Fallout Survey Team, L.W. Wynn, Fallout Shelters (An unpublished paper delivered to the 1977 Industrial Mobilisation Course). Especially see pp. 14-20.
45 Australia's relatively poor state of development in civil defence programmes is illustrated most clearly in Air Vice-Marshall W.E. Townsend, Overseas Developments in Civil Defence, but also by reference to Kurt Ek, Civil Defence to Protect and Save Lives (Stockholm, The Swedish Civil Defence Administration, 1970), and also Civil Emergency Planning in Norway (An unpublished paper prepared by the Directorate of Civil Defence and Emergency Planning, Oslo, 1975).
rural and underdeveloped regions. Evacuation systems are normally structured so that, in the circumstances of a worsening international situation, the precautionary evacuation of non-working people - children, elderly, incapacitated, etc. - can be undertaken first. Facilities for satisfying the physical needs of the dispersed civilian population - food, shelter materials, clothing and other supplies - need to be stockpiled in advance in the dispersal regions. Although all of the available mass media are used to inform the public of these preparations, it is common in Europe for precise plans, maps and personal instructions to be published in telephone directories.46

The second element of most integrated civil defence systems is a shelter programme. Frequently two separate categories of shelter are constructed: those which are adjacent to or under residential buildings and larger structures which are constructed within cities or close to places of work. In Sweden, for instance, residential shelter construction is compulsory for every building which houses two or more families and is positioned either in a vulnerable area or in a town with more than five thousand inhabitants.47 That programme is estimated to add approximately two per cent to new residential building costs.48 The public is encouraged to utilise the space provided by the shelters for a variety of peacetime activities. The smaller residential shelters are frequently used as storage areas, libraries, activity or local community centres. The larger shelters in cities or at workplaces are used as parking stations, theatres, recreation areas and gymnasiums and, over time, largely pay for their own construction.

46 This was noted during my field trip in Europe in October-November 1975. It is also mentioned in Air Vice-Marshal W.E. Townsend, Overseas Developments in Civil Defence, p. 20.

47 For details see Kurt Ek, Civil Defence to Protect and Save Lives, pp. 29 ff.

48 This point was made in the 'Special Survey on Sweden', The Australian, June 1972, p. 2.
The third element of most integrated civil defence structures is a trained relief or rescue force. The actual methods of force formation employed overseas vary widely but in most countries large numbers of people are trained in a part-time manner to perform rescue, fire fighting and basic medical tasks. For operations within large towns and cities, specialised equipment and advanced training are required for effective function performance. While civil fire, rescue and medical facilities can be integrated into this relief system, the scale of the requirement which must be anticipated in wartime situations is of a magnitude which makes the training and equipping of large part-time forces essential.

The fourth and final civil defence element is a warning mechanism to detect the approach of potential threats and to initiate appropriate local, regional and nation-wide response measures. Because of its geographic isolation, Australia is confronted by peculiar difficulties in this regard. In many circumstances, it seems probable that a heightening of regional or global tensions would provide sufficient notice to trigger precautionary civil defence measures. However, if Australia is to be assured of preliminary warning of a bomber, intercontinental ballistic missile (ICBM), submarine launched ballistic missile (SLBM) or long range cruise missile attack, a much more advanced detection system would be required. The over-the-horizon backscatter (OTH-B) radar which Australia is developing for long range surveillance purposes should be capable of detecting and tracking the approach of long range bombers and large cruise missiles. However, the detection of ICBMs, SLBMs and probably long range cruise missiles of small dimensions may require the purchase of a surveillance satellite capability. As

49 The capabilities of this system are discussed in Chapter 2.

50 For a satellite to be capable of performing cruise missile detection as well as ICBM and SLBM detection tasks, it would probably need to incorporate advanced high-altitude large-optics (HALO) technology. For details see Barry Miller, 'Advances in Missile Surveillance Pushed' in Aviation Week and Space Technology, Vol. 105, No. 2, 12 July 1976, pp. 17, 18.
Australia already possesses numerous ground stations with a capacity to monitor such a system, the major costs involved would be those of the satellite itself and its positioning. This might cost between $50 million and $150 million.\(^\text{51}\) However, as one satellite could be expected to operate effectively for at least ten years, and it might also perform secondary military and/or civil functions, an annual cost of between $7 million and $20 million might be acceptable.\(^\text{52}\) A satellite surveillance system could be expected to provide an effective 30 minute warning of incoming ICBMs and a 5 minute plus warning of SLBMs and sea-launched cruise missiles fired from platforms close offshore.\(^\text{53}\) Under most circumstances this would be sufficient to permit widespread shelter occupation.

Australia already possesses the basic organisational framework and much of the manpower and technical expertise required for an integrated and highly effective civil defence network. However, a great deal remains to be done if the conceptual potential of civil defence is to be approached in Australia. As a bureaucratic problem, such an effort would

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\(^{51}\) These cost figures should be viewed only as generalised approximations. They are derived from more detailed calculations undertaken in 1973 based on the costs of the US 949 and 647 satellite programmes. See Ross E. Babbage, *A Strategy for the Continental Defence of Australia* (Unpublished M.Ec. thesis, University of Sydney, Sydney, 1974), p. 127. Costs would obviously vary according to the type of satellite actually procured. However, it should be noted that with the SPACE SHUTTLE becoming operational in the early 1980s, the costs of orbital placement are likely to be reduced significantly. A total system cost of $150 million has been quoted by the Vice-President of Hughes Corporation for a combined communications and regional surveillance capability. For details see Ken McGregor, 'Australia May Again Look at a Domestic Satellite System' in *Australian Financial Review*, 19 August 1977, p. 17.

\(^{52}\) These figures are calculated to include annual operating costs.

involve the diversion of resources away from already established programmes and priorities. As a political issue, the apparent remoteness of the scenarios for which it is designed makes it easy to neglect in the absence of a widespread public demand for protection.

Theme 7: Psychological Defence

The primary objectives of psychological defence structures are to inform the public in periods of peace of what they are expected to do in crisis situations and to ensure an adequate flow of accurate news and information during the actual course of a crisis or conflict. In those countries employing this concept, the existing civil media are employed extensively in the performance of both of these functions.\(^5\)

In preparing for their special tasks in crisis situations, the peacetime facilities of the media are usually analysed carefully to determine their survivability and effectiveness in a range of hostile environments. Decisions can then be made to restructure or back up existing arrangements by duplicating or protecting facilities. In a crisis situation, a properly structured psychological defence system can provide a capability to largely eliminate rumours, defeat enemy propaganda and strengthen national resolve.

Conclusion

Primarily because the national security function has been tied intimately to the activities of major power allies for so long, the consideration of alternative force structures in Australia has been limited almost completely to relatively minor variations of the conventional, major power-derived

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\(^5\) For details of Swedish psychological defence preparations see Jerry Wilson Ralston, *The Defense of Small States in the Nuclear Age*, pp. 90, 91.
order of battle. Force structure debates have tended to centre almost entirely on numbers and types of aircraft, destroyers, aircraft carriers, infantry battalions, armoured vehicles, etc. But now, with the changes in Australia's security environment stimulating a requirement to deter, defer and, if necessary, defend against a much wider range of potential pressures and threats independently, the scope of the force structure debate in Australia needs to be broadened considerably.

All of the strategy themes which have been discussed in this chapter suffer from major weaknesses and problems when viewed in isolation. Yet by drawing selectively upon the positive elements of a number of themes, it is possible to construct strategy and structure conglomerates which possess an efficient capacity to meet a wide range of pressures and threats.

For instance, the following strategy themes could be combined in various ways to produce several alternate conceptual solutions. Adapted conventional units might be used for peacetime surveillance and policing duties as well as to provide an immediate counter-attack capacity in more serious scenarios. Territorial defence forces might be employed to provide a highly survivable attrition capacity in the circumstances of major assaults as well as a local rapid-reaction force in the context of a wide range of less demanding contingencies. Civilian resistance forces might be available to organise resistance should major population centres fall into enemy hands. Economic, civil and psychological defence measures might be employed, in addition, to provide the total community with a degree of protection from the broad array of economic pressures and direct physical and propaganda assaults.

Combinations of these strategy themes could serve to optimise Australia's response capacities to particular types of threat or pressure. The precise character of the individual strategy themes and the emphasis given to particular
elements would not be a simple matter to determine. Consequently, as was discussed in Chapter 9, it would be necessary to generate and test in concept alternative mixes of strategy themes for their effectiveness in meeting a wide range of contingencies. Only through such a detailed evaluative process could a combination of themes be chosen which would optimise, in a demonstrable fashion, deterrence, deferment and defensive capacity for a given resource input.
CHAPTER 11
NEW MANPOWER OPTIONS

The Problems of the Status Quo

As with most aspects of its national security structure, Australia's military manpower system is a function of past requirements. Since the Second World War, Australia has relied almost completely upon small, highly trained, professional forces in all three services. This has made it possible to maintain a conventional armed force structure which has been highly compatible with those of Australia's major power allies. Standing professional forces readily absorb high technology systems and their inherent flexibility makes them very well suited to overseas commitments at relatively short notice. 1

However, Australia's changed strategic environment effectively generates force structure requirements which are quite different to those of the past. In this new situation, Australia's small standing military forces suffer from several important deficiencies.

Firstly, as was discussed in Chapter 4, Australia now requires a much greater surge capacity. In the first thirty days following an order to mobilise (M+30), 2 Australia requires fully equipped and trained armed forces of a magnitude substantially greater than is currently possible.

Australia does possess small supplementary reserve

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1 The strengths and weaknesses of standing professional forces are discussed at length by Erwin Häckel in Military Manpower and Political Purpose (London, The International Institute for Strategic Studies, Adelphi Paper 72, 1970), pp. 3 ff.

