MANAGING AND PROTECTING

THE OFFSHORE ESTATE

Edited By Jack McCaffrie

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Australian Defence Studies Centre

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Contributors

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Rear Admiral Don Chalmers, who joined the RAN in 1958, is a navigation specialist with extensive seagoing experience including command of *HMAS Perth*. He is a graduate of the US Naval War College and the Royal College of Defence Studies and has held senior personnel and operational positions during his shore postings. As Commodore Chalmers, he led the first RAN Task Group to the Middle East in August 1990, supporting UN sanctions against Iraq. Subsequently, he was appointed an Officer in the Military Division of the Order of Australia. He was appointed Maritime Commander in December 1993.

Rear Admiral Frederick W Crickard served in the Royal Canadian Navy and Canadian Forces for 35 years before retiring in 1985. While serving he commanded three warships and completed his BA degree at Dalhousie University in 1971. Recently, he was awarded a Masters degree in Political Science (International Relations) from the same university. Since 1988 he has been a Research Associate with the Centre for Foreign Policy Studies at Dalhousie with specific responsibility for the Canadian Marine Policy and Strategy Project.

Mr Richard Kenchington was trained as a marine ecologist with a Bachelor of Science degree from London University and a Master of Science from the University of Wales. he is the Senior Director of External Services, Great Barrier Reef Marine Park Authority with responsibility for advisory, consultancy and training services. He has been involved in research on the Crown of Thorns Starfish and had a major involvement in the development and implementation of procedures for declaration of the marine park.

Air Commodore Robert Laing joined the RAAF in 1963 and as a pilot has amassed a great deal of experience, especially in maritime patrol aircraft. He is a graduate of the Canadian Forces Command and Staff College and the Joint Services Staff College and has served as Director RAAF at the Australian Joint Maritime Warfare Centre. Air Commodore Laing served in senior staff positions in Air headquarters and in Air Force office before taking up his present appointment as Commander Maritime Patrol Group in June 1992.

Mr John McFarlane is currently the Officer-in-Charge of the Strategic Intelligence Division of the Australian Federal Police Investigation Department in Canberra. His extensive background in intelligence includes 28 years service with the Australian Security Intelligence Organization which included postings to Papua New Guinea and London. Mr McFarlane is a graduate of Monash University and is undertaking research at present for a Masters thesis on the impact of international criminality on the stability of states.

Captain Michael Robinson is a master mariner who also has tertiary qualifications in economics and education. He is currently with the Maritime Technology Centre at the Sydney Institute of Technology.

Mr Donald Rothwell is Senior Lecturer and Associate Dean (Postgraduate) in the Faculty of Law, University of Sydney where he has taught since 1988. In 1993 he was a Visiting Scholar at the Scott Polar Research Institute, Cambridge University and in 1994 he was a member of the United Nations University Advisory Group on the teaching of International Environmental Law. His Ph.D thesis on 'The Polar Regions and the Development of International Law' was under examination at the time of this seminar.

Commodore David Shackleton is a naval officer with some 28 years experience. A warfare officer, he has had two seagoing commands as well as extensive experience in a variety of sea postings in the RAN and on exchange service with the Royal Navy. he is a graduate of both the RAN Staff College and the Joint Services Staff College and has a Diploma in Corporate Management. Recently, he has been deeply involved with the JORN Project and with C3I in Maritime Command. He is at present the Director General of Naval Policy and Warfare in Navy office.

Mr Peter Venslovas is at present Manager, Compliance and Monitoring of the Australian Fisheries Management Authority. He is an Economics graduate of Australian National University and has spent several years with the department of primary Industries and Energy with particular experience in finance and levy collection. Prior to taking up his present position he was a Fisheries Licensing Officer in the Australian Fisheries Service, the predecessor of the Australian Fisheries Management Authority.

Mr Dick Wells has been Executive Director of the Australian Petroleum Exploration Association Ltd since July 1991. Prior to this he has worked a senior adviser to a number of Commonwealth Government Ministers and has had extensive experience in the management and analysis of energy and resource policy issues. Mr Wells is a Science graduate from the Australian National University and a graduate of the Australian School of Management.

Mr Steven Youll is the Managing Director of Canberra-based LOPAC Pty Ltd. A retired naval officer who spent 25 years in the RAN, he has an extensive knowledge of surface warfare matters. He is a graduate of the Joint Services Staff College, has had seagoing command of the Destroyer Escort *HMAS Swan* and served as Director of the RAN Tactical School.

Acronyms and Abbreviations

2D	Two-dimensional
3D	Three-dimensional
ABARE	Australian Bureau of Agricultural and Resource Economics
ACOPS	Assistant Chief of the Defence Force Oerations
ACS	Australian Customs Service
ACT	Australian Capital Territory
ADF	Australian Defence Force
ADFORMS	Australian Defence Force Formatted Message System
AEW&C	Airborne Early Warning and Control
AFMA	Australian Fisheries Management Authority
AFP	Australian Federal Police
AFZ	Australian Fishing Zone
AGPS	Australian Government Publishing Service
AHQ	Air Headquarters
AMISC	Australian Marine Industries and Science Council
AMSA	Australian Maritime Safety Authority
APEA	Australian Petroleum Exploration Association
AQIS	Australian Quarantine Inspection Service
BHP	Broken Hill Proprietary Ltd
BRS	Bureau of Resource Sciences
C2	Command and Control
C3	Command, Control and Communications
CCCA	Civil Coastal Control Agency
CCG	Canadian Coast Guard
CF	Canadian Forces
CIA	Central Intelligence Agency
CLR	Commonwealth Law Reports
CNN	Cable News Network
CPU	Coastal Protection Unit
CR 90	Cyclical Review 1990 (Canada)
Cth	Commonwealth
DND	Department of National Defence (Canada)
DFO	Department of Fisheries and Oceans (Canada)
DISCON	Defence Integrated Secure Communications Network
DSTO	Defence Science and Technology Organization
EEZ	Exclusive Economic Zone
FLIR	Forward Looking Infra-Red
GBRMPA	Great Barrier Reef Marine Park Authority
GNP	Gross National Product

GPS	Global Positioning System
HQADF	Headquarters Australian Defence Force
HMCS	Her Majesty's Canadian Ship
ICMO	Interdepartmental Concept of Maritime Operations (Canada)
ICVU	Interdepartmental Coordination of Vessel Utilisation (Canada)
IMO	International Maritime Organization
Imp	Imperial
INMARSAT	International Maritime Satellite
INTERPOL	International Criminal Police Commission
IPCRC	Interdepartmental Program Coordination and Review Committee
IR	Infra-Red
JFAS	Jindalee Facility Alice Springs
JORN	Jindalee Over the Horizon Radar Network
JOTS	Joint Operational Tactical System
LEO	Low Earth Orbit
LHQ	Land Headquarters
LIDAR	Light Detection and Ranging
LLTV	Low Light Television
LNG	Liquified Natural Gas
LPG	Liquified Petroleum Gas
MARCOT	Maritime Coordination Training (Canada)
MARPOL	International Convention for the Prevention of Pollution from Ships
MHQ	Maritime Headquarters
MOU	Memorandum of Understanding
MRCC	Maritime Rescue Coordination Centre
NAFO	North Atlantic Fisheries Organisations
NATO	North Atlantic Treaty Organisation
NT	Northern Territory
NVG	Night Vision Goggles
NWS	North West Shelf
OCS	Offshore Constitutional Settlement
OGD	Other Government Departments (Canada)
OPAC	Operational Program Advisory Committee
OPEC	Organization of Petroleum Exporting Countries
OPC	Offshore Patrol Combatant
OPV	Offshore Patrol Vessel
ORV	Operational Response Vessel
OTHR	Over The Horizon Radar
PNG	Papua New Guinea
PRRT	Petroleum Resource Rent Tax
Qld	Queensland

R&D	Research and Development
RAAF	Royal Australian Air Force
RAC	Resource Assessment Commission
RAN	Royal Australian Navy
RCMP	Royal Canadian Mounted Police
SA	South Australia
SAR	Search And Rescue
SATCOM	Satellite Communications
SIEV	Suspect Illegal Entrant Vessel
SIGINT	Signals Intelligence
SLOC	Sea Lines of Communication
SPICIN	South Pacific Islands Criminal Intelligence Network
SWATH	Small Water Area Twin Hull
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program
US	United States (of America)
Vic	Victoria
VLA	Vertical Line Array
VMS	Vessel Monitoring Service
WA	Western Australia

Foreword

With the 1982 UN Convention on the Law of the Sea seemingly certain to enter into force in November 1994 and with the prospect of Australia declaring an Exclusive Economic Zone of 200 nautical miles also in the latter half of 1994 a need was seen to consider publicly some of the issues and responsibilities with which Australia would be confronted as a consequence. Accordingly, two seminars were organised by three groups with a direct interest in Australia's offshore interests. The first of the seminars 'Oceans Management Policy: The Strategic Dimension' was held in Canberra on 27 May 1994, while the second 'Protecting And Managing The Offshore Estate' was held in Sydney on 31 May 1994. Both seminars were jointly sponsored by the Royal Australian Navy's Maritime Studies Program, the Centre For Maritime Policy at the University of Wollongong and the Australian Naval Institute.

This monograph contains the proceedings of the second seminar, which examined the issues of sovereignty and responsibility associated with the two legal regimes already mentioned. The importance of conducting the examination lay in the fact that declaration of an EEZ would bring with it not only legal access to resources, living and inert, but legal responsibilities relating to the exploitation, management and protection of them. The nature and extent of these responsibilities are not necessarily well appreciated in Australia, either by the general public or, regrettably, by the responsible authorities.

Seminar papers presented in this volume cover the full range of issues involved and include both academic and practical perspectives. The legal implications of protecting and managing the offshore estate are examined in light of the regime which applies under UNCLOS III, while another legal perspective is given with an examination of the extent of maritime related illegal activities affecting Australia. Other papers deal with the most important offshore resources and the management of them as well with the environmental implications of marine activity in the EEZ.

As has been mentioned, declaration of an EEZ brings with it responsibility for management and protection of resources. Consequently, a number of the seminar papers examine some of the means by which maritime surveillance can be conducted as well as some of the difficulties that are encountered in the task. The importance of this issue will become more evident as Australia comes to terms with the nature and scale of the job. The relevant seminar papers investigate the limitations and costs of different surveillance and enforcement systems as well as the critically important issue of well coordinated command arrangements for these operations.

Even though declaration of the Australian EEZ has come about much later than might have been expected there has been an Australian Fishing Zone in existence since 1979 and with it a surveillance and management regime to ensure regulation of foreign fishing activity within it. One of the seminar papers examines our

experience with this regime which has been criticised in some quarters for lack of coordination. Importantly, therefore, another of the papers articulates the experience of Canada, a nation also with extensive maritime interests and significantly a national approach to maritime matters manifestly more coordinated than is our own. This paper was presented by Rear Admiral Fred Crickard, RCN (Rtd) from Dalhousie University. He has been closely involved with the development of Canada's strategy for dealing with these issues.

Since the seminar took place there have been several developments which require amendment to positions expressed in a number of the papers. Apart from the fact that both the EEZ and UNCLOS III have come into force, a new Defence White Paper, 'Defending Australia 94' has been published, a new surge of boat people has arrived in Australia and the Federal Police contingent to Mozambique has returned home. Happily, too, Mr Donald Rothwell is now Dr Donald Rothwell. The papers have not been updated to reflect these changes.

1

Opening Address

Don Chalmers

This timely and useful publication stems from a seminar on protecting and managing the offshore estate which was held in May 1994. The coference was jointly hosted by:

. The Maritime Studies Program of the RAN
. The Centre for Maritime Policy, University of Wollongong and
. The Australian Naval Institute.

I note also with pleasure our Navy's growing association with the Centre for Maritime Policy, and the University of Wollongong's maritime focus—we are an island with a large offshore estate, a nation reliant on maritime trade but, I would argue, a maritime trading nation with a continental outlook. Proceedings like these contribute to the growing awareness of our maritime status, and of our national responsibilities in detecting, collating and controlling activities within our maritime littoral.

As the Maritime Commander (Australia) I am charged with the planning and conduct of maritime operations for the defence of Australia and its interests, for the defence of the offshore territories, and for the defence of offshore installations. Among these national interests I include our trading routes and our sea lines of communication (SLOCs) to our major trading partners. In a sense they are an extension of our sovereignty, a part of the national estate.

However, this publication looks at a far broader issue than that normally associated with defence, for there are many other departments and organisations involved in the overall surveillance, management and protection of Australia's offshore estate. It behoves us to have a thorough understanding of the issues, of the legal framework in which we operate, and of the potential for illegal maritime activity. This can range from the pollution of the offshore environment, to illegal entry into the EEZ, through to the possibility of special forces action against our offshore assets.

There is no doubt that we must have a thorough knowledge of what is happening in the approaches to, and within, the offshore estate and this requires sophisticated intelligence and surveillance systems, which must be able to fuse data into a comprehensive picture and then disseminate that information. We must, through coordination of assets from a range of organisations, be able to react cohesively within an expandable legal regime to protect the offshore estate we as a nation claim.

This important publication addresses all of these issues and forms the basis for the dissemination of a wider understanding of the issues surrounding the protection and management of Australia's offshore estate.

2

The Legal Framework Associated with the Offshore Estate

Donald Rothwell

Introduction

Australia's offshore estate has gradually been expanding throughout much of the twentieth century. This expansion of Australia's offshore interests has partly been dictated by the international law of the sea. As the law of the sea has recognised the legitimacy of coastal state interests in offshore areas, coastal states such as Australia have responded by gradually extending their sovereign rights and jurisdiction over these maritime areas. Another factor which has influenced Australia's gradual expansion of its offshore interests has been its own domestic legal system. In 1975 the High Court confirmed the Commonwealth Parliament's extensive powers over the offshore estate.[1]

Yet, despite the developments in international law and Australia's own constitutional position, Australia has still adopted a rather conservative attitude towards its maritime claims and the law of the sea generally.[2] It was only in 1990 that Australia extended its territorial sea from three to 12 nautical miles.[3] In 1991 it was announced that Australia intended to declare both a contiguous zone and exclusive economic zone (EEZ),[4] however, it has taken till 1994 for the appropriate legislative changes to be put in place.[5] The result of this conservative approach is that Australia has taken 12 years from the conclusion of the 1982 United Nations Convention on the Law of the Sea (UNCLOS)[6] actually to put in place an offshore regime which approximates that contemplated in the Convention. This is to be contrasted with the action taken by many other coastal states who quickly took advantage of the recognition in UNCLOS of expanded coastal state sovereign rights to offshore resources by extending their maritime zones in conformity with the Convention, and in some cases, beyond the limits contemplated.[7] Australia's conservative approach towards the law of the sea generally is also reflected in its delay in ratifying UNCLOS.

4 Legal Framework

This paper will address these issues in greater detail by considering the state of Australia's current offshore regime, particularly focussing on recent changes. For the purposes of the paper, the 'offshore estate' will be taken as the seas and submerged lands which extend from the low-water mark and baselines around the Australian coastline and that of Australia's external territories. Internal waters are therefore excluded from consideration. The emphasis will be on Australia's exercise of sovereignty and jurisdiction over the offshore estate. This extends from control of navigation and shipping within the territorial sea, enforcement of customs and immigration laws, and management of both living and non-living resources. Consideration will also be given to the constitutional framework within which recent changes to the extent of Australia's maritime claims have been made, including the federal ramifications of these developments. Conclusions will be reached as to the international law and constitutional implications of these developments.

Outline of Legal Framework

Law of the Sea

The Third United Nations Conference on the Law of the Sea held between 1973 and 1982 resulted in the negotiation of UNCLOS. The Convention, which will eventually enter into force later in 1994, is the first comprehensive attempt by states to implement a global convention on the law of the sea. In one of the most detailed international conventions ever negotiated, UNCLOS deals not only with coastal state rights over certain maritime zones but navigation rights, management of the deep seabed, protection and preservation of the marine environment, marine scientific research, and also the rights of archipelagic states and geographically disadvantaged and land-locked states. Despite taking nearly 12 years to enter into force, many of the provisions of the Convention have crystallised into customary international law during the interim period between negotiation and entry into force. This particularly applies to those provisions extending the limits of existing maritime zones or which create new maritime zones. Other provisions of UNCLOS, however, have been contentious and it has primarily been because of the controversy over Part XI dealing with the deep seabed that the Convention's entry into force has been delayed.[8]

UNCLOS either gave further content to, or recognised for the first time a number of maritime zones. These include the territorial sea, contiguous zone, exclusive economic zone (EEZ), continental shelf, deep seabed, archipelagic waters and high seas. The first four comprise part of Australia's offshore estate. In the case of the territorial sea, UNCLOS continued to recognise that a coastal state's sovereignty extended beyond its land territory and internal waters to the outer limits of the territorial sea.[9] Importantly, the Convention also for the first time recognised that the outer limit of the territorial sea was not more than 12 nautical miles.[10] This was a most important development as previously there has been no uniformity in territorial sea claims. As a result, one of the lingering problems from the 1958 Geneva Conventions was resolved. Similarly, UNCLOS also extended the outer limits of the contiguous zone from 12 to 24 nautical miles.[11] It did not, however, modify the extent of a coastal state's jurisdiction within the contiguous zone, but rather, extended the ability to exercise jurisdiction for certain purposes in regard to offences committed within the territorial sea.[12] In the case of the continental shelf, UNCLOS sought to give more definition to what constituted that area. At a minimum, UNCLOS provides that the continental shelf of a coastal state extends beyond the territorial sea to a distance of 200 miles.[13] In some instances, it is possible for the continental shelf to extend beyond this limit to the outer edge of the continental margin.[14] When reliance is placed upon the continental margin as being the limit of the continental shelf, the outer limit shall not be in excess of 350 miles from the territorial sea baselines or 100 miles from the 2,500 metre isobath.[15] The extent of a coastal state's sovereign right to explore and exploit the natural resources of the continental shelf were not altered by UNCLOS.[16]

The recognition of coastal state rights to an exclusive economic zone was one of the most significant achievements in UNCLOS.[17] It also fulfilled one of the major aims of developing states who strongly argued at the Law of the Sea Conference for greater equity in access to the world's ocean resources. The EEZ shall not extend more than 200 miles from a coastal state's baselines.[18] Within the zone a coastal state is granted sovereign rights for the purposes of 'exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed and its subsoil.'[19] Coastal state jurisdiction is also conferred to establish artificial islands and installations, for the purposes of marine scientific research, and also to protect and preserve the marine environment.[20] With the exception of exploration and exploitation of the natural resources of the continental shelf within the EEZ, coastal states do not have exclusive sovereign rights over the area. Subject to the Convention, all states enjoy traditional freedoms of navigation within the EEZ.[21] With respect to living resources within the EEZ, it has been noted that in effect coastal states only have 'preferential' rights.[22] Coastal states are required to promote optimum utilisation of living resources within the EEZ, and to that end if the coastal state does not have the capacity to harvest the total allowable catch within the area other states are to be given access to the surplus.[23] In addition, express recognition is given to rights of access to surplus stocks within an EEZ to both land-locked and geographically disadvantaged states.[24]

Australia's Constitutional Framework

Following the Statute of Westminster, 1931 (Imp) the Commonwealth Parliament's extraterritorial competence is unquestioned, but it must still rely upon a relevant head of constitutional power to legislate for the offshore estate. Two particular provisions in the Constitution confer power upon the Commonwealth in this regard.

Apart from a territorial limitation, the s. 51(x) power over fisheries is expansive.[25] The Commonwealth's s.51 (xxix) power over 'external affairs' has also proved significant. In *New South Wales v. Commonwealth*,[26] the High Court was prepared to hold that s.51 (xxix) could be used as a basis to enact legislation dealing with the offshore in two instances. The first was where the matter the subject of the legislation was physically external to Australia.[27] The second was where the Commonwealth sought to give domestic effect to an international treaty to which Australia had become a party. In this instance, the Court found that provisions of the Seas and Submerged Lands Act 1973 (Cth) were validly based on both the 1958 Convention on the Territorial Sea and Contiguous Zone and 1958 Convention on the Continental Shelf. These two approaches to interpreting s.51 (xxix) of the Constitution have since been expanded upon by later cases.[28] As a consequence, the Commonwealth's constitutional power over the offshore estate is now expansive.

With the High Court upholding the validity of the Seas and Submerged Lands Act, the Commonwealth had extensive control over the offshore. The States only retained control over waters considered to be internal waters of a state at federation (which formed part of the territory of that state),[29] and also over some offshore fishing. However, the result of this constitutional battle between the Commonwealth and States was that sovereignty and jurisdiction over the Australian offshore and other adjacent internal waters was divided, thereby creating the potential for considerable administrative difficulties. In an effort to resolve these difficulties the 'Offshore Constitutional Settlement' (OCS) was agreed upon in 1979.[30] In this complex legislative package there are two central Acts. The first, the Coastal Waters (State Powers) Act 1980 (Cth),[31] extends the legislative jurisdiction of the states to certain offshore areas. The importance of this Act lies in the fact that it confers legislative jurisdiction on the states in respect of all activities within coastal waters and in respect of specified activities beyond coastal waters. Each state is empowered to legislate in respect of areas beyond the coastal waters of the state within the 'adjacent area', though only in relation to specified activities. These include fisheries, shipping facilities and works, and subterranean mining commenced within the limits of the state.[32] The second relevant Act which forms a part of the OCS is the Coastal Waters (State Title) Act 1980 (Cth).[33] This Act vests in each state the same title to its adjacent 'coastal waters' and subjacent seabed as if those areas formed part of the territory of the state.

The Australian Offshore Regime Pre–1990

As a result of Australia's proclamations of various maritime zones, and the constitutional arrangements entered into between the Commonwealth and the States through the OCS, the offshore estate around Australia prior to 1990 can be described as follows.[34] At that time, Australia claimed a three mile territorial sea.[35] While the Seas and Submerged Lands Act 1973 (Cth) recognised that sovereignty over the territorial sea was vested in and exercisable by the Crown in right of the

Commonwealth,[36] the effect of the OCS had been to reconfer upon the States substantial powers and title to the territorial sea. As a result, it was the States rather than the Commonwealth which substantially managed the territorial sea at that time.[37]

In regard to a contiguous zone, Australia had not at this time declared such a zone despite there being provision for such zones under the 1958 Convention on the Territorial Sea and Contiguous Zone. A continental shelf had been proclaimed as long ago as 1953,[38] but it had taken some time for the Commonwealth to implement a legislative regime dealing with the area. The Seas and Submerged Lands Act 1973 (Cth) confirmed Commonwealth sovereignty over the continental shelf,[39] the limits of which were to be determined not inconsistently with the 1958 Convention on the Continental Shelf.[40] In both the Petroleum (Submerged Lands) Act 1967 (Cth) and the later Minerals (Submerged Lands) Act 1981 (Cth) the Commonwealth sought to create a legislative regime for mineral resource activities over Australia's continental shelf. However, as the OCS had also recognised legitimate State interests in mining activities within the territorial sea,[41] the States still retained an interest in offshore mining.

In a further attempt to devolve some administrative functions upon the States, both Commonwealth Acts dealing with mining in the offshore estate conferred day to day administrative responsibilities upon relevant States. In regard to fisheries, no EEZ had been proclaimed at this time. However, in 1979 an 'Australian Fishing Zone' (AFZ) was proclaimed.[42] The AFZ was declared to extend from the baselines from which the territorial sea was determined to an outer limit of 200 miles.[43] However, an exemption existed for coastal waters of a State out to the three mile limit. While the then Fisheries Act 1952 (Cth) substantially created a regime which gave legislative control over the AFZ to the Commonwealth, the OCS had also contemplated the States exercising legislative powers in waters beyond the territorial sea by way of arrangements entered into between the Commonwealth and States.[44]

Australia's New Offshore Regime

Extension of Territorial Sea to 12 Miles[45]

On 13 November 1990, Australia announced its intention to extend its territorial sea from three to 12 nautical miles.[46] Soon afterwards a Proclamation was issued under the Seas and Submerged Lands Act 1973 (Cth), extending the territorial sea to 12 nautical miles, with effect from 20 November 1990. In so doing, Australia joined the ranks of the large and growing number of coastal States that claim a 12 mile territorial sea.[47] The principal effect under international law of the extension of the territorial sea from three to 12 miles is the significant expansion of the geographical area over which Australia has sovereignty. The 1990 Proclamation extends to all Australian territories,[48] including internal territories.[49] It also includes Australia's numerous external territories,[50] and countless islands that are regarded as forming

part of the territory of particular Australian states.[51] Most of these lie in close proximity to the state of which they form part, but one lies as much as 800 nautical miles from its metropolitan state.[52]

Australia's expanded territorial sea also results in a reduction in the rights of other States to the use and enjoyment of the sea area between three and 12 miles from baselines. However, Australian sovereignty, like that of all coastal States, is subject to the right of ships of all States to innocent passage through the territorial sea.[53] Nevertheless, Australia's 12 mile territorial sea claim does result in a greater assertion of jurisdiction over vessels navigating close to the Australian coastline, and also impacts on the status of several straits through which high seas corridors previously existed.[54]

Australia's New Maritime Zones

Australia announced in 1991 that it intended to declare for the first time a contiguous zone and EEZ. It was acknowledged at that time, however, that there would be a need to amend existing legislation to take account of this change. These amendments were finally introduced into Parliament in the form of the Maritime Legislation Amendment Bill 1993 (Cth), which was subsequently passed by Parliament and assented to on 15 February 1994. The Maritime Legislation Amendment Act 1994 (Cth) essentially seeks to amend various pieces of Commonwealth legislation so as to ensure that Australian law dealing with the offshore estate adopts definitions of various maritime zones consistent with UNCLOS.[55] It also introduces for the first time into Australian law the concept of a contiguous zone and EEZ. Though the Maritime Legislation Amendment Act has been assented to, it has yet to be proclaimed. However, s.2(2) provides for its commencement six months after having received assent in any event. As a result, if it is not the subject of a proclamation, the Act takes effect from 15 August 1994.

The Seas and Submerged Lands Act 1973 (Cth) has been amended by inserting new provisions providing for a definition and limits to the contiguous zone,[56] Australia's rights and control over the zone,[57] and allowance for the preparation of appropriate charts.[58] The definition adopted for the contiguous zone is that found in Article 33, UNCLOS. A proclamation declaring the limits of the contiguous zone is not to be inconsistent with either the Convention or any other international agreement to which Australia is a party. One curious aspect of these provisions is that no attempt has been made to amend already existing legislation dealing with the possible enforcement of Australia's customs, fiscal, immigration or sanitary laws within the contiguous zone, or to create a new legislative regime for the area.[59]

The Seas and Submerged Lands Act 1973 (Cth) has also been substantially amended to reflect Australia's declaration of an EEZ. These amendments, however, do not merely reflect a redefinition of the AFZ as the Act did not previously deal with the AFZ.[60] As in the case of the contiguous zone, the Act has been amended to reflect the definition of the EEZ found in UNCLOS.[61] Provision is made for the

limits of the EEZ to be proclaimed not inconsistently with either the Convention or any other international agreement to which Australia is a party. In a manner consistent with existing legislative provisions dealing with both the territorial sea and continental shelf, the amended Act provides that 'the rights and jurisdiction of Australia in its exclusive economic zone are vested in and exercisable by the Crown in right of the Commonwealth'.[62]

The Maritime Legislation Amendment Act 1994 (Cth) also effects amendments to various other pieces of Commonwealth legislation which previously dealt with the AFZ or have now become relevant for the purposes of an Australian EEZ.[63] The most substantial amendment occurs to the Fisheries Management Act 1991 (Cth). This Act was introduced to replace the previous Fisheries Act 1952 (Cth)[64] and up until these recent changes provided the legislative regime to support the AFZ. In another curious move, the 1994 amendments to the Fisheries Management Act do not replace the concept of an AFZ, but instead provide that the AFZ is now to be defined consistently with the EEZ with three exceptions.[65] While this legislative approach was most probably taken so as to allow for separate pieces of legislation to deal with fishing within the EEZ and minerals activity within the EEZ and continental shelf, the retention of the term AFZ when Australia is now claiming an EEZ will inevitably cause confusion.

Continental Shelf

It has been noted above that sovereign rights over, and the exploitation of, the continental shelf have been the subject of much constitutional debate within Australia since the 1960s. In 1967, the Commonwealth enacted the Petroleum (Submerged Lands) Act 1967 in an attempt to create a legislative regime dealing with petroleum exploration and exploitation on the continental shelf. The States implemented similar legislation in an effort to create a cooperative regime. This regime was then overridden by the Seas and Submerged Lands Act 1973 (Cth) which sought to vest sovereignty over offshore mineral resources in the Commonwealth to the exclusion of the States. However in an effort once again to adopt a cooperative approach to the management of the offshore estate, a new legislative regime was put in place following the OCS which allowed the States more actively to participate in the administration and management of mineral resource activities taking place on Australia's continental shelf. At the time, this was reflected in changes to the Petroleum (Submerged Lands) Act 1967 (Cth) and the enactment of the Minerals (Submerged Lands) Act 1981 (Cth) which dealt with the exploration and exploitation of minerals other than petroleum. These two pieces of Commonwealth legislation effectively dealt with issues relating to the management, exploration and exploitation of Australia's continental shelf.

In 1994 there have been two substantial changes with respect of the legal regime applying to Australia's continental shelf. The first is that the Seas and Submerged Lands Act 1973 (Cth) definition of the continental shelf has been amended so as to

allow Australia to claim sovereignty over a continental shelf consistent with the terms of UNCLOS.[66] The consequence is that in most instances Australia will be claiming sovereignty over a continental shelf which exceeds its previous claim as based on the 1958 Convention. At the very least, the claim extends to a minimum of 200 miles from the baselines because the EEZ in effect asserts such a claim in any event.[67] However, the actual limits of the new claim have still to be ascertained. Some work has been done towards this end, but the task is enormous and could take some time.[68]

The second substantial change has occurred to the legal regime dealing with the management of the continental shelf. In the case of the Petroleum (Submerged Lands) Act 1967, various amendments have been made to reflect the new continental shelf definition.[69] The Minerals (Submerged Lands) Act 1981 (Cth) has also been replaced by the Offshore Minerals Act 1994 (Cth). This new 1994 Act creates a revised Commonwealth-State regime for the exploration and recovery of minerals, other than petroleum, in certain offshore areas. It primarily deals with 'Commonwealth-State offshore areas' which in effect are those areas beyond the three mile limit of the baselines to either the outer edge of the continental shelf or a bilaterally negotiated maritime boundary between Australia and another state.[70] The result of the Offshore Minerals Act 1994 (Cth) is to create a new mining regime for non-petroleum products over substantial areas of the continental shelf. It implements the provisions of the OCS with respect to joint Commonwealth-State management, respects the continuing rights of the States over their three mile territorial sea areas, but does not seek to deal with areas such as the Torres Strait or Zone of Cooperation between Australia and Indonesia in the Timor Sea.

Federal Implications For the New Offshore Estate

There are several federal implications flowing from Australia's new regime for the offshore estate. It has already been noted that the ownership and control of Australia's territorial sea are, from a domestic viewpoint, complex because of Australia's federal constitutional structure and because of the special arrangements made in the OCS. Perhaps the most significant federal impact of the declaration of a 12 mile territorial sea is that ownership, title and jurisdiction over the territorial sea is now divided between the States and Commonwealth at the 3 mile limit. This is a consequence of the OCS. The Coastal Waters (State Powers) Act 1980 provided that if the breadth of Australia's territorial sea were ever declared to be greater than three miles, the coastal waters of a state would nonetheless remain fixed at three miles. This provision clearly contemplated a future extension of Australia's territorial sea, and sought to avoid the expansion of state legislative jurisdiction beyond three miles in that event. It is this fact that has created a divided territorial sea in which the states have jurisdiction from the baselines to three miles and the Commonwealth has jurisdiction beyond. While this result is not uncommon amongst federal states,[71] it

does potentially create major difficulties for the effective administration and management of activities within the territorial sea.

Notwithstanding the right which the Commonwealth retains to override State legislation,[72] there is considerable scope for conflicting State and Commonwealth laws and administrative practices to develop within the territorial sea. This could be the case particularly in regard to navigation. In Bass Strait especially, there is the prospect of a variety of navigational regimes being in place and so affecting a vessel depending on whether it is within Tasmanian, Victorian or 'Commonwealth' territorial sea. This not only has serious implications for local shipping, but also for foreign-flagged vessels which may be seeking to exercise the right of transit passage through an international strait.[73]

In the case of the contiguous zone, it can only be speculated as to what the federal ramifications will be of Australia, for the first time, having such a maritime area. As noted above, to date there does not seem to have been any effort made at the Commonwealth level to create a special legislative regime for this area. However, it may be unnecessary to do so because the contiguous zone, as it is provided for in UNCLOS, is principally a maritime zone within which jurisdiction can be enforced. Its purpose is to confer greater enforcement powers upon the coastal state in regard to infringements of certain laws and regulations occurring within its territory and territorial sea.[74] Given that there is the potential for vessels to infringe both State and Federal laws within the territorial sea, and especially State laws within State coastal waters such as ports and harbours, there is once again scope for difficult problems to arise in regard to enforcement of Australian law within the contiguous zone. Whether it is intended to confer enforcement powers within the contiguous zone upon the RAN or both State and Federal Police is uncertain.

With respect to the EEZ, Australia has now had some experience in enforcing its AFZ claim. The management regimes created by both the previous Fisheries Act 1952 (Cth) and now the Fisheries Management Act 1991 (Cth) provided for joint Commonwealth-State cooperation in managing fishery resources within the AFZ consistent with the OCS.[75] This cooperative management approach will remain in force under the new EEZ regime. The High Court's approval of cooperative management of a fishery within the AFZ, and also of a State's extraterritorial powers to legislate with respect to such a fishery, also seemingly removes any constitutional issues in regard to the new EEZ.[76] The Fisheries Management Act also provides for an enforcement regime for not only Australian nationals and flagged boats but also foreign nationals and boats.[77] From the perspective of Australian domestic law then, the legislative regime for the management of fishing activities within the EEZ seems well tested and appropriate. One issue of potential concern though is that despite having declared an EEZ, the term AFZ will remain in place and it will in effect be fishing rights within the AFZ that the Fisheries Management Act will continue to administer. This may result in some confusion at both the international and domestic levels and Australia may wish to consider its

position on making a suitable declaration or statement concerning its domestic legal regime when it eventually ratifies UNCLOS.[78]

With respect to Australia's continental shelf, the declaration of a continental shelf consistent with the provisions of UNCLOS presents few difficulties. During the past 25 years Australia has gradually put in place a legislative regime dealing with the management of resource exploration and exploitation of the continental shelf. Notwithstanding the effect of the Seas and Submerged Lands Act 1973 (Cth) and the High Court's ruling in *New South Wales v. Commonwealth*, the OCS and subsequent legislative amendments and initiatives have put in place a cooperative Commonwealth-State regime for management of the area. These arrangements are perhaps best reflected in the new Offshore Minerals Act 1994 (Cth) which comprehensively puts in place a legislative regime for the exploration and exploitation of non-petroleum non-living resources in the offshore estate. Great care is taken in carefully detailing the extent of Commonwealth-State offshore areas, coastal waters of a State, and the effect in the change of a baseline.[79] Under these circumstances, the declaration of revised limits to the continental shelf has little domestic implication. It does, however, represent the further assertion of Australian sovereignty over portions of the offshore estate and this brings with it the issue of enforcement.

Conclusion

When reviewing Australia's attitude towards its offshore estate it can be seen that constitutional limitations and federal concerns have impacted upon the approach taken. While the OCS may have resolved many of these constitutional and political problems it has continuing ramifications for the offshore estate. This especially is the case with the territorial sea and contiguous zone. Within the territorial sea State and Commonwealth jurisdiction, power, and title is in effect divided at the three mile limit, notwithstanding that the Commonwealth retains sovereignty. As a result, within Australia's territorial sea there are eight legislative regimes: six State, one Territory, and one Commonwealth. This cannot be in Australia's best interests and has the potential to result in great enforcement and surveillance difficulties within Australia's most significant sovereign maritime area unless streamlined and working cooperative arrangements are in place. While this issue does not arise to the same degree in the case of the contiguous zone, questions must arise over the adequacy of the existing legal regime in regard to that area. For example, the OCS does not contemplate the States having enforcement powers beyond the limits of their three mile territorial sea. However, a contiguous zone provides for just such a situation potentially out to a 24 mile limit. Without amending the OCS, and given the position of the High Court concerning the limits on State extraterritorial powers, it would be questionable whether a State could enforce its laws this far offshore.

The position concerning the EEZ and continental shelf is more settled because the Commonwealth's sovereignty and power over these areas has not been

compromised by the OCS. Even in those instances where the Commonwealth has been prepared to allow for cooperative arrangements with the States to apply, these are substantially supported by a detailed legislative regime allowing for joint management. In these situations, there is less chance of a legal lacuna arising. The implementation of the Fisheries Management Act 1991 (Cth) and Offshore Minerals Act 1994 (Cth) also have put in place more detailed and streamlined legislative regimes than existed in predecessor legislation. However, despite the relatively settled nature of the domestic legal regime for both the EEZ and continental shelf both maritime areas have other implications for Australia's offshore estate.

Enforcement of Australia's sovereign rights over the resources within these areas remains at issue. In the case of the continental shelf, the negotiation of the Zone of Cooperation Agreement with Indonesia in the Timor Sea has resolved a long running dispute over continental shelf rights in an area rich in resources.[80] However, the legal challenge to the validity of this agreement in both the International Court of Justice and also High Court (the latter one recently resolved) has created some uncertainty as to the legal regime created for the area.[81] Because of the friendly nature of Australia's relations with other neighbours with whom it shares continental shelf boundaries, and because of the nature of the resource rights at stake, questions of enforcement of Australia's rights over this zone are unlikely to arise in other areas.

The same cannot be said for the enforcement of Australia's EEZ rights. While it has been noted that the Fisheries Management Act has detailed enforcement provisions, the continued violation of Australia's fishery laws by foreign fishermen will remain a problem. This problem has been highlighted by the activities of Indonesian fishermen in the Arafura and Timor Seas.[82] Given the enormous extent of Australia's EEZ, there remains tremendous potential for infringement and this is an area in which the RAN already has played , and will continue to play, an important role.

Finally, not only does Australia's domestic legal regime for the offshore estate have a patchwork appearance because of the various Commonwealth and State legislative provisions which can apply within it, but there is also the question of the conformity of Australia's offshore regime with the law of the sea. The agenda which Australia has pursued during the past few years in relation to the offshore estate has been to ensure that appropriate domestic arrangements were in place so as to allow Australia eventually to ratify UNCLOS. With satisfactory resolution of concerns over Part XI of the Convention, this step was taken on 5 October 1994 later this year. However, Australia's approach towards the offshore estate has not been comprehensive. This is particularly the case for the EEZ where the emphasis has been to deal only with fishery management and is reflected in the somewhat simplistic approach taken in amendments to the Fisheries Management Act. The EEZ is not only a fishery resource zone, but also a zone conferring sovereign rights over the natural resources of the seabed, and jurisdiction in relation to the

establishment of certain offshore installations, marine scientific research and also protection and preservation of the marine environment. No substantial initiatives have yet been taken in regard to these areas. In addition, Australia will also have to confront at the international level its obligation to manage the living resources of the EEZ in such a manner that the rights of access by other states to these resources are accounted for. To some extent there was a growing recognition of this obligation, as Australia moved towards ratification of UNCLOS and as the date of entry into force of the Convention, 16 November 1994, came closer.[83]

The declaration in 1994 of both a contiguous zone and EEZ, plus amendments to the outer limits of Australia's continental shelf claim complement Australia's 12 mile territorial sea. As a result of these actions Australia has substantially taken advantage of the benefits available to coastal states under UNCLOS. However, as shown, Australia's internal constitutional arrangements, as codified in regard to the offshore by the OCS, have particular ramifications for the management and control of the offshore estate. In addition, UNCLOS also imposes certain obligations upon Australia in regard to the management of the offshore estate. The adoption by Australia then of new maritime zones is perhaps only the first step in a process of asserting sovereign rights and jurisdiction over the offshore estate. Inevitably, there will need to be adjustments made to the legislative regime over time, and the assertion of more extensive jurisdiction for purposes related to the protection and preservation of the marine environment. Under these circumstances, the management of the offshore estate promises to pose continuing challenges.

Notes

1   New South Wales v. Commonwealth (1975) 135 CLR 337 (Seas and Submerged Lands Act Case).

2   H. Burmester, 'Australia and the Law of the Sea' in J. Crawford and D.R. Rothwell (eds), *The Law of the Sea in the Asian Pacific Region (forthcoming)*.

3   G. Evans and M. Duffy, 'Australia Extends Territorial Sea' (1990) 61 *Australian Foreign Affairs and Trade* 816.

4   N. Blewett, M. Duffy and S. Crean, 'Australia Enhances its Power Over Marine Conservation and Resources' (News Release by Minister for Foreign Affairs and Trade, Canberra, September 24, 1991).

5   See Maritime Legislation Amendment Act 1994 (Cth), amending Seas and Submerged Lands Act 1973 (Cth) and other related legislation.

6   (1982) 21 International Legal Materials 1261 (hereinafter UNCLOS).

7   See B. Kwiatkowska, 'Creeping Jurisdiction Beyond 200 Miles in Light of the 1982 Law of the Sea Convention and State Practice' (1991) 22 *Ocean Development and International Law* 153–187.

8   There have been continuing efforts to amend some of the provisions of Part XI in order to make it more acceptable; see D.H. Andersen, 'Efforts to Ensure Universal Participation in the United Nations Convention on the Law of the Sea' (1993) 42 *International and Comparative Law Quarterly* 654–664.

9   Art 1, UNCLOS.

10   Art 3, UNCLOS.

11   Art 33, UNCLOS.

12   Art 33, UNCLOS.

13   Art 76 (1), UNCLOS.

14   Art 76 (3), UNCLOS provides that the continental margin comprises 'the submerged prolongation of the land mass of the coastal state, and consists of the sea-bed and subsoil of the shelf, slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.'

15   Art 76 (5), UNCLOS.

16   Art 77, UNCLOS.

17   Coastal states favour EEZ claims to offshore resources as opposed to continental shelf claims; see United Nations, Report of the Secretary-General—Law of the Sea (UN Doc A/48/527, 10 November 1993) p. 9 in which the total number of maritime claims as at 15 October 1993 were:
Territorial Sea—146
Contiguous Zone—50
EEZ—91
Continental Shelf—78

18   Art 57, UNCLOS.

19   Art 56(1)(a), UNCLOS.

20   Art 56(1)(b), UNCLOS.

21   Art 58, UNCLOS.

22   D.P. O'Connell, *The International Law of the Sea*, I.A. Shearer (ed.) Vol 1 (1982) 552.

23   Art 62, UNCLOS.

24   Arts 69, 70, UNCLOS.

25   See eg. Fisheries Act 1952 (Cth), since repealed by the Fisheries Management Act 1991 (Cth); also J. Waugh, *Australian Fisheries Law* (1988) 11–14.

26   (1975) 135 CLR 337.

27   (1975) 135 CLR 337, 360 per Barwick CJ noting: 'The power extends, in my opinion, to any affair which in its nature is external to the continent of Australia and the island of Tasmania subject always to the Constitution as a whole.'

28   In regard to matters physically external to Australia see the decision in Polyukhovich v. Commonwealth (1991) 172 CLR 501, with respect to legislation based on international treaties see Commonwealth v. Tasmania (1983) 158 CLR 1.

29 See R.D. Lumb, *The Law of the Sea and Australian Off-Shore Areas*, 2nd (1978) 84–88.

30 See M. Haward, 'The Australian offshore constitutional settlement' (1989) 13 *Marine* Policy 334–348. For further background to the OCS and its impact on offshore arrangements in Australia generally see R. Cullen, *Federalism in Action: The Australian and Canadian Offshore Disputes* (1990) 104–129.

31 The Coastal Waters (Northern Territory Powers) Act 1980 (Cth) makes identical provision for the Northern Territory as the State Powers Act makes for the states.

32 The 'adjacent area' is defined by reference to a schedule in the Petroleum (Submerged Lands) Act 1967 (Cth), in force immediately prior to 1 January 1982. The 'adjacent area' for each State is delimited by a series of coordinates.

33 The Coastal Waters (Northern Territory Title) Act 1980 (Cth) makes identical provisions for the Northern Territory.

34 The position, as it existed in 1984, is well described in R.D. Lumb, 'Australian Coastal Jurisdiction' in K.W. Ryan (ed.), *International Law in Australia*, 2nd (1984) 370–389; also see Cullen, *supra* n 30 at 130–132.

35 ss. 6, 7, Seas and Submerged Lands Act 1973 (Cth) dealt with Australian sovereignty over the territorial sea and invested power in the Governor-General to proclaim the limits of the territorial sea.

36 s. 6, Seas and Submerged Lands Act 1973 (Cth).

37 This also applied in the case of the Northern Territory as per Coastal Waters (Northern Territory Title) Act 1980 (Cth) and Coastal Waters (Northern Territory Powers) Act 1980 (Cth), however the Commonwealth retained sovereignty and power over the territorial seas of Australia's external territories.

38 Lumb, *supra* n 34 at 380.

39 s. 11, Seas and Submerged Lands Act 1973 (Cth).

40 s. 12, Seas and Submerged Lands Act 1973 (Cth).

41 s. 5(b), Coastal Waters (State Powers) Act 1980; s 4(1), Coastal Waters (State Title) Act 1980.

42 See Commonwealth of Australia Gazette No S. 189 (26 September 1979).

43 s. 4(1), Fisheries Act 1952 (Cth).

44 s. 5(c), Coastal Waters (State Powers) Act 1980. See for further discussion B.R. Opeskin and D.R. Rothwell, 'Australia's Territorial Sea: International and Federal Implications of Its Extension to 12 Miles' (1991) 22 *Ocean Development and International Law* 395 at 398–399. In 1989 the High Court had occasion to consider the validity of one of these joint arrangements, entered into between the Commonwealth and South Australia: see Port MacDonnell Professional Fishermen's Association v. South Australia (1989) 168 CLR 340 where the Commonwealth-South Australia agreement concerning the rock lobster fishery and also the OCS was upheld.

45 The following discussion of Australia's extension of its territorial sea draws heavily from Opeskin and Rothwell, *supra* n 44.

46 Evans and Duffy, *supra* n 3.

47 See United Nations, Reports of the Secretary-General—Law of the Sea (UN Doc: A/48/527, 10 November 1993) p. 9 which notes the existence of 120 claims to a 12 mile territorial sea.

48 s. 4, Seas and Submerged Lands Act 1973 (Cth).

49 The internal Territories are the Northern Territory and the Australian Capital Territory (ACT).

50 The seven external territories are: Territory of Ashmore and Cartier Islands, Australian Antarctic Territory, Territory of Christmas Island, Territory of Cocos (Keeling) Islands, Coral Sea Islands Territory, Territory of Heard Island and McDonald Islands, Territory of Norfolk Island. For a discussion see H. Burmester, 'Island Outposts of Australia' in W.S.G. Bateman and M.W. Ward (eds), *Australia's Offshore Maritime Interests* (1985) 54–64.

51 An exception applies in the case of certain islands in the Torres Strait which are subject to arrangements entered into between Australia and Papua New Guinea under the Torres Strait Treaty [1985] Australian Treaty Series 4. Under the Treaty certain Australia islands which are north of the Seabed Resources Delimitation Line retain their original three mile territorial sea; see for discussion Opeskin and Rothwell, *supra* n 44 at 399–401.

52 This is the case of Macquarie Island, which is part of the state of Tasmania.

53 Arts 4, 15, 16, Convention on the Territorial Sea and Contiguous Zone; Arts 17, 18, 19, UNCLOS.

54 For a discussion of the position concerning Bass Strait, see D.R. Rothwell, 'International Straits and UNCLOS: An Australian Case Study' (1992) 23 *Journal of Maritime Law and Commerce* 461–483; for a consideration of the position in the Torres Strait, see Opeskin and Rothwell, *supra* n 44 at 403.

55 In regard to the territorial sea, new provisions are inserted in ss. 3(1) and 7 of the Seas and Submerged Lands Act 1973 (Cth) to reflect the UNCLOS definition of the territorial sea. s. 12, Seas and Submerged Lands Act 1973 (Cth) is also amended by substituting the UNCLOS definition of continental shelf for that from the 1958 Convention on the Continental Shelf.

56 ss. 3(1), 13B, Seas and Submerged Lands Act 1973 (Cth).

57 s. 13A, Seas and Submerged Lands Act 1973 (Cth).

58 s. 13C, Seas and Submerged Lands Act 1973 (Cth).

59 s. 13A, Seas and Submerged Lands Act 1973 (Cth) includes the following note:

The rights of control that Australia, as a coastal state, has in respect of the contiguous zone of Australia are exercisable in accordance with applicable Commonwealth, State and Territory laws.

It is understood, however, that new Commonwealth customs and quarantine legislation is in preparation so as to allow for the assertion of a limited enforcement capacity out to the edge of the contiguous zone from territorial sea baselines; Burmester, *supra* n 2.

60   Legislative provisions dealing with the declaration and enforcement of the AFZ were to be found under the Fisheries Act 1952 (Cth), since repealed and replaced by the Fisheries Management Act 1991 (Cth).

61   ss. 3(1), 10B, Seas and Submerged Lands Act 1973 (Cth).

62   s. 10A, Seas and Submerged Lands Act 1973 (Cth).

63   See Sea Installations Act 1987 (Cth), Whale Protection Act 1980 (Cth).

64   The Fisheries Act 1952 (Cth) is repealed by the Fisheries Legislation (Consequential Provisions) Act 1991, which in effect provides for the operation of the new Fisheries Management Act 1991 (Cth).

65   s. 4(1), Fisheries Management Act 1991 (Cth) provides:
'Australian fishing zone' means:
(a) the waters adjacent to Australia within the outer limits of the exclusive economic zone
(b) the waters adjacent to each external territory within the outer limits of the exclusive economic zone;
but does not include:
(c) coastal waters of, or waters within the limits of, a State or internal Territory; or
(d) waters that are excepted waters; or
(e) waters, that under an agreement in force between Australia and another country, are within the fisheries jurisdiction of that other country.
The substantial effect of this provision is that the AFZ still commences from the outer limits of the State's three mile territorial sea.

66   The effect of these amendments is best illustrated by the amended s. 12, Seas and Submerged Lands Act 1973 (Cth), which now provides:

The Governor-General may, from time to time by Proclamation, declare, not inconsistently with the Article 76 of the Convention or any other relevant agreement to which Australia is a party, the limits of the whole or any part of the continental shelf of Australia.

67   There have also been consequential amendments to other pieces of Commonwealth legislation dealing with the continental shelf, see Customs Act 1901 (Cth), Designs Act 1906 (Cth), Migration Act 1958 (Cth), National Museum of Australia Act 1980 (Cth), Pipeline Authority Act 1973 (Cth), Quarantine Act 1908 (Cth).

68   Burmester, *supra* n 2. Under the terms of Art 76(8) and Annex II, Australia has 10 years to report the outer limits of its continental shelf to the Commission on the Limits of the Continental Shelf.

69   There have also been some changes to the 'adjacent areas' for both Western Australia and Tasmania which now reflect at the very least a claim out to at least a 200 mile limit; see Schedule 1, Maritime Legislation Amendment Act

1994 (Cth), amending Schedule 2, Petroleum (Submerged Lands) Act 1967 (Cth).

70   s. 13, Offshore Minerals Act 1994 (Cth).

71   See Opeskin and Rothwell, *supra* n 44 at 419–420 discussing similar positions in Canada and the US.

72   s. 109, Commonwealth Constitution provides that if there is a conflict between Commonwealth and State laws the State law is inoperative to the extent of the inconsistency.

73   See for a more detailed discussion of this issue, Rothwell, *supra* n 54 at 479–483.

74   See D.P. O'Connell, The International Law of the Sea, I.A. Shearer (ed.), Vol II (1984) 1057–1059; R.R. Churchill and A.V. Lowe, *The law of the sea*, Rev ed. (1988) 116–118.

75   See ss. 58–82, Fisheries Management Act 1991 (Cth).

76   Port MacDonnell Professional Fishermen's Association v. South Australia (1989) 168 CLR 340.

77   ss. 83–105, Fisheries Management Act 1991 (Cth).

78   Art. 310, UNCLOS allows for the making of a declaration or statement upon ratification of UNCLOS 'with a view, inter alia, to the harmonisation of its laws and regulations with the provisions of this Convention, provided that such declarations or statements do not purport to exclude or modify the legal effect of the provisions of this Convention in their application to that State.'

79   See ss. 13, 15, 16, Schedule 2, Offshore Minerals Act 1994 (Cth).

80   (1990) 29 International Legal Materials 469.

81   Portugal instituted in 1991 a claim in the International Court of Justice contesting the validity of Australia's Agreement with Indonesia, the case has yet to proceed to the merits stage; see, C. Chinkin, 'The Merits of Portugal's Claim Against Australia' (1992) 15 *University of New South Wales Law Journal* 423–438. An application has also been brought in the High Court challenging the Commonwealth's treaty-making power as relied upon in making the Agreement with Indonesia, see H. Charlesworth, 'International Law Notes' (1993) 4 *Public Law Review* 265.

82   See (1992) 13 *Australian Yearbook of International Law* 282.

83   See eg. Agreement on Fisheries between the Government of Australia and the Government of Japan, done in Canberra, 17 October 1979, in force 1 November 1979, [1979] Australian Treaty Series 12; Australia—Indonesia Agreement relating to Cooperation in Fisheries, done in Jakarta, 22 April 1992, (1993) 14 *Australian Yearbook of International Law* 699. For discussion see Burmester, *supra* n 2.

3

The Potential for Illegal Activity

John McFarlane

Introduction

It is not the intention of this paper to catalogue all the types of crime which may occur within the area covered by the 'Offshore Estate', nor to deal in detail with the legal powers under which the police, the Australian Customs Service (ACS) or the Australian Defence Force (ADF) may intervene. There are many unresolved legal and practical issues involved and in reality the Australian Federal Police (AFP) has no independent capacity to operate in the offshore environment: we are heavily dependent on support from the ACS, Coastwatch or the ADF to enable us to exercise such powers as we may have covering this area.

The aim of this paper is to comment on a number of specific areas of actual or potential criminal activity where Australian law enforcement agencies, such as the AFP and the ACS, may be called upon to react. I have been asked to deal with such issues as:

- the illegal exploitation of living or non-living resources;
- the disposal of hazardous wastes;
- illegal population flows associated with rapid world population growth;
- the potential for increased smuggling by sea;
- the adequacy of our intelligence and surveillance capabilities in dealing with these problems;
- what use we should make of the RAN and maritime industry.

As most of these issues are fairly new to the AFP, it would be fair to say that there is little established law enforcement doctrine to cover them and it is being developed as individual cases are dealt with. There is agreement, however, that the enforcement of the law in our offshore estate is becoming a matter of increasing importance to our law enforcement agencies and presents many new challenges which are being addressed in accordance with our overall priorities and capabilities. At a time when severe financial and manpower restrictions apply to all our agencies,

the solution of some of the enforcement problems associated with the offshore estate may take some time. This paper will, therefore, deal with some of these issues in a way which reflects the AFP's present assessment of the overall criminal threat to Australia.

Drug Smuggling

With the exception of the amphetamine problem and some local cannabis production, most of the illegal drugs abused in Australia are illegally imported. Many methods of importation are employed; including the use of the postal service, air cargo, passenger baggage, drug couriers carrying the commodity externally or internally, or moulding the commodity into an apparently innocent item such as a surfboard or a piece of industrial machinery. However, the big and more significant importations are usually made by sea, using such means as secretion in the walls or contents of sea containers; hidden in compartments or in cargo carried by trawlers; hidden in coastal traders or yachts; transfers at sea from mother ships to trawlers which have a legitimate reason to be in the area; use of torpedo-like containers attached to cargo vessels, or by simply throwing the commodity over the side of passing ships for recovery by local trawlers or yachts.

The methods used are limited only by the ingenuity of the people involved in the drugs trade. The potential profits to be made through drug trafficking are so immense that some very good brains can be bought to devise new ways of importing drugs and laundering the profits therefrom. The profits made from the Australian illegal drug trade are estimated at something between $A1.2 billion to $A2 billion per year, and the international drug trade was recently assessed by both the United States Central Intelligence Agency (CIA) and the Financial Action Task Force of the Group of Seven as worth some $US300 billion per year.[1]

Most of the large heroin seizures in Australia were based on importations by sea secreted in cargo, such as newsprint, whitegoods or vehicles. All of the large cocaine seizures (600+ kg) made by the AFP over the last eighteen months appear to have involved drugs imported by sea. Last year, one consignment of some 13 tonnes of Pakistani cannabis was off-loaded from a mother ship, to a fishing trawler some 300 miles off the Western Australian coast. In another recent case, some four tonnes of cannabis resin were imported into Australia in a sportsground roller, from Southeast Asia, via Tonga. The only large proven importation of cannabis from Papua New Guinea was located on an island in the Torres Strait, during a military exercise in the area.

As will become apparent in all law enforcement in the offshore estate, the two key requirements to intercept illegal drugs being smuggled into Australia are good intelligence and a reliable response capability.

Weapon Smuggling

So far, our anecdotal experience suggests that the main problem with weapons smuggling is weapons being smuggled out of or transiting through Australia. The illegal movement of weapons from Australia to Papua New Guinea or New Caledonia is an example of the first category, although because of the tougher gun importation and licensing regulations now in place in Australia, the number of weapons likely to be involved in such trafficking is very limited. The 1988 case of weapons smuggling to Fiji demonstrated the difficulty of regulating the international sea container trade, particularly in transit ports. Weapons smuggling into and out of Australia does not appear to be a significant problem at this stage, and if this situation were to change, a number of intelligence indicators would probably alert us to the increase in this threat.

Flora and Fauna Smuggling

Although it is not as profitable as the illegal drugs trade, there are significant profits to be made from the illegal trade in Australian flora and fauna, as a number of recent cases have revealed. Flora smuggling usually involves the illegal export of seeds or plant samples. The smuggling of Australian birds and reptiles overseas (particularly to the United States) and the illegal importation of fauna and flora into Australia are quite common and represent a number of problems, not the least of which involves quarantine. The ACS and the Australian Quarantine Inspection Service (AQIS) are the lead agencies in this area, with their law enforcement authority derived from the *Wildlife Protection (Regulation of Export and Import) Act, 1992* and the *Quarantine Act, 1908*.

People Smuggling

Australia's relative isolation and the control measures in place do not make the smuggling of people into this country as easy as it is in those countries overseas which share common land borders with other countries or which are closer to the source countries. That is not to say that there is not a large number of illegal immigrants in Australia, but by far the largest number of these people are visa overstayers or people who have travelled to Australia on fraudulent documentation. There has been a number of cases involving the smuggling of Asian or Eastern European people into Australia by ship, but in comparison with the numbers involved in the United States or Western Europe the problem here is of very limited significance. Economic and political issues in the source countries will probably continue to act as 'push' factors encouraging some people to seek a better life overseas, particularly in the United States.

Of continuing concern in this region is the movement of the so-called 'boat people' from Vietnam, Cambodia or China. Since November 1989, 18 boats originating from southern China, carrying some 790 ethnic Chinese intending

illegal but overt entry have arrived in Australia. Most of these people have been or will be repatriated to China, but, although 'boat people' continue to arrive in Australia from time to time, they are not arriving in anything like the numbers attempting to enter the United States. Our remote coastline and inhospitable terrain in the north-west of Australia make it difficult for 'boat people' to land and melt into the wider community. There is possibly an organised crime connection with these movements. The lead agency in this field is the Commonwealth Department of Immigration and Ethnic Affairs, with powers derived from the *Migration Act, 1958*.

Environmental Crime Affecting the Offshore Estate

Apart from the conservation related issues of protection of flora and fauna in the marine parks, the main environmental crime concerns in the offshore estate relate to pollution. The Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act, 1983 prescribes a maximum penalty of $A200,000 for the master and $A1 million for the owners of any vessel which discharges material in contravention of the Act. Despite this, some 100 million tones of ballast water is discharged in Australian waters each year, with consequent risks to the marine environment and fishing resources.[2]

There are considerable difficulties in enforcement in this area, particularly in proving that the violation occurred within our territorial waters. The Australian Maritime Safety Authority (AMSA) has proposed legislation to allow a suspected violating vessel to be detained until it provides security to cover estimated penalties and clean-up costs.

There is also the serious problem of the pollution of coastal waters by commercial interests and utilities through industrial and domestic waste outfalls. All Australian states have anti-pollution legislation to cover this problem, but their enforcement is patchy. It is difficult to educate the violators to appreciate the seriousness of their activities, and there may sometimes be a conflict between this issue and the political imperative of not driving away or crippling business. The Environment Protection (Sea Dumping) Act, 1981 meets Australia's obligations under the London Dumping Convention and makes it an offence to dump waste and other matter, including radioactive material, into Australian waters from any vessel or aircraft, or to load them for dumping purposes, without a permit. The Hazardous Waste (Regulation of Exports and Imports) Act, 1989 requires a permit for the import or export of any intractable waste.