2 The choice of this period as a target for force structure design is, of course, open to debate. Its selection is intended merely to provide clearer perspective to the discussion in Chapter 4 concerning the lengths of active defence preparation time likely to be received prior to the onset of a wide range of threats.
forces in all three services but in total these number only 22,600 and the efficiency and overall military utility of these units leaves a great deal to be desired.\(^3\) As the Committee of Inquiry into the Citizen Military Forces reported:

We have seen a progressive deterioration in ... [the] reserve component to its present state, which, despite the best efforts of its members, must be regarded as unsatisfactory and in urgent need of reorganization and rehabilitation.\(^4\)

The length and nature of the Army Reserve training cycle (normally a 14 day annual camp and 12 days weekend or evening training) effectively restricts its peacetime efficiency as well as its potential for wartime service.\(^5\) It has been estimated officially that in a crisis situation the current reserves could not be ready for combat duty before M+180 to 300.\(^6\) This is too slow to be of significant assistance in meeting a wide range of scenarios which are characterised by short defence preparation times. But even if the existing reserve forces could be deployed in time to meet the contingency at hand, their very limited numbers would restrict their battlefield potential severely.

Because of these obvious weaknesses, a possible alternative function for the current reserves in crisis situations might be to serve as a basis for further force expansion. However, even in this cadre role, a study


\(^5\) The time obligations for some specialised units, such as the 'Bushmen's Rifles' and Commando Units do differ from those given in the text. Full details are provided in the chapter entitled 'Conditions of Service, Pay and Administration' in the Millar Report, *ibid.*, pp. 101-116.

commissioned by the Millar Inquiry concluded that, from a level of 20,000 enlisted personnel, it would take three years to expand to 55,000, and even that would be possible only if a considerable imbalance in the rank structure was accepted.  

Australia's armed forces as they currently stand have not been designed to optimise surge capacity. However, in the new strategic environment, many pressures and threats may arise quickly and Australia requires a capacity to meet them with a much higher degree of independence than has been necessary in the past. As a consequence, there is now a clear and urgent need for alternative manpower systems to be examined for their capacity to provide the greater levels of force expansion capacity which are necessary.

The second major weakness of Australia's current small professional military forces is that, as was discussed in Chapter 4, the costs of servicing and maintaining forces of this type are rising dramatically. The trends in Australia's defence budgetary allocation from 1965-66 to 1975-76 can be seen in Figure 1. As the costs of full-time manpower and its maintenance have risen, the proportion of the budget remaining for new capital equipment, the construction of new defence facilities, the maintenance and development of defence industrial support and other important national security functions has fallen dramatically.

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7 Ibid., p. 50.

8 The full impact of these developments on the overall force structure is not fully conveyed by this diagram. For not only have manpower and maintenance costs risen dramatically during this period but so have equipment costs. See this discussed by Desmond J. Ball in 'Australia's Tactical Air Requirements and the Criteria for Evaluating Tactical Aircraft for Australian Procurement' in Desmond Ball (ed.), The Future of Tactical Airpower in the Defence of Australia (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 61-65. The end result has been that not only has a smaller proportion of the total defence budget been allocated to capital equipment but, in addition, the equipment buying capacity of a given number of fixed-year dollars has also fallen.
FIGURE 1. CATEGORIES OF EXPENDITURE AS A PERCENTAGE OF THE TOTAL DEFENCE BUDGETARY VOTE

Percentages of Expenditure

100
90
80
70
60
50
40
30
20
10

1965/66 66/67 67/68 68/69 69/70 70/71 71/72 72/73 73/74 74/75 75/76

Financial Years

Sources: The statistics for this figure were derived from tables appearing in Department of Defence, Defence Reports for the years 1967, 1968, 1970, 1975 and 1976 (Canberra, Australian Government Publishing Service).
This type of standing manpower cost-squeeze phenomenon is not confined to the Australian military structure. It has been the subject of extensive inquiry in a number of advanced western countries during the past decade. In West Germany, for example, the capital expenditure share of the defence budget fell from 41.1 per cent in 1968 to 30.6 per cent in 1972. The German Government realised that, if this trend was allowed to continue unchecked and if the manpower structure as it then existed was retained unaltered, the proportion of the defence budget which would be available for capital expenditure in 1981 would be reduced to an unacceptable 7.3 per cent. As a consequence, a Force Structure Commission was established in July 1970 to examine alternative military structures. One of its prime directives was to derive force structure alternatives so that within the postulated budgetary allocations for the late 1970s and 1980s, the proportion of the defence vote allocated to capital expenditure would not fall below the minimum acceptable level of 30 per cent.

A number of similar investigations and measures have been undertaken in other countries to ensure that capital expenditure as a proportion of defence budgets has remained in the 25-35 per cent category. This high level of concern


and remedial activity contrasts markedly with Australia's recent experience. Even allowing for international differences in the methods of calculating manpower and capital expenditures, it seems clear that the proportion of Australia's defence budget now allocated to capital expenditure is much lower than that of comparable countries and insufficient for the long term sustenance of 'state of the art' conventional forces. As Desmond Ball has remarked, '... most developed defence establishments seem to have a ratio of equipment spending to the total defence vote which is 2-3 times better than Australia's.' The major implications of permitting manpower and maintenance expenditures to continue to dominate Australia's defence budgets will be to restrain heavily the processes of structural adaption to the new strategic requirements and to limit severely the operational capacity, flexibility and endurance of the total defence system. A thorough examination of alternative means of overcoming the standing force cost-squeeze problem is overdue in Australia.

The third and final major weakness of the present professional force structure is that its dimensions are restrained by the number of recruits which can be attracted as volunteers. As was discussed in Chapter 5, the absolute size of the manpower pool available in Australia during the 1980s will be limited and relatively stable in size. When this is combined with the inelastic supply function for military manpower, it becomes clear that in normal economic

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circumstances, it will be very difficult and expensive to expand the professional standing forces significantly beyond their current levels. This imposes a very severe constraint upon the nation's capacity to react to changes in the strategic environment. As was discussed in Chapter 4, a resort to conscription in crisis situations does not provide a satisfactory means of supplementing existing force levels within the time constraints of a wide range of scenarios.

It can be concluded from this discussion that there are three important new criteria to be considered when evaluating alternative types of manpower systems for Australia's future national security requirements.

1. It is of central importance to boost the dimensions of the defence force which can be mobilised within a short period, such as four to six weeks.

2. Because, in the past, defence budgets have not been compensated fully for the rising support costs of professional personnel, and it appears unlikely that this will be done in the future, it is imperative that the proportion of the total defence budget allocated to personnel be expended in such a manner that it can produce a larger and more effective mobilised force. In practice, this implies a requirement to reduce significantly the total force's costs per mobilised man.

3. It is important to recognise the inelastic supply constraints on Australia's voluntary full-time manpower pool and develop alternative ways of raising forces.

The Potential of Latent Manpower Options in Australia

The three new criteria for Australia's national security manpower system effectively raise a requirement for part-time, mobilisation-dependent or latent forces. The nature of a series of latent force options is discussed at some length in Kenneth Hunt, *The Alliance and Europe*, pp. 10, 11.
United States Secretary of Defense, Melvin Laird, explained the rationale for such forces clearly in his Congressional statement on the 1972 defense budget:

Lower sustaining costs of non-active duty forces, as compared to the cost of maintaining larger active duty forces ... allows more force units to be provided for the same cost as an all-active force structure, or the same number of force units to be maintained at a lower cost.\(^\text{14}\)

The costs of latent or non-active forces are lower than those of comparable standing forces primarily for three reasons. Firstly, as latent personnel perform national security duties for only a relatively small proportion of the year, they are only paid for that time. Secondly, the rates of equipment usage (rounds fired, miles travelled, hours steamed or flown, etc.), tend to be somewhat less per year than for standing units and thus, lower operations and maintenance costs are incurred. In addition, the capital equipment holdings of latent forces normally have a lower rate of natural attrition. The third reason why latent forces tend to be less expensive than standing forces is that, in most countries, latent force personnel are not entitled to most of the fringe benefits enjoyed by full-time personnel, except when they are on active duty. The peacetime requirement for full-time medical, dental, travel, recreational and other support services is thus usually much reduced. As a consequence of these factors, Martin Binkin asserts that the average per capita personnel costs of reserve forces in all four US armed services are approximately one fifth of those for otherwise comparable active standing units.\(^\text{15}\) In some European military structures the contrast is even more marked.\(^\text{16}\)


\(^{15}\) Ibid., p. 14.

\(^{16}\) The relative costs of a number of latent manpower systems are discussed in Erwin Häckel, Military Manpower and Political Purpose, pp. 18-22 and also in Horst Mendershausen, Territorial Defense in NATO and Non-NATO Europe, p. vi.
However, in order to compare the total annual costs of latent with standing force units, an allocation for operations and maintenance (fuel, repairs, etc.), for the construction of facilities and for the procurement of capital equipment must be added to the personnel costs of each type of force. It is here that an important difference between various types of latent military units emerges. Obviously the capital equipment, facilities and operations and maintenance costs of a fighter-bomber or destroyer unit are much greater per man than those of a light infantry unit, regardless of whether it is manned by full-time or part-time personnel. Thus, in highly capital intensive units, especially those operating complex ships and combat aircraft, the large size of capital equipment, facilities and operations and maintenance costs tends to reduce the overall significance of the savings which can be made by operating such units with part-time personnel. Herman Boland illustrates the point by referring to US Navy selected reserve ships. In their case, initial acquisition accounts for more than 60 per cent of the costs of operating these vessels over a ten year life cycle. Thus, the potential savings which can be made by substituting part-time forces for full-time professionals are much lower in specialised high technology and skill areas than in units employing low and medium technologies and relatively unsophisticated skills. In fact, in the United States' case, the total annual costs of a reserve destroyer unit have been cited in Congressional hearings as 60 per cent of an active destroyer unit, those of a reserve air defence squadron between 40-46 per cent of an active squadron and those of an infantry battalion 21 per cent of those of an active unit. The higher the proportion of total unit costs


taken up by personnel and maintenance expenditure, the greater the potential for gain by latent force substitution.