The AFP has responsibility to investigate offences under the Petroleum (Submerged Lands) Act, 1967 particularly in relation to work practices involved in the exploration and recovery of petroleum. Additionally, the Antarctic Treaty (Environmental Protection) Act, 1980 and the Antarctic Marine Living Resources Act, 1981, with their accompanying regulations and guidelines, prohibit the importation of anything environmentally harmful, such as non-sterile soil, and they also regulate appropriate behaviour in relation to the animals in the area.

Illegal Fishing

Under the Commonwealth Fisheries Act, 1952 and the Commonwealth Fisheries Management Act, 1991 the AFP has, from time to time, been concerned with the investigation of alleged breaches of fishing quotas. However, as the Australian Fisheries Management Authority (AFMA) well knows, there are both State and Commonwealth laws applicable in the fishing industry, with Coastwatch performing an important intelligence role in support of them.

Vulnerability of Offshore Oil Installations

The offshore oil installations are potentially vulnerable to sabotage, extortion or terrorism and the ADF has a very significant role in relation to the protection of these installations. The Crimes (Ships and Fixed Platforms) Act, 1992 provides the appropriate provisions relating to Australia's responsibilities under the Protocol for Suppression of Unlawful Acts Against the Safety of Fixed Platforms Located on the Continental Shelf, Rome, 1988. The penalties for offences against these Acts are very severe.

Piracy

The International Maritime Bureau defines piracy as—

> ... the act of boarding any vessel with the intent to commit theft or other crime and with the capability to use force in furtherance of the act.

The Crimes Act, 1914 was amended in 1992 to include reference to piracy. Under the Act[3], an

> 'act of piracy' means an act of violence, detention or depredation committed for private ends by the crew or passengers of a private ship or aircraft and directed:
>
> (a)   if the act is done on the high seas or in the coastal sea of Australia—against another ship or aircraft or against persons or property on board another ship or aircraft; or
>
> (b)   if the act is done in a place beyond the jurisdiction of any country—against a ship, aircraft, persons or property.

The penalties under the Crimes Act 1914 and Crimes (Ships and Fixed Platforms) Act, 1992 for piracy and related offences are very severe. Nevertheless, although there is little evidence of piracy within our immediate area, Australian vessels and trade[4] are at risk from piracy in Southeast Asia, in the shipping lanes in the vicinity of Malaysia, Indonesia, Singapore and the Philippines and, particularly, in the South China Sea. Of special concern is the incidence of this activity in the approaches to Hong Kong and the involvement of uncontrolled elements of the Chinese Navy and law enforcement agencies under the guise of anti-smuggling patrols.

There are many problems associated with the piracy issue, including those of jurisdiction, reporting arrangements, patrolling and response capabilities and whether or not vessels at risk should resist pirate attacks. Fortunately, at this stage, this is not a problem which affects our territorial waters and the likelihood of such a threat[5] emerging is not great, although the potential exists off the coast of Papua New Guinea.

Maritime Fraud and Related Matters

Although the evidence of charter party fraud and cargo deviations from Australian ports is very limited, the potential for future problems in this area does exist. In charter party fraud, a shop front office is established and criminals hire or charter a vessel, often for a nominal fee. Cargo space is then advertised, usually at a rate below the normal, and the fees are collected up front. The vessel then sails with a legitimate cargo, the shop-front is closed and the offenders leave with the money without paying for the vessel and associated costs. The charter industry consists of many small players in many countries, and, as a result, the industry is difficult to police.

Cargo deviations have been quite common in the Mediterranean region, particularly in the unstable Lebanese area. In such cases, old vessels take on valuable legitimate cargo and simply do not arrive at their nominated destinations. The cargo may be off-loaded illegally at another port and the vessel then simply disappears, either by being scuttled or re-registered. In 1986 the International Maritime Organisation estimated that maritime fraud costs the international shipping industry more than $US13 billion per year.

Another variation of charter party fraud involves 'phantom ships'. These are vessels which may be registered with false information about tonnages, dimensions, previous names and details of the owners. This is facilitated because some officials do not always check the details or are simply corrupt. False registration certificates reportedly have been issued by the Panamanian Consulates in Hong Kong, Singapore and Bangkok, and by the Honduran Consulate in Singapore.

The AFP has certain responsibilities in relation to the Shipping Registration Act, 1981, particularly in regard to the safety of ships registered under the Australian flag. In 1992, the House of Representatives Standing Committee on Transport, Communications and Infrastructure conducted an inquiry into Ship Safety. Its report[6] drew attention to the fact that between January 1990 and August 1991, six bulk carriers were lost off the coast of Western Australia, apparently because of their poor level of seaworthiness.

Container Manipulation

There are many ways in which sea containers can be manipulated. These include:

- Substituting legitimate cargo with contraband;

- Mixing bogus shipments in a container with legitimate shipments;
- Packing legitimate cargo at the front of the containers, with contraband or nothing at the back;
- Secreting contraband in legitimate cargo;
- Shipping empty containers with false compartments containing contraband;
- Shipping a suspect container by one shipping company to a transit port, where it is transferred to another company, to mask the country of origin.

The main transhipment port in our region is Singapore, where 9 million containers are handled annually, on 600 different shipping lines. The Port of Sydney handles some 700 containers each day. Such numbers of containers makes their systematic inspection virtually impossible, so recourse has to be had to profiling high risk container traffic and depending on intelligence leads.

Adequacy of Intelligence and Surveillance Capabilities

There are some national and international law enforcement liaison arrangements in place which may assist in focusing our attention and resources on offences likely to occur within our offshore estate. Apart from the normal close relationship which exists between the Australasian Police and Customs Services (including Coastwatch), there is a range of cooperative arrangements with State and Commonwealth Government Departments and Authorities which should assist in drawing to our attention matters which require investigation or law enforcement action. At the international level, the AFP has an extensive overseas liaison network with officers located in:

Argentina	Cyprus
Hong Kong	Indonesia
Italy	Malaysia
Pakistan	Papua New Guinea
Philippines	Singapore
Thailand—Bangkok and Chiang Mai	The United Kingdom
The United States—Los Angeles and Washington	

A Canberra-based liaison officer also travels regularly to the small South Pacific countries. Additionally, officers are stationed on Christmas Island, Cocos and Keeling Islands and Norfolk Island, together with police advisers in Papua New Guinea, The Solomon Islands and Vanuatu. As well, the AFP has members serving in Cyprus, Somalia, Mozambique and South Africa on United Nations or Commonwealth Secretariat duties and it also provides the regional INTERPOL facility.

Australia is part of the South Pacific Islands Criminal Intelligence Network (SPICIN), which provides members with intelligence and investigative services and is one of the three managing countries and reporting centres for the Pacific basin

Customs Reporting Network for small craft (Project Cook). Supplementary to this, the Australian Customs Service (ACS) has liaison officers in Washington, Tokyo and Brussels and is a member of the Brussels-based Customs Cooperation Council. In addition, the ACS provides the Regional Intelligence Liaison Officer, who is based in Hong Kong Customs.

The Role of the Military and the Maritime Industry

From the range of law enforcement interests outlined earlier in this paper, and the limited resources available, the best operational results will come from good intelligence, sound profiling of high risk targets, sophisticated surveillance capabilities and a readily available response capacity. By reporting incidents of potential law enforcement relevance to us, maritime agencies can perform a vital role in establishing our overall intelligence capabilities within the offshore estate. In all of these aspects, the resources of the traditional law enforcement agencies are very stretched and the support which is given by the ADF and the maritime industry is greatly appreciated. ADF assistance is usually in the form of intelligence, surveillance, technical support, language training and linguistics support, and some interdiction. The benefits of sharing resources, skills and technology among the military and the law enforcement agencies may well be beginning to outweigh the arguments against sharing these national assets. Assistance from the ADF could well become a significant part of Australia's armoury in the war against drug importations and other maritime-related crimes which may impact on our offshore estate.

The use of Defence assets and expertise would considerably enhance the capability of law enforcement agencies to identify and counter these threats. With the current limitations on resources an increase in this cooperation would benefit both law enforcement agencies and the military establishment. This would, of course, raise a number of questions about the role of the military in peacetime. However, in a law enforcement sense we are at war now.

Notes

1   See, for example, Clifford Karchmer and Douglas Ruch: 'State and Local Money Laundering Control Strategies' in U.S. Department of Justice *National Institute of Justice Research Brief,* October 1992, p. 1. This figure was also mentioned in the Central Intelligence Agency presentation to the 15th International Asian Organised Crime Conference in Las Vegas, Nevada, 28 March–2 April 1993.

2   *ABC News,* 12 May 1994.

3   *Commonwealth Crimes Act 1914,* S. 51.

4   On 11 December 1992 the English Master and Filipino 1st Mate of the Danish freighter Baltimar Zephyr were murdered in a pirate attack in the Straits of Malacca whilst the vessel was en route from Fremantle to Singapore.

5   This assessment includes the threats of hijacking and terrorism.

6   Commonwealth of Australia. *Ships of Shame: Inquiry into Ship Safety.* Report from the House of Representatives Standing Committee on Transport, Communications and Infrastructure. AGPS, Canberra. December 1992. p. xv.

4

Fisheries

Peter Venslovas

Introduction

The regulation of fisheries in the waters around Australia is not new. Since colonial days the states have had jurisdiction over fish within the three mile territorial sea. It was in the 1930s, in response to increased Japanese interest in pearl shell resources off Northern Australia, that the Commonwealth first became involved in the surveillance of fisheries. This function was initially carried out by civilian craft. Australian Defence Force involvement in fisheries enforcement seems to have occurred only since the Second World War. At this time the only activity that could be regulated was fishing within state territorial waters and the Commonwealth passed the Fisheries Act 1952 to give it power to regulate fishing by Australians, in what were called 'proclaimed waters'. Under international law no country had power to regulate fishing by other nations except within its territorial sea.

Australian Fisheries Potential

The point is worth making that, contrary to popular belief, there was never a great deal of fishing activity by foreign boats in waters around Australia. This was in part because of our remoteness from major world markets but more significantly because the waters around Australia are generally poor in nutrients and not capable of supporting large fish populations. While boats from many nations conducted exploratory fishing in what is now the Australian Fishing Zone (AFZ), catch rates were generally not attractive enough to entice them to return. The major exception to this was of course long-lining for tuna by the Japanese.

The major advance in establishing an Australian fishing regime came in 1979 when Australia declared its 200 nautical mile fishing zone, or AFZ. This action actually anticipated developments in the United Nations Convention on the Law of the Sea which did not ratify the right of coastal states to exercise such control until 1982. With declaration of its AFZ, Australia could regulate fishing both by Australian and foreign vessels within the whole of the AFZ. This meant that each of

the states and the Northern Territory had jurisdiction over their three mile territorial seas, while the Commonwealth had jurisdiction from three to 200 miles. Although Australia only recently ratified the United Nations Convention on the Law of the Sea (UNCLOS), and was under no legal obligation to abide by its provisions before doing so we have been treating the provisions of UNCLOS III as customary international law in accordance with general international practice.

As previously noted, nutrient levels in waters around Australia are such that we will never be a major fishing nation. Nonetheless many of our resources, particularly some crustaceans and molluscs, have very high unit values and the Australian fishing industry contributes over $1.3 billion to the national economy each year. Experience world wide indicates that unregulated fisheries are over exploited which leads to the depletion of fish stocks and often to a biological collapse of the fish resource. Most of Australia's known fish resources are already fully exploited while some are significantly over exploited. There is a high degree of over capitalisation in a number of Australian fisheries and measures are being developed by the Australian Fisheries Management Authority (AFMA), in conjunction with industry, to reduce effort in those fisheries for which we are responsible.

Regulation

The reasons why fish resources become over exploited are complex. In part they are due to the absence of individual ownership. Australia's fisheries are a common property resource and with the absence of individual ownership the incentive for individuals to conserve the resource are small. There is also great difficulty in calculating the size of a fish population. Fish numbers cannot be counted easily and research costs are high. With modern fishing technology it is often declining catches that indicate the limits of a resource, rather than some scientific assessment. Added to this, there is the complex nature of marine ecosystems which often make it difficult to separate the effects of fishing from changes caused by fluctuations in the environment.

While acknowledging that Australia does have its problems in terms of fisheries management, Australia has, by world standards, a good record. Most of our fish resources are in reasonably good shape, partly because of a combination of the absence of significant international fishing competition, innovative and far-sighted fisheries managers and an industry which is, in the main, management aware and conservation minded. As an example of this, AFMA was established in 1992 and is now the federal government authority responsible for the management of fisheries under commonwealth jurisdiction. AFMA's mission is to create conditions which ensure the long term sustainability of Australia's fish resources, while allowing for the efficient exploitation of these resources and an equitable sharing of them among all user groups. The conservation aspects of the mission statement bear a direct relationship to provisions under article 61 of UNCLOS (conservation of the living

resources), while the exploitation by user groups aspects of the statement relates to the provisions under article 62 of UNCLOS (utilisation of the living resources).

As mentioned earlier, under UNCLOS a nation does not 'own' the fish resources of its fishing zone, but rather is their custodian on behalf of the world community. Flowing from this there is a requirement under UNCLOS that a coastal state must allow foreign access to unutilised fish resources within its zone. Also, in declaring its 200 mile zone Australia had to recognise traditional fishing activity. This provision is not quite as dramatic as it might first appear because it is up to the coastal state to determine what these unutilised or excess resources might be. In policing fishing activity within its fishing zone Australia can therefore claim to be protecting its own national interests and also to be meeting its international obligation effectively to manage the resources of which it is custodian.

Japanese access to the tuna resources within the AFZ is in part a result of this provision and links with the current trilateral arrangement (Australia, Japan and New Zealand) negotiated annually for the management of this southern bluefin tuna fishery. Besides this UNCLOS obligation there are other reasons why one nation might allow foreign fishing boats access to its fishing zone. One of these could be the access fees that it can require foreign boats to pay. Obligations under a bilateral trading arrangement could be another. The finite nature of fish resources is now well recognised by both fisheries managers and fishing operators. With this recognition has gone a much more cautious approach to the development of newly found fish resources. A depleted fishery may take many decades to recover and it is those who rely on the fishery for their livelihood who must bear the pain of restructuring, catch restrictions, or fishery closure.

AFMA recognises that compliance with the fisheries laws is an essential element of fisheries management. Any compliance program provides the cornerstone of effective fisheries management. It provides the mechanism by which the integrity of the fisheries management arrangements are maintained by ensuring that the rules are followed. For any compliance program to work effectively four basic rules must be applied.

- The industry must understand the rules.
- The industry must also accept the rules as necessary for effective management and sustainability of the resource.
- The rules must be enforced fairly and consistently.
- Any penalties handed down should be of sufficient magnitude as to deter illegal activity.

The fisheries compliance program in Australia can be separated into three sub programs:

- domestic licensed vessels,
- foreign licensed vessels, and
- unlicensed foreign vessels.

Fisheries monitoring and enforcement activities are undertaken under the authority of the Fisheries Act 1952, the Fisheries Management Act 1991 and, in some circumstances, the Crimes Act 1914. Fisheries related investigations may be conducted under the Crimes Act 1914 when criminal activities are considered serious to the extent that action under the fisheries legislation is either inappropriate to or not sufficient for the severity of the offence. Surveillance of Australian fishermen and licensed foreign fishermen is carried out by state employed fisheries officers under agency arrangements with the Commonwealth which conferred the necessary powers to them under the relevant fisheries legislation. Coastwatch provides a coordinating role in regard to foreign fishing vessels, with the RAN and RAAF providing sea and aerial surveillance.

More recently, AFMA has been trialling a vessel monitoring system (VMS) to track the positions of fishing vessels. The system is capable of providing real time data on the vessels' position as well as catch details. The Japanese fleet operating in the AFZ is expected to have been fitted with VMS by November 1994. Offshore surveillance of illegal foreign fishermen is mostly carried out by the patrol boat fleet of the RAN, with aerial cover being provided by private contractors arranged by Coastwatch; with the RAAF also contributing to a lesser degree. Defence resources are not used to police domestic fishing operations. Annually, the RAN provides 1,800 sea days and the RAAF 250 flying hours to the civil surveillance program which is coordinated by the Coastwatch organisation, which is part of the Australian Customs Service.

The decision to place the responsibility for Coastwatch in the hands of the Australian Customs Service resulted from a Government review of Australia's civil coastal surveillance arrangements under Mr Hugh Hudson. The findings of the review also provided for an annual allocation of:

- a minimum of 10,000 hours of contractor provided visual aerial surveillance;
- 700 hours dedicated airforce surveillance provided by RAAF P3C Orion aircraft;
- 1,800 sea days provided for civil related purposes by naval patrol boats; and
- complementary effort provided by other secondary surveillance vessels.

From mid 1991 the hours currently provided by the RAAF were reduced to 250 per annum. These hours were replaced by the charter of three jet powered, all weather surveillance aircraft which provide approximately 3,200 hours of offshore surveillance. The visual surveillance capability was also reduced to 7,450 hours but there was an additional 1,300 hours of inshore electronic surveillance aircraft, supplemented by 250 hours of rotary wing capability for use in the Torres Strait while the sea day allocation by Navy remained unchanged.

AFMA is but one of several major clients that bid for the resources of the civil surveillance program. The operational program advisory committee (OPAC) is convened each month to plan the civil surveillance program and it is in this forum that the client agencies submit requests on a monthly, six monthly and annual basis. AFMA is by far the major user of the civil surveillance resource, because of its responsibilities within the 200 mile AFZ.

Surveillance of foreign fishing within the AFZ falls into two parts, licensed foreign fishing and illegal foreign fishing activity. Surveillance of licensed foreign fishing is relatively straightforward. The vessels involved are known and are subject to various reporting requirements, including regular position reporting and usually pre and post fishing inspections, in port. These methods of surveillance are effective when monitoring the amount of catch taken, which is particularly important in fisheries subject to quota management arrangements. But, they are ineffective in detecting unauthorised fishing operations at sea and especially in closed areas. Experience has shown that maintenance of an adequate at sea response capability is essential in these instances.

Illegal fishing activity by unlicensed foreign vessels is, by its nature, somewhat less predictable, although illegal incursions into the AFZ have in recent years developed a pronounced seasonal and area pattern. While aerial surveillance provides a vital searching and no doubt important deterrent component, it must be backed up by a surface response capacity. During the 1993/94 financial year 29 Indonesian fishing vessels were apprehended off the North and North West of Australia. This represents an increase on the previous year's total of 10. Most vessels were targeting shark. The prosecutions were successful and the boats, catch and gear were forfeited to the Commonwealth. In the past five years, illegal Indonesian fishermen have had a significant impact on the foreign surveillance program. Historically, the numbers of incursions have been directly related to the prevailing price of trochus and shark fin in Asia. Currently the prices are low and the number of incursions may subside for a while.

The Future

This should prove to be a brief respite, with the situation likely to worsen in the future as the pressures on the fishing stocks in Indonesian waters force the vessels further afield. Intelligence reports indicate a likely marked increase in the number of incursions in the future; something which will only add to Australia's surveillance task. The major port of Papeela on Roti Island in the Southern archipelago of Indonesia, North East of Darwin, has had a fleet increase of from 60 to more than 180 vessels in the past two years. These vessels do not belong to the traditional Rotinese people but to the 'sea gypsies' (the Sama Bajo people) or rural people from southern Sulawesi. Southern Sulawesi is the area were many trochus fishermen have come from in the past.

Estimates suggest that the current shark fishing effort by illegal foreign fishermen in the north may already be above the long term sustainable yield for the stock and any increase in effort is sure to place the stocks at great risk. Foreign fishing surveillance resources have also been utilised in the last few years to apprehend illegal fishermen from Papua New Guinea (PNG) collecting beche-de-mer in the Torres Strait protected zone. The catch is sold to foreign buyers in Daru and sold on the Southeast Asian markets at very good prices. The beche-de-mer fishermen are driven largely by the need for money and are willing to take significant risks to meet this need. To address the problem the PNG authorities initiated a moratorium on the taking of beche-de-mer. A prohibition on its collection came into effect on 23 September 1993 and was extended to 25 March 1995. Since the prohibition, there have been very few incidents involving PNG nationals in the area of the Torres Strait subject to Australian jurisdiction. This situation is likely to continue.

Conclusions

It is very difficult to measure the effectiveness of the civil surveillance program. At present there is no universally acceptable means of measuring compliance. Some people contend that compliance is not working if there are no successful prosecutions. Others argue that a low number of cases being prosecuted signifies a relatively high level of compliance. On balance AFMA is of the opinion that the civil surveillance program, in its current form, provides for an effective deterrent to illegal foreign fishing activities. AFMA has enjoyed a long-standing relationship with the RAN: a number of fisheries officers are ex-naval personnel. AFMA believes that the service provided by the RAN for fisheries surveillance tasks is as good as can be expected having consideration for the hardware and personnel resources available to them.

Some people have suggested that a coastguard approach would provide a viable option to the current law enforcement arrangements. Naturally, AFMA would support such an option if it could be assured that it could meet its objectives under the fisheries legislation. However, before such a proposal could be considered there would need to be a detailed study to assess the economic viability and practicalities associated with establishing such an organisation. We suspect that at this stage, to introduce a coastguard could result in duplicating the existing patrol boat program at great expense without any perceived additional benefits to fisheries. A coastguard approach may prove too costly both to implement and to administer.

Realistically, the RAN is currently the only agency that can provide the required level of service in offshore areas of the AFZ. In the future the level of illegal foreign fishing activity is likely to increase. RAN patrols to distant water areas such as Christmas Island will need to be undertaken on the basis that should an apprehension occur there is a high likelihood that the apprehended vessel will need to be escorted back to the Australian mainland. Patrol vessels need to be of sufficient size relative

to the size of illegal fishing vessels, provide a safe platform for conducting boardings and investigations, and provide sufficient capacity both in terms of accommodation and supplies to accommodate the crew of a foreign fishing vessel and in some instances a lengthy escort or transit back to the mainland.

5

Australian Petroleum Exploration Activities

Dick Wells

Introduction

Australia's vast marine environment is a uniquely important resource. Inshore and offshore waters, the coastal beaches and cliffs, mangrove forests, coral reefs, islands, embayments, ports and harbours are of major significance for recreation, tourism, commerce, shipping and transport, mineral extraction, the mariculture and fishing industries and defence.

One of Australia's most important economic uses of the offshore marine environment is the production of oil and gas. The supply of crude oil and gas remains an important component of Australia's current and future energy needs. It can be argued that exploration for and, hopefully, ultimate discovery of further oil and gas reserves are essential imperatives for our economic survival with a reasonable standard of living. Yet offshore oil and gas developments are not highly visible projects of economic endeavour for the vast majority of Australians. Few people would understand the immense value of the industry to the Australian economy.

What Does the Oil and Gas Industry Mean to Australia?

Some facts and figures may help to set the record straight as to the importance of the oil and gas industry to Australia. For example:

- Petroleum (oil and gas) is Australia's single most valuable commodity. According to the Australian Bureau of Statistics and other sources, Australia's oil and gas production in 1991–92 was worth approximately \$7.8 billion. That is half a billion dollars more than the next single most valuable commodity—coal at \$7.2 billion.
- Oil and gas production is more than twice the value of gold (\$3.6 billion), two and a half times the value of wool (\$3.0 billion) and

iron ore ($3.0 billion) and nearly four times more valuable than meat production ($2.1 billion)

- Oil and gas production saves Australia an estimated $5.5 billion in annual import bills. Petroleum exports earned Australia $4.5 billion in 1992–93.
- Australian governments are enormous beneficiaries of oil and gas production. Direct taxes paid by oil and gas producers are over 60 per cent of pre-tax profits earned by the industry, compared with about 50 per cent for other minerals.
- Taxes, royalties and excise paid by oil and gas producers to Federal and State governments total more than $2.5 billion annually. In 1992–93 they totalled $2.9 billion.
- The huge North West Shelf (NWS) project now generates liquefied natural gas (LNG) exports of more than $1 billion per year. Virtually all Australia's LNG production comes from the NWS project. LNG is Australia's 10th largest commodity export.
- A study by the University of Western Australia in 1991 found that the operational phase of the NWS project would give a substantial boost to the Australian economy. In a typical year of the production phase, the NWS project boosts Australian exports by five per cent, real gross domestic product by one per cent and employment by 69,000 jobs.

According to the Commonwealth Department of Primary Industries and Energy, oil and gas supply the largest proportion of all energy use in Australia—between 50 and 55 per cent. Australia now produces about 180 million barrels of crude oil and condensate each year, about 90 per cent of it from offshore fields. Sixty-seven per cent of indigenous crude oil and condensate production was consumed in Australia in 1992–93, providing about 52 per cent of Australian crude oil requirements. Australia's net self sufficiency in crude oil presently stands at about 77 per cent. Furthermore, about 530 billion cubic feet of natural gas is produced and sold annually. Sales of gas production expanded rapidly in the 1970s and 1980s, both to replace oil and to meet a growing demand for energy. liquified petroleum gas (LPG) production totals 23 million barrels per year and annual LNG production is about 220 billion cubic feet.

Where Is Australia's Petroleum Produced?

Bass Strait's Gippsland Basin, offshore from Victoria, produces the largest share of Australia's crude oil and condensate—about 61 per cent—as it has done for more than a quarter of a century. Western Australia—predominantly the Carnarvon Basin of the north-west—is the next largest producer with a 21.5 per cent share. The Gippsland Basin also leads as the largest producer of natural gas (with a 32 per cent share) and LPG (with a 73 per cent share). Other significant areas of natural gas

production are the (onshore) Cooper Basin (with a 31 per cent share) and the North Rankin field in the Carnarvon Basin (with a 27 per cent share). The balance of Australia's production of naturally occurring LPG comes from the Cooper Basin (24 per cent) and the Surat Basin and Barrow Island. Encouraged by Government policies, domestic LPG consumption almost tripled during the 1980s and reached 3 billion litres in 1989–90. Annual consumption is forecast to reach 4 billion litres by 2002–03.

Australian Oil and Gas Production 1993
State shares (percentage)

	Vic	Qld	SA	WA	NT
Oil/Condensate	60.8	3.8	5.3	21.5	8.6
Natural gas	32.6	6.6	30.9	27.6	2.3
LPG	73.4	2.8	23.8	–	–
LNG	–	–	100	–	–

How Will the Industry Develop In the Future?

In June 1993, the Bureau of Resource Sciences (BRS) released new projections for crude oil and condensate production. The BRS expects it to increase reasonably strongly until 1995–96 and then decline rapidly until 2004–05. According to this most recent projection, the 50 per cent probability estimate of production in 2004–05 is only about 40 per cent of actual production in 1991, or about 80 million barrels.

The 1993 BRS projections represent a significant downgrading of previous production estimates. Part of the difference in estimates of production in later years arises from the downgrading of the assessments of the main producing basins and a change in the perception of the likely levels of future drilling within them. Another part derives from a reassessment of the likely future production rates from Australia's identified petroleum accumulations. On the other side of the ledger, the Australian Bureau of Agricultural and Resource Economics (ABARE) has projected that demand for crude oil and condensate will increase at an average annual rate of 2 per cent between now and 2004–05. The gap between supply and demand could widen rapidly in the second half of the decade and net crude oil imports could escalate to about 220 million barrels per year in 2004–05. ABARE has also projected that natural gas production will grow by an average of 3.5 per cent a year to 2004–05. Natural gas consumption is projected to grow at an average annual rate of 2.6 per cent per year to 2004–05, by which time natural gas is expected to account for about 18.5 per cent of total energy consumption, compared with 17 per cent in 1992–93.

Of course all projections are subject to heavy qualification and there is a number of factors which need to be taken into account when assessing the BRS supply side

forecasts. Firstly, the latest BRS projections are not strictly comparable with their earlier ones. Previous BRS projections included estimates for all basins, whereas the latest projections for undiscovered reserves only included estimates for the Bonaparte, Carnarvon, Eromanga and Gippsland basins. The magnitude of the 50 per cent probability estimate of annual production in 2005 increases by 19 per cent when crude oil production from undiscovered accumulations in the Perth, Browse, Otway and Bass basins and the onshore Cooper Basin is added. However, there is presently very little exploration being carried out in these basins.

Secondly, the BRS itself acknowledges that the extent of the projected decline in Australia's crude oil production could be arrested to some degree if exploration is increased in the producing basins over the next few years and greater attention is given to exploration of Australia's other prospective areas over the next ten years.

Where Is the Industry Likely to Develop In the Future?

Exploration activity fluctuates over time and between areas (offshore and onshore) according to explorers' perceptions of the potential reward in relation to the potential risks. Perceptions of potential reward are based on exploration success and economics. Thus, exploration is affected by access to acreage, perceived prospectivity, the record of commercial discoveries, the size and production capacities of fields discovered, oil prices, costs related to exploration, development, production and transport, and the fiscal regime. The main focus of exploration activity in recent years has been offshore, while onshore activity has languished. 1990 was an exceptional year offshore, when exploration and discoveries were in line with that required to sustain future production at present levels. Sixty-three wells were drilled and new discoveries added an estimated 200 to 300 million barrels to crude oil reserves. The following three years have been uninspiring with offshore drilling activity returning to more normal levels of 40 to 43 wells and only 100 million to 170 million barrels being added to reserves.

However, offshore seismic data acquisition has surged to record levels in the past three years, with much of it being 3D seismic which is superior to 2D seismic for identifying drilling targets. Record seismic acquisition is an encouraging pointer to future exploration drilling, but a large part of it was associated with appraisal and development of current discoveries. Seismic activity has been focussed mainly on the Carnarvon and Bonaparte basins, off Western Australia.

The Australian Petroleum Exploration Association's (APEA) survey conducted in December 1993 of member companies' plans for exploration activity in 1994 indicated that offshore exploration could surge to between 67 and 97 wells compared with 43 wells in 1993. Again, the main areas of activity continue to be off the north-west coast in the Carnarvon and Bonaparte basins. However, 20 of the 27 wells programmed for the Bonaparte Basin are in the Zone of Cooperation between Australia and Indonesia. The industry's interests are therefore extending further afield

and recent encouraging discoveries in the Zone of Cooperation should maintain the attention of explorers over the next few years.

The offshore Otway and Bass basins are also likely to receive greater attention further into the future. There have been encouraging petroleum discoveries in these areas in the past and the development prospects of the gas discoveries made by BHP Petroleum are improved by their location adjacent to the large gas markets in Australia's south east.

What Does the Industry Do Offshore?

Petroleum industry operations may be divided into three distinct phases—exploration, development/production and abandonment. The initial step in any exploration program is to gather information on the search area to assess its prospectivity. Offshore, this will involve conducting a marine seismic survey.