However, in practice, there are a variety of factors which effectively limit the scope for adopting latent force options in Australia. Firstly, latent forces of most types tend to be generally less capable on the battlefield than similarly equipped standing units. Yet this weakness of latent forces should not be overemphasised. As might be expected, the capacity of part-time units varies greatly according to a large number of factors, but particularly the amount of effective training they receive. As Horst Mendershausen points out:

A latent force can, of course, be a thing of many different hues and colors. The fact that it is not standing, i.e. not made up of men living permanently in barracks next to their equipment, may mean that it is no force at all. Its members may be reservists with some previous but largely forgotten military training, spread out over civilian society, unassigned to specific units or functions, practically unrecallable and, if recalled, not immediately (if ever) usable. Its units may be paper organizations; its equipment primitive, in bad condition, or nonexistent; its leaders, superannuated. 'Forces' exist which have several if not all of these characteristics. Yet to assert that these are the necessary characteristics of a latent force, as some partisans of standing forces sometimes do, merely invites a similar caricature of standing forces as barracks full of time-serving, crime-prone, soldier-playing, and in time of real challenge, hapless ruffians. Latent forces can also be well-trained and retrained soldiers, familiar with their tasks and equipment, quickly recallable and smoothly assignable, capably officered, and well-equipped. They can, moreover, be intertwined with standing elements, permanent cadres or specialists in many, including highly efficient, ways.\textsuperscript{19}

\textsuperscript{19} Horst Mendershausen, \textit{Territorial Defense in NATO and Non-NATO Europe}, p. 20.
There have certainly been a large number of instances where part-time forces have acquitted themselves very well in combat. For example, the performance of the Israeli tank crews in recent wars has been acclaimed almost universally as being first class. In some respects an even more notable case is cited by Adam Roberts:

During the battle of France in 1940, groups of Me 109 fighter aircraft frequently flew over Swiss territory. They were regularly intercepted by Swiss citizen pilots flying exactly the same aircraft - Me 109s. The rate of scoring was 7 to 1 in favour of the Swiss; not figures to be shrugged off as quite insignificant.

The proven combat capacity of well-trained, equipped and led latent force units has encouraged a large number of countries to attempt to exploit their full potential. A notable example is the United States. In the US Army, for instance, 43 per cent of total manpower, 38 per cent of division increments, 66 per cent of support increments and 56 per cent of air defence batteries are provided by reserve forces. In the US Navy, 34 per cent of anti-submarine warfare squadrons are operated by reserves. 25 per cent of the US Marine Corps divisions and air wings are provided by reserve forces. For the US Air Force, 50 per cent of airlift crews, 50 per cent of fighter air defence strength and 50 per cent of tactical reconnaissance capacity will be provided by Air Force Reserve and Air National Guard units by fiscal year 1979. In that year, reserve units will also


22 For details see Martin Binkin, US Reserve Forces, p. 10.
provide 33 per cent of US tactical fighter strength and 20 per cent of the Air Force's strategic air refuelling capability. The important role played by latent forces in the military structures of the United States, most European NATO and neutral countries is difficult to dispute seriously. Although on a direct unit comparison basis most European and US latent force units are marginally less capable than their comparable full-time equivalents, their lower overall costs and the natural process of post-mobilisation capability equalisation reinforce their cost-effectiveness in most environments.

The second major constraint on the widespread adoption of latent force options is that, because of their part-time nature, they tend to be slower to mobilise than standing full-time forces. In practice, well-trained and organised latent units are limited in their mobilisation only by the simple administrative task of gathering personnel from their normal civilian activities. In fact, in some countries, latent force mobilisation times rival those for standing forces. The biggest constraint on latent force mobilisation occurs only when part-time units are insufficiently prepared

23 These figures are drawn from the testimony of General D.C. Jones, Chief of Staff, United States Air Force, before a Subcommittee of the Committee on Appropriations, US House of Representatives, Department of Defense Appropriations 1977, Part 1, 2 February 1976, p. 68.

24 Martin Binkin states that some US Air Force Reserve tactical units have met deployment standards surpassing those set for active units. See Martin Binkin, US Reserve Forces, p. 9. The Swedes claim to be able to mobilise their complete structure within 72 hours. See Adam Roberts, Nations in Arms, p. 98. The Swiss claim a capability to be fully mobilised within 48 hours. See 'A Look at the Swiss Army' (An official translated digest of D. Borel, 'Aperçu de l'armée suisse' in Revue Militaire Suisse, September 1972), p. 1. The Israelis claim a mobilisation time of 36 hours, but during an exercise in August 1974, 90 per cent of Israeli combat units were mobilised in a record 22 hours. For details see 'Israeli Military Manpower Raised to 400,000' in International Defense Review, Vol. 10, No. 2, April 1977, p. 205.
for immediate commitment to combat. Post-mobilisation training can effectively delay the processes of total force deployment for very long periods.

A further constraint on the employment of latent force units is that there are some military functions which are not well suited to part-time personnel operation because they require round-the-clock duty, even in periods of peace. Regional surveillance, reconnaissance, intelligence and basic command functions all fall into this category. It is notable in this context that those components of the Australian Defence Force which may require full-time operational status in the new strategic environment may not be the same as those judged to require it in the past.

Another constraint upon the development of latent forces is that many of the people who might normally volunteer for part-time service in periods of peace occupy full-time posts in the civil community of a 'reserved' nature from which they could not easily be removed in a time of crisis. This factor tends to reduce the size of the manpower pool which is eligible for latent force recruitment and, if personnel in organisations of a marginally 'reserved' character are permitted to join the forces, it may also serve to complicate the actual processes of mobilisation.

25 It is notable that in the absence of large, well-equipped and easily mobilised latent army units at the commencement of the Second World War, the first Australian division to be deployed (the 6th Division, Second AIF) was ready for combat only after eight months intensive training. For details see Gavin Long, To Benghazi (Canberra, Australian War Memorial, 1952), pp. 68, 126.

26 Where post-mobilisation training is necessary, the smaller the unit to be deployed, the shorter the period of post-mobilisation training which is generally required. In other words, it is normally much simpler and quicker to deploy post-mobilised trained latent forces as army companies, aircraft squadrons or individual ships than as divisions, wings or ship squadrons.

27 For details of the difficulties caused by the presence of personnel with 'reserved' occupational skills in the Second World War, see S.J. Butlin, War Economy 1939-1942 (Canberra, Australian War Memorial, 1955), pp. 228-234.
A fifth major constraint on the substitution of part-time for full-time personnel is that a large proportion of defence manpower in Australia, as in all western states, consists of civilians who perform administrative and support functions. Because of the continuous nature of their work requirement, there is no financial incentive to replace these individuals by larger numbers of part-time personnel operating in rotation.

As can be seen from Table 1, despite the problems of international comparisons, the size of Australia's civilian 'tail' does not appear to be out of proportion to those of comparable western countries. Moreover, a detailed breakdown of the distribution of civilian manpower within the Australian defence structure reveals that this sector performs many functions which are of central importance to the overall capacity of the national security system. For instance, civilian personnel provide direct support to combat and training units and, in so doing, free military personnel from many purely administrative tasks. Civilians also provide much of the repair, maintenance, production and supply which is vital to the defence structure's operational capacity and endurance.28

This is not to suggest that economies could not be made in Australia's civilian support structure. If, for instance, Australia follows the general trends dictated by modern technological developments and reduces the number of large surface naval ships in the fleet,29 it may also be possible to reduce gradually the size of the civil workforce engaged in naval dockyards. In the defence factories, where surplus capacity and underemployment are perennial problems

28 A case can be made, on economic grounds, for the replacement of military personnel by civilians in an even wider range of defence tasks. See this case made briefly by R.E. Babbage, D.J. Ball, J.O. Langtry and R.J. O'Neill, The Future Operational Requirement and Officer Development (Canberra, Strategic and Defence Studies Centre, The Australian National University, 1977), pp. 3, 4.

29 This trend is discussed in Chapter 2.
Table 1
A Comparative Tabulation of Civilian Personnel
Strengths in Defence Establishments

<table>
<thead>
<tr>
<th>Country</th>
<th>Numbers of civilians (in thousands)</th>
<th>Civilians as a percentage of all full-time defence personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>330</td>
<td>91</td>
</tr>
<tr>
<td>Canada</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Australia</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>West Germany</td>
<td>168</td>
<td>35</td>
</tr>
<tr>
<td>United States</td>
<td>1,122</td>
<td>34</td>
</tr>
<tr>
<td>Denmark</td>
<td>14</td>
<td>32</td>
</tr>
<tr>
<td>France</td>
<td>131</td>
<td>27</td>
</tr>
<tr>
<td>Italy</td>
<td>82</td>
<td>20</td>
</tr>
<tr>
<td>Austria</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Sweden</td>
<td>30</td>
<td>37 (5)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>21</td>
<td>43 (3)</td>
</tr>
</tbody>
</table>

Sources: The figures for all countries except Australia are drawn from Erwin Häckel, Military Manpower and Political Purpose, p. 17. Häckel emphasises that his figures are approximations only and they relate to 1969-70. Those for Australia are drawn from Department of Defence, Defence Report 1976 (Canberra, Australian Government Publishing Service, 1976), p. 59 and from D.J. O'Connor, 'The Contribution by the Defence Factories to Australia's Defence Capability' in The United Service Institution of the Australian Capital Territory, The Defence Capability of Australian Industry (Canberra, The United Service Institution of the Australian Capital Territory, 1977), p. 3. Note that the figures for Australia relate to 1976-77. The figures for Sweden and Switzerland are the percentages of average peacetime armed force strength. The percentage figures in brackets are calculated on the basis of full mobilisation strengths.