Seismic surveys rely on data from the reflection or refraction of low frequency but high intensity sound energy from rock formations under the seabed. These sound pulses are created artificially by specially designed air guns which function by discharging a bubble of highly compressed air into the water. A single air gun is not very 'powerful' and the guns are usually deployed in arrays of up to 30 or so and towed behind the survey vessel at a depth of 6–10 metres. As the vessel moves along the survey line, at a speed of about 4 knots, the guns are 'fired' at approximately 10 second intervals. Also towed at a depth of about 10 metres are one or more strings of hydrophones, each up to 3–5 kilometres long. The hydrophones detect the reflected sound waves and the data (time of arrival, frequency, amplitude, for example) are transmitted back to the ship, logged into a computer and analysed. These data can help to identify petroleum source rocks, possible petroleum migratory paths and traps for petroleum accumulations.

However, drilling is the only certain way of testing the oil or gas potential of a prospective area. Offshore oil wells can be drilled from a ship or other vessel held stationary in the ocean, or from a fixed platform. There are four types of mobile offshore drilling rigs:

- Submersibles—these are fitted with ballast tanks so they can be floated to shallow water locations, then ballasted to sit on the seabed and provide a stable drilling base;
- Jack-ups—these units are usually towed to a location by a tug and mechanically jack their legs down to the sea bed, raising their hulls clear of the water for drilling operations (they are used in water depths up to 400 feet);
- Drillships (or drilling barges)—these are ship-shaped vessels, usually with the drilling derrick placed in the centre to drill through a hole in the hull, which are either anchored or kept in position by dynamic positioning employing computer controlled propellers along the hull to correct drift continually in any direction;

- Semi-submersibles—these are mobile structures, some having their own locomotion, with super-structure supported by columns sitting on hulls or pontoons ballasted below the depth of wave action for drilling operations.

The most common method of drilling is rotary drilling, in which, simply, the drill bit is screwed to a length of pipe, suspended from a structure called a derrick and rotated by a motor as it is lowered into the hole. Over the years, directional drilling has been developed where drill bits are steered laterally as much as several kilometres towards areas of the reservoir remote from the surface location. Wells may now be drilled in a variety of directions at all angles.

A further development is horizontal drilling, which aims to have drill pipe enter the oil bearing rock horizontally, instead of nearly vertically. In this way the oil and gas production string can be exposed to a much longer section in the productive formation, thereby increasing flow. As much as 600 metres of horizontal completion may tap a formation. As a result, oil from small fields which might otherwise have been left untouched becomes economic to produce.

After oil or gas has been discovered in an exploration well, it must be determined whether the accumulation is large enough to permit economic development. A number of stepout or appraisal wells must be drilled to establish the limits of the accumulation of oil or gas. If a project proceeds to production, then a range of facilities will need to be developed. For medium to large fields in water depths to 150 metres, it is common to have a fixed production platform which houses all the wellheads and the processing equipment, plus accommodation for the field workers. A submarine pipeline is then laid ashore to permit further processing and storage or distribution. Platforms vary in size, shape and type depending on the size of the field, the water depth and the distance from the shore. Most common are steel structure fixed to the seabed with steel piles, but there are also concrete structures which can accommodate oil storage and which sit on the seabed by force of gravity.

If the water is shallow and land or another platform is nearby, small platforms may be used, with the main processing facilities located ashore or on the main platform. They need not be manned, but can be controlled remotely. Floating structures, either anchored or tethered to the seabed, support the same process facilities and may also have storage. They are generally used for smaller or remote fields. In other developments, subsea production units are used. These sit on the seabed and fill floating storage systems via flexible flowlines and buoyed marine risers running to floating facilities where processing is carried out .

In most instances the development of an offshore production facility will require a substantial onshore facility having oil, gas and water processing and treatment plants. In Victoria, the onshore facilities associated with the Bass Strait fields include the Longford crude oil stabilisation plant (Gippsland) and Long Island Point fractionation plant (Westernport Bay). Various companies involved in production off the north-west shelf operate onshore facilities on Varanus, Thevenard and Airlie

islands and on the Burrup Peninsula. The kinds of coastal facilities associated with petroleum developments are much the same as those that would occur with any industrial development on or near the coast. They include dredging of shipping channels, construction of jetties and groynes, pipeline receiving facilities, laying of pipelines and construction of oil, gas and water processing and treatment plants.

What Factors Will Affect the Industry's Development?

There are three principal factors which will affect the future development of Australia's petroleum industry. They are:

- Fiscal settings,
- Environmental and other regulatory requirements, and
- Technology development.

There are both opportunities and constraints attached to each of these factors.

Oil prices play a major role in the economics of exploration. Movements in oil prices are generally closely reflected in the level of exploration expenditure. History shows that, apart from a couple of notable exceptions, real oil prices do not change very much. At the present time, oil prices are relatively low and there does not appear to be any likelihood of a change in market fundamentals to alter the situation. Internationally, oil and gas reserves are increasing marginally and, for oil, the Middle East is clearly the dominant supply source. Increased Middle East production capacity should ensure that low real oil prices are likely to prevail in the longer term. For a marginal oil province like Australia that can only lead to less exploration and development expenditure.

With this in mind, the Federal Government has acted to boost Australia's appeal as an exploration province. In June 1991 the Petroleum Resource Rent Tax (PRRT) was amended to allow wider deductibility for exploration expenditures from a project to a company, or on a corporate group basis. On the other hand, the decision to reduce the rate for carrying forward undeducted general project (including development) expenditures adversely affects the economics of gas developments which acts to discourage exploration. There were further amendments to the PRRT in December 1992 and December 1993 to rectify some technical deficiencies of the Act. The present Australian petroleum industry taxation regime is not overly onerous by international standards. It should not be a serious factor in discouraging exploration. In the case of gas, lack of market opportunities is the main constraint, although should markets emerge the PRRT will limit the potential of a major Australian project being developed.

A potentially serious constraint on the future development of the offshore industry is the environmental regulatory regime under which the industry is forced to operate. At the present time, environmental interests and petroleum interests tend to be mutually exclusive. Petroleum exploration is excluded from marine parks. If a marine park is gazetted an exploration permit cannot co-exist. Similarly, if a petroleum permit exists a marine park cannot be established to overlay it. This sort

of competition for resources—environmental and mineral—is untenable. It is also unnecessary. The offshore petroleum industry has been shown to be environmentally benign by the recent independent scientific review of the environmental implications of offshore oil and gas developments in Australia. As was noted by the independent scientific review:

> This project has revealed that environmental impact assessment and management has taken place at all stages of the offshore developments and that current work practices in drilling and production are such as to minimise the possibility of environmental harm.

APEA, for some, time has been pressing Federal and State governments to implement a sensible multiple use policy offshore. Environmental controls appropriate to conservation values of a particular area can and should be implemented and the petroleum industry should be allowed to operate in accordance with those controls. The need for exclusion should be rare and only over very limited areas.

Furthermore, technological development should enable ongoing review of access to particular areas where it is restricted or excluded. As technology improves, the industry will likely be able to operate without concern for environmental damage in areas previously denied. In fact, technological development will be a positive factor in maintaining Australia's offshore petroleum industry. As technology improves so do production rates, recovery rates and the ability to tap previously uneconomic reserves. In the future the industry will surely be able to develop smaller reservoirs in deeper water than is possible today.

Security Threats?

The security threat from the offshore petroleum industry, in terms of some sort of disaster such as a major oil spill or a blow-out/explosion, is extremely low. The industry has demonstrated a commitment to technological ingenuity to improve production efficiencies and to ensure the highest safety and environmental management standards possible. The industry's oil spill and safety records are exemplary and the future search will involve science and engineering brought to high levels of accomplishment. The industry complies with international requirements for ensuring navigational safety in the vicinity of abandoned offshore facilities. Petroleum companies also supply information to the RAN Hydrographer to assist in the preparation of navigation charts.

It may be more appropriate to consider possible security threats to the industry's facilities. Companies are now searching in frontier areas, in deeper water further away from the coast. Environmental extremists such as Greenpeace have a policy of halting all petroleum exploration and production, combined with a record of direct action against production plant. APEA member companies have recently experienced Greenpeace direct action. A Greenpeace vessel endangered the safety of a seismic vessel under contract to BHP Petroleum in the Otway Basin. Another Greenpeace

vessel entered the exclusion zone surrounding the North Rankin A platform on the north west shelf. Such acts place lives and property at risk.

And the Future?

There are two certainties which need to be taken into account in reviewing issues associated with management and security of offshore resources. First, there is more oil to be found in Australia and companies will continue the search for the foreseeable future. Second, new offshore production facilities will be developed. The navy and other law enforcement agencies need to be aware, for security reasons, of where those developments will occur and the type of facilities which will be constructed.

6
Commercial Shipping

Michael Robinson

Introduction

Australia has a coastline of about 21,600km. Consequently, the declaration of the EEZ will give us responsibility for one of the largest ocean areas in the world; one which will exceed our land area. The development and integration of ocean policy to manage this area requires a sound understanding of all the different phenomena and activities which do and may take place in the marine environment. At a time of growing environmental concern, when ships have never been older or larger, this paper describes some of the contemporary problems associated with commercial shipping. It examines one option for the management of ships within Australia's EEZ to preserve its environmental value and its intrinsic economic benefits against accidental, deliberate or perceived damage by commercial ships. Finally it argues that the creation of an Australian Coastguard Service will lead to a more cohesive approach to management of most maritime activities within the EEZ.

Commercial Shipping—A Threat?

Before considering any action the first question to ask as far as commercial shipping is concerned is whether it represents any sort of threat to our EEZ, and if so, the extent of that threat.

Australia is the ninth largest trading economy in the world and has the biggest transport task measured in tonne kilometres. Our economy is dependent on ships to bring us the products which we cannot or choose not to manufacture ourselves and to take away our mineral, primary produce and manufactured exports. Our exports and imports combined amount to some 34 per cent of our GNP, which is around $A400 billion. Of this trade, sea transport carries around 76 per cent ($A100 billion) by value and over 99 per cent by weight (300 million tonnes). Freight charges for imports and exports total $A6.2 billion. In addition there is $A700 million of coastal freight charges. Four percent of this trade is in Australian ships. In round terms there are 10,000 calls made each year by ships of all flags to Australian ports

and an estimated 64,000 million ship kilometres steamed each year within our Search and Rescue Area (SAR). This SAR area exceeds our EEZ in size by a considerable amount, and despite being relatively untravelled it may be used as a measure for the significance of the figures involved. On average there are 300 ships underway within that area and another 70 or so berthed within Australian ports on any day (MRCC figures). Compare this with the figure of 3450 ships at sea each day in European Seas from Murmansk to Suez.[1]

In his seminal work 'The Influence of Sea Power on History' Mahan said that:

> The first and most obvious light in which the sea presents itself from the political and social point of view is that of a great highway; or better, perhaps, of a wide common, over which men may pass in all directions, but on which some well-worn paths show that controlling reasons have led them to choose certain lines of travel rather than others.[2]

The trouble with this analogy is that elementary economic theory teaches us that any unregulated common property has several characteristics. Specifically, it can be used simultaneously by more than one user, and no individual has exclusive control of any part of the resource and cannot stop others using it. Since each user is in direct competition with all other users there is no incentive to maintain a sustainable yield. Rather the opposite is the case and each user will try to obtain as large a share as possible before others use it. Any restraint will not be rewarded as anything not taken will be claimed by others. We have seen this with the fishing industry and especially drift net or 'wall of death' fishing.

The Ships of Shame Inquiry Report and some rather sensational journalism have led us to believe that the ships that visit our ports or pass our coast are rusting coffins that are liable to sink at the slightest excuse. These sinkings are alleged to drown innocent sailors, and to pollute our waters beyond redemption. Even if the ships do not sink there is a media induced perception that they are owned by unscrupulous environmental murderers and profiteers, crewed by illiterates who delight in leaving a trail of oil, grease and rubbish in their wake.

Clearly this perception is inaccurate and the media never mentions the millions of ship kilometres sailed quietly and efficiently every year with cargoes delivered to the complete satisfaction of the customers. What is true is that there was a series of six deep sea sudden sinkings of laden ore ships between January 1990 and August 1991. These ships had all loaded in Western Australia. Structural failure was held to be the reason for these sinkings which were the catalyst for the Ships of Shame Report. These six sinkings were included in the world wide total of 47 losses of dry bulk ships with cargo in the four years from January 1988 to the end of 1991. Thirty seven of these sinkings were attributed to structural failure and 26 of them were without loss of life.[3]

Forty seven ships with a total deadweight tonnage of 2,600,802 in four years seems to be a lot and is on average one ship per month. If we look at it in percentage terms a different picture emerges. For 30 September 1992 the British

Chamber of Shipping Statistical Tables gives the world total number of dry bulk ships as 5185, with a total deadweight of 136,807,000 tonnes. So the average annual loss of, say 12 ships, represents a loss rate of .23 per cent of these ships. The annual deadweight tonnage loss rate is 1.9 per cent.

So, whilst the loss of these ships and the 100 seafarers per year who went with them is regrettable it is not a phenomenon which is a serious threat to world trade. Some books give unsubstantiated figures of 1000 shipwrecks per year in the early 19th century on the coasts of Great Britain and Europe. Of course it is not fair to compare the technology of the 19th century with that of today but it is a simple fact that with any technology there is a concomitant and inseparable risk. Trains have crashes, so do aeroplanes and motor vehicles certainly do. The Titanic sank and a Space Shuttle exploded. Technology in fact promotes its own accidents and it is largely through analysis of accidents that we advance. The advance in technology is one reason why the overall ship accident rate has declined in recent years, despite the universally acknowledged fall in training standards and competency of ships crews. Another reason is that whilst seafarers may be badly trained they are not foolhardy and have as much sense of self-preservation as anyone else.

Given the harsh and unforgiving nature of the sea it is perhaps surprising that there are not more sinkings; but even the worst maintained ship in the world has had strength and survivability built into it from the start. Generally ships do not suffer sudden catastrophic structural failure and sink. The fighting Navy knows that ships are designed to sustain enormous damage and still float. This was proved in the last war with the examples of tankers such as the *San Demetrio* and the *Ohio* taking enormous bomb and torpedo damage and still making it to port nursed by determined crews. Even the *Kirki* which lost her bow at the number two bulkhead managed to stay afloat and was salvaged.

The Ships of Shame report describes examples of structural damage and corrosion, rusted fire hydrants and frozen lifeboats. These deficiencies do not necessarily make a ship liable to catastrophic failure any more than a bit of rust in a motor car makes it likely to break in half whilst driving normally on the road. Look at most cars strictly enough and you will find a percentage of defects as high as that on even the worst of ships. And just as motorists attend to their engines rather than the rust in the back door, shipowners and crews concentrate their efforts on the bits that keep them mobile and earn money.

This is not to say that damage to hold frames and corrosion of structural components does not matter. Clearly, they are latent weak points where more serious damage may start in the event of inappropriate ship handling in heavy weather or after shear force and bending moments have been exceeded by incorrect loading practices. This point has been made recently:

> Latent failures are removed in time and space from the actual incident. Given the nature of the shipping industry where ships may change owners and management many times through their service life, such

latent failures may be removed from a ship's current owner and be attributable to some decision made many years before.[4]

The Ships of Shame Report made reference to the age of some of the ships involved in incidents. The age of the world fleet is estimated to be 17.9 years and aging at a rate of eight months every year.[5] But an old ship is not necessarily a bad ship let alone that creature of the media a 'rustbucket'. It is however, a fact that the older a ship the higher the maintenance costs and the greater the pressure to economise, given that present rates of freight fail to provide sufficient revenue for replacement and are often insufficient to cover other than daily running costs. Under these circumstances owners cannot afford to scrap their ships so they keep them running in the hope of better freight rates in the future. Despite this, the scrap figures for 1992 show it to have been the best year since the mid-eighties with more tonnage, at 4.0 million tonnes deadweight of bulk carriers, being broken up than the total for the previous three years.[6]

The flag of registry is also held to be a significant factor contributing to accidents, particularly by some Australian shipowners. But open registers, flags of convenience or whatever name is used, are creatures of economic necessity and provide flexibility which is absent in traditional ship registries. Although there are undoubtedly flags with a worse record of losses than others (see table 1) the flag on the stern does not necessarily indicate low standards. Note the presence of Ireland, Italy and New Zealand in the table. Australia too is over-represented in shipping incidents on the Great Barrier Reef and has three times the rate that might be expected from voyage numbers alone.[7]

Returning to the 47 sinkings we now need to look at the impact they had on the wide common. Well actually not much was ever noticed. Air and sea searches for the *Alexandre P* off Western Australia in March 1990 failed to locate the ship or any trace of oil or wreckage except for two dead crewmen in a life raft some time later. The oil from the *Braer* had dissipated in ten days, although not without creating some environmental problems. But, although ships are the most environmentally friendly form of transport and only 5 per cent of oil in the sea comes from ship accidents ('The State of the Marine Environment', UNEP 1990) it is the potential for damage that counts in the mind of the population. Journalists constantly remind us of the *Exxon Valdez* incident and in the mind of the public all ships have the same potential for pollution.

So, ships do not routinely break up in deep water and they do not even break down particularly often. If ships do get into trouble it is through grounding or collision when excessive corrosion, lack of maintenance and inadequate crew training could be critical. To return to the car analogy if you are not a good driver you are more likely to have a collision and if your car is rusty you are more likely to sustain damage and injury. Ship groundings and collisions take place in the shallow and crowded coastal zone where human rather than technological factors predominate. It is ships in these coastal waters that have the potential to cause trouble because the

entire coast of Australia and not just the Barrier Reef has become a resource worth protecting.

Figure 1: Flags with Losses Above World Average (excluding Taiwan)[a]
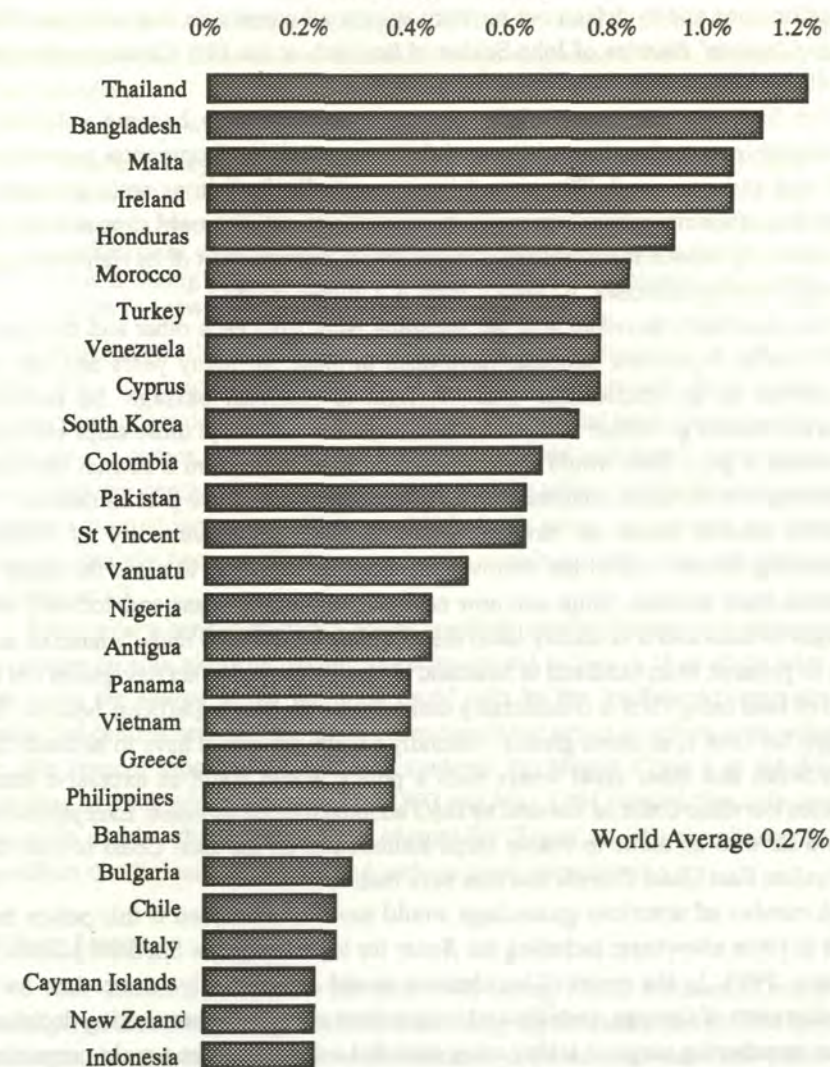
a   Five year average 1988–1992 (excluding fleets of less than 100,000grt).
Source: Institute of London Underwriters

Reducing the Risk

Now let us look at the options open to us. There are two extremes. One is to do nothing and permit access to the EEZ without let or hindrance. This would be the

'Mare Liberum' doctrine which the Dutchman Hugo Grotius articulated in 1609 and which means that the seas belong to all men. The Romans called this 'communis omnium naturili iure', that is common to all. This is enshrined in International Law as the right of innocent passage. The other extreme is to declare the EEZ a total exclusion zone and to defend our territory against all comers; in line with the 1623 'Mare Clausum' doctrine of John Seldon of England, or the 12th Century collection of tolls by Venice from ships transiting the Adriatic.

The first extreme is essentially the status quo and may become politically unacceptable as national priorities tend further towards environmental protection, both real and perceived. The second is economically foolish, as well as being a confusion of sovereignty and sovereignty rights. Such action would almost certainly provoke a diplomatic reaction from a major power and assertion of its rights through peaceful warship exercises. As always there is a middle course.

One possibility therefore is to get the ships away from each other and the coast. IMO Traffic Separation Schemes have been in place for many years and can be interpreted as an interference with the right of innocent passage. So perhaps Australia should go further and close coastal zones to all except those ships entering or leaving a port. This would result in an exclusion zone from a coastal baseline extending, say, 50 miles offshore with access corridors directly to port entrances.

This sounds harsh on navigators but in fact the universality of Global Positioning System (GPS) has removed the need for mariners to close the coast to establish their position. Ships can now navigate with perfect ease and accuracy out of sight of land and it is mainly habit that requires mariners to make a landfall and then to proceed from headland to headland along the coast. In fact navigation out of sight of land using GPS is considerably easier for watch keeping officers because the margin for error is so much greater. Naturally exceptions would have to be made for Bass Strait and other areas where such a policy would result in excessive extra distance but these could be covered by IMO adopted routing schemes. Exceptions too would have to be made to enable ships southbound on the East Coast to ride the Australian East Coast Current and thus save fuel.

A number of notorious groundings would have been avoided if this policy had been in force elsewhere; including the *Braer* for instance on the Shetland Islands in January 1993. In the event of accidents it would certainly give more time for a consideration of damage, stability and longitudinal strength before making decisions about transferring cargo or taking other remedial action. And for a main propulsion or steering breakdown it would give more time for repair or for salvage services to arrive. Such a policy would actually be easier for Australia to adopt than for most other countries because there are few ships in our waters which are not headed for an Australian port. It would be much harder to achieve for, say, Spain or Malaysia where most of the traffic is passing trade.

Of course the international shipping fraternity would protest about interference with freedom of navigation and rights of innocent passage. That certainly happened

after the *Amoco Cadiz* disaster when the French Government immediately and unilaterally declared traffic regulations which forced ships away from the coast into prescribed traffic lanes. Similarly the South African Government has proclaimed a prohibited area which keeps tankers well away from its coast. The Norwegian Government is considering extending its territorial waters to 12 miles and imposing laws empowering authorities to apprehend ships suspected to be substandard within that boundary.

Michael Grey, writing in Lloyds Maritime Asia recently, stated that:

> While it may be thought justifiable to act to protect a coastal state from the effect of large scale pollution, there is a worry that the process has now got out of hand, with coastal states attempting to unilaterally control passing traffic. There is also some concern that this is taking place, not primarily as a result of international need, but often to answer local political requirements.[8]

I would argue that it is highly justifiable for any coastal state to act to protect itself from large scale pollution just as a state acts to protect itself against any military or economic threat. There is never an international need for such action. The need always comes from individual states for the good and sound reasons that their coastlines are perceived to be under threat. So any action would provoke an initial reaction from shipowners, which would diminish when shipowners accepted the change, mainly because, if there were any marginal costs, they would impinge equally on all.

A secondary benefit of such a policy would be that politicians and others would no longer be able to blame passing ships for coastal pollution. If no ships were near the coast the source of the pollution could only be the landbased population and industrial centres nearby. This could encourage faster action to reduce such pollution. In this respect a poll of 37 overseas students for Master Class 1 at the Sydney Institute of Technology between July 1993 and May 1994 showed that only one had sailed in a ship where Annex V of Marpol 73/78 was not strictly observed. This prohibits the disposal of plastics and garbage from ships into the sea.

Other Issues

Two other incidental comments are also worth noting. Firstly freedom of navigation and right of innocent passage evolved when shipping casualties had far less negative effect on the coastal environment and economy. (In another time and place ship wrecks were actually encouraged as an economic boost to the local community)! Secondly, trading ships are no longer the only users of the oceans. The oceans themselves have become a resource. As Zimmerman argued:

> Resources are not, they become. Resources expand and contract in response to human needs, wants and actions.[9]

This is intended to mean that a resource is defined by perceptions, attitudes, wants, institutions, customs and technology. A resource is subjective, relative and

functional. What is a resource to us such as coal, the snowfields or the oceans was not always seen to be such by the inhabitants of this country.

The other aspect that I now wish to discuss is who benefits and who pays for patrols, surveys and inspections. Presently the Australian Maritime Safety Authority is the front line for the safety of Australian ships and port state inspections of ships flying other flags. The Commonwealth requires AMSA to pay a dividend on funds invested in it at the long term bond rate plus a margin for risk. The only way it can do this is to charge Australian shipowners for surveys and all ship owners for the use of navigational services. No charge can be made on overseas owners whose ships are inspected under port state control. This adds extra cost to Australian owners which has to be passed on in the form of freight rates to customers, thus increasing their freight rate disadvantage against cheaper foreign flag operators.

And who benefits from safe ships and a coast free from pollution? The community at large certainly does, but particular benefits flow to the users of the coastal zone; including those who use boats for recreational yachting and fishing, swimmers and those who place a value on the resource of a clean coast. The growth in recreational uses has created a powerful economic interest in marine environmental quality which can be explicit, as in the case of a coastal hotel operator, or implicit as in the case of those who take satisfaction from a pristine coast. Do these beneficiaries pay for the services which inspect commercial shipping? Certainly some do pay a boat registration fee or a power boat drivers licence fee but this revenue, in NSW at least, goes largely towards paying for the costs of administering the system. More to the point, many users or beneficiaries of a clean marine environment do not pay for the cost to shipping of ensuring it. Any surplus goes to State consolidated revenue. None goes towards coastal protection or ship safety. It does not even go directly towards search and rescue for recreational boaters.

Economic rationalism, or user pays, would seem to indicate that those who benefit should contribute. Clearly there is no easy way but the simplest will be through the existing recreational boat registration and licensing systems. Instead of being State based they could be converted to a Commonwealth based system and the revenue directed towards an Australian Coast Guard Service. This Service could continue the State based control of recreational boaters and also combine a number of roles which are presently fragmented between many Commonwealth and State Agencies. These would include the ship inspection, ship survey, crew competency, oil spill and navigational functions of AMSA, search and rescue (generally carried out by State Water Police) and the drug and illegal entry interception presently carried out by Customs and Coastwatch. To these could be added the provision of uniform guidelines for maritime emergency planning which presently varies from State to State.

The 1993 Conroy Report into the Australian Customs Service recommended that State officers be empowered to act for Coastwatch or Customs. The 1988

Hudson Report into civil coastal surveillance recommended that an Australian Maritime Safety and Coastwatch Agency be established.[10] What I am suggesting is that these recommendations should be carried further by combining Commonwealth and State Marine Agencies into an organisation similar to the United States Coastguard. Finance for the organisation would come partly from existing sources and allocations, and partly from licensing and registration revenue from the recreational boating community. This would mean that the direct beneficiaries of safe, green ships and clean seas, rather than Australian shipowners, would be paying for their coastal protection. These beneficiaries would also pay for coastal aids to navigation which commercial ships will no longer need and certainly have no wish to pay for.

Notes

[1] *Maritime Policy*, Vol 17, No 5. September 1993.

[2] A.T. Mahan, *The Influence of Sea Power upon History 1660-1783*, New York: Hill and Wang, 1957, p. 22.

[3] *Ships of Shame*, Canberra: Australian Government Publishing Service, 1993.

[4] C.W. Filor, 'The Human Element in Ship Casualties', a paper delivered at the Ships of Shame Conference, Fremantle, 1994.

[5] *Daily Commercial News*, 17 June 1992.

[6] Intercargo Annual Review, 1993.

[7] Filor, op cit.

[8] Michael Grey, *Lloyds Maritime Asia*, June 1993.

[9] E.W. Zimmerman, *World Resources and Industries*, New York: Harper and Brothers, 1991, p. 15.

[10] H. Hudson, *Northern Approaches*, Canberra: Australian Government Publishing Service, 1988, p. 63.

7

Environmental Management

Richard Kenchington

Introduction

A century ago, T.H. Huxley, one of the leading scientists of the British Empire, denounced as absurd the notion that humans could have significant, widespread impacts upon marine environments (see Cushing, 1988). By the late 20th century, however, the need for protection and preservation of the marine environment has been established.

The history of the 20th century has banished the innocence of the late 19th century. Widespread and increasing impacts on marine environments are following growth in human populations and unsustainable uses of technology. One of the major global challenges is to develop and apply the means to halt and reverse those impacts. If we fail, the pattern of marginal and collapsing wild stock fisheries will increase while pollution and degradation of coastal margins and waters will foreclose options for sea farming. The social and economic costs will be very high, particularly in developing countries which rely on protein from the sea to feed their populations. Maintaining, protecting and restoring the productivity of coastal and marine environments are critical to the long-term resource security of many nations.

Properties of Marine Environments

Density, mobility and the capacity to dissolve a wide range of materials are three fundamental properties of seawater which make the scale of management of marine environments different to that of terrestrial areas.

The density of seawater enables it to support sediments, other small particles, and plant and animal cells. Larger animals and plants can remain in the water column for long periods or all of their lives by buoyancy or the expenditure of manageably small amounts of energy. Over land, the air supports only minute particles; animals and plants that move in it are either very small, or very specialised and capable of achieving substantial outputs of energy.

Large bodies of water are constantly mobile, driven by winds, by currents derived from the rotation of the earth and by tides driven by the gravitational effects of the moon and planets. While there are prevailing currents, they vary and even reverse. Water masses mix and merge and the food, nutrients, larvae or pollutants which they carry may have widespread effects far from their point of origin.

On land, water flows down catchments. It is extremely rare for effects to be carried between catchments or to upstream areas. While for many purposes areas of land can be regarded as independent, isolated entities, the same is very rarely the case for coastal and marine waters and the seabed beneath them. Because water dissolves, reacts with and disperses many chemicals, it can absorb, treat and recycle many natural waste materials. In times of relatively limited and localised human impacts, these properties were the protection of marine environments. Eggs, spores, larvae and migrants came from unaffected areas to restore those, relatively limited areas damaged by exploitation or pollution. As human impacts have increased there are fewer unaffected areas to provide recruits and more pollution to be carried and accumulated in distant areas.

Problems Needing Management

As the scale of human use and impact have grown, the limits of the capacities of the sea are becoming apparent. The application of modern technologies to fishing has left few undisturbed resources. Fishery after fishery has developed to the point of economic and population collapse. Development has changed almost all the world's rivers and catchments; loading them with silt, nutrients and other pollutants from agriculture, industry and urban development, and changing their flow through dams to store water and control floods.

The problems are quietly cumulative and they are physically, socially, economically, culturally and ecologically erosive. There is physical erosion, because of bad design and engineering; social and economic erosion, as fish populations and coasts can no longer support recreational and commercial expectations; cultural erosion, as waters become unhealthy for swimming; heritage erosion and ecological erosion, as the wilderness and variety of coastal environments and the cultures and life they support are gradually overwhelmed.

The most obvious problems occur in enclosed seas bordered by large human populations—the Adriatic, Baltic, Black, Mediterranean and North Seas are well documented. The same can be true of populated ocean coasts and embayments such as the Bay of Bengal, Chesapeake Bay and Sydney coastal waters. In comparison with other parts of the world Australia is in relatively good shape. Most of our coast and marine environment is remote from human impact and is relatively undamaged. But the populated South East corner, roughly from Adelaide to the Sunshine coast in southern Queensland, has examples of all the cumulative erosions (from a conversation with Zany).

The Basis for Management

The recent Resource Assessment Commission (RAC) Inquiry into the Coastal Zone (1993)[1] examined in detail some 29 reports produced since 1980 and considered the recommendations of a further 30 inquiries into coastal issues between 1960 and 1980. Repeatedly, these inquiries and reports conduced that coordination and integration are needed to overcome the short term and fragmented approach to management which underlies continuing degradation of the coastal zone, its ecosystems and resources.

The RAC confirmed the problems and concentrated on the search for a basis for management. In the course of its inquiry the RAC confirmed the findings of many preceding inquiries, that the major underlying problems flow from fragmentation of management between competing sectoral agencies within and between spheres of government. It found that while there had been recent improvements in the level of coordination among the large number of institutions involved in coastal zone management, coordination and integration remained inadequate, leaving major shortcomings in the systems of management of Australia's coastal zone.

It is clear that effective, long-term ecologically sustainable management of the coastal zone will not occur without a system of strategic and integrated approaches. The RAC concluded that a national approach is needed but was under no illusions as to the difficulties of, and resistance to, achieving such an approach.

National Approach to Coastal Zone Management

A National approach to the problems of Australia's coastal zone is essential for four main reasons:
- No single sphere of government can manage the zone alone;
- Issues of national significance and great public concern are involved;
- The socio-economic development of the coastal zone is of profound importance to the nation; and
- Australia has international obligations in the zone which necessitate co-ordination between the spheres of government.

A national approach will ensure that government agencies have common objectives for coastal zone management, thus minimising duplication and conflict. It will ensure more effective use of human and financial resources, by pooling experience, resources and knowledge. It will also provide a framework for national leadership and financial support and for the mobilisation of community and industry involvement throughout the coastal zone.

Rivalries between the spheres of government make achievement of a national approach to any issue a difficult task in a federated nation such as Australia. But it is a necessary task if Australia is to avoid the coastal management problems that beset other parts of the world such as the Mediterranean, the North Sea and parts of the United States. Australia is one nation; it is not a loose configuration of states. It is bound by a national constitution that has as joint aims the preservation of the rights

of the states and the forging of one nation with common goals and aspirations. The whole is greater than the sum of its parts, and it is in the interests of the states, local government and the Commonwealth to act cooperatively to protect what is probably Australia's greatest asset—its coastal zone.[2]

The Setting for Management

The most favourable setting for management is one in which the goals of manager and managed coincide closely. The immediate user can perceive direct benefits in maintaining the system. If the system collapses, so do the economic activities that depend upon it. There may be short term differences of priority but direct users such as commercial and recreational fishers, divers, environmental, recreational and tourist users can accept that the immediate costs of management are in their interest because they are linked with sustaining long term benefits.

For others who operate in the marine environment the costs of management may represent competitive disadvantage. The collapse of the system has little impact on their activity. This category includes the mariner, and particularly the ship owner. For these users the benefits of environment management may be reflected in the quality of their work situation but they are generally more indirect and arise from accepting responsibility for the environment in which they operate. The additional costs to reduce or remove impacts or risks to the marine environment may include increased pilotage or longer shipping routes to avoid specially sensitive areas, treatment of ballast water or prohibition of highly toxic but efficient anti-foulants.

The third and most difficult category comprises those who operate remote from the marine environment but whose activities impact on its systems and quality. This includes agricultural, industrial and urban activities which may take place hundreds or even thousands of kilometres from the point of primary impact on the marine environment. For them, there may be substantial costs in alternative technologies to reduce or remove impacts of their activities upon marine environments whose benefits are enjoyed by other human communities in different jurisdictions far downstream.

With this combination, there are broad demands on management which cross jurisdictional and sectoral boundaries. This is an immense challenge in a world where most management is sectoral and reductionist; focussing on problems of a single sector in a single jurisdiction. Over the centuries, limitations have been developed and applied for sectoral purposes. Fisheries are managed by controls on gear type, seasons, fish size and catch quotas. Navigation is managed by a mass of laws relating to the safe operation of shipping. Managing marine environments requires challenge and change to old assumptions and practices derived from land management.

Addressing the Problems: Will There Be More Limits to Use?

For the immediate users the challenge is to develop and accept a strategic approach to keep activities within the sustainable capacity of the environment. This involves challenge or limitation to concepts such as the right to enjoy the marine commons and the right to navigation limited by nothing more than mariners' prudence. New activities and increasing demands require a multisectoral approach. Such an approach involves the capacity to separate conflicting or incompatible uses in space or time. This involves the capacity to address known operational effects and impacts so that they do not exceed the sustainable capacity of the environment. It also involves reducing the risk of gross environmental impact from accidental catastrophic impacts such as shipwreck and toxic cargo spillage.

For remote users the major challenge is to manage discharges from land so that the cumulative effects of a potentially wide range of pollutants do not exceed the sustainable capacity of the environment. It involves developing the means for communities rather than sectors to decide on the acceptability of risks.

All of these statements imply a level of understanding of the sustainable capacity of the environment which does not yet exist. We can observe the problems in Australia and overseas but we do not know the sustainable levels of individual or combined uses which would avoid those problems. Even more than usual, management must allow for uncertainty. This must be included in developing the capacity to manage at scales which cover direct and remote uses and impacts.

Whatever the appropriate management response, it generally involves some controls on use of and entry, to protected fragile areas, some refuge and reference sites to provide a degree of security against management inadequacy, and sanctuaries for biological diversity. It must also include a means of monitoring the effects of use and management.

Is New Legislation Necessary?

The RAC Inquiry concluded that new legislation would be needed to provide for the establishment of appropriate national institutions. Despite general reluctance to establish new agencies or legislation the RAC recommended that:

- The Commonwealth enact a Coastal resource Management Act, which, among other things, would provide that Commonwealth funding of coastal resource management activities—whether in the form of direct expenditure by Commonwealth agencies on coastal zone management or as grants to state and local governments for specific elements of coastal zone management—be confined to activities consistent with the objectives and principles of the National Coastal Action Program.[3]

It also recommended the creation of a National Coastal Management Agency with the following functions:

- To supervise the preparation of the proposed agreement to establish the National Coastal Action Program;
- To implement objectives and principles for coastal zone management;
- To coordinate and monitor implementation of the National Coastal Action Program;
- To promote the incorporation of the agreed objectives and principles in government policies and programs;
- To facilitate the adoption of innovative management techniques;
- To advise on existing funding priorities and to manage financial allocations for elements of the National Coastal Action Program;
- To prepare proposals for changes to the National Coastal Action Program in the light of changing circumstances and outcomes; and
- To prepare annual reports on the implementation of the National Coastal Action Program.[4]

The RAC envisaged an expert agency with a board comprising a representative from each of the states, which would preferably comprise the heads of the state coastal coordinating committees, and representatives from the Commonwealth, local government and Australia's indigenous people. It would have a small expert staff.

> Secretariat staff of the National Coastal Management Agency should be officers selected on the basis of their experience in coastal zone management and their ability to understand coastal zone issues in the variety of jurisdictions represented in the national Coastal Management Agency. Staff may be seconded to the secretariat from state and local government sources[5]

In the long run, such legislation will probably be needed by the Commonwealth and by the states and territories. But for the immediate future it can be argued that the process of developing a national approach with the necessary secretariat or agency support, and the vehicles for Commonwealth and state funding could all be developed within existing legislation drawing upon powers contained in a wide range of legislation with a wide range of responsible ministers. As operational arrangements and trust develop the real need and the best strategy for any necessary coordinating legislation would emerge.

What are the Implications for the RAN?

From the environmental perspective the tasks which are required of a marine field force include:

- Surveillance using surface, air and automated techniques to determine the behaviour of users in relation to the requirements of the management plan;
- Enforcement to follow-up infringements, collecting the necessary evidence to sustain charges in court;

- Support of scientific and technical staff in research, monitoring and maintenance tasks; and
- Servicing automated research and monitoring equipment and collecting routine monitoring data.

The RAN could undertake or contribute to all of these. Given the size of the Australian EEZ and the remoteness of much of Australia's coastal and offshore areas from operational centres, there is, at the very least, a pressing need to make use of existing RAN presence and capacity to contribute to management of the EEZ. There is a parallel need which is shared by the RAN's primary functions, to develop new methods for surveillance, monitoring and research so that Australia can achieve maximum benefits from patrols to remote areas. Technologies such as hydrophone arrays to monitor traffic to specific sites, electronic vessel identification capable of being monitored by satellite, air or surface vessel and airborne sensors for detecting and monitoring natural phenomena and pollution all have potential to contribute to effective management of the 200 mile EEZ.

Do We Need A Coast Guard Service?

The implications of the RAC findings are that a coast guard is needed, particularly to provide the capacity to deliver meaningful offshore management in the 200nm EEZ. The RAC examined the adequacy of existing capacity to patrol and enforce the provisions of a wide range of Commonwealth and state legislation in the coastal zone. As with other management activities in the coastal zone, the RAC found that effort is fragmented and coordination does not come easily. Quite large numbers of people and vessels are engaged in sectoral components of coastguard-type work. These extend from state fisheries and national parks services, through customs and immigration to activities including operations in which the RAN is tasked for fisheries, customs and immigration objectives.

There appears to be strong logic in coordination to achieve better use of resources at sea for management of boating, customs, environment, fisheries, immigration and police functions. Marine capacity is an expensive operational element for most of the users but they are likely to argue that, while there may be merit in a coast guard approach, some of their functions can only be addressed by dedicated vessels. It is beyond the scope of this paper to discuss those issues but two observations can be made. First, the issue should be thoroughly discussed and second, the RAN should play a creative role in those discussions because there are major implications for the RAN whatever the outcome.

Conclusions

Management, containment and reversal of human impacts are fundamental challenges in the search for means for humans to live sustainably within the ecological capacity of marine environments. They are national and global challenges because the

linkages between land and sea, and within marine environments, cross jurisdictional, economic and political boundaries. No one government or nation can manage the marine environment in isolation. Australia, needs to make important decisions in relation to the capacity needed to manage its responsibilities for the world's third largest EEZ. Those decisions should focus on the means to provide for levels of government and the agencies of governments to work together in ways which challenge most of the traditions, procedures and precedents which have served for the management of terrestrial resources and environments.

Notes

1   Resource Assessment Commission Inquiry into the Coastal Zone, 1993.

2   Ibid, p. 95.

3   Ibid, Recommendation 7.

4   Ibid, p. 132.

5   Ibid, p. 132.

8

Fixed Arrays in Maritime Surveillance

Ross Barrett

Introduction

Surveillance of our northern approaches is regarded as an important Australian defence priority. The Australian Government white paper, 'Defence of Australia' (1987), states that 'The Australian Defence Force requires a manifest capability to conduct surveillance of our vast sea and air approaches. The capability must provide the means to detect, identify and, if necessary, respond to sea and air activity in our sovereign air and sea space.'

Surveillance of such a vast area for a country with a small population and limited resources is a formidable problem. The surveillance activity can be broken down into a number of distinct processes. We may describe these as detection, localisation, classification and data fusion. To put it simply, the detection process establishes whether an intruder is present, localisation determines where the intruder is, classification establishes what it is, and data fusion ascertains whether the current contact is the same intruder that was detected earlier (and later lost) and whether the contacts found by two different surveillance sensors are from the same source. Different surveillance systems will carry out these diverse roles to varying degrees of satisfaction.

It is also customary to divide the surveillance task into broad area surveillance, which presents a general picture of the air and sea traffic in the region of strategic interest, and focal area surveillance. The latter is intended to give more detailed information in areas of special concern. These might include fishing grounds, oil drilling platforms, port entries, and choke points, or in other words confined sea lanes along which adversaries might be expected to pass. The use of military force, to harass targets such as these, has been identified in the 1987 White Paper as a possible scenario for low level conflict to embarrass Australia and force political concessions over some disputed issue.

The surveillance operation is further complicated by the range of possible intruder types. To be effective, a surveillance system needs to be capable against air, surface ship and submarine intrusion. Within these broad categories, we have military and civilian aircraft, helicopters, low-flying aircraft, large merchant ships, naval craft, fishing boats, small craft used by drug runners and illegal immigrants, diesel and nuclear-powered submarines. These types can all be expected to pose their own characteristic problems to a surveillance system, and it is unrealistic to expect any one system to be equally effective against them all.

Any surveillance system must operate by the detection and analysis of either emissions or reflections of radiation from the target craft. The radiation may be either electromagnetic (for example, light, radio waves, microwaves) or acoustic. The characteristic performance of the sensor is to a large degree determined by the frequency and type of the radiation.

This paper examines some of the fixed array surveillance systems that are under consideration for surveillance of Australia's northern waters and compares the capabilities of the systems to fulfil the various surveillance functions against the range of possible intruders.

Jindalee Over-the-horizon Radar Network (JORN)

To provide broad area surveillance to the north and west of Australia, the government has opted for over-the-horizon radar (OTHR) technology. The Defence Science and Technology Organisation's (DSTO's) High Frequency Radar Division has carried out research into skywave OTHR for the last twenty years. Its principal tool has been the Jindalee Facility Alice Springs (JFAS), an OTHR covering a 90 degree arc centred on a north westerly direction.

Unlike conventional radar systems, which operate at microwave frequencies and use line-of-sight propagation, OTHR operates in the HF radio band at frequencies between 5 and 32 MHz, and relies on reflection of the radio waves from the earth's ionosphere on their path to and from the target. The ionosphere is an ionised layer above the earth's surface. The operating principles of an OTHR are shown in Figure 1.

Following the success of Jindalee, the government announced in 1986 that it was proceeding with the acquisition of a network of OTHRs, to be known as JORN. OTHR was seen as the only affordable solution to the broad area surveillance problem. The JORN will comprise new radars at Longreach, Qld (90 degree arc) and Laverton, WA (180 degree arc) with data also supplied from JFAS. The JORN will have the potential to detect a range of moving targets, those of principal interest being aircraft and ships.

Because OTHR illuminates the targets from above, it is not possible for an aircraft to fly under the radar, as is the case with line-of-sight radar systems. For small surface vessels, particularly those with wooden hulls, detections can be spasmodic. However, because JORN is a broad area surveillance system and these

Figure 1: Operating Principles of OTHR
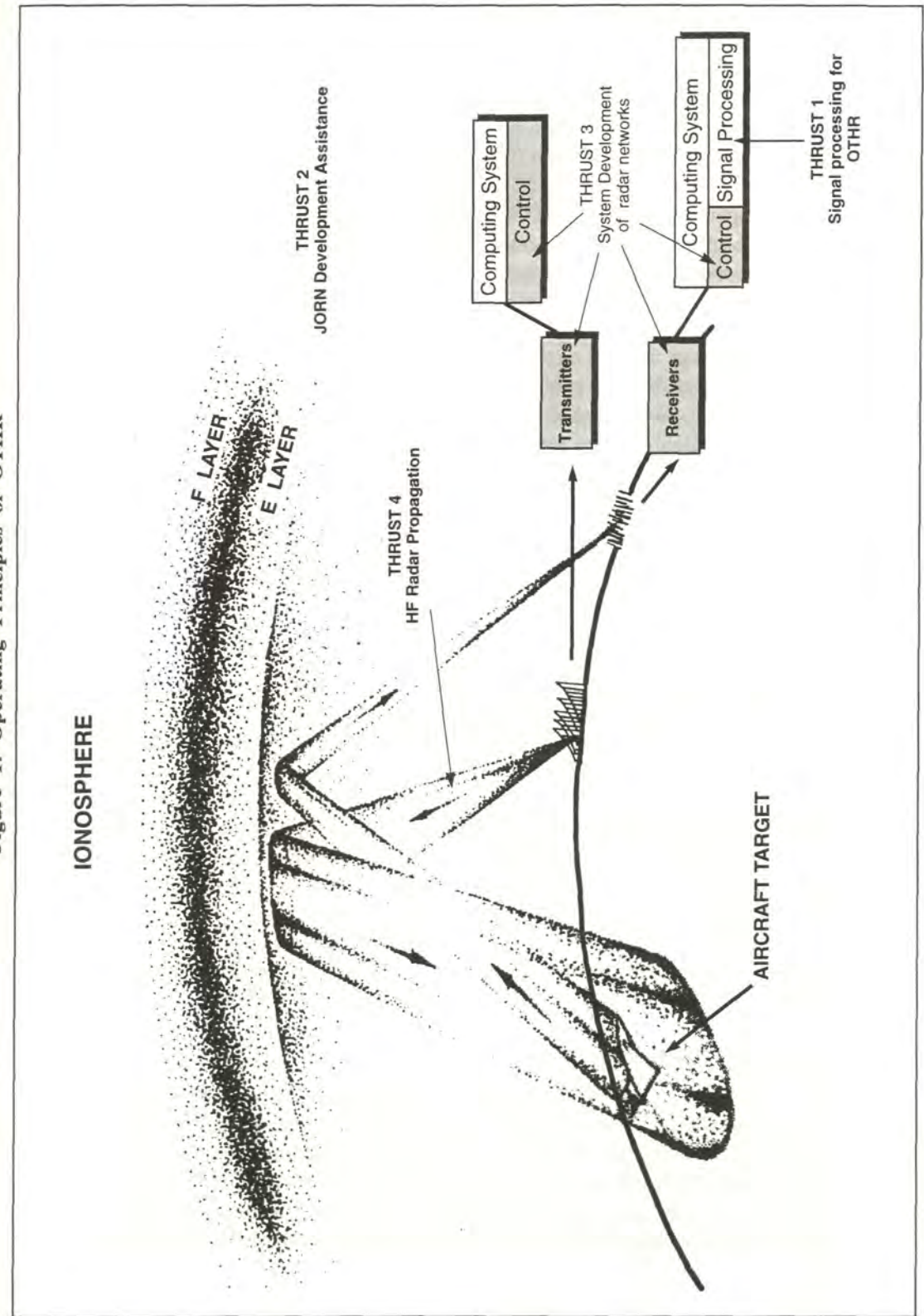
vessels are moving slowly, it is possible to reconstruct their tracks over a long time period. The OTHR technology is unreliable against submarines because of the lack of penetration of the radio waves into water.

A by-product of the JORN operations is remote sensing information. The wind at sea level and the sea state can be estimated from OTHR returns. Apart from the military application of JORN, data will be made available for customs, search and rescue, ionospheric prediction and meteorological applications.

The coverage of JORN is illustrated in Figure 2. The large area swept by OTHR is compared with the coverage available from other types of radar. The range coverage indicated is 1000–3000km. In fact, there are no sharp cutoffs, and the available coverage depends on the state of the ionosphere. At times, the coverage will be wider than this, and at other times narrower. Under extreme conditions, for example during a so-called short wave fade out, no coverage will be available. This state of affairs could last for a period of about 15 minutes to more than an hour.

Another feature of OTHR systems is their poor localisation capability. With conventional radars, one could expect to localise a target to typically 100m. With an OTHR, this figure is closer to 10 km. OTHRs also have little capability to classify the target. Their strength is that they provide a broad area coverage which no other ground based system can approach. The cost of the JORN network is $970 million.

Surface Wave Radar

The High Frequency Radar Division of DSTO is also carrying out research into Surface Wave Radar for the detection of ships and aircraft. With this technique, electromagnetic energy is coupled into a ground, or surface, wave, and travels along a duct comprising the surface and the region above it. Over land, this wave is quickly attenuated, but over the ocean the wave can propagate to a large distance. The frequencies used are in the 5–12 MHz range. DSTO is performing experiments in St Vincent's Gulf which are aimed at detecting and tracking targets of opportunity from Adelaide airport. At the moment, the work is in the concept demonstration stage. Detection ranges up to 300km are expected.

Surface Wave Radar shares with skywave OTHR the advantage that it is not possible for an aircraft to escape detection by flying under the beam. The cost of an operational system is anticipated to lie in the range $10–$100 million.

Land-based Microwave Radar

With constraints imposed by the site and the environment, a network of land-based microwave radars is capable of providing accurate information on surface and airborne targets. Unlike the two systems described above, information in the form of fundamental target parameters, classification, and even identification of the individual aircraft is possible. The greater classification capability of microwave radar is a result of its short wavelength (~3cm) compared with the size of the objects being

Figure 2: Area Coverage of Jindalee OTHR Radar Network

WIDE AREA SURVEILLANCE
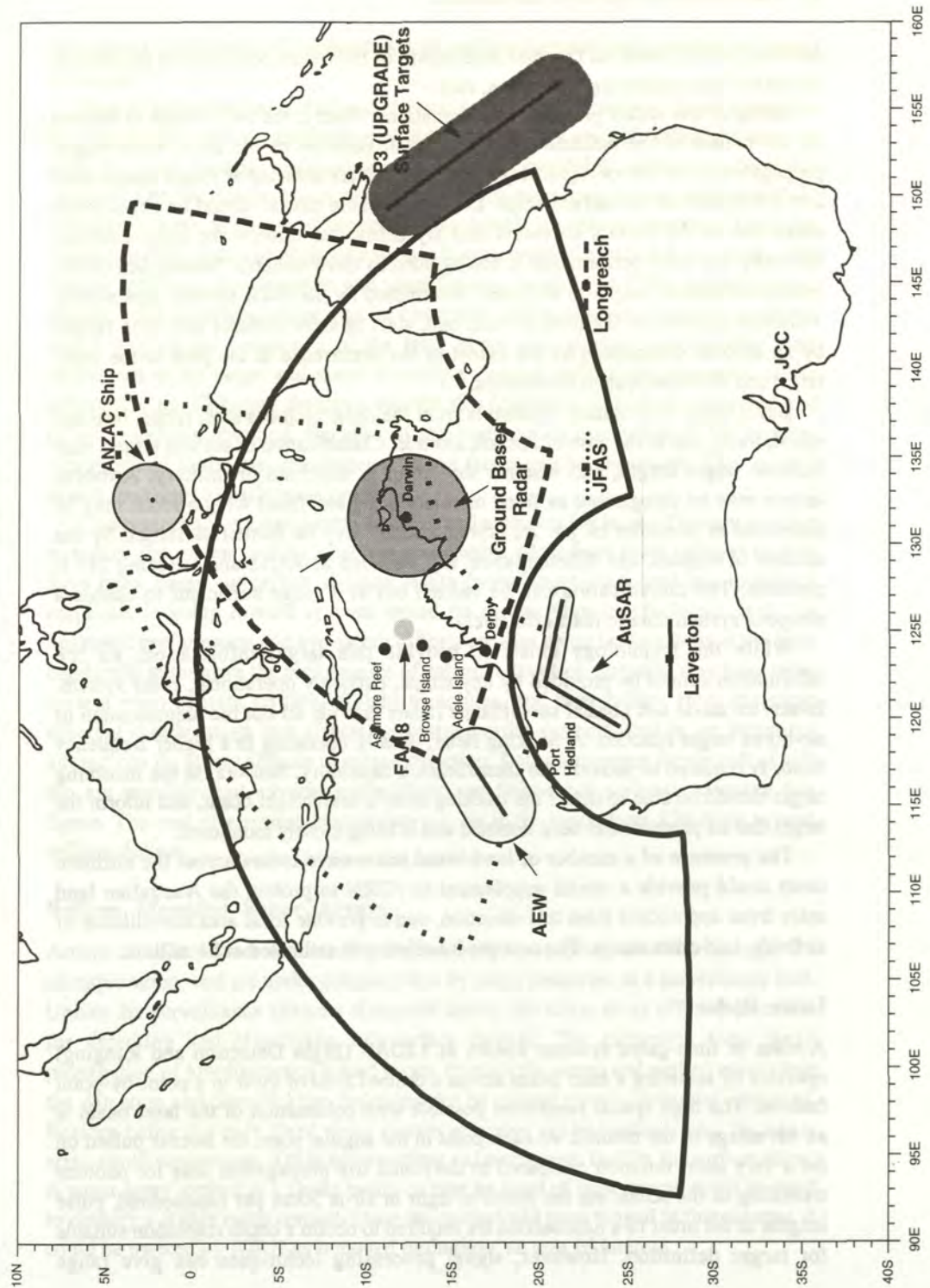
detected, and is based on Doppler modulation of the return beam due to the motion of parts of the contact (eg, propellers, etc).

Siting of the radars provides two limitations. Firstly, the radar range is limited by the height of the antenna above sea level. Because of the short wavelength, propagation is by line-of-sight. High-flying aircraft are detected at longer ranges than low-flying aircraft or surface ships. Incoming hostile aircraft could be expected to make use of the earth's curvature and fly below the microwave radar horizon. Secondly, the radar performance is downgraded by environmental factors. Sea clutter reduces detection ranges to an extent determined by the radar system capabilities. Volumetric clutter in the form of rain, hail, sleet or snow reduces detection ranges by an amount determined by the extent of the occurrence in the path to the radar target and the radar system capabilities.

Basic target information obtainable from the radar includes size, range, bearing, speed, track, and in the case of aircraft, altitude. Classification of surface targets may indicate target length, and whether the target is merchant or military. Airborne targets may be categorised as fixed or rotary wing and fixed wing aircraft may be classified as propeller or jet. Jet driven aircraft may be further classified by the number of engines, and differentiation, say, between an FA/18 and a Boeing 747 is possible. The classification can be carried out at a range sufficient to enable a weapons system time to react effectively.

While the technology exists to provide this target information, all the information cannot be provided by any single, currently operational, radar system. In-service naval and coastal surveillance radars provide all but the identification of air-borne target function. A tracking radar, usually operating in a higher frequency band, is required to provide the identification capability. Sensors on the incoming target should be able to detect the tracking radar's searchlight beam, and inform the target that its presence has been detected and is being closely monitored.

The presence of a number of land-based microwave radars across the northern coast could provide a useful supplement to JORN to protect the Australian land mass from approaches from this direction, and to provide focal area surveillance of airfields, and other assets. The cost per installation is estimated at $1 million.

Laser Radar

A class of time-gated systems known as LIDAR (Light Detection and Ranging) operates by scanning a laser beam across a desired field of view in a point-by-point fashion. The high spatial resolution possible with collimation of the laser beam is an advantage of the method. At each point in the angular scan, the laser is pulsed on for a very short duration compared to the round trip propagation time for photons travelling to the scene. As the speed of light in air is 30cm per nanosecond, pulse lengths in the order of a nanosecond are required to obtain a depth resolution suitable for target definition. However, signal processing techniques can give range

resolutions of the order of centimetres with easily achievable pulse widths of around 15 nsecs.

Recent advances have occurred in laser technology. However, pulse repetition frequencies suited to the production of video-rate images are still difficult to achieve with the pulse energies required for long distance capability. The return from the detector can be displayed as amplitude versus scan position to obtain a 2–D reflectance map, or image, of the object illuminated. By taking account of the pulse round trip delay time, depth information is incorporated to obtain a 3–D image. This feature facilitates the detection and identification capabilities of the system. Small targets, such as power cables, can be observed. At the receiver, detection methods which exploit the coherency of the laser beam offer further possibilities. Any movement of the target will result in a slight Doppler shift of the frequency of the returned beam. Coherent detection enables this frequency shift to be measured and target velocities obtained. Because of the high spatial resolution of the system, vibrations of individual components of the target can be measured. This greatly assists the target identification process.

Current technology developments are aimed at improving laser efficiency in order to reduce the system weight, cost and complexity. Most laser radar systems to date have been based on carbon dioxide lasers (wavelength 10.6 µm) but increased emphasis is going toward systems based on shorter wavelength lasers, both for improved performance and eye-safety. Efforts are also being made to reduce the laser bandwidth to improve the performance of coherent detection methods. Any laser radar system must operate on line-of-sight principles, and thus suffers from the same inherent disadvantage that affects microwave radar systems, that is, an incoming aircraft can fly at low altitude to escape detection. Detection ranges for aircraft of 100 km are possible, but adverse atmospheric conditions can seriously degrade this figure. The cost of a system is anticipated to lie in the range from $200K to several million dollars.

Bottom Mounted Sonar Arrays

Arrays of hydrophones mounted on the sea bottom are being used increasingly for oil exploration, and are under consideration by many countries as a surveillance tool. Unlike the surveillance systems discussed above, the sonar array offers a potential for detecting and classifying sub-surface targets. The extremely long range propagation of low frequency sound waves through the ocean and seabed means that the detection and classification functions can be carried out at substantial distances. Besides being the only fixed array system effective against submarines, the sonar array could supplement JORN by providing a classification facility for surface ships. A sonar array located at a choke point, or near an asset of importance, could be used to classify a JORN radar contact. Once the contact had been tagged in this manner, it could be tracked by JORN as it moved throughout an area of interest.

The idea of a fixed underwater surveillance system has been around since World War II. What has made the idea more attractive to a country like Australia is the rapid development and reduction in cost of fibre optic communication technology. Optical fibres are replacing conventional conductors in many military applications, for instance, as the data link to a Mk48 torpedo. Optical fibre hydrophones and multiplexers have already been constructed, and fully fibre-optic towed arrays are under development in several countries. The huge bandwidth associated with fibre optic communications makes them ideal for use in a fixed acoustic array comprising several hundred hydrophones.