It is difficult to draw detailed conclusions from this table. Some countries employ civilians for a much wider range of tasks than others. A large civilian 'tail' may not necessarily be a symptom of civilian bureaucratic inefficiency but rather an indication of high levels of military specialisation and efficiency. In fact, there appears to be a close correlation between the size of the volunteer element in the armed forces and the size of the civilian defence administration.
Table 2

Functional Distribution of Full-Time Defence Manpower

<table>
<thead>
<tr>
<th></th>
<th>Service</th>
<th>Civilian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combat Forces</td>
<td>23,600</td>
<td>-</td>
<td>23,600</td>
</tr>
<tr>
<td>Direct Logistic Support to Combat Forces</td>
<td>6,400</td>
<td>900</td>
<td>7,300</td>
</tr>
<tr>
<td>Specialist Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(eg. Medical Services, Communications)</td>
<td>5,300</td>
<td>1,000</td>
<td>6,300</td>
</tr>
<tr>
<td>Stores and Supply</td>
<td>3,200</td>
<td>5,000</td>
<td>8,200</td>
</tr>
<tr>
<td>Workshops and Repair Facilities</td>
<td>2,900</td>
<td>900</td>
<td>3,800</td>
</tr>
<tr>
<td>Quality Assurance, Inspection</td>
<td>100</td>
<td>1,300</td>
<td>1,400</td>
</tr>
<tr>
<td>Naval Dockyards - Construction and refit program</td>
<td>100</td>
<td>5,300</td>
<td>5,400</td>
</tr>
<tr>
<td>Training Staff, Direct Support and Servicemen in Training</td>
<td>17,700</td>
<td>1,800</td>
<td>19,500</td>
</tr>
<tr>
<td>Support to Reserves and Cadets</td>
<td>1,600</td>
<td>100</td>
<td>1,700</td>
</tr>
<tr>
<td>Research and Development</td>
<td>400</td>
<td>5,700</td>
<td>6,100</td>
</tr>
<tr>
<td>Central and Departmental Functions and Specialist Administrative Services</td>
<td>2,300</td>
<td>3,700</td>
<td>6,000</td>
</tr>
<tr>
<td>Defence Regional Offices - provide financial, audit, civil personnel and management support to the Services and the Department</td>
<td>-</td>
<td>1,900</td>
<td>1,900</td>
</tr>
<tr>
<td>Service Command and District HQs and Administrative Units - provide administrative support to Service Units and Establishments</td>
<td>5,200</td>
<td>2,900</td>
<td>8,100</td>
</tr>
<tr>
<td>Defence factories</td>
<td>-</td>
<td>7,961</td>
<td>7,961</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>68,800</td>
<td>38,461</td>
<td>107,261</td>
</tr>
</tbody>
</table>

Sources: Department of Defence, *Defence Report 1976* (Canberra, Australian Government Publishing Service, 1976), p. 19. The figures relating to defence factories were gained during a conversation with a spokesman for the Department of Productivity and were correct as at September, 1977. (The Department of Productivity controls the defence factories.)
in times of peace, the central national security objective should be the preservation of skills and capacities rather than simple employment. In this type of situation, it may be preferable to reallocate funding so that highly efficient capital equipment and plant may be installed, but only operated in periods of peace by fully-trained personnel operating on a part-time basis. The wage and salary savings derived might be invested in expanded emergency production capacities or, alternatively, reallocated to other, more pressing national security priorities. There may be additional potential for savings by reducing the level of civilian support provided to a large number of components of the national security structure.

Overall, it must be concluded that the scope for substituting latent for full-time service and civilian manpower in the Australian national security structure is limited. The large number of civilians and the substantial proportion of servicemen whose functional tasks do not render them easily replaced by part-time personnel effectively provides a relatively large and stable (in real terms) fixed manpower cost factor in the national security system. Those functions which remain most amenable to latent forces do not require round-the-clock peacetime duty, can be performed by exploiting skills already held in the civil community and/or involve skills which are mastered readily by significant sections of the civilian population. However, in addition, the potential scope for employing part-time forces in the Australian national security structure also varies greatly according to the type of latent force systems considered.

30 The problems of operating the defence factories in periods of peace are discussed at length in the Interim Report of the Joint Parliamentary Committee on Foreign Affairs and Defence, Industrial Support for Defence Needs and Allied Matters (Canberra, Parliament of Australia, June 1977).
Alternative Latent Force Systems

There are three broad categories of latent manpower systems—those involving universal conscription, selective conscription and voluntary service. The possibilities and problems of each of these options, as they might be applied in the Australian environment, are discussed in turn.

1. Universal Conscription

A large number of western countries employ universal conscription systems to train young men for a period of between 9 and 36 months.\(^{31}\) As well as being very common in an international sense, universal conscription also appears to be by far the most popular type of military manpower system with the Australian population. During a series of public opinion polls more than 60 per cent of the respondents have consistently expressed their preference for a programme of compulsory military service of between 3 and 12 months.\(^{32}\)

\(^{31}\) Those western countries operating universal conscription systems include France, Belgium, the Netherlands, Norway, Denmark, Austria, Finland, Italy, Sweden, Switzerland and Israel.

\(^{32}\) The general preferences of Australians in this regard were displayed in the poll results reproduced in Chapter 5. However, in addition, Australian Gallup Polls sampled the opinion of the public with greater precision on two occasions in 1972. On the first occasion, people were asked which proposal 'came closest to their ideas about compulsory military training'. (Note that this question is highly ambiguous.) The results were as follows:

- All young men to camp for 6 months: 42%
- All young men to camp for 3 months: 21%
- Total of those in favour of training 'all young men': 63%
- 1 in 12 for 18 months, as now: 11%
- Only full-time volunteers: 19%
- No military training: 4%
- No opinion: 3%

On the second occasion the question remained the same and, despite a different set of alternatives, the results were comparable:

- All young men should go to camp for about 12 months: 38%
- All young men should go to camp for about 3 months: 28%
- 1 in 12 should be called up for 18 months, as now: 7%
- We should have only full-time volunteers: 20%
Yet despite its apparent popularity, a system of universal conscription would be extremely difficult to implement satisfactorily in practice and would not necessarily provide a basis for meeting Australia's national security requirements.

During the 1980s and 1990s, a reasonably constant 130,000-140,000 young men will reach the age of 18 each year and under a system of universal conscription they would all be liable for call-up. Even if 40 per cent or 50 per cent of these were rejected on medical, educational, conscientious objection or some other grounds, universal conscription would still provide 70,000-85,000 young men to be trained and equipped annually.\(^{33}\) The cost of equipping the numbers involved with even the most basic infantry weaponry would, in itself, impose a significant strain on the defence budget. Yet in addition to equipment costs, the expense of feeding, training and paying a force of this size would

\(^{33}\) There should be no military training in Australia

4%  
No opinion 3%


It is conceivable that the rejection rate for conscripts might be even greater than this. In the selective conscription system, which operated in Australia between 1964 and 1972, approximately 70 per cent of those balloted into the scheme did not actually serve. A large proportion were rejected on educational, medical or conscientious objection grounds. But, in addition, those who were married and those undertaking religious training to become ministers of religion or priests were also excluded. A further number had their service obligation deferred because of their involvement in trade or professional courses of education. For details see Roy Forward, 'Conscription 1964-1968' in Roy Forward and Bob Reece (eds.), *Conscription in Australia* (St. Lucia, University of Queensland Press, 1968), pp. 120-122. It is notable that, in most foreign countries employing systems of universal conscription, the proportion of each age group which actually serves is, in several instances, over 85%. See Erwin Häckel, *Military Manpower and Political Purpose*, pp. 4-9.
have to be met. Moreover, the capacity of the regular forces to train effectively the large number of conscripts which would be involved in such a scheme must be the subject of considerable doubt. It is notable that the Army experienced extreme difficulty in providing even the most basic training to the 28,000 youths who were enlisted annually under the National Service Training Scheme between 1951 and 1957.\textsuperscript{34} It is thus reasonable to anticipate that, in the absence of a very major restructuring of the regular forces, the conscription of even larger numbers of young people in the late 1970s or 1980s would encounter similar difficulties.

Clearly the running costs of such a scheme would vary according to the length of conscript training. It is here that one of the major dilemmas of the universal conscription option becomes apparent. A conscription period 3-6 months long might be sufficient to train recruits in the absolute basics of territorial defence, civil defence or civilian resistance, if these alternative strategies were to be adopted. However, it would be extremely difficult to teach the skills required for the effective performance of conventional military operations in this period.\textsuperscript{35} Hence, in order to train conscripts to perform efficiently the military functions required of them, at least 6 months is likely to be necessary for those trained in territorial defence, civil defence and civilian resistance units and a minimum of 9-12 months for those destined for conventional units. Because of the numbers involved, this type of training effort would fully occupy almost the entire regular forces

\textsuperscript{34} For details of the National Service Training Scheme, which in a modified form continued until 1959, see Neville T. Shields, 'National Service Training, 1950-1959' in Roy Forward and Bob Reece (eds.), Conscription in Australia, pp. 66-78.

\textsuperscript{35} The length of the initial training period in the Swiss Army is only 4 months. The Swiss freely admit that this restricts severely the efficiency of their personnel in conventional units until they have successfully completed a series of supplementary training periods. See Erwin Häckel, Military Manpower and Political Purpose, p. 11.
and the budgetary costs would undoubtedly be high.

Moreover, the national security utility of such a training system would be highly dependent upon a range of supporting measures. It is important to realise that a simple system of conscripting young men for several months' military service would, on its own, be very wasteful of civil manpower and military resources. The majority of conscripts returning to civil employment would rapidly lose their acquired military skills. In order to avoid the natural wastage of training and equipping large numbers of personnel and then permitting a natural attrition of their operational capacity, it would be important to retain conscripts in formed units and to institute a system of compulsory supplementary training periods. Without the reinforcement of acquired skills and knowledge and the subsequent development of additional expertise which such a system would permit, the national security value of a universally conscripted force would be very limited unless the period of initial full-time training was of extended duration.

There are many other complications and problems which have been experienced by countries employing systems of universal conscription. For instance, although it is rarely described as such, conscription is a tax in kind and, as a consequence, many of the real costs are hidden. Regardless of an individual's personal preferences or productivity in another occupation, universal conscription provides no legal option but to undertake training for the period required. In this sense, universal conscription represents an inefficient and unreasoned use of labour resources. Many of the frictional costs expressed in terms of disrupted production and education systems, although hidden and difficult to quantify in a simple budgetary sense, are no less real.