The waters to the north and north-west of the Australian continent consist of a mixture of shallow and deep water regions. In deep water regions, the incoming sound waves are expected to be coherent, and beamforming techniques can provide a detection and classification capability out to several hundred kilometres, depending on the noisiness of the target and the sea bottom characteristics. In shallow waters, propagation conditions are modal, analogous to the passage of microwaves inside a wave guide, and the coherency length of the sound is reduced, with a consequent degradation of beamforming performance. To compensate for the poorer beamforming in shallow water, a number of techniques might be used. To protect an important offshore asset, or to monitor a choke point, a barrier array could be established. Such a system could comprise several hundred kilometres of array, with hydrophones spaced closely enough that no intruder, be it on the surface or beneath it, could pass without being detected by at least one of the hydrophones. Such a spacing would be of the order of several hundred metres, and so an array of a thousand hydrophones becomes a consideration. The advantage afforded by cheap and reliable fibre optic systems is immediately apparent.

Another possibility for improved shallow water performance of a passive sonar array is the exploitation of anisotropies in the underwater ambient noise field. Modelling of warm tropical waters in the northern hemisphere has suggested that there may be a notch in the ambient noise field in the horizontal direction. Deployment of a vertical line array (VLA) would take advantage of such a notch, and give an improved signal-to-noise ratio to any signal arriving from the horizontal direction. If the VLA were combined with a horizontal section to produce a planar array, signal directional information would also be obtained. It must be said, however, that very little information is available on ambient noise directionality in the waters to our north. Special local characteristics, such as the presence of snapping shrimp, require extensive investigation.

The third method that deserves consideration in shallow waters is the technique of Matched Field Processing (MFP). In this approach, our knowledge of the bathymetric and oceanographical environment is exploited to improve signal detection and localisation. For instance, in the case of a VLA, the cylindrical symmetry of the array normally prevents us from obtaining any bearing information from a detected signal. However, if we know details of the ocean bottom losses and the sound speed profiles, and these features contain spatial irregularities, we can use computer models of the sound propagation to exploit this breaking of the cylindrical symmetry and thus obtain the desired bearing information. Once again, a lack of knowledge of the conditions in our northern waters is a handicap to the application of this technique. Trials are being planned to obtain ambient noise profiles and other oceanographic measurements in our northern shallow waters. Estimated costs for a fixed sonar array vary from $10 million to $100 million, depending on the capability desired.

Conclusion

From the discussions above, we can conclude that there is no simple solution to the surveillance of such a large area as that denoted loosely by the term 'sea-air gap'. Fixed arrays, such as Jindalee, have a role to play, as do mobile surveillance systems. Each of the systems described above has its own strengths and weaknesses. JORN is the only one of the systems that can really be said to offer broad area surveillance. However, JORN has little classification capability, and is ineffective against underwater targets. Both microwave and laser radar offer better target classification, but are propagated by line-of-sight transmission, with the consequent disadvantage that hostile aircraft can fly at low altitudes to avoid long range detection. The performance of underwater sonar arrays is optimal in deep water, but much of the water to our north is shallow, limiting the effectiveness of fixed sonar arrays.

Effective protection of our off shore assets will best be secured by a judicious combination of fixed and mobile surveillance systems. The particular combination chosen will be the result of a balance of performance against cost. Other factors taken into account will be the value of the assets to be protected, and the perceived damage to national security of a failure to protect them. Another factor is the relative likelihood of various intruder types, be they air, surface or submarine. The selection of the most appropriate combination of surveillance systems is clearly an important priority to safeguard our offshore assets and to protect our nation from illegal incursions.

Acknowledgments

9

Aerial Platforms
In Maritime Surveillance

Bob Laing

Introduction

Australia currently regulates fishing activities within the 200nm Australian Fishing Zone (AFZ) and the taking of sedentary organisms from the continental shelf. With the declaration of an Exclusive Economic Zone (EEZ) by the Australian Government the area to be regulated will not change significantly, if at all.

The requirements of Australian Government agencies with regard to the AFZ are achieved through an effective civil surveillance program which is coordinated by the Australian Customs Service Coastwatch Program. This service is delivered through the coordination of strategic and tactical surveillance and response missions, utilising the resources of civil contractors, Australian Customs Service, the Australian Defence Force and other agencies as appropriate to the situation.

Aerial platforms are already used quite extensively for surveillance and enforcement of the wide range of concerns of the many client departments and agencies serviced by Coastwatch. These interests extend, for example, from fishing, unauthorised air and sea landings, customs, quarantine, conservation, marine pollution, historic shipwrecks, seismic survey and drilling vessels, sea installations and the like. The range is quite wide and extensive details of the responsibilities and information needs are given in the Australian Customs Service Coastwatch Manual.

Aerial Surveillance

Aerial surveillance of the Australian EEZ will require very little change from the current arrangements. Any change to the coverage or reporting details should be accommodated readily within the current Coastwatch arrangements. Nevertheless, developments in aerial surveillance technology should continue to be monitored to ensure that the civil surveillance and enforcement of the AFZ/EEZ remains cost effective and efficient. Surveillance and response for military purposes have been

excluded specifically, irrespective of whether they are conducted concurrently or separately, as they are outside the scope of this presentation.

Aerial surveillance can be conducted from any platform which is both raised above the earth's surface and provides the necessary support, be it physical, electrical or otherwise, to enable the sensor to operate. Some, such as tethered balloons and unmanned aerial vehicles, lack flexibility and are operationally limited to some unique civilian situations. Despite their operational inflexibility, unmanned aerial vehicles are extremely useful in some special military situations, such as when they can both accomplish the mission and avoid the risk of aircrew casualties. The aerial platforms which are currently used for civil surface surveillance and are expected to continue to be used for the foreseeable future are fixed wing aircraft, rotary wing aircraft (helicopters) and satellites.

Sensors

Before considering these aerial platforms further, it is appropriate first to review the sensors which they could use during surveillance or enforcement missions, and to touch briefly on the requirements for evidence to support legal proceedings as part of the enforcement task. The primary sensors can be grouped into visual, optoelectronics or radar categories.

Visual search (sometimes colloquially referred to as the Mark 1 eyeball) is very cost effective and it can be improved with the use of optical devices either to magnify contacts or improve vision in low light situations. The cheapest of these devices are binoculars or battery powered and hand-held monoculars, gyro-stabilised to dampen out the vibrations of the aerial platform.

Optoelectronics include infrared (IR) systems, video cameras and recorders, and photographic cameras. With the advent of IR systems, night illumination devices (searchlights and flares for example) are now rarely used. Night vision goggles (NVG) have a very limited tactical usefulness in civil operations and, as such, might not warrant the cost of equipping crews, modifying aircraft interior lighting and conducting the necessary continuation training to maintain capability and meet safety standards. Accordingly, ADF assistance would very likely be requested if a night tactical mission requiring an NVG capability was envisaged.

IR systems detect the temperature difference between different materials and surfaces and present operators with a black on white, or a white on black picture on a screen. A small offshore commercial fishing boat could be displayed, in good conditions, at ranges out to 10 nautical miles. This range reduces in some types of haze and IR systems cannot see through rain or clouds. Against surface vessels IR systems are used primarily as an identification aid at night and only as a secondary sensor for search purposes.

Video and photographic cameras, especially with amplification features, are useful for identifying contacts and monitoring activities in daylight. With suitable on-board systems the picture can be transmitted live (or 'down linked') to another

station. An advantage of this feature is that the crew, while airborne, can replay the frames from the video or the camera if it is a digital system. This replay function improves the on-the-spot analysis capability of the crew. If digital systems could be interfered with, conventional camera photographs would be taken in preference as supporting evidence for any subsequent legal proceedings.

Current airborne radars operate in the microwave spectrum and the most common types have a rotating parabolic antenna or small phased array in the nose cone or in a dome underneath the aircraft. With clever computer software using such techniques as high range resolution, doppler beam shaping, pulse compression, synthetic aperture and inverse synthetic aperture, surface maritime targets can be detected and classified by vessel type well beyond 100 nautical miles range. Larger phased arrays, either conformal on the side of a large aircraft or longitudinal in a large pod underneath or above the fuselage have a much larger surface antenna area and, therefore, have the potential to provide improved target identification. At least for the next decade, because of their high cost, only standard short range (up to 50nm) parabolic radars are likely to be justified solely to meet civil surveillance requirements. However, the planned fitting of advanced radars to the RAAF P3 aircraft will permit identification of surface targets by type outside their effective weapons range, thus enabling the P3Cs to search much larger areas in any given time.

When considering search and identification sensors, due regard must be given to the legal requirements and rules of evidence if any prosecutions are to be successful. This could require more than one crew member to witness the crime, supporting documentary evidence, indisputable means of fixing the offending vessel's position and maybe also that of the platform carrying the sensor. For example, a photograph of a vessel allegedly unlawfully fishing with nothing but ocean in the background would not necessarily prove that the alleged act occurred within the AFZ/EEZ.

Platforms

The aerial platforms which can effectively carry sensors on maritime surface surveillance missions are fixed wing aircraft, helicopters and satellites. Each type of platform has its own advantages and disadvantages.

Fixed wing aircraft include light aircraft with one pilot and maybe an observer through to military long-range maritime patrol aircraft with crews of about ten. Larger aircraft and correspondingly bigger crews normally result in increased range, endurance, transit speed, operating height and a wider range of more capable sensors. To take obvious extremes, a light aircraft would normally be best suited to search visually for signs of a landing along the mainland coastline, using their capacity for slow flight and good manoeuvrability. On the other hand, a larger, more capable and longer range aircraft would be required and more suited to search a large open ocean area at night.

Helicopters have many of the operational characteristics of fixed wing aircraft. One distinct advantage is that they can conduct boarding operations, hover and land at isolated localities. However, they are generally more expensive to purchase and operate than equivalent fixed wing aircraft and have reduced range, speed, operating altitude, endurance and payload.

The topic of satellites is worthy of a separate paper. Their primary advantage is high operating altitude and consequent wide area coverage. While this is a distinct disadvantage when identification by optoelectronic sensors is necessary, it gives advantages for some other functions. Satellites are currently used for surveillance support activities such as navigation through the Global Positioning System (GPS), communication relays, satellite photography of clouds for meteorology, and IR photography of the ocean surface for oceanographic purposes.

A satellite mounted surveillance senor would have to be in low earth orbit (LEO) and for Australian surveillance purposes an equatorial orbit would give more useful time than would a polar orbit. (Geostationary satellites orbit at too high an altitude for sensors to be effective, but they are useful for communications.) The cost of an LEO system would be in the order of $250 million for the first satellite and ground facilities, and approximately $50 million for each additional satellite. A constellation of at least three would be required for reasonable coverage of all of the AFZ/EEZ and each would have a four to six year lifespan. For example, two satellites would enable the mainland AFZ/EEZ north of the Tropic of Capricorn to be observed each day. Each satellite would be covering about three nautical miles per second over the earth and would be in contact with each ground station for only about ten minutes on each pass. Accordingly, the broad-band information on AFZ/EEZ activities could not all be processed quickly enough to enable a very advanced lens to be refocussed for detailed examination of individual contacts. Naturally, cloud cover limits the usefulness of optoelectronics but not that of synthetic aperture radars.

Other limitations associated with satellites are the small payloads, which are limited by launch cost, solar electrical power generation capacity which relies on rechargeable batteries and high cost, especially of sensors. Satellite equipment must have inbuilt redundancy to account for airborne failures (difficult and expensive to repair after lift-off). It also needs to be built to withstand launch stresses and needs protection from increased solar and gamma radiation and micro-meteorites.

Each satellite observing the AFZ/EEZ could carry either a synthetic aperture radar, an optoelectronic sensor, or an IR sensor. While it would be far too expensive to launch a system purely for civil surveillance of the AFZ/EEZ, there could be merit in gaining access to surveillance satellites launched for other purposes and which might cover the AFZ/EEZ.

Enforcement

Surveillance and enforcement would be facilitated if vessels had to carry a transponder which transmitted GPS derived positional data to the central coordinating facility. These shipborne systems are sometimes referred to as vessel monitoring systems. Their value would derive from providing the movement pattern of particular ships, with a resultant indication of their current activity. Knowledge of the current position of vessels would also aid in the planning of surveillance sorties and the effective use of flying hours.

Those without experience in it can assume that enforcement equates with physical arrest and escort of offending vessels into an Australian port. In the Australian context this is an action of last resort and is resorted to, against illegally operating civilian vessels, less often than might be expected.

Australian and South Pacific Forum Fisheries Agency experience suggests that most operators are deterred, especially from repeat violations, if they feel they will be detected, if they are fined appropriately and if they are made aware that the review of current licences and the issue of future licences can be reconsidered unfavourably. Depending upon the authority, fines could be imposed arbitrarily or as a consequence of the full legal process. The threat of future denial of access can be a powerful deterrent, but is credible only if an effective surveillance reporting system is known by the possible offenders to be in place. In other words, the long term commercial loss has to outweigh any short term commercial gain if it is to act as a deterrent. Nevertheless, there will continue to be a requirement for the RAN's Fremantle Class patrol boats to arrest and escort to port, refugee boats, village fishing craft and others involved in smuggling or other illegal activities.

When considering the surveillance requirements of Australia's extensive AFZ/EEZ there needs to be consideration of what actually has to be monitored, for how long or how often, when (at night or during the day) and of any tactical issues (will the offenders have electronic surveillance measures and then be able to hide their activities from an approaching aircraft using a continuous radar search?). Of course there will have to be ongoing examination of the extent to which resources can be devoted to the national surveillance effort. It may even be that the present efforts represent an optimum use of resources, given the nature and extent of the challenges now confronting our surveillance authorities.

10

Surface And Sub-Surface Platforms

Steven Youll

Introduction

This chapter addresses the following:

- Recent technological developments in surface and sub-surface surveillance platforms.
- Technologies required by surveillance and enforcement agencies in terms of surface platforms to keep pace with the increasing sophistication of the tools of those infringing national maritime sovereignty and its associated legislative framework?
- Whether the technology required is becoming so expensive that platforms have to be used for other national tasks? and
- Whether there is such a thing as an inexpensive offshore patrol vessel these days?

Technology and its Implications

In this brief chapter, these questions will be addressed but, probably more importantly, notice will be given of some currently available, home grown, cost effective technologies that are in service and which would seem to offer real opportunities to reduce vastly the variables and costs, whilst increasing the effectiveness, of our national surface and, if required, sub-surface surveillance.

From the outset, it is probably worth noting that a definition of surveillance is 'the systematic observation of things by means'. Reconnaissance is not surveillance and a patrol is not surveillance, but surveillance can be conducted while patrolling. A return should now be made to recent technological developments in surface and sub-surface platforms as they might apply to the purposes of this paper.

Whilst there are some dedicated 'stealth' technology ships such as the Swedish SMYDGE and the recently revealed USN version, 'stealth' technology has been universally adopted by degrees in all new naval construction, including offshore patrol vessels (OPVs). It simply means in its application that ships are more

difficult to detect which could be to their advantage when operating as surveillance platforms. 'Stealth' technology is also potentially available to would-be offenders but there is little evidence of its widespread use.

The Small Water Area Twin Hull (SWATH) and Wave Piercing Catamaran hull technologies can now provide 500 tonne 50 knot helicopter carrying OPVs with significant endurance and seakeeping capabilities. Greater displacements and speeds are becoming available—as in the large ferries now being built. In terms of surface sensors, there have been general parallel incremental developments in all sensor areas such as radar and communications but the developments that have most impacted on operations at sea are satellite communications (SATCOM), global positioning systems (GPS) and electro-optical and infra-red imaging sensors.

These developments provide increased degrees of navigational accuracy, secure and covert communications, and covert surveillance, all of which enhance the probabilities of detection, apprehension and prosecution in the offshore estate. GPS, SATCOM and, to a lesser degree, electro-optical and IR imaging are, however, readily and cheaply available in local electronics stores and, if the stakes are high enough, military quality equipment can be acquired. There is evidence that many potentially illegal fishermen have been using simple radar intercept equipment to alert them to the approach of a patrol boat and, having been alerted, they then cease any illegal activity or vacate the zone—actions which would seem to serve the objectives of the exercise.

This chapter will not dwell on sub-surface platform developments as they are not considered to constitute a real threat in the medium term and any examination would be better devoted to the management of underwater sensors. There would thus appear to be no real high level vertical technological developments being applied to the surface platforms operating in the offshore estate—be they the pursued or the pursuer. For the foreseeable future, the vast majority of target surface platforms in the offshore estate will be North Asian fishing or similar vessels, archipelagic subsistence fishing craft and medium sized yachts—albeit some fitted with GPS and SATCOM and able to operate covertly. Projected offshore estate surface vehicles involved in the management roles appear to be similarly predictable in character.

The latest iteration of Australia's potential Offshore Patrol Combatant (OPC) appears just to have one of everything and looks remarkably like a scaled down ANZAC which is really a scaled down SPRUANCE or similar (see Figures 1 and 2). And herein lies a problem. With this conventional 'one of everything' approach there is the creation in each platform of inordinate data collation and analysis requirements which are really overkill for offshore estate management but essential for any future major combat activity in the South West Pacific. The localised 'one of everything' approach is also most demanding in terms of space and maintenance requirements. Each sensor has its own local process in, and output functions which are then conventionally merged to inform the command appreciation. The relevant elements of each command appreciation are then transmitted to at least two, if not

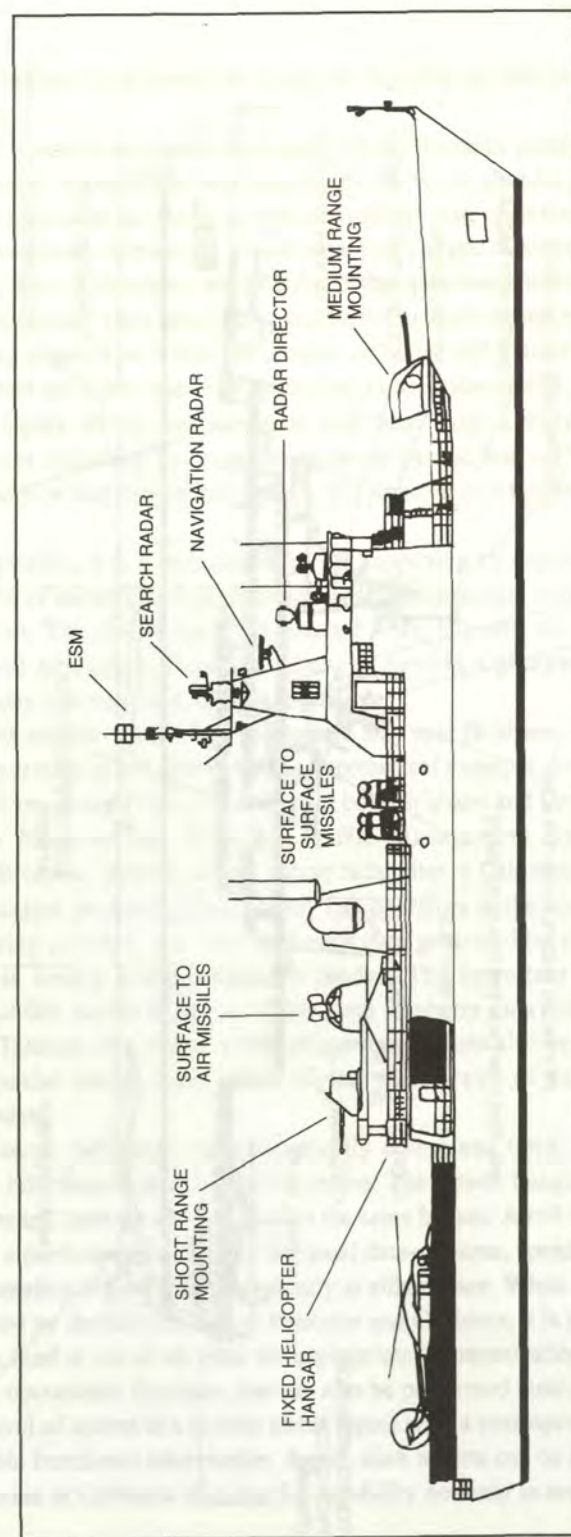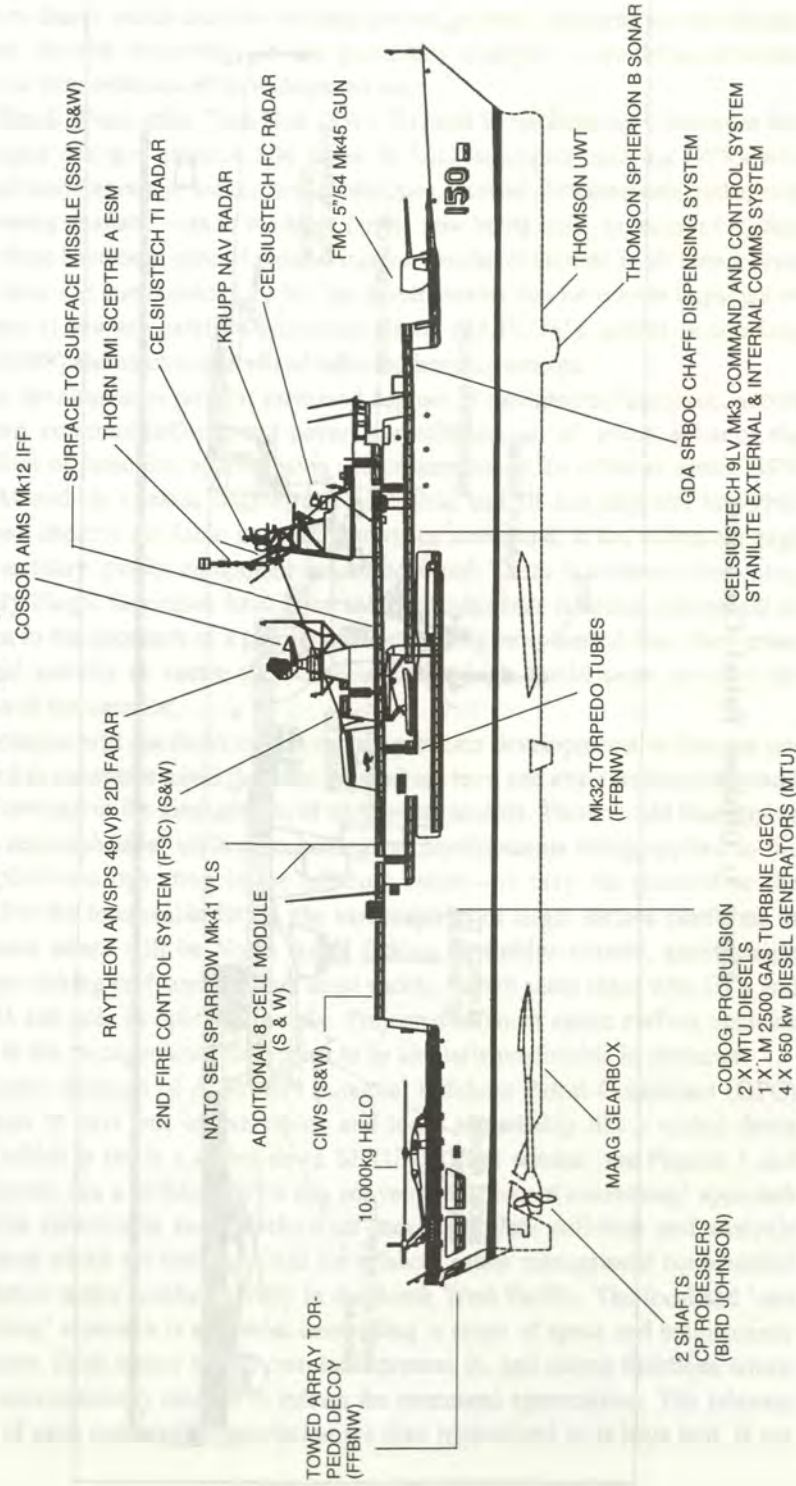

Figure 1: Offshore Patrol Combatant

Figure 2: ANZAC Frigate

COSSOR AIMS Mk12 IFF
SURFACE TO SURFACE MISSILE (SSM) (S&W)
THORN EMI SCEPTRE A ESM
CELSIUSTECH TI RADAR
KRUPP NAV RADAR
CELSIUSTECH FC RADAR
FMC 5"/54 Mk45 GUN
THOMSON UWT
THOMSON SPHERION B SONAR
GDA SRBOC CHAFF DISPENSING SYSTEM
CELSIUSTECH 9LV Mk3 COMMAND AND CONTROL SYSTEM
STANILITE EXTERNAL & INTERNAL COMMS SYSTEM
RAYTHEON AN/SPS 49(V)8 2D FADAR
2ND FIRE CONTROL SYSTEM (FSC) (S&W)
NATO SEA SPARROW Mk41 VLS
ADDITIONAL 8 CELL MODULE (S & W)
CIWS (S&W)
10,000kg HELO
Mk32 TORPEDO TUBES (FFBNW)
MAAG GEARBOX
CODOG PROPULSION
2 X MTU DIESELS
1 X LM 2500 GAS TURBINE (GEC)
4 X 650 kw DIESEL GENERATORS (MTU)
2 SHAFTS
CP ROPESSERS (BIRD JOHNSON)
TOWED ARRAY TOR-PEDO DECOY (FFBNW)

more, further appreciation levels to form the regional or national picture of a particular event.

As in any hierarchal structure, the higher up the decision making process, the less the next level understands the nuances of the local situation, so there will inevitably be questions! In the non 'life-and-death' but, nonetheless nationally important, surveillance operations, which have not yet got down to time of flight considerations, how efficacious would it be if the questioner could see what the reporting unit is seeing? How much more conducive to professional appreciation and decision making might it be if that one person -or better still a machine—could see everything?—and all at the one time, including radar, video, ESM, hardcopy, and local manual inputs all on one screen in real time from a variety of distance unlimited sources including as examples, a patrol boat at sea, a Coastwatch type aircraft, fixed surface and sub-surface sensors and someone in a telephone box around the corner?

Well it is possible, it is economical and it is happening by degrees right now. It is a combination of clever signal processing, sensor management and a current catch cry—data fusion. The author does not pretend to be any sort of expert in these matters, but will attempt, in layman's terms, to provide a glimpse of what is in regular day-to-day operation and of what is possible.

Firstly, let us imagine an incident in Moreton Bay near Brisbane. The geographic extent of the operation might extend in this hypothetical example, from Brisbane, to Canberra, 1000 km distant. Decision makers at both Brisbane and Canberra might be involved. The Moreton Bay Shipping Traffic Management System near the approaches to Brisbane, consists of two remote radar sites at Caloundra and Redcliffe and a control station on the Brisbane River. The operators in the control station, in addition to having access to the video and track data generated by the remote sites, can also access tuning and maintenance modes. The important point to note, however, is that this access is also available from Canberra on a computer (laptop) over a regular Telecom line. Other modes of communications also available could be data cable, coaxial cable, fibre optic, digital microwave or satellite via any appropriate modem.

Existing remote radar stations automatically detect and track the target craft displaying the information on a computer screen. The screen image is available to decision makers in Canberra and Brisbane at the same instant. A roll of the computer track ball onto a particular track causes the usual data—course, speed, identification, and other information to be displayed instantly at either place. While the information is being accessed by decision makers in Brisbane and Canberra, it is also available to anyone else on land or sea or air with the appropriate communications. In the menu are some basic operational functions that can also be performed remotely.

The next level of access is a system status report with a corresponding increased level of available functional intervention. Again, such reports can be accessed by, for example, someone in Canberra who has the capability not only to see the report, but

to reconfigure it, change it or interrogate it. This is just an example of what is an everyday routine in Australia today and it would seem to offer some potential enhancements to our current national surveillance system. Remote radar and other capabilities such as IR and low light TV (LLTV) which require power can now be driven by 24 volt batteries with solar trickle charging. They too, can contribute their data to such a system. The remote sensors do not have to be stationary but can be borne in ships, land vehicles and aircraft.

Conclusions

There do not appear to have been many recent technological developments that have, or will, seriously impact on surveillance platforms *per se*. Sensible cost effective applications of signal processing, sensor management and data fusion technologies, however, would appear to offer significant opportunities to increase surface and sub-surface platform effectiveness. It is far from evident that the sophistication of potential infringers in the offshore estate has increased markedly of late and, therefore, there would not appear to be a priority requirement for increased or different platform technologies, other than those embodied in the proposed OPVs, namely, of adequate:

- Sea keeping;
- Sensors;
- Endurance; and
- An intermediate helicopter capability.

Neither is it contended that the technology required is becoming so expensive that offshore surveillance platforms will have to be used for other tasks. They will be used because they can be—not because they have to be. It should be noted that the Maritime Commander's current (1994) problem in the offshore estate is a quantitative rather than a qualitative one—just providing the agreed number of patrol days. And finally, yes, there is such a thing as an inexpensive OPV but it doesn't look much like Australia's proposed OPC. It would need good sea keeping and endurance and a sensor suite able to contribute to a multi sensor, remotely managed and data fused national, or at least regional, system. As such, it would be a very boring warship and the Navy is likely to want nothing to do with it.

11

Command Control and Communications

David Shackleton

Introduction

The conduct of operations for managing and protecting the offshore estate is the responsibility of both civil and military authorities. The degree of effectiveness with which this is achieved depends on many complex interdependent considerations and activities which need to be planned, directed, coordinated and adapted to suit the circumstances at the time. In its simplest form, this is achieved practically by a commander applying his authority and exercising control through communications.

Through sophisticated and unsophisticated means of analysing events, their causes and outcomes, the common wisdom which has united commanders of all ideological persuasions and shades of moral integrity from Sun Tzu to Schwarzkopf has become formalised in contemporary nomenclature as 'Command, Control and Communications' (C3). The phrase 'ideological persuasions and shades of moral integrity' is used because we need to consider not only how to deal with the effects of the natural environment such as earthquake, fire, storm and such like, but also how to deal with acts of a criminal form against the Commonwealth and States, humanitarian acts associated with those who have left their homeland as refugees and, possibly, hostile acts by a foreign power.

Australia's C3 capabilities have evolved to suit our circumstances but, it could be argued, we have not yet experienced the national crises which would fully test the existing machinery. We therefore have an obligation to consider what introduction of the UN 1982 Convention on the Law of the Sea means from a C3 perspective. To meet that objective, this paper will address current concepts for operations and how the ADF and Coastwatch might interact, some principles of Command and Control (C2), and will draw some assessments of areas where further mutual development might prove beneficial.

Coastwatch Concepts for Operations

The formation of Coastwatch was a conscious decision to place the responsibility for surveillance of Australia's immediate approaches outside the auspices of Defence. Coastwatch is now the coordinating body for all other Commonwealth Departments which have responsibilities for different aspects of Commonwealth legislation requiring surveillance of our approaches. In this paper they are referred to collectively as clients. Defence is not a client agency *per se* of Coastwatch, but 10 other Departments effectively contract Coastwatch to meet their surveillance requirements.[1] These are:

- Australian Customs Service
- Australian Fisheries Management Authority
- Department of Foreign Affairs and Trade
- Australian Quarantine and Inspection Service
- Department of Immigration and Ethnic Affairs
- Australian National Conservation Agency
- Great Barrier Reef Marine Park Authority
- Australian Federal Police
- Department of Environment, Sport and Territories
- Department of Primary Industry and Energy

Coastwatch Locations

In contributing to Coastwatch operations, the ADF is therefore supporting a Commonwealth enforcement operation for which Coastwatch is the controlling agent, and for that reason naval officers are authorised to make apprehensions.