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This argument is made in greater length and detail by Ross Parish and Mendel Weisser in 'Paying the Soldier his Hire ... the Economics of Abolishing Conscription', *Current Affairs Bulletin*, Vol. 46, No. 3, 27 July 1970, pp. 72-74.
A related problem arises as a result of the significant proportion of each age group which is inevitably excluded from the call-up on medical, educational, conscientious objection or other grounds. In most countries employing universal conscription, it is a continuing political and social question whether such individuals should be required to pay a compensation tax or suffer some other type of penalty in lieu of their labour tax in kind.37 This same question could be expected to be the source of debate and potentially of political disagreement if such a system were to be introduced in Australia.

The final major difficulty of a system of universal conscription is that, in a period of peace with no clear and obvious external threat to the nation, it is doubtful whether Australians as a whole would consider national security preparations of such a socially disruptive nature to be warranted. Despite the fact that well over 60 per cent of the population have consistently expressed their support for universal conscription for at least 3 months service, approximately 25 per cent of the sample has also expressed consistent opposition to any form of compulsory military training. If only a small proportion of the young men conscripted proved to be unwilling or recalcitrant recruits, the costs in terms of political and military turbulence and social discord may be sufficient, over a period, to outweigh any possible benefits.

2. Selective Conscription

Under a system of selective conscription, it is possible to limit the intake of recruits specifically to match national security requirements. It also means that those recruits who

37 The Swiss, for example, levy a special military tax or Militärpflichtersatz on all Swiss males who for medical or other reasons do not serve in the Army. For details see Erwin Häckel, Military Manpower and Political Purpose, p. 21. A wide range of equalisation methods is also discussed in Force Structure Commission of the Federal Republic of Germany, The Force Structure in the Federal Republic of Germany, pp. 158-167.
are called up can be trained for much longer periods of time without imposing severe strains on the national economy. Full-time training for a period of between 9 and 18 months is sufficient to impart a high level of skill in either conventional, territorial, civil defence, or civilian resistance techniques and thus selective conscription potentially provides much greater scope for the application of the full range of alternative strategic concepts.

As with universal conscription, if a selective system's cost-effectiveness is to be maximised, it is necessary to retain trained people in mobilisable units for several years following their initial call-up. This requires the institution of a system of supplementary training at regular intervals.

Another feature shared by universal and selective conscription systems is that much of the total cost to the economy and society is expressed in terms of overridden preferences, disrupted careers, interrupted courses of education, etc. and as such is largely concealed from quantifiable assessment or easy public scrutiny. However, in addition, the budgetary costs of such an option could be expected to be substantial, particularly if compensatory taxes are not levied on those who avoid the call-up. In this situation, the requirements of Australian political and social equity would require, in normal peacetime circumstances, that those who are conscripted be well paid and provided with a wide range of post-conscription support services. The level of financial generosity which such a policy would imply could amount to a substantial budgetary burden.\footnote{For details of the support measures provided to Australian conscripts in the scheme initiated in 1964, see Roy Forward, 'Conscription 1964-1968', in Roy Forward and Bob Reece, (eds.), Conscription in Australia, pp. 123-126.}

It is clear from the opinion poll results displayed in this chapter and in Chapter 5 that the Australian public favours either a form of universal conscription or a totally voluntary military structure. These preferences have most probably been reinforced by the experiences of the Vietnam
era and by the changing nature of the social values held by the Australian public. As a consequence, despite its relative attractiveness in purely military terms, the political problems of the selective conscription option are likely to thwart any serious attempt to seek its reintroduction in peacetime.

3. Voluntary Latent Forces

The primary emphasis in voluntary latent force systems is the selective employment of civilians who possess skills which can be further developed for national security purposes. Because recruitment is voluntary, there is little political or social difficulty in acquiring appropriate numbers of each type of recruit which is required so long as the market price for part-time skilled labour can be met or exceeded.

The most efficient type of voluntary system is one where the length of full-time service and the frequency and duration of supplementary training periods are varied according to the technical skills, the rank and responsibility of individual recruits. For instance, a high school graduate who desires to be trained as a sergeant in a territorial defence unit may require 9 months full-time training with 4 weeks full-time supplementary activity every second year. A similar high school graduate who desires to become the driver of an armoured personnel carrier in a conventional armoured cavalry unit may require 12 months full-time training and 3 weeks supplementary duty annually. A fully qualified civil truck driver may require only three months full-time duty to be trained as a truck driver in an army logistics unit. Supplementary training periods in his case might be limited to three weeks full-time duty every second year. A fully qualified pilot of a civil jet airliner might require 6 months full-time training to reach

39 A similar categorised system is used to train Swedish conscripts. For details see The Swedish Army (An official booklet produced by the Press Department of the Swedish Army Staff, no date), pp. 7-11.
the standards required of Air Force fighter-bomber pilots or 2 months to reach those required of a military transport pilot. Supplementary training for these individuals might average three days per month for a part-time fighter-bomber pilot and one day per month for the pilot of a military transport aircraft. 40

Voluntary latent manpower systems provide the potential to draw heavily upon a wide range of skills already existing in the civil community. For the individuals employed in such a system, the skills learnt in both the civil and military spheres would tend to be mutually reinforcing. Both civil and military employers, as well as the individuals concerned, would stand to gain. In addition, the system would effectively provide strategic planners with a great deal of flexibility. Over time, force structures could be tailored precisely by controlling closely the numbers of particular types of skilled individuals recruited.

The overall costs of such a system would be expressed in quite different terms to those of the conscript options. The training and manpower costs per hour would most probably be higher than those for comparable standing units. This would particularly be the case if it were decided to pay the full market price for the services of the individuals concerned. In these circumstances, it would be necessary to award what would, in effect, be overtime rates and, because many of those involved would possess high levels of skill in their civilian employment, their part-time service would command high rates of pay. 41 An additional factor would be

40 The training times cited in this section, although intended to be merely illustrative, are comparable with those employed in other countries.

41 The high hourly rates of pay awarded to voluntary latent forces might be resisted strenuously by full-time military personnel. This objection might be overcome, at least partially, if the latent force rates of pay were reduced below civilian overtime levels but made non-taxable. This could be expected to provide a strong incentive to a wide range of skilled civilians whose normal incomes are subject to high rates of progressive income tax.
that the periods of training for these individuals, although relatively short, could be expected to be very intensive and thus incur high maintenance, support and capital attrition costs. Yet despite these relatively high hourly costs, the price per fully trained and equipped mobilised man could be expected to be substantially lower than those for comparable full-time standing personnel.

So, in summary, this type of voluntary latent force system is adaptable to a wide range of strategic concepts. Although it may involve higher budgetary costs per mobilised man than either type of conscription system, voluntary latent forces do appear to be much less politically sensitive and socially and economically disruptive. As a consequence, this option, or some variant of it, would appear to provide the most desirable form of latent military manpower in the absence of a serious and obvious national security threat.

The Interaction of Strategy and Manpower Options

The potential for employing latent force options in Australia varies greatly according to the types of strategy options considered. If Australia continues to rely heavily upon conventional military strategies and structures, the potential for latent force substitution is limited to the selected introduction of 'hybrid' and 'cadre' units of the same general mobilised nature as present standing units. Hybrid units contain a mix of full-time and part-time elements within a full-time professional command and control structure. Cadre units, on the other hand, maintain only a skeleton of full-time personnel (normally under 35 per cent) to assist in peacetime organisation, administration and the maintenance of equipment and facilities. The vast majority of cadre unit positions are filled by part-time individuals on mobilisation. 

The potential savings which a mix of standing and latent conventional units can provide are evidenced by the increasing popularity of such options, particularly in Western Europe. As Kenneth Hunt points out, this is the type of system which the West German Force Structure Commission concluded would best suit their needs:

... the German Force Structure Commission ...
has proposed that the existing 33 brigades (which are substantially under-strength) be reduced to 24 at full-strength and 12 in cadre, to be brought up to full size by the mobilization of reservists within three days. (It will be noted that the recommendation produces three extra brigades, thus involving more equipment.) Costing is, of course, difficult to estimate, since it will vary with countries, depending on how much reservists are paid when they are called up for training or in crisis. It will vary, too, with the size of the regular cadres, the length of training that reservists get each year and the arrangements for looking after their equipment. All that can be said here is that manpower costs, which are forming an increasing part of defence budgets, should be markedly lower.43

Steven Canby, a senior United States defence analyst, has argued the case for an even more extensive substitution of West Germany's standing divisions for hybrid and cadre units:

German ground forces total 340,000 in peacetime, of which 35,000 are in the territorial forces and 28,000 in the various defence agencies. Assuming wartime division slices of 20,000, the German field army of 277,000 could produce a 25 division structure, say 7 Category I division slices at near full strength; 8 Category II at 50 per cent strength; and 10 Category III at 25 per cent strength. With a similar cadre ratio and assigned strength in the defence agencies, France could support 23 divisions, the Netherlands 6½ and Belgium 5¼. Another combination to increase immediate front-line readiness and overall structure, while reducing

German visibility, would be to lower the German contribution to 17 higher readiness divisions (10 Category I and 7 Category II), and lower the French and Benelux cadre ratio, increasing their division structure from the 35 above to 51 divisions, to correspond with their more rearward geographical position in peacetime. Personnel in the defence agencies can also be used to enrich the active force content of the cadre units upon mobilization as is done in Israel.44

It is difficult to translate these concepts into the Australian environment with any precision without a much more thorough examination of the proportion of the total defence force which is required full-time and the means which might be available to raise and train latent personnel. However, it might be concluded from the thrust of this discussion and also from the nature of Australia's military traditions that standing latent force mixes could provide a basis for resolving at least partially two of the three fundamental new difficulties confronting Australia's military manpower planners. For instance, it would be possible to ease significantly the constraints on Australia's force expansion capacity, caused by the limited absolute members of available full-time personnel, by adopting latent manpower options. This same action also holds potential for reducing the percentage of the budget allocated to manpower and its maintenance. If the financial savings made as a result of the processes of latent force substitution were to be expended on capital equipment, facilities, defence industries, etc., the current funding constraints in these areas could be greatly relieved.