Coastwatch has a head office in Canberra and regional offices in Broome, Darwin and Cairns, with a minor station at Thursday Island. Figure 1 depicts the geographical spread of Coastwatch offices.

Figure 1: Coastwatch Locations
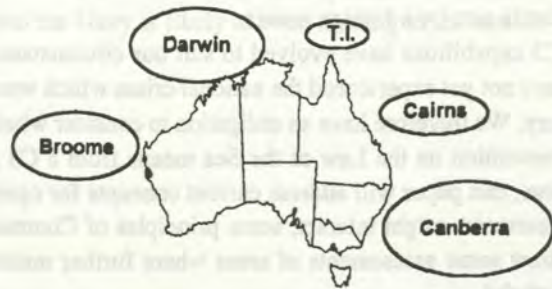
Coastwatch Objectives

The specific objectives for Coastwatch in civil coastal surveillance are:

- To detect the presence of targets of interest to Coastwatch within coastal areas and the 200nm Australian Fishing Zone and EEZ;
- Where necessary, to respond to breaches or potential breaches of Australian laws by raising alerts and coordinating response operations to meet the concerns of Departments and participating agencies;
- If required, to provide special assistance to drug enforcement bodies; and
- By displaying a physical presence, to deter potential violations of Australian law.

Coastwatch is not a search and rescue organisation, although it may be called upon to provide assistance in the event of a maritime or aviation emergency.

Administrative Oversight and Advice

Following the Government decision in 1988 to transfer administration of the Coastwatch program to the Australian Customs Service, the Minister for Science, Customs and Small Business within the portfolio of the Minister for Industry, Technology and Commerce (now Industry, Science and Technology) assumed responsibility for its operation. Day to day administration is exercised by the national manager of the Coastwatch program within the Australian Customs Service.

With many Government activities, there is considerable need to coordinate the efforts of the participants to obtain the best complete output, and Coastwatch is no different. There is a four-tier advisory committee structure to help the National Manager and to promote cooperation among the states, territories and participating departments, and in summary these are:

- **Standing Advisory Committee on Coastal Protection and Surveillance**: meets annually and provides a forum for discussion on development of Commonwealth/State/NT cooperation in surveillance matters.
- **Coastwatch Interdepartmental Advisory Committee**: meets as required to review the effectiveness of interdepartmental arrangements.
- **Coastwatch Operations and Program Advisory Committee**: meets monthly to review activities and develop the surveillance program. HQADF is represented on this committee by a Commander from ACOPS' staff.
- **Coastwatch Regional Coordination Meetings**: occur in Cairns, Darwin and Broome to provide regional participation in the surveillance program.

Coastwatch Canberra is operated 24 hours per day, seven days per week to coordinate the surveillance program.

Capabilities

Coastwatch capabilities presently consist of 12 Shrike Aero Commander aircraft used for visual search, three Nomad aircraft fitted with radar but again predominantly used for visual search, and three Westwind SeaScan jet aircraft fitted with surveillance radar, FLIR and a simple tactical data system. A single Squirrel helicopter is based at Thursday Island. RAAF P3Cs assist these searches to the extent of about 250 hours per year—an expensive addition to the surveillance effort, but Coastwatch's technical capabilities will improve with the new nine year contract to be signed this year, and the associated expansion of the area to be searched.

The obvious element missing from this force is the means of arrest or apprehension at sea, and this is provided for by RAN Fremantle Class patrol boats which are allocated to Coastwatch operations for about 1800 patrol boat days per year. As Navy expects to replace the Fremantles with fewer, more capable vessels at some time in the future, there will need to be a reassessment of how this surveillance effort will be provided for, including the possible involvement of a variety of ship types, for various periods of time.

Surveillance

The discussion so far has included Coastwatch's platforms and general organisation. Even without the upgraded capabilities which will accompany the new contract the Coastwatch organisation will inevitably acquire several typically military attributes for its operations. Not the least of these will include professionalism and technical proficiency, detailed operational planning and procedures, as well as physical and communications security measures. There is capacity for greater sharing of information and interaction in our goals for the defence of Australia. Both the Maritime and Air Commanders need to appreciate routine activities taking place in the sea and air space around Australia and they may need to interact very closely with Coastwatch, often at very short notice.

At this point it is worth recalling that Coastwatch is not conducting surveillance for itself, but for its client agencies previously listed. The diversity of departments with surveillance requirements creates the potential for diversity in purpose and inadequate cooperation in utilising assets, setting priorities and sharing of information. The degree to which this so far has not become a difficulty is a credit to those concerned. Nevertheless, the result is that the Maritime and Air Commanders, should they want to task Coastwatch assets, will be required to bid as the other agencies do. Because of limited availability, and the potential for competing demands, defence force planning does not assume the availability of Coastwatch units

Resources and Surveillance

Australia's EEZ

Any platform or sensor can be employed to conduct surveillance, but each has its own strengths and weaknesses and there is no single perfect means of achieving a satisfactory capability. A man or woman standing on the coast with a pair of binoculars can be very effective, as the Coastwatchers of WW II so ably proved. So too can submarines conducting covert operations in selected areas be useful, for example by giving advance warning of air attacks, or of the departure or transit of especially important ships. RAN shipborne helicopters, and RAAF and Coastwatch fixed wing aircraft can search vast expanses of ocean and shorelines, and RAN patrol boats operating near important commercial fishing or other resource areas can provide much needed information. But it would be useful if we could reduce unnecessary visits to locations where nothing is likely to be found, and instead use mobile assets more effectively to localise and identify what other sensors or intelligence has suggested might be found.

Figure 2: Australia's EEZ

Surveillance is expensive in resource use; people, sensors, time and money, especially when the vastness of Australia's ocean approaches and other national maritime interests are considered. There is not only the need to determine what is happening in our areas of interest, but also to be able to identify what has been detected. Simply knowing that there is something out there is only part of the issue.

Knowing that something is there places an onus on us to do something, and has the potential to influence the peacetime employment of forces as well as having a direct bearing on force readiness and preparedness.

Even at low levels of conflict, and in the prior warning periods, the conduct of surveillance will tax the resources of the RAN and RAAF very heavily to satisfy both the political and military needs for knowledge. The area of operations is extensive as shown in Figure 2. Consequently there has been much research and development effort placed in developing cost effective wide area surveillance systems which have huge coverage capabilities, but affordable manpower and operating costs in relation to their performance. JINDALEE and SIGINT are two examples of cost effective wide area surveillance capabilities. JINDALEE's initial capability will cost about $A1 billion and its introduction will add a new dimension to Australia's ability to police its own airspace. While it is an expensive way to do business, this could affect RAAF F18 activities in terms of being required to intercept unidentified air traffic in the north; a video developed by the JINDALEE Project in 1989 highlighted this very potential for OTHR and F18 cooperation against civil airborne intruders. It should also be obvious that AEW&C aircraft would find particular application in sea and airspace surveillance of the offshore estate.

*Wide Area Surveillance Data Sharing*

As improvements have been made in sensors, so too have big advancements been made in coordinating their tasking and providing outputs to meet the needs of many customers. Figure 3 summarises how modern military organisations have progressed in dealing with wide area surveillance systems, which help create a composite picture which is then fused to help complete the jigsaw. The process is one of continuous information refinement, where data is collected based on the priorities established to meet the mission, assessed for its accuracy, consistency and relevance, and added to more locally obtained information gained from short range sensors or intelligence. This highly effective process helps achieve the synergy not possible by manual methods or individual capabilities.

While defence has access to this kind of technology, it is presently not consistently made available to Coastwatch or its clients, nor with current technical capabilities discussed later could it be done in an efficient and effective manner. The client and agent roles of other departments and Coastwatch make this approach more complicated because of the potential to coordinate information with 10 different organisations.

Coordination of Surveillance

It would be unwise, however, to underestimate the options available to a unit which wishes to remain unlocated. Human ingenuity, technical efforts and sometimes sheer luck are often overlooked when assessing the effort necessary to counter such actions. The capabilities of modern surveillance systems, however, contribute to

Figure 3: Wide Area Surveillance Data Sharing
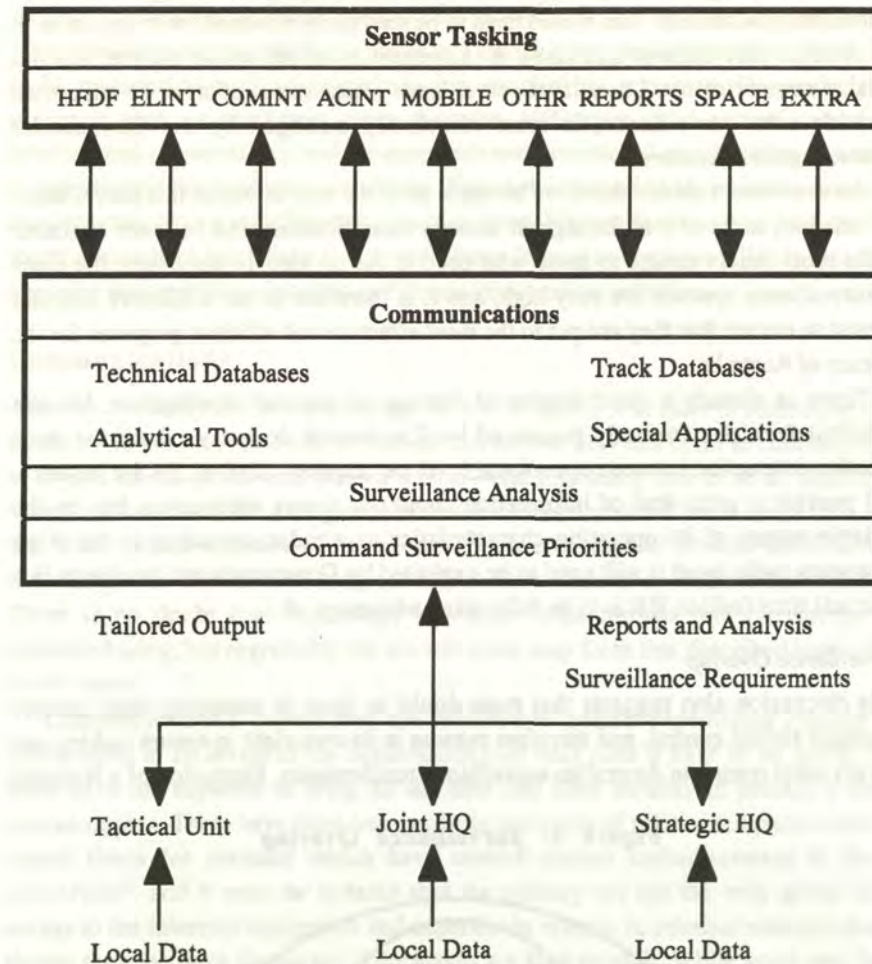
both their strengths and weaknesses. Complexity is inevitable, which comes with having so many modes of operation and special features designed to take advantage of, or limit the effect of environmental conditions. In turn, this has a major influence on general effectiveness which is often a function of the person operating the equipment, his specialised training and so forth, as well as some of the less well-understood effects of selecting various capabilities. The age of the fully automatic, omnipotent, intelligent electronic beast of the movies has not yet arrived.

To reinforce the perception already suggested in this paper, surveillance requires a great deal of coordination to be effective. It is highly desirable to avoid duplication of effort, but also it is important to be sure of not leaving any holes in the complete scheme. The management of wide area surveillance is particularly complex and requires considerable resources to be effective. To be most productive, the

coordination of wide area surveillance operations and requirements should be centralised to the greatest degree possible and limited only by technological costs and operational practicality. This would need to be staffed by personnel with expertise in the systems they manage and skills in interpretation of the whole regime, and not isolated compartments. Local level surveillance which can support or be supported by wide area surveillance, is most effectively managed by the Commander conducting the operation.

An assessment should therefore be made as to the way in which this surveillance information, some of it at the highest security classifications, can be made available in the most timely means to those who need it. As previously discussed, the costs of surveillance systems are very high, and it is therefore in our collective national interest to ensure that they are put to the most effective and efficient purposes for the defence of Australia.

There is already a good degree of sharing of national intelligence, but the technical facilities currently possessed by Coastwatch do not yet help the most effective interaction between operational level participants. JINDALEE for instance, will provide a great deal of information about our nearer approaches, but by the variable nature of its operating characteristics as a radar operating in the High Frequency radio band it will need to be exploited by Coastwatch and its clients in a near real time fashion if it is to be fully taken advantage of.

Surveillance Overlap

This discussion also suggests that more could be done in assessing what sensors Australia should control, and therefore possess in its own right to ensure tasking can always meet complete Australian surveillance requirements. Formation of a National

Figure 4: Surveillance Overlap
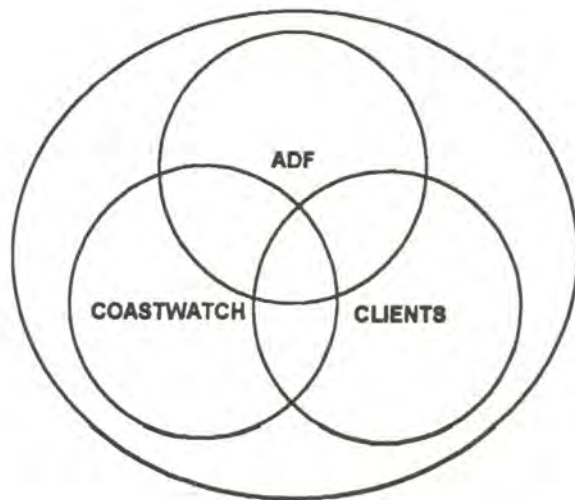
Surveillance Coordination Centre may be a realistic option in due course and this concept would require participation by the 10 clients and Defence in a collocated facility where all surveillance information is available and tasking is developed to meet particular needs. Obviously there will be security compartmentalisation issues to be resolved as well as procedures for establishing priorities. The underlying notion is that, as we know, more than the ADF have valid surveillance (and intelligence) requirements, and for economic and operational coordination reasons it is not sensible to duplicate our efforts. Figure 4 is intended to represent how our requirements have a significant degree of overlap. We can draw lessons from the US experience where Joint Task Forces have been formed to combine military and civil agencies in combating narcotics and illegal immigration activities.

Communications

After the visibility of CNN's coverage of the 1991 Gulf War there is something of a tendency in modern Australia to assume that all one now has to do to communicate is to pick up the phone and press a button—and this surely has to be an objective. Somehow there will be a magical electronic connection to all those concerned and live video, sound and data will somehow appear on computer screens which allows the omnipotent commander to press a few more buttons to achieve his mission. There is no doubt that technology has made huge inroads into our means of communicating, but regrettably we are still some way from that described here—but it will come.

Communication's capabilities are required to permit expeditious routing of information to all levels of the organisation, not only does it have to be quick, but must have the capacity to bring all the data and have security to protect it from eavesdroppers. There have been some notable intercepts of cellular telephone calls in recent times for instance which have caused serious embarrassment to those concerned[2], and it must be restated that the military are not the only group with access to the intercept equipment and expertise to operate it; criminal elements have shown they too have the means if the stakes are high enough. While voice and data links are important, there is the increasing recognition that video, be it slow, medium or fast frame, helps other commanders see events as they unfold and react accordingly—this would be particularly so in a developing rules of engagement situation, or for briefing special forces preparing to retake a seized oil or gas rig, or for recording illegal acts as they occur.

But underlying all of this is the notion that we have achieved the requisite degree of interoperability between the players. Not only must the radio's be compatible with emission types and characteristics, they must also use the same cryptographic systems and data management arrangements; and it is these latter areas where we do not yet match up yet. Coastwatch central operations in Canberra has a DISCON connection, but otherwise their communication system is not compatible in a security sense with the ADF. Coastwatch aircraft radios are not fitted with ADF

compatible secure keying material, but instead use a commercial product (but fortunately one which has the potential to be upgraded to an acceptable Defence Signals Directorate standard), irrespective it will still require ADF units to be fitted with the same equipment to be compatible. Hence the notion of security has some room for improvement, but it is not impossible to achieve.

The ADF has started to introduce the ADF Formatted Message System (ADFORMS), a long overdue standardised means of transferring man and machine readable messages over telex and data systems. ADFORMS allows direct input of data from the communications line into computer data bases without human interaction, but each message has enough embedded syntax to make it understandable to those without access to such sophistication. This simple invention overcomes an unachievable requirement for standardisation of computers and could be used by Coastwatch, but because it is admittedly initially complex and requires some training to use properly, there will be an overhead cost so attached. The ADF will be conducting training courses in the use of ADFORMS and perhaps could come to our partner's assistance here. Without the interoperability of communications and data formats we will not achieve the synergy which comes from the ability to speak the same language and, at least as importantly, have the same understanding.

The Navy is also introducing the Joint Operational Tactical System (JOTS) which is suitable for smaller scale requirements, but is still quite a powerful system capable of displaying data received through several different communications channels. JOTS would be a very useful equipment for use by Coastwatch and would markedly improve our collective interoperability.

Not withstanding these issues, there is a close working understanding by both organisations that interoperability is essential and it can be expected that these issues will be fully addressed in the future.

Command and control

The preceding discussion has been focussed on the concepts related to how Coastwatch and the ADF do business and identifying areas where overlap takes place. This has laid the groundwork for consideration of command and control so far as management of the offshore estate is concerned.

Operational procedures and technical capabilities of Coastwatch can be expected to evolve as previously discussed, and it is unlikely that those in Coastwatch would withdraw their services based on the conflict being the problem of somebody else. The underlying question though which needs to be answered is most related to how effectively would we transition from peace time operations to those of conflict when history shows that our sense of timing to initiate change will almost certainly be poor. The lead in to this question is whether there should be greater military C2 of Coastwatch now to make this transition more likely to succeed. The responsibility of the military in setting and controlling the priorities and execution of surveillance during conflict is well understood, but in reality there could well be a protracted

period in the twilight zone when future developments generate great uncertainty. Prolonged interference to normal business through tighter control of Coastwatch operations might lead to dissatisfaction from its usual clients and, because of the previously semi-autonomous nature of Departmental surveillance operations, may indirectly result in an inferior standard of understanding and performance. This reinforces the notion that we need to continue with confidence building processes in current day to day operations.

As the adage suggests, when all else fails it is prudent to refer to the instructions. In C2 matters however, much more so than in developing the general principles of war, command and control theory and its application has principally been the domain of the Commander, who until quite recently was always limited by communications and related technology to put his wishes into practice. But technology is not the only answer, indeed it can add considerably to the confusion where it is not managed and is itself kept under control.

The notion of protecting and managing the offshore estate will inevitably involve many participants, and to be successful in this endeavour, it would be useful to consider some principals when assessing how this might be achieved.

The ADF has several guiding principles to assess how effective a particular C2 arrangement might be, and they would probably find congruence with most organisations with similar imperatives in terms of achieving the maximum effect with economy of effort:

- **Unity of command**: ensuring that the nominated Commander has the requisite assets assigned, authority and responsibility for achieving his mission;
- **Span of command**: recognising there is a limit to the number of subordinate elements that can be effectively commanded;
- **Chain of command**: clearly delineating the lines and direction of authority;
- **Continuity of command**: ensuring that command is always possible in case of a higher or lower level Commander being removed from his position;
- **Delegation of authority**: the necessary delegation to ensure that there is sufficient authority at all levels commensurate with the responsibility of the lower Commanders and that required to meet their delegated mission and tasks; and
- **Control of scarce resources**: where resources are scarce but are important to a variety of elements or operations, their control should be centralised at the highest level at which they can be used effectively.

These yardsticks are not easy to put in place, not the least reason of which being the complexity that modern organisations seem to find themselves constantly dealing with. Command and Control above all else, in direct competition with

complexity, must be kept simple. Individuals and Commanders must know to whom they are responsible and for what. The last test point of controlling scarce resources is one which can cause considerable antagonism when those with very real requirements end up having to bid for their slice of the cake, with the inevitable result that someone is disappointed and must seek other ways of achieving goals, or instead give up the quest.

As we develop our understanding of the task we face with offshore matters we will need to assess our C2 arrangements against these tenets. It is not proposed that a single organisation necessarily be responsible for all aspects of policing the offshore estate, but there will be the need for close liaison, and occasionally a push for greater integration may flow from this work. If any lesson has been relearned about command and control in contemporary times, it has been that too many cooks spoil the broth.

Summary and Conclusions

Command and Control concerns and issues stem from the Mission of the Commander. In current circumstances when Coastwatch is supported by the ADF, the arrangement probably works as well as could be expected. Inevitably there will be some friction, but this is often caused through an inadequate understanding of an individual's role in the scheme of things—normally caused by all too frequent changes in personnel. The contribution by the ADF is welcomed by Coastwatch, and in the case of Navy Fremantle patrol boats, is probably the only means they have of consummating the catch.

Coastwatch Liaison

Standard military C2 arrangements sit comfortably with the tasking of ships and aircraft to participate in Coastwatch operations. HQADF acts as the prime point of contact and liaison with Coastwatch, but direct liaison by MHQ, LHQ and AHQ can and does take place with Coastwatch regional offices for coordination of efforts. As depicted by Figure 5, once Coastwatch Canberra and HQADF have established requirements for a particular activity, then direct liaison takes place between each relevant office to get the job done, keeping respective superiors informed of progress, problems etc. Coastwatch has participated in Exercises Kangaroo 89 and 92, and on each occasion received high regard for its contribution. In keeping with requirements for identification of personnel articulated in the Law of Armed Conflict, there is no reason to believe Coastwatch will not participate in any conflict involving mainland Australia.

Figure 5: Coastwatch Liaison
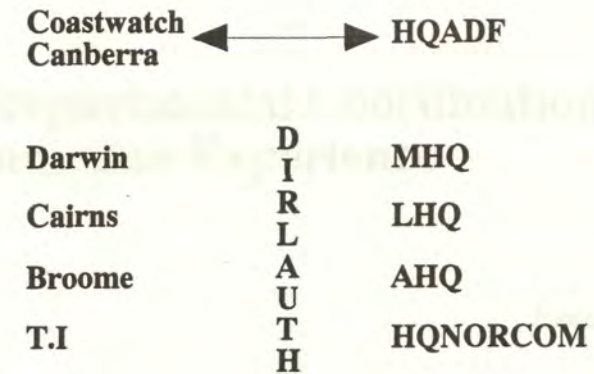
In summary, the arrangements now in place do work and with minimum fuss. There is growing maturity by the ADF and Coastwatch about how each relates to the other, and what reasonable expectations they should have in a variety of circumstances. There are also practical measures which could be considered now in terms of improving communications interoperability and the cross flow of intelligence and surveillance between Departments, but each has its own requirements for security and special handling which need to be respected if trust is not to be lost, not to say lives in the case of drugs and other smuggling activities. Attachment of liaison officers to respective organisations is a remarkably simple act which can often accomplish the goal of protecting security while achieving effective and harmonious interaction.

Notes

1 Although Coastwatch is part of the Australian Customs Service, it is managed as a separate entity.

2 The 'Diannagate' intercepts of personal telephone conversations of members of the Royal family is cited as an example here.

12

Inter-Departmental Coordination: The Canadian Experience

Fred Crickard

Introduction

The Federal Government's involvement in oceans-related activities is considerable. In 1987, some 75 oceans-related programs were managed through 14 federal departments involving more than 13,000 person-years and $1.3 billion annually—excluding Maritime Command.[1] The role of the government in oceans management includes:

- the offshore environment and the economic development of its resources;
- mediating conflicts between users;
- providing the infrastructure for safe navigation;
- protecting the resource base, and the marine environment; and
- preserving and enhancing Canadian sovereignty.[2]

This paper reviews the development of interdepartmental coordination in maritime enforcement between federal departments with regulatory responsibilities for effective oceans management and Canada's maritime forces.

The need for protection of Canada's maritime vital interests evolved from the perception of Canada as a coastal state with mainly domestic concerns rather than as an international trading state. The Department of Fisheries and Marine was the first federal department with oceans responsibilities. The Royal Canadian Navy was formed from it. Canada's first 'naval' vessel was the Canadian Government Ship *CANADA* commissioned in 1905 for fisheries protection duties.[3]

Canadian policy for the protection of its maritime vital interests has been implemented through a blend of law, force and diplomacy. The strategy has been one of surveillance, monitoring and enforcement—in strategic terms, *naval presence* and *sea control*. The force posture or structure has evolved from three autonomous federal government fleets: the Navy, including maritime air; the Canadian Coast Guard (CCG); and the Fisheries and Oceans Fleet. These fleets support the mandates of five

federal departments: National Defence, Fisheries and Oceans, Transport Canada, the Solicitor-General, and Foreign Affairs and International Trade. Except for the Department of National Defence (DND) these jurisdictions have statutory responsibilities for the protection and preservation of Canada's coastal zones.

The Department of Fisheries and Oceans (DFO) is the 'lead' department in oceans matters as well as being responsible for policies and programs in support of Canada's economic, ecological and scientific interests in the oceans and inland waters.[4] Important to note for the purposes of this paper is DFO's mandate to coordinate policies and programs of the Federal Government respecting oceans. Transport Canada's Marine Branch controls the Canadian Coast Guard which is responsible for marine navigation systems, ice breaking and Arctic operations, marine regulations and standards, search and rescue, public harbours and ports and the Canadian pilotage authorities. It is also the 'lead' agency for ship source oil spills and maintains pollution response centres with spill response equipment. The Ministry of the Solicitor-General is the 'lead' federal law enforcement agency and coordinates counter-terrorism policy and response to terrorist incidents. The Royal Canadian Mounted Police (RCMP) is its enforcement agency. Currently the full extent of Canadian law, and RCMP authority, applies only within the 12-mile territorial limit. Beyond that Canadian jurisdiction applies to natural resources within the 200 nautical mile limit.[5] The Department of Foreign Affairs and International Trade provides policy and legal advice on the international aspects of maritime affairs. In the marine context it exercises principally a consultative role.

Many other departments and agencies have interests in the marine context. Among these is Environment Canada whose mandate, in marine affairs, is principally meteorological, regulation, inspection and monitoring. Revenue Canada is responsible for preventing smuggling, particularly illicit drugs, while the Department of Citizenship and Immigration is responsible for preventing illegal immigration.

In the case of National Defence, enforcing Canadian domestic law is not in its mandate. As a matter of policy the Canadian Forces (CF) support but do not replace a civil jurisdiction. The Department of National Defence has no authority for maritime enforcement. There are no domestic laws or regulations that DND is legislated to enforce. The Department contributes to the surveillance and monitoring of Canadian coastal zones and ocean approaches and offers resources in support of the enforcement activities of other government departments as required.[6]

The Evolution of Maritime Enforcement Since the 1960s
In the past 25 years the attention of national oceans policy-makers in Canada became highly focused during two periods. The first, from 1969 to the mid 1970s, was largely in response to international offshore oil and gas exploration, over-fishing and development and growing concern over marine pollution. In the second period, from

1985 to the 1990s, offshore resource development became overshadowed by environmental concerns and the near depletion of important fish stocks. During the 1970s, the ocean was often described as a *frontier* and ocean explorations were characterised as *challenges*. In the 1980s the public perception of the oceans had changed. Oil spills, threats of the extinction of species and tragedies such as the *Ocean Ranger* dominated headlines. The net result has been a shift away from technology-based ocean development to a regulatory-based approach to ocean management. Conservation or protection interests have, by and large, gained precedence over revenue generation of energy self-sufficiency aims.[7]

Interest in the protection and preservation of coastal waters developed in the early 1970s against a backdrop of global marine pollution incidents—the *Torrey Canyon* grounding, the OPEC instigated energy crisis and high level international conferences such as the 1972 United Nations Conference on the Human Environment and the UN Conference on the Law of the Sea. In the 1970s the Canadian view of international affairs underwent a fundamental change. Prime Minister Pierre Eliot Trudeau's foreign policy stamp was distinctly 'Canada first'. Foreign policy was to be 'the extension abroad of national policies'.[8] In the 1971 Defence White Paper 'Defence In The 70's' the protection of Canadian sovereignty became the first priority of Canadian defence policy, ahead of North American defence, NATO or international peacekeeping.[9]

Coinciding with this foreign and defence policy shift was the emergence of awareness in Canada and internationally of the peaceful uses of the oceans. At home, the voyages of the U.S. Registered Tanker, *Manhattan,* through the Northwest Passage in 1969 and 1970, overfishing and concern over the Arctic marine environment resulted in the passing of the Arctic Waters Pollution Prevention Act proclaimed in August 1972 and the unilateral declaration of a 200 nautical mile Fisheries Extension Zone in 1977. In the United Nations, Canadian leadership was significant in the UNCLOS III negotiations in the 1970s. Canada broke ranks with Britain, the United States and other major industrial powers and acted for or spoke with the coastal states as opposed to the maritime ones.[10]

The early 1970s witnessed a return by the Navy to historic coastal patrol and surveillance tasks in support of Canadian national maritime interests. Initially the Canadian Forces were involved in five foreign policy issue areas in waters of Canadian interest or jurisdiction; namely, fisheries, sovereignty operations in the Arctic, marine pollution, offshore energy and mining, and maritime scientific research.[11] By the 1980s maritime forces tasking had expanded to include drug smuggling, illegal immigrants, and maritime boundary delimitations. With the exception of Arctic sovereignty flights and northern deployments of naval vessels, which are controlled by the Department of National Defence (DND), these operations were carried out in support of the designated lead department of the Federal Government.

In the 1960s, Canadian military aircraft in their daily operations maintained contact on foreign fleets. In the early 1970s the surveillance was still loosely coordinated and operated on inter-departmental agreements negotiated yearly to provide limited support to the Department of Fisheries and Oceans. Canadian warships commenced fisheries patrols in the 1970s, prior to which they had been conducted by Fisheries and the RCMP.

On January 1st, 1977 with the implementation of Canada's 200 nautical mile fisheries extension zones, the Government directed that Canada's military support to DFO in surveillance and control be increased and formalised. Initially, air surveillance was conducted entirely by Canadian Forces aircraft and 36 per cent of the ship patrols by H.M.C. warships. In 1977, the first year of the new arrangements, 5,000 flying hours, all military, and 1,700 ships days, of which 600 were steamed by warships, were expended on the surveillance and control of foreign and Canadian fishing fleets.[12]

As Canada's 200 nautical mile fisheries extension zones gained recognition, as evidenced by historical sightings and boarding data, the level of air surveillance and ship patrols dropped in the early 1980s. DFO assumed more of the burden of surveillance and control of fishing activity. Until 1989 aerial resources were still largely dependent on the Tracker medium range reconnaissance aircraft fleet of DND. With the loss of the Tracker in 1990, aerial surveillance services were contracted out to civilian aviation companies. On the East Coast, Provincial Airlines provided 4,000 hours of patrol time in 1991. DND, using Aurora maritime patrol aircraft, continued to provide 420 hours of free air time over the 'nose' and 'tail' of the Grand Bank and the Flemish Cap outside Canada's 200 mile limit as well as off Labrador.[13] In 1987 Canada's Atlantic-based fishery patrol vessels were armed with 50 calibre machine guns and naval fishery patrols became less frequent. Nevertheless, two hundred DND sea days were used in fishery surveillance patrols in 1989.[14] The contribution of naval warships remained an important one. In 1988, Atlantic fleet warships conducted surveillance of over 211,000 square miles of ocean, recorded 318 significant sightings, boarded 61 vessels from eight nations and reported 21 violations of the Northwest Atlantic Fisheries Organisations (NAFO) agreements.[15]

In the late 1980s drug smuggling and illegal immigration became problems which entailed DND countermeasures. In 1985 the Panamanian motor vessel *Ernestina*, the mother ship for a drug smuggling operation bound for Nova Scotia, was tracked covertly for some weeks by Aurora patrol aircraft cooperating with the RCMP. At the right time, the destroyer *HMCS Iroquois* was dispatched in hot pursuit with an RCMP officer embarked. The *Ernestina* was boarded, the crew arrested and the vessel escorted to Halifax.

Illegal immigration has required DND assistance at least twice in recent years. In July 1987 it was believed that the *M.V.Walfis* was bound for Canada from Europe with 100 East Indian illegal refugees on board. At the request of Canada

Employment and Immigration a large area of the Grand Banks and Scotia Shelf was searched by ships and aircraft from Maritime Command as well as vessels of the Canadian Coast Guard and Fisheries and Oceans. Although 35 vessels were identified, in spite of thick fog, the *Walfis* was not found and returned to Europe without landing at a Canadian port. Even less successful was the search for 174 Sikhs who landed undetected and illegally on the South Shore of Nova Scotia in July 1987. Both cases illustrated the difficulty of mounting a successful large area ocean search for a vessel of interest off the Atlantic Coast given the typical weather conditions. Such operations require good intelligence, a large air search effort, fast seaworthy ships, a systematic search plan and a good measure of luck.

Interdepartmental Coordination in the 1990s

By 1990, increasing fishing violations, marine accidents, such as the *Exxon Valdez*, drug-running and illegal immigration by sea demanded increased vigilance and response. In the Atlantic, fishery patrols could not maintain a presence as government ships and operations were becoming committed to a wider range of offshore activities occurring simultaneously. In December 1989 an incident occurred which triggered an enquiry and action in the House of Commons and by the Government. This was to lead to closer Government fleet integration and the coordination of maritime operations in response to routine activities and emergency situations.

At 0900 on 11 December 1989 a Canadian Forces Tracker aircraft spotted and tried to contact the United States fishing vessel *Concordia* fishing illegally on the Canadian side of the HAQUE line, which divides United States and Canadian jurisdiction, on the Georges Bank fishing grounds off the coast of Nova Scotia. At the time, the crews of Fisheries and Oceans vessels were on strike and naval ships were carrying out fisheries patrols. The *Concordia* did not respond and fled towards American waters. *HMCS Saguenay*, a destroyer, took up pursuit shortly before 1100 and attempted to contact *Concordia* which rammed the destroyer and continued towards home waters. The incident was immediately reported. The interdepartmental consultation process began in Ottawa at 1pm but it was not until 6.25pm that approval was given to *Saguenay* to fire warning shots across the bow of *Concordia*. Undeterred, the *Concordia* steamed on and entered United States territorial waters at 9.51pm The United States Coast Guard assumed hot pursuit at 11pm. The *Concordia's* captain and owner were subsequently fined $10,000 each under United States civil law. It had taken almost eight hours for *Saguenay* to receive permission to escalate the action, by which time darkness and the sea state ruled out further measures such as a forcible boarding. It was deemed that cumbersome interdepartmental coordination was a critical factor in this failure to apprehend a foreign vessel engaged in illegal fishing in Canadian waters.[16]

The incident focused public attention on maritime sovereignty and law enforcement. In 1990, a Parliamentary committee produced a report on maritime

sovereignty and the Government ordered an interdepartmental study to assess current fleet management policies and to determine the desirability and feasibility of 'some form of fleet consolidation'.[17] The remainder of this paper describes, briefly, the recommendations of the Parliamentary committee, the study, the follow-up policy and planning measures and the changes underway in Federal Government fleet operations.

In November, 1990 the Standing Committee on National Defence and Veterans Affairs tabled its report 'Maritime Sovereignty' in the House of Commons.[18] While the report affirmed the first principle of the Canadian Forces to be the defence of Canada, much of it concerned the non-military roles of Canada's maritime forces. Its findings and recommendations on interdepartmental coordination included a programme for '... exercising interdepartmental coordination procedures particularly for emergency operations ...'.[19] It also recommended a study of Federal Government activities in Canada's maritime jurisdictions, including evaluations of coordination among government departments, aircraft and ship equipment and operations and '... possible integrated command and control structures with a view to exercising optimum use of resources and ensuring a more rapid response'.[20]

The Federal Government's response was the study on Canadian Government Fleet Utilizatiion led by the Honourable G.F. Osbaldeston and made up of representatives from National Defence, Transport Canada, Fisheries and Oceans and the Solicitor-General. Its mandate was:

- To examine the current management of the Federal Government's fleet management policies, practices and operations, including the resources involved;
- To assess alternatives to the current management and delivery of these functions; and
- Where the findings of the Study Team warrant the consideration of some form of fleet consolidation, to identify preferred options for its achievement in terms of desirability and feasibility.[21]

Periodic reviews by the Federal Government of fleet integration are not new. Major studies of the Government's marine fleets were commissioned in 1962, 1969, 1975 and in 1986.[22] Their recommendations ranged from the consolidation of civilian marine patrol and law enforcement fleets under the Canadian Coast Guard, to a single agency under DND, to a paramilitary role for the Coast Guard similar to that of the United States Coast Guard. None of the studies became policy.

The case of the Fleet Utilisation or 'Osbaldeston Study' appears to be different. The report 'All the Ships That Sail: A Study Of Canada's Fleets' was tabled in October 1990. It recommended an Interdepartmental Program Coordination and Review Committee (IPCRC) be established, consisting of the three fleet operating departments (National Defence -Maritime Command; Transport Canada—Canadian Coast Guard; and Fisheries and Oceans) and all major users. The Committee would match marine enforcement and scientific research requirements with available ship

capacity, the principal beneficiary being Fisheries and Oceans whose patrol needs would be met by increased full or part-time use or, in other words, multi-tasking of naval and coast guard vessels. The Committee would have no managerial role and continuing bilateral arrangements, normally laid down in Memoranda-of-Understanding (MOUs) between departments, would continue. In addition to the major recommendations, the Study concluded that DND should be assigned increased offshore tasks in support of sovereignty, fisheries management, search and rescue, and environmental surveillance. In addition DND should assist in meeting RCMP needs for preventative patrols in inshore waters and ports. The CCG should contribute to the unmet demand for fisheries management as well as additional coastal patrols.[23]

The Osbaldeston Report was influential in the first internal defence review of the post-Cold War period. In late 1989 it was decided that DND needed a comprehensive defence review to chart the future direction of the Forces. The Cyclical Review 1990 (CR90) has been called '... the most fundamental internal review of CF structure since World War II'.[24] Based on CR90 the Minister announced the new defence policy in September 1991 and followed it with the document 'Canadian Defence Policy in April 1992. These two policy announcements are Canada's post-Cold War defence policy. The first defence priority is 'defence, sovereignty and civil responsibilities in Canada,' ahead of collective defence arrangements and international peace and security.[25] A new set of challenges are presented to the Navy; 'the focus of the Canadian Navy, first and foremost, will be the Canadian areas of maritime responsibility off our East and West Coasts'.[26] The Navy's top priority post-Cold War mission lined up with the policy recommendations of the Parliamentary report 'Maritime Sovereignty' and its future concept of maritime operations came into line with the findings of the Government's Fleet Utilisation Study.

Responding to the new policy as well as to the findings of the Osbaldeston Report, DND and other departments are aligning their fleet operations. Interdepartmental procedures and operations are becoming formalised and more closely coordinated. At the level of policy implementation in Ottawa, the IPCRC and its working group and sub-committees have made significant progress. By 1991, six sub-committees had been established on communications, concept of operations, surveillance, vessel utilisation, hydrographic operations and vessel design requirements.[27] Compatible secure voice and facsimile equipment and satellite communications (INMARSAT) are being fitted in the three Government fleets. A study on Canadian offshore surveillance and surface picture compilation was completed and equipment to transfer surveillance data by electronic means is being acquired by the DND, CCG and DFO fleets as well as the RCMP. At the national level, 'joint' naval and civilian doctrine has been promulgated in an Interdepartmental Concept of Maritime Operations (ICMO). This document lays out the current departmental mandates, command, control and communication

arrangements, a summary of the various Memoranda-of-Understanding governing bilateral or multilateral departmental operations in normal as well as national or war emergency situations, the levels of force in support of other government departments during operations at sea, and the various operations required or anticipated. These include assistance to fisheries and marine scientific research, counter-drug operations, illegal immigration, marine counter-terrorism, preventative policing patrols, search and rescue, marine environmental protection and the control and use of navigation and civilian federal fleets in a national emergency or war.[28] In addition, work has begun on consolidating oceanographic and hydrographic requirements and coordinating plans and requirements for ships and marine equipment where possible. For example, the Navy and the Coast Guard are sharing in the development of a new Blind Pilotage shore trainer.[29]

The matching of unmet sea patrol days with available hulls is coordinated by an Interdepartmental Coordination of Vessel Utilisation (ICVU) sub-group in Ottawa working through three regional scheduling groups for Atlantic, Pacific and Central and Northern waters. The scheduling of the three fleets is becoming integrated and surplus ship availability subsequently determined. Unfortunately, due to continuing cuts in the operating budgets of all departments, the required sea days for fisheries enforcement, the RCMP, marine environmental patrols and marine research are still not being met.[30]

By virtue of its 'blue water' capability, infrastructure and organisational potential, the Navy has taken the lead in developing interdepartmental coordination on the waterfront. Policy direction is provided in the Maritime Commander's Concept of Operations 'Maritime Command: The Naval Vision'.[31] This expands on the Government's defence policy. The maritime strategy is one of *naval presence* entailing the capability for surveillance, patrol and response in Canadian areas of maritime responsibility. A second national consideration is assistance to other Government departments, either in support or, in rare cases, through direct armed assistance. Since 1990, the number of ship days devoted to fisheries patrols has increased by almost 300 per cent. Maritime Air Group air patrols have expanded by more than 700 per cent.[32] In 1993/94 Maritime Command contributed 95 ship days and 750 air patrol hours to the Department of Fisheries and Oceans and 22 sea days and 597 air hours to the RCMP, mostly in counter-drug operations. Maritime patrol aircraft provide 85 per cent of Canada's aerial pollution detection.[33] In the North Pacific, Canadian patrol aircraft have been monitoring compliance with United Nations resolutions on drift-net fishing.

Guidance to on-scene commanders, Maritime Headquarters staffs and other authorities involved in maritime support to federal departments is provided in the document 'Maritime Forces Support To Other Government Departments'.[34] In it the employment of maritime forces in the constabulary role is defined. Guidance is provided on MOUs, departmental mandates, legal aspects, the use of force, evidence gathering, boardings, contingency plans and other subjects. Naval and civilian

training and readiness exercises in 'joint' maritime surveillance and policing operations have become regular fixtures. These range from workshops on Level of Force—Rules of Engagement and navigation/OGD operations symposia to multinational, interdepartmental advanced exercises at sea. From 16 to 27 November, 1992 units from the Navy, Maritime Air Group, the USN and the federal civilian fleets exercised in open ocean and coastal waters off Newfoundland and Nova Scotia. Multinational maritime operations, coastal defence and harbour security as well as counter-narcotics events were conducted. Canadian Coast Guard and Fisheries and Oceans ships participated along with RCMP Emergency Response Teams, Canada Ports Police, Customs officials and a coast watch was maintained by the Canadian Rangers. MARCOT 1/92, as it was called, was the first, live interdepartmental exercise in Canadian waters. It was followed by a smaller, but similar, exercise on the Pacific coast in April 1993. Two such exercises are planned for the Atlantic in June and the fall of 1994.

The ability to conduct coordinated marine operations in Canada's coastal zones and sea approaches has grown significantly in the 1990s. Although the primary role of Canada's maritime forces is the defence of Canada, the priority mission is currently the protection of sovereignty and the nation's vital maritime interests in areas of Canadian jurisdiction in three oceans. On 10 May 1994, legislation was introduced in the House of Commons to allow fisheries officers to board and make arrests on foreign vessels illegally fishing adjacent to the 200 nautical mile zone on the Nose and Tail of the Grand Bank off Newfoundland. The Federal Government will use the Navy, the RCMP, the Coast Guard and Fisheries and Oceans vessels to stop foreign 'pirates' from exploiting endangered cod stocks.[35] Today, Canada's fleets are up to the task.

Conclusion

Over the next two decades (1990 to 2010), the scale and complexity of increasing oceans use in the Northwest Atlantic, the Northeast Pacific, and in Canadian Arctic waters will have profound implications for Canadian security, broadly defined. Trends in the patterns of marine transportation and ocean use, especially the management of ocean resources, and the broad requirements to preserve the security of Canada's other maritime vital interests at home and overseas will increasingly have foreign policy implications. In this regard, oceans policy, like security policy, will need to become more closely integrated into the foreign policy process. Similarly, the fishery and living resources, offshore energy, marine transportation and navigation, the marine environment, maritime boundary delimitations, marine science and technology and recreation and community development will call for closer coordination between federal and provincial governments.

The fishery has traditionally been the most influential vital maritime interest behind Canada's preservation and protection strategies. It will likely continue to be the driving force behind Canada's marine enforcement regime. Things will probably

get worse in the near term as competition for dwindling stocks gives rise to disputes between states and user groups. New demands to counter offshore criminal activity, ocean dumping, marine accidents, mass illegal immigration and to provide search and rescue capabilities will also have to be met. The cost of maritime enforcement is high and budgets are shrinking. Institutional trends towards federal, regional and community coordination as well as partnership with industry will be necessary. National security will require the meshing of policy and instruments of surveillance, monitoring, and enforcement to meet the challenges of law enforcement, marine emergencies, and to protect maritime sovereignty. The recent federal initiative in seeking closer integration and interoperability of the principal Federal Government fleets, the Navy, the Canadian Coast Guard and the Fisheries and Oceans fleet is sensible.

In meeting the management challenges which lie ahead, the development of a national oceans policy is of the highest priority. The movement towards greater interoperability of the Federal Government's three fleets must proceed. Multilateral, regional cooperation in the protection and management of Canada's three oceans is an imperative, dictated by interdependence for reasons of politics and costs. Finally, the harmonisation of federal and regional activities in the uses of the seas must be integrated in the outreach towards states with a legitimate interest in Canada's three oceans. While the United States will be the dominant partner, Canada will need the active involvement of European, Nordic and Northeast Asian states.

Notes

1   Canada, Department of Fisheries and Oceans, *Oceans Policy for Canada* (Ottawa: Minister of Supply and Services, 1987), p. 2.

2   Canada, Department of Fisheries and Oceans, *Canada's Oceans: An Economic Overview and a Guide to Federal Government Activities* (Ottawa: Minister of Supply and Services, 1987), p. 29.

3   Richard H. Gimblett, 'From Militia to Navy: Reassessing the Origins of the Naval Service In Canada', *Maritime Warfare Bulletin: Special Historical Edition* (Spring 1991), p. 35.

4   Canadian Federal Government Handbook (Toronto: Globe and Mail Publishing, 1993).

5   Canada, House of Commons Standing Committee on National Defence and Veterans Affairs, *Maritime Sovereignty* (Ottawa: Queen's Printer for Canada, November 1990), p. 39.

6   D.W. Knight, 'DND Involvement in Maritime Enforcement', *Integrated Maritime Enforcement for Effective Oceans Management*, Workshop, Dalhousie University, Halifax, N.S., 12 April 1994.

7   Cynthia Lamion, 'The Ocean Environment and Resources', *Canadian Marine Policy and Strategy*, Ed. M.E. Eames and C. Lamion (Halifax: Dalhousie University, January 1993).

8   Jack L. Granatstein, *Canadian Foreign Policy* (Toronto: Copp Clark Pitman Ltd, 1986), p. 51.

9   Canada, Department of National Defence, *Defence in the 70's* (Ottawa: Director of Supply and Services, 1971), p. 16.

10 Clyde Sanger, *Ordering the Oceans: The Making of the Law of the Sea* (Toronto: University of Toronto Press, 1987), p. 25.

11 Danford W. Middlemiss, 'Canadian Maritime Enforcement Policies', eds, B. Johnson and M. Zacker, *Canadian Foreign Policy and the Law of the Sea* (Vancouver: University of British Columbia Press, 1977), pp. 314–331.

12 Canada, Maritime Command, 'Military Involvement in the Canadian Economic Zone', *Maritime Command Briefing* (Halifax: International Oceans Institute, July 1989), p. 3.

13 John W. Lavers and Iain S. Stewart, 'Fisheries Surveillance and Enforcement', *Canadian Ocean Law and Policy*, ed., David VanderZwaag (Toronto and Vancouver: Butterworths Canada Ltd, 1992), p. 179.

14 Ibid, p. 181.

15 Ibid.

16 *Maritime Sovereignty, op* cit, pp. 53–54.

17 Gordon F. Osbaldeston, 'All the Ships That Sail: A Study of Canada's Fleets', *Study on Canadian Government Fleet Utilization* (Ottawa: 15 October 1990), p. 66.

18 *Maritime Sovereignty*, op cit.

19 Ibid, p. 56.

20 Ibid, p. 63.

21 *Osbaldeston*, op cit, p. 66.

22 Ibid, pp. 1–2.

23 Ibid, pp. 59–63.

24 A.M. DeQuetteville, 'Canada's Maritime Force Posture and Financial Constraints in the 1990s', Canada's *Navy Sailing Into the 21st Century*, eds, F.W. Crickard and J.P. Nash (Halifax: Niobe Papers Vol 5, Naval Officers Association of Canada. Nautica Publishing, December 1993), p. 41.

25 Canada, Department of National Defence, *Statement on Defence Policy* (Ottawa: April 1992), p. 21.

26 Canada, Department of National Defence, *Canadian Defence Policy* (Ottawa: April 1992), p. 21.

27 Gary Garnett, 'Department of National Defence Presentation', *Interdepartmental Coordination Symposium* (Halifax: Canadian Forces Maritime Warfare Centre, 20 January 1993).

28 Canada, Interdepartmental Program Coordination and Review Committee, Working Group, *Interdepartmental Concept of Maritime Operations,* ed., George Borgal, Department of National Defence (Ottawa: February 1993).

29 Garnett, op cit.

30 Denis Brock, 'Department of Fisheries and Oceans, Enforcement Branch', *Integrated Maritime Enforcement for Effective Oceans Management,* op cit.

31 Peter W. Cairns, *Maritime Command: The Naval Vision* (Halifax: Maritime Command, May 1994), pp. 2–6.

32 Fred W. Crickard and Peter T. Haydon, *Why Canada Needs Maritime Forces,* Naval Officers Association of Canada (Ottawa: Napier Publishing Inc. 1994), p. 29.

33 Cairns, op cit., pp. 1–4.

34 Canada, Maritime Command, *Maritime Forces Support to Other Government Departments, MA OP 330* (Halifax: 7 March 1991), pp. 2–3.

35 Kevin Cox, *'Fishing 'Pirates' Beware',* The Globe and Mail, May 11, 1994, A1.

13

Inter-Departmental Coordination: The Australian Experience

Anthony Bergin

Over the last fifteen years there have been four critical decisions that have changed significantly the relationship between Australia and the surrounding offshore areas. In 1979 Australia moved to declare a 200 mile fishing zone. The previous limit had been set at 12 miles in 1968. In 1990 the government announced that Australia, as one of the last states claiming only a 3 nautical mile territorial sea would move to a 12 nautical mile limit. In 1991 it was announced that Australia would move to proclaim a full 200 mile exclusive economic zone as well as declare the outer limits of its continental shelf in accordance with the limits as defined in the 1982 Law of the Sea Convention. The Australian EEZ came into effect on 1 August 1994. These decisions significantly enlarge the area over which Australia claims jurisdiction (and in the case of the territorial sea total sovereignty). For example, the wider definition of the continental shelf gives Australia sovereign rights over an area of seabed 1.5 times the land area.[1]

These moves to assert greater control over offshore areas did not really provide a complete framework for a coordinated Australian ocean policy. That is, they did not spell out how these areas of ocean space were to be effectively managed at the highest levels of government. A number of critical questions remains unanswered. For example; What are the obligations of Australian governments (federal, state and local) toward ocean resources, the marine environment, adjacent communities (including in particular indigenous communities) and the international community? Are government responsibilities in newly acquired ocean space beyond those found in current Australian marine laws?

Australia has a host of laws dealing with ocean matters, but for the most part they deal only with single resources, such as fisheries. Through the 1980 Offshore Constitutional Settlement, federal-state roles offshore were settled for most ocean sectors on a sector-by-sector basis. Australia's ocean laws do not spell out any overall strategy or vision for coordinated ocean management. The Great Barrier Reef Marine Park Act is an exception here: this act governs the only large marine

ecosystem in the world which is comprehensively managed with the explicit goal of ensuring that its use is ecologically sustainable in perpetuity. A recent study of Australian coastal zone management has argued for a multi-purpose law, a Coastal Resources Management Act, but it remains to be seen whether any action will come from this. In any event such legislation would not really deal with offshore management challenges.[2]

One of the difficulties facing a coordinated Australian policy with respect to the oceans (including both coastal and wider sea areas under Australian jurisdiction) has been the way in which ocean policy making has often been subject to the dominance of particular sectoral groups and single issues. The result has often been that policy has moved between rapid development goals to strict conservation measures (for example the fishing industry, where there was rapid development to a situation where Australia appears to be at or even beyond the maximum achievable in the majority of its fisheries).

There does appear to be a greater recognition in Australia that ocean management ought to be, at least partly, focussed on ocean areas and not just solely on the resources. This approach certainly underlines the recent Resource Assessment Commission's report on the coastal zone.[3] This stressed the need to integrate differing perspectives, particularly those of conflicting state, federal and local governments. Most importantly the role of the community in ocean policy decisions is grossly underrated and needs to be enhanced. There has for example been inadequate consultation on such matters as sewage ocean outlets and approvals for intensive fish farming in certain areas. Aboriginal groups have not had their traditional expertise harnessed in the task of ocean management.[4]

Coordination Problems

There are a number of issues concerned with managing Australian ocean areas which have raised questions about whether the current management framework, which essentially relies on single purpose approaches, is adequate and whether better coordination would result in more effective conflict resolution, sounder long-range planning and greater opportunities for community involvement in ocean planning.

- With respect to offshore oil and gas, the industry has shown steady growth and it is a major export earner. The North West shelf field alone is responsible for 3 per cent of Australian exports. However, while the acreage release program has been reasonably well coordinated between the tiers of government there have been coordination problems with respect to the states and federal government on marine park planning. This has made the offshore oil and gas planning program difficult at times.
- With respect to fish stocks, the Industry Commission in its 1992 report on Cost Recovery for Managing Fisheries stated that; 'coordination of fisheries management (at Commonwealth and state

levels) within the broader objectives and functions of resource management of the AFZ requires a new institutional framework' and; 'the lack of coordination and integration is inflating the costs and reducing the effectiveness of management'.[5] OCS agreements have still to be reached in a number of important fisheries, including the southeast fishery, southern shark fishery and marine scale fisheries. A lack of OCS agreement is a significant obstacle to fisheries management.[6]

- With regard to the coordination of Australian marine science and technology, the recent McKinnon report found that coordination was poor, especially across the different levels of government.[7] While Australia spends around 7 per cent of total government R&D effort on marine science and technology there is no national coordination or strategic development of marine research priorities.
- Despite the fact that aquaculture is growing rapidly (showing a 146 per cent increase in value from $105 million in 1987/88 to $258 million in 1992/3) it appears to be growing in something of a policy vacuum. A recent draft strategy on aquaculture pointed out that: 'the large number of and inadequate coordination amongst government agencies (federal, state, and local) has resulted in an industry being faced with complex and time consuming regulatory procedures'.[8] Similarly, marine biotechnology is now showing some signs of growth but also lacks a coordinated national approach.[9]
- With respect to marine industries there have been some efforts through the *1989 Oceans of Wealth* report and a section within the then Department of Industry, Technology and Commerce (with around eight staff) to develop Australian marine industries. The recent McKinnon review of marine research organisation[10] recommended an Australian Marine Industries and Sciences Council (AMISC), an expert body drawn from agencies, researchers, industry and universities. The need for a more nationally coordinated marine policy framework was recognised in the review. McKinnon recommended that AMISC be charged with developing an oceans management policy, setting strategic priorities, encouraging and supporting balanced marine research and technology development and facilitating communication between clients and research providers. The Prime Minister, Mr Keating, in his May 1994 White Paper 'Working Nation' announced that AMISC could be formed, although in a slightly different format from McKinnon. AMISC will focus on development on Australia's marine industry and more effective linking of marine research with industry development. The Council is expected to be formed by the end of 1994.

- With respect to the 200 mile EEZ, which came into effect on 1 August 1994, little has been done to work out what role the States will have in support of marine industry development.
- At least 16 inquiries or studies have been undertaken by the Commonwealth alone on coastal management between the mid 1960s and 1993. The most recent 664 page report by the Resource Assessment Commission was submitted to the Prime Minister in November 1993. It recommends the establishment of a National Coastal Management Agency with a board representing interests of the Commonwealth, State and local governments and Australia's indigenous peoples.[11] Virtually all these reports have concluded that past management of coastal resources has led to inadequate coordination of effort, ineffective consideration of the multiple-use potential of natural systems and unsustainable use of resources. Resource management in Australia's coastal zone is fragmented, with basic resources such as soil, water, forest and land being managed by a number of agencies that have a range of responsibilities and jurisdictions. Fragmentation of responsibilities for resource management has caused confusion, environmental damage and lost opportunities in the coastal zone mainly through a lack of coordination. There is a need for the 'big picture' approach so as to help avoid the problems of unintended impacts on other users caused by single purpose management decisions or from the cumulative impact of small decisions, unobjectionable in themselves, which have led to an environmental, social and in many cases, a visual eyesore.[12]

Civil Coastal Surveillance—a Case study in Cross-cutting Ocean Coordination

One ocean policy area which has had its fair share of policy conflicts, jurisdictional gaps and charges of management inefficiencies and overlaps over the years has been that of civil maritime surveillance and enforcement in Australia. Some eight Commonwealth reviews have been held on civil surveillance since the declaration of a 12 mile fishing zone in 1968, the action which officially commenced the start of Australia's civil coastal surveillance. Responsibility for surveillance has shifted from department to department, with major problems of command and control not being effectively addressed until the late 1980's. A major complicating factor was the perceived need not to tread upon various ministerial responsibilities for legislation impacting upon coastal surveillance. The story of coastal surveillance from 1968 to 1990 will not be retold here in detail.[13] Nevertheless, the main points are:

- From the outset defence was a major provider of surveillance resources with the RAAF and RAN sharing the surveillance task on behalf of the Department of Primary Industry. In 1971 a Standing Interdepartmental Committee on Coastal Surveillance was formed as a result of an internal review, with Defence being the sole provider of surveillance assets.
- In the 1970s there was increasing concern with drug smuggling in northern Australia, and a large increase in the number of illegal fishing vessels detected. Anxieties were also heightened with the first arrival of Vietnamese boat people in 1976. The Department of Transport's marine operations centre was vested with day to day coordination of activities, but the problem was that Transport did not control the budget. Quarantine authorities owned the funds for surveillance and their interests were mainly confined to the littoral.
- A 1978 Committee of Permanent Heads review concluded that the surveillance effort was poorly coordinated and recommended that surveillance be completely transferred to Transport. It was felt that this would remove some of the confusion whereby Primary Industry was responsible for fisheries and quarantine surveillance yet Transport coordinated surveillance on behalf of Primary Industry and the other 14 departments with some interest in the surveillance effort. The marine operations centre was renamed the Australian Coastal Surveillance Centre. The name was to change, again as a result of another interdepartmental review in 1981, to 'Coastwatch'.
- The 1983 Beazley review moved coastal surveillance from Transport to the Australian Federal Police, (AFP) largely on the grounds that the AFP were already responsible for enforcing a significant element of Australian laws. Beazley was particularly mindful of criticism made by the Royal Commission into Drugs that coastal surveillance efforts had proved inadequate in detecting or identifying the level of incursions across the coastline. Beazley recommended a Coastal Protection Unit (CPU) be established, manned by AFP and co-located with Transport's Federal Sea Safety and Surveillance Centre. A standing committee on coastal protection and surveillance was to be formed in cooperation with the states and Northern Territory, which combined with regional CPUs in Broome, Darwin and Cairns would improve coordination of surveillance and information exchange. Beazley argued that there was little connection between civil and defence surveillance and the high cost of defence assets militated against their use in civil surveillance. Beazley also considered that there would be some value in creating a separate coastguard but

discounted it on the basis of cost—around $365–450 million in 1977 prices.

- A 1985 review by the House of Representatives Standing Committee on Expenditure which considered the Beazley reforms[14] found little evidence of a clear link between coastal surveillance and drug prevention, with the AFP itself advising the Committee that it did not see the need for specific surveillance patrols for interdicting drug smugglers. The report concluded that the creation of the CPU had not resulted in increased efforts to counter drug smuggling, that additional resources had not been provided to the AFP with the transfer and that the surveillance effort had continued to focus on fisheries and quarantine, with uniformed police being misemployed in a purely administrative role. The review recommended surveillance be given back to Transport, with the CPU manned by Transport personnel. Enforcement would remain with the AFP. The government decided in the end to defer acting on these recommendations as it felt that more change to the civil surveillance program would be disruptive.

- In 1988 the government commissioned a detailed review of civil coastal surveillance arrangements. The report, titled 'Northern Approaches' was completed by Hugh Hudson in April 1988. This report is the blueprint around which current civil surveillance policy and operational policy has been developed in Australia.[15] Some of the key areas identified by Hudson as requiring attention and reform included:

  - Restructure of the civil surveillance effort by establishing Coastwatch as an autonomous entity, independently funded to provide surveillance as a 'public good' or service to user agencies