The surge capacity problem is much more complex and its solution is heavily dependent upon the degree of flexibility

which is acceptable in selecting operational strategic concepts. As can be seen from the hypothetical substitution function FL, depicted in Figure 2(a), a partial replacement of full-time conventional forces by latent conventional units would expand the total mobilised capacity available at M+30 quite significantly. From position F in this illustration, if ten full-time units were phased out in favour of comparably equipped and trained latent units (at X), the total mobilised force could be increased by 100 per cent. However, when the limited overall scope for latent force substitution in the existing Australian national security structure is considered, it is doubtful, within the current budgetary parameters, whether this type of action would be sufficient to satisfy the surge capacity requirements of a wide range of potential pressures and threats.

One means of producing an even greater surge capacity would be to substitute not only latent conventional forces but also latent territorial defence, civil defence and civilian resistance units. Because of their relatively simple training, equipments and, to some extent, operating procedures, even larger numbers of these units could be procured for the price of a standing conventional unit. However, for Australia's national security purposes, the simple production of large numbers of trained personnel is not the only criterion of importance. Those units which are trained must be capable of substituting for conventional forces in the types of contingencies in which maximum surge capacity is likely to be required. Both civil defence and civilian resistance personnel would be incapable of performing this function. The primary role of civil defence forces

45 Figures 2(a) and 2(b) have been drawn on the assumption that the latent/full-time personnel substitution functions are linear in character. It is doubtful that this would be the case in practice. They may be convex, concave or a combination of both. However, as is pointed out in footnotes 40 and 42, the general nature of the rates of substitution is soundly based.

46 The central assumption of Figure 2(a) is that a mix of well-trained and -equipped latent air, sea and ground conventional forces can be procured for one third of the cost of a comparable mix of full-time conventional forces. This is consistent with the evidence provided earlier in the chapter.
FIGURE 2(a). AN APPROXIMATE COST SUBSTITUTION FUNCTION
BETWEEN FULL-TIME CONVENTIONAL FORCE
PERSONNEL AND LATENT CONVENTIONAL FORCE
PERSONNEL

Numbers of
Full-Time Conventional
Force Personnel

FIGURE 2(b). AN APPROXIMATE COST SUBSTITUTION FUNCTION
BETWEEN FULL-TIME CONVENTIONAL FORCE
PERSONNEL AND LATENT TERRITORIAL
FORCE PERSONNEL

Numbers of
Full-Time Conventional
Force Personnel
is to prevent damage to the total community and to mitigate the effects of conflict and natural disasters. Civilian resistance is designed to raise an enemy's costs of residence, particularly in areas of high population concentration. Clearly the deterrence, deferment and defensive role of expanded civil defence and civilian resistance forces could not effectively substitute for reduced numbers of conventional units in primary military conflicts. In this context, the only conceptual strategic alternative to full-time and latent conventional units is territorial defence forces.47

As can be seen from Figure 2(b), a much larger increase in surge capacity can be procured by substituting full-time personnel with individuals trained and equipped in latent territorial units rather than the latent conventional forces alternative.48 In the hypothetical instance displayed in the figure, the phasing out of 10 units of full-time personnel would permit a 400 per cent increase in total M+30 strength. This is not to suggest that a mix of 70 latent territorial defence units and 10 full-time conventional units (or alternatively a mix of 5 full-time

47 In order for territorial defence forces to substitute substantially for conventional units, action would need to be taken to compensate for these forces' limited strategic mobility. In Australia's case, the most effective means of overcoming this problem would be to raise a disproportionate number of territorial defence units in the more vulnerable, exposed and isolated parts of the country. This would effectively provide these regions with a readily mobilised local defensive capacity and free the conventional force components for more direct counter-offensive activities.

48 The major assumption underlying Figure 2(b) is that seven well-trained and equipped latent territorial units can be procured for the price of one full-time conventional unit. This may, in reality, be an over-conservative estimate. Using 1971 statistics, Horst Mendershausen has argued that West Germany's mixed conscript and standing professional forces were seven times more expensive per mobilised man than Switzerland's latent conventional units. See Horst Mendershausen, Territorial Defense in NATO and Non-NATO Europe, p. 23. It is reasonable to anticipate that Swiss territorial defence units, if they existed, would be even less expensive.
conventional, 15 latent conventional and 70 latent territorial units) would possess four times the deterrence, deferment and defensive capacity of 20 full-time conventional units on their own. In Australia's continental defence environment, latent territorial defence units would rarely provide an absolute substitute for the high mobility, flexibility and firepower of conventional units on a one-on-one basis. However, in a large number of contingencies, when the strength of surge capacity would be critical to the outcome of the conflict, the utility of territorial defence units is likely to be much higher than their marginal rate of cost substitution. In other words, it may be possible to procure 7 latent territorial units for the price of every full-time conventional unit. But in many continental defence scenarios, conventional units are not likely to be 7 times as effective as those trained and equipped for territorial defence. In force-on-force, rather than unit-on-unit comparisons, standing/latent - conventional/territorial force mixes are likely to provide a more effective capacity to meet a wide range of scenarios than simple and traditional standing conventional force options.\textsuperscript{49} This represents a marked contrast to the situation which applied in the forward defence era when latent force options, and particularly non-conventional latent force options, were of far lower utility.\textsuperscript{50}

\textsuperscript{49} The utility of large numbers of latent territorial units would be at a premium in those scenarios where the requirements for surge capacity are most pressing. See the discussion of this matter in Chapter 4.

\textsuperscript{50} Erwin Häckel described those situations for which latent medium-technology forces are most suited in the following terms:

... all-militia forces provide an economically and psychologically attractive method of mobilizing a nation to the defence of its own territory by relatively primitive military means, at the cost of strictly limited mobility and flexibility within the national territory and none whatever outside it. They are thus more appropriate to nations whose military commitment is exclusively limited to their own defence than they are to those with any wider involvement.
There is, in addition, a secondary category of factors which further supports the potential significance of territorial defence forces in meeting Australia's surge capacity requirements. In a time of international crisis and severe threat, it should be possible to mobilise rapidly those standing and latent conventional forces, as well as any latent territorial forces, as then exist. However, if the Government injects a large increase in funding in an attempt to further expand mobilisable capacity rapidly, it is clear from the discussion in this chapter that a much stronger manpower and effective battlefield response could be gained from a territorial defence-heavy expansion than from a primary expansion of conventional forces. This is partly a consequence of the moderate level of technological and operational complexity of territorial defence forces and the resultant relative simplicity of their training.

A second and possibly more important factor may apply if external sources of supply, particularly of heavy capital equipment, are restricted severely. In this type of situation, Australia's force expansion capacity may be limited effectively not so much by manpower shortages as by the military equipment production capacity of Australia's domestic industry. To a large extent, this was the case during the Second World War and there is little reason to believe that Australia's industrial support capacity in the late 1970s is stronger, in a relative sense, than that of the 1930s. As a consequence, the character of any future

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Erwin Häckel, *Military Manpower and Political Purpose*, p. 30. The nature of Australia's strategic reorientation renders this type of force far more appropriate than it was in the forward defence era. However, because of the size of Australia's continental expanses, such forces are likely to require a greater level of mobility than that which is mentioned by Häckel.

51 The constrainingly influential of Australia's industrial support structure during the Second World War was demonstrated most clearly in October 1943, when the War Cabinet ordered the Army to release 20,000 men to strengthen industrial production. For details see Gavin Long, *The Six Years War: A Concise History of Australia in the 1939-45 War* (Canberra, Australian War Memorial and the Australian Government Publishing Service, 1973), p. 317.
mobilisation should be planned within the context of the limitations of domestic support industry. This is of particular significance because, as was discussed in Chapter 5, it is unlikely that Australia will, in the future, possess an indigenous capacity to produce the major hardware requirements of conventional units. However, by contrast, it is quite possible that Australian industry will possess a capability to provide most, if not all, of the equipment and supply requirements of territorial units. Hence, in a crisis situation, it would appear that territorial units could be raised and trained faster, less expensively and in larger numbers than conventional units. They may provide a very valuable security option in situations when the requirements of self-sufficiency are at a premium.

Conclusion

Australia's standing conventional force structure has been derived to meet the requirements of successive foreign commitments, primarily in support of those made by major power allies. In retrospect, it has proved to be eminently suitable for the performance of most of the functions related to this task. But now that Australia's security environment demands that a much greater priority be given to operations on the continent itself and in its immediate surroundings, the country's historically derived military structure appears to be much less appropriate. Erwin Häckel summarises this general argument in the following terms:

From the national point of view, all-volunteer forces offer mobility, flexibility and firepower at the cost not only of heavy per capita financial expenditure but also of a shortage of reserves and a partially consequent weakness in combat endurance and 'ground-holding' potential. They are thus more appropriate to nations with diverse or widely-scattered commitments, which may involve limited operations by highly trained task forces or which can back up their conventional capability by a credible threat of escalation to
a nuclear level, than they are to nations whose primary concern is the conventional defence of continental territory against threats which may enforce prolonged combat.52

Australia's prime national security concerns are now much more closely related to the type of continental defence for which Hâckel argues full-time conventional forces are unsuitable. In Australia's case, the military structure inherited from the past is particularly limited in its very high costs per mobilised man and in its restricted immediate response and surge potential.

In seeking means of overcoming the weaknesses of the current structure, it is clear from the analysis in this chapter that a wide range of latent force options offer considerable potential. However, in the context of Australia's national security environment and structure as they exist in the late 1970s, the scope for actually employing these concepts would appear, in practice, to be limited. Systems of universal and selective conscription, in particular, suffer from a wide range of political, social and economic difficulties in normal periods of peace. Voluntary latent force options can be very effective and are less politically sensitive and socially disruptive. However, they do tend to impose a more severe drain upon defence budgets.

The adoption of latent force options is also frustrated by the fact that many national security functions cannot be performed cost-effectively by part-time forces. Some tasks require round-the-clock operational activity, some involve very specialised high technology equipment and others are currently performed by civilians. Hence, within the national security budgetary parameters of a relatively undisturbed international environment, the scope for exploiting the manpower cost-saving capacity and the surge potential of latent force options is heavily restricted. However, despite these difficulties, if it were possible to replace a significant proportion of current full-time defence manpower with well-

52 Erwin Hâckel, Military Manpower and Political Purpose, p. 30.
trained and equipped latent forces, Australia's manpower and cost-squeeze and surge capacity problems could be alleviated to a substantial degree. The greatest scope

As is obvious from the examples cited earlier in this chapter, the concept of a mix of full-time professional forces and much larger, well-trained and-equipped, latent forces is not a new one. However, it is also clear, in an international sense, that such force mixes are coming to be seen as a useful and appropriate means of overcoming the problems of manpower and equipment cost-squeezes and surge capacity erosion. Thus, Kenneth Hunt writes:

It is difficult to escape the conclusion that smaller active forces and more reliance upon reserves is likely to be the way in which European nations will try to keep defence budgets in check while maintaining a defence structure on the ground on a militarily and politically acceptable scale. If this is to be the case the concept will have to be taken seriously.

Kenneth Hunt, *The Alliance and Europe*, p. 41. C. Douglas-Home comes to a similar conclusion at the end of his extensive review of Britain's reserve forces:

The answer obviously lies in extremely short engagements - possibly lasting no longer than the time spent in basic military and technical training ... The concept of small regular standing forces partially organized for an operational role but mostly involved in the training of large, volunteer reserves, who spend only as long in uniform as it takes to give them a skilled or semi-skilled trade qualification, is a wholly different one from the guiding philosophy of the defence forces today.


Erwin Häckel concludes part of his major study with an even more explicit description of the developing trend as he perceives it:

To conclude this chapter on problems of manpower policy, it appears that several of the parameters that were discussed seem to point towards one particular model which may avoid a maximum number of disadvantages inherent in different manpower systems while combining a maximum number of possible advantages. Such a model has been discussed independently in several countries in recent years, yet with a significant similarity of considerations and conclusions, particularly in France, West Germany.
for standing force substitution would appear to be in two categories of service personnel employment: first, in those areas involving low and medium skills and technologies which are readily acquired by civilians; and second, in those areas involving high levels of skill and technology which are already familiar to significant sections of the civil population.

So, in summary, Australia's current national security manpower system is clearly inappropriate for the new strategic environment. Over time, its maintenance can be expected to become more difficult and expensive. But even more importantly, its continued retention will imply the acceptance of unnecessary dangers and risks because of its non-optimisation of available resources. There thus appears to be a clear requirement for the full range of manpower and strategy options to be examined thoroughly within the context of Australia's new strategic situation. This would require governmental action at a senior level. Moreover, because

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and Belgium; the Austrian and Yugoslav Governments have armed forces according to this model.

The model consists, briefly of a relatively small professional force, made up of volunteers on medium-term and long-term engagements and equipped with the most advanced and powerful weapons, and a complementary and much larger force of conscripts, serving no more than a total of 12 months in several instalments of militia-style refresher courses, trained largely by its own militia training cadre and equipped with light and relatively simple weapons suitable for home-defence tasks. Such a model, which is clearly designed to combine the capabilities of a highly mobile and proficient volunteer force with the massive manpower supply of a large reserve force, may well be on the way to become the dominant form of military manpower systems in Europe.

Erwin Häckel, Military Manpower and Political Purpose, p. 18. The applicability to Australia of much of the detail raised by these scholars is, of course, highly debatable. However, the underlying trend towards the increased use of well-equipped and trained latent forces, frequently in partial substitution for full-time standing forces, is very difficult to dispute.
such an undertaking would involve the serious questioning of highly institutionalised systems of employment, the bureaucratic resistance would inevitably be intense. The political resolve of the initiating actors would need to be strong and their sense of direction clear. However, a significant proportion of the opposition likely to be aroused could most probably be pre-empted and, to a large degree, dispelled if it were made clear, from the outset, that the potential of alternative manpower and strategy concepts was being examined solely in the interests of greater national security, not less.
CHAPTER 12
CONCLUSION: THE CHALLENGE OF APPROPRIATE RESPONSE

The central argument of this thesis is based upon the proposition that Australia's strategic environment has altered substantially during the past decade. The generalised nature of this change has been recognised publicly by the Government, the Opposition and by significant elements of both the military and civilian bureaucratic structures. However, the full implications and consequences of the changing environment do not appear to have been delineated in any comprehensive or integrated form. Thus, although individual elements of the defence structure have perceived the general need to change, their perceptions of the detailed nature of the new requirements based on their particular interests, values and experiences, have varied greatly. As a consequence, the processes of adaptation have tended to be piecemeal.

The discussion in this thesis represents only a limited initial approach to the problems of adapting to the changed strategic environment. No attempt has been made to derive the precise form of an optimal Australian security response structure. Nor has a definitive means of determining such a structure been prescribed. Rather, attention has been focussed primarily on the nature of the new requirements and the introduction of some of the broader conceptual options.

During the course of the discussion in this thesis, two major themes have emerged which are deserving of brief comment in conclusion.

1. The Increased Scale of Australia's Security Requirements

The first theme is that the task of securing the Australian continent and its immediate interests in the late
1970s and into the 1980s is of a much more demanding nature than that of making single-service commitments overseas to support the foreign deployments of major power allies. This is partly because of the greatly increased requirements for independence in national security capacity. It is now clear that the traditional and highly institutionalised limited liability approach, involving a presumption that foreign sources of support would be available in crisis situations, can no longer be justified. But the increase in the scale of the new requirements is also due to the fact that the strategic environment of the 1980s will be characterised by a much more expansive range of pressures and threats, some of which will be capable of developing at short notice.

In combination, these factors are the cause of a major problem. The resources required to develop an indigenous capacity sufficient to deter or, if necessary, defer and defend against the new range of potential pressures and threats are of a magnitude substantially greater than those currently allocated to the task. However, it is unlikely that the proportion of total national resources devoted to the security function on a full-time basis will be increased substantially in the absence of a serious and obvious threat. As a consequence, Australia's security planners are confronted by a wide gap between the ends desired and the means available.

In these circumstances, the only way of satisfying indigenously the demanding requirements of the new strategic environment is to draw more extensively upon the latent capacities already existing in the civil community. This is not to advocate the mass militarisation of the total society. In practice, this type of proposal would involve a relatively inconspicuous process of planning and low level preparation to facilitate the transfer of a wide range of civil capacities to perform national security functions
at short notice. The potential for employing latent manpower and manufacturing capacities has been discussed in earlier parts of this thesis. However, preparations could be made to exploit fully a much wider range of civil resources: primary industry; air, road, rail and sea transport; communications; fuels and power; food and water; medical facilities and services; police forces; etc.

Planning national security responses on the assumption that a significant proportion of civil resources would be available in emergency situations could be expected to impact upon the priorities of the total community and most particularly upon those of the established security system. In an overall sense, it would encourage the concept of the nation at large generating and maintaining its own security. To some extent it would also facilitate the design and development of civil resources with long term national security requirements as a significant, although not necessarily dominant, consideration. But perhaps most importantly, the acceptance of this type of concept would make it possible for full-time national security resources to be allocated primarily to supplement and enhance the

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1 The concept of security planning in normal periods of peace, on the assumption that in serious crisis situations large sections of civil society can be redirected to perform national security functions, is by no means new. It is employed by a number of small and medium-sized states which are confronted by large and potentially overwhelming security problems and require a means of managing them independently. It has variously been termed Total Defence, All Nation Defence or General People's Defence.

much greater latent potential of the civil community. This type of approach would prevent duplication of service and civilian capacities and encourage the integration and rationalisation of the total society's national security resources.

The full ramifications of this concept are far reaching. It essentially provides a means by which Australia's security capacity can be extended far beyond that which the country can afford to devote to the task on a full-time basis. It possesses the potential to multiply Australia's independent response capacity very substantially.

2. The Changed Character of Australia's Security Requirements

If means may be found to eliminate, or at least alleviate, the national security resources gap, there remains the

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2 For instance, it if were appreciated that several thousand heavy road transports could be made available at short notice in crisis situations, the armed services would most probably refrain from purchasing such equipment. Moreover, they could plan in advance and in detail to employ this enormous resource in the most efficient manner possible. There might even be a case for managing the civil road transport fleet, perhaps by limiting alternative brands of equipment, so as to rationalise peacetime and crisis support, maintenance and servicing requirements.

Similar potential exists in the air transport industry. If it were taken for granted that, in a crisis situation, most of the resources of Qantas and the domestic airlines would be available for national security tasks, the efficient utilisation of this very extensive resource could be prepared in detail in advance. Acceptance of this concept might also encourage a rationalisation of equipment types not only among the commercial airlines themselves, but also between the airlines and the three armed services. Preparations for the employment of civil air resources in security crises have been undertaken in many countries. For example, see details of the United States Civil Reserve Air Fleet Program in General William G. Moore, Jr, USAF, 'Airlifts Contribution to Mobility Planning' and in Robley L. Mangold, 'Airlines Contributions to the Nation's Strategic Mobility', in Proceedings of the 1977 Worldwide Strategic Mobility Conference (A conference sponsored by the Organization of the US Joint Chiefs of Staff Logistics Directorate, Los Angeles, 2-4 May 1977), pp. II-B-8, II-B-9 and II-I-1 ff.
challenge represented by the second major theme of this thesis - that of adapting the character of the established security system. The nature of the national security task now confronting Australia is fundamentally different to that of the 1960s and early 1970s in several important respects. First, it is clear that the environment of future operations will be characterised by quite different technology, terrain, climate, ground cover, population and infrastructure features to those of the past. The unique nature of the Australian continent and its immediate surrounds increases greatly the desirability of developing original solutions to satisfy the local requirements.

The second new characteristic of Australia's security task is that the threat environment is of a substantially different nature to that of the past. In the future, many potential threats may be primarily economic, political, social and psychological in character. In these circumstances, a response capacity which is limited to diplomatic and military means will be inappropriate and ineffective. In the face of such a variety of potential pressures and threats, it will be necessary to be able to draw upon a wide range of diplomatic, economic, civil, psychological and military defence resources at short notice. Thus, in the new strategic environment, Australia needs a multiple-component national security policy and system rather than simply separate, but coordinated, foreign and defence policies.

The fundamentally altered nature of these requirements imposes new demands and pressures upon the processes of Australian security policy formulation. It is now necessary to develop indigenously a strategy and structure which optimises Australia's independent national security capacity. This cannot be expected to be a simple task as there are no comprehensive solutions to the new security requirements which are immediately obvious. As a consequence, a very major effort is required to develop an efficient evaluation system within which a wide range of strategy options can be tested in concept for their capacity to contribute to an optimal solution. The model which is derived from such a
process could be structured into a long range planning system to provide coherent and consistent direction for the security structure's development.

However, before any fundamental changes can be planned, it is essential that the need for change be acknowledged. Because of the wide range of bureaucratic influences which constrain meaningful adaptation, such acknowledgement will be difficult to achieve. Even if it is achieved, effective changes will only be instituted if complementary measures are taken to moderate significantly the highly institutionalised pressures for conformity with out-dated ideas, the unquestioning adherence to precedent and the processes of protecting established vested interests. The functional performance of existing structures will need to be reviewed, the knowledge and experience held by civilian and service policy-makers broadened, many of the processes of security policy formulation opened to public scrutiny and personnel incentive patterns restructured to encourage a much higher level of experimentation and innovation.

Certainly these processes of fundamental reassessment and adaptation would be demanding and difficult to implement successfully. They would require a major and concerted effort by a large number of people over an extended period of time. Strong and clear leadership would be required of both the Government and senior advisors. Largely because of these factors, the prospects for substantial progress in the immediate future are not favourable. In the absence of any generally perceived serious and immediate threat to Australia's security, it has been possible for the stimulus for major change largely to be ignored. In recent years, it has almost always been easier for individuals and political and bureaucratic structures to concentrate on repeating well-established routines and to postpone meaningful investigation of the basic issues at stake. As Dr T.B. Millar described the situation:

Australians ... are groping self-consciously for their own identity while blandly deferring the problem of security - not because of
economic restraints but because of a habit of hedonism, procrastination and dependence.3

Yet although it may not be universally appreciated in the present environment, the perils of constantly deferring a thorough investigation of these problems are very real. Australia is in danger of perpetuating many strategic concepts which were derived during the forward defence era into a new strategic environment in which they are patently inappropriate. Although the penalties of this type of intransigence may be barely apparent in the short term, in the long term they may be extremely severe. As J.K. Galbraith has emphasised, the influence of a dynamic external environment cannot be resisted indefinitely:

The enemy of conventional wisdom is not ideas but the march of events ... the conventional wisdom accommodates itself not to the world that it is meant to interpret but to the audience's view of the world. Since the latter remains with the comfortable and familiar, while the world moves on, the conventional wisdom is always in danger of obsolescence. This is not immediately fatal. The fatal blow comes when the conventional ideas fail signally to deal with some contingency to which obsolescence has made them palpably inapplicable. This sooner or later, must be the fate of ideas which have lost their relation to the world.4

Thus, the most fundamental and urgent challenge to Australia's security system in the late 1970s is that of appropriate adaption to the requirements of the changing strategic environment. Australia can no longer afford to refrain from acknowledging the importance of the problem and from instituting a comprehensive process of policy review.


APPENDIX

Additional Information Concerning the Character of the Australian Continental Environment

The prime purpose of this appendix is to provide additional information to support the discussion throughout the thesis, especially that in Chapter 3. The information which is presented in the maps which appear on the following pages is not intended to provide a comprehensive survey of Australia's geographical environment. Rather, that which is contained herein has been selected because of its capacity to supplement in a useful way the material which is obtainable from any comprehensive atlas. Amongst the most helpful sources of more general reference are:


Map 8 is a redrafted black and white version of a detailed map which appears on page 14 of an appendix entitled 'The Bases of Landscape' bound in as the central pages of Nancy and Andrew Learmonth, Regional Landscapes of Australia: Form, Function and Change (Sydney, Angus and Robertson, 1971).
MAP 1

AVERAGE ANNUAL TEMPERATURE
Isotherms in Degrees Celsius
AUSTALIA
Issued by the Director of Meteorology

PROJECTION: ALBERS CONICAL EQUAL AREA
HEAT DISCOMFORT
AUSTRALIA

Average number of days per year when the relative strain index at 3pm exceeds the critical discomfort level

Issued by the Director of Meteorology

PROJECTION: ALBER'S CONICAL EQUAL AREA

KILOMETERS 0 40 80 120 160 200
MILES 0 25 50 75 100

FROST PERIOD
MEDIAN ANNUAL LENGTH
(DAYS PER YEAR)
Frost-day: Minimum Temperature ≤ 2°C
AUSTRALIA
Issued by the Director of Meteorology
MAP 5

RAIN-DAYS AVERAGE ANNUAL FREQUENCY
AUSTRALIA
Issued by the Director of Meteorology
NATURAL VEGETATION

- Tropical Rain Forest
- Sub-tropical Rain Forest
- Temperate Rain Forest
- Wet Sclerophyll Forest
- Dry Sclerophyll Forest
- Woodland and Parkland
- Savannah and Grassland
- Mallee Scrub and Heath
- Mulga and other arid Scrub
- Semi-desert Steppes
- Deserts
- Alpine

INTENSIVE LAND USE

- Dairying
- Irrigated crops
- Rain-fed crops

MAP 8
NATURAL VEGETATION AND LAND USE IN AUSTRALIA - A SIMPLIFIED PRESENTATION
A NOTE ON SOURCES

Gathering the information required for this thesis has not been easy. This is primarily because the processes of security policy-making in Australia are unusually 'closed'. In marked contrast to most western countries, senior service and civilian officers rarely express their views publicly and in any detail on the broader issues of national security concern. No senior serving officer in the defence bureaucracy (military or civilian) has chosen or, perhaps, been permitted to express his personal opinions on defence policy issues in a major study of book length. Nor does the Parliament hold regular or detailed committee hearings on the central issues of security policy. As a consequence, the number of people who are actively engaged in public debate on national security issues in Australia is relatively limited. Nearly all of those who are available to comment regularly and in depth do so from a vantage point outside the formal decision-making structure and many are motivated to plead the cause of particular interest groups.

The problems which this situation presents to serious researchers are formidable. However, in this thesis, it has proved possible to overcome many of the difficulties caused by this paucity of authoritative information by drawing extensively upon the accounts and opinions of those who have been intimately involved in the processes of security decision-making in the recent past, those who have studied the existing system closely and those who have monitored the progression of Australian defence policy over an extended period. Excessive reliance upon any particular individual would make one vulnerable to the dangers of subjectivity. However, it has been found that, although the diverse group of informed external observers differ widely in their levels of experience, their political beliefs and means of earning a living, they do largely agree on a wide range of important matters. As a consequence, it has been possible to base a significant proportion of the argument and some of the conclusions in this thesis upon their evidence.
No classified documents or materials have been employed in the construction of this thesis. However, it has been possible to gain a significant amount of information on a wide range of matters which are veiled by secrecy within Australia by referring to overseas journals and the documentation produced by foreign governments. United States Congressional hearings deserve particular mention in this regard. The researcher who is prepared to sift through thousands of pages of nearly unreadable and often irrelevant testimony is frequently rewarded by insights and facts which do not appear in Australian Government press releases, the daily newspapers or trade journals.

The limited number of Australian Government publications which are available have been of some assistance. Various Parliamentary Papers, Hansard, committee reports and departmental annual reports have been consulted extensively.

In some sections of the thesis, it has been necessary to rely primarily upon newspaper accounts of particular issues or events. In those instances where the bases of these reports have been the subject of doubt, extensive efforts have been made to corroborate the information from other sources. Of the daily Australian press, the two newspapers employing defence correspondents, The Canberra Times and The Australian, have been most helpful.

Of special value in this area of research are the many professional and trade journals which monitor military affairs and defence industry. For this study, the most important of these have been International Defense Review and Aviation Week and Space Technology. Although individual authors and, in some cases, particular journals consistently favour those strategies or weapon systems which conform most closely to well-established service or industry beliefs and interests, these publications do cover most security and, particularly, most technical issues more systematically and in far more detail than the general press. Consequently their contribution to this thesis has been indispensable.
The great bulk of the information gathered for this thesis originated from published sources. Nevertheless, a significant debt is owed to a large number of senior civilian and military personnel in Australia and overseas who granted interviews, provided material and freely offered opinions. Although many of these meetings were conducted on an off-the-record and/or not-for-attribution basis, the information gained proved to be invaluable in guiding the selection of material from other sources and in providing original emphases and perspectives.

Finally, reference should be made to the great deal of information and the many important perspectives which have been derived from debate and discussion within the academic and broader national security communities in Canberra. In this respect, the day-to-day contact with the membership of the Strategic and Defence Studies Centre and the Department of International Relations has been particularly helpful. In addition, the United Service Institution of the Australian Capital Territory has provided valuable opportunities to mix informally with a wide range of civilian and service officers. These three bodies have organised numerous lectures, seminars and conferences on national and international security issues. Such occasions have provided ideal opportunities to share the insights of others and to subject my own views to informed and critical review.
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Occasionally - between one issue in eight and one issue in three
Regularly - more than one issue in three and, in most cases, every issue.)

Australian (The), 1967-77, regularly.
Boston Sunday Globe, rarely.
Canberra Times (The), 1974-77, regularly.
Melbourne Age (The), 1974-77, occasionally.
National Times (The), 1974-77, regularly.
New York Times (The), rarely.
Sun Herald (The), 1967-77, occasionally.
Sydney Morning Herald (The), 1967-77, regularly.

3. Periodicals

(Name of periodical, years read and frequency of reference:
Rarely - less than one issue in eight
Occasionally - between one issue in eight and one issue in three
Regularly - more than one issue in three and, in most cases, every issue.)

Aircraft, 1974-77, regularly.
American Economic Review, rarely.
Armed Forces and Society, 1974-77, regularly.
Armed Forces Journal International, 1974-77, occasionally.
Army Journal, 1974-76, regularly.
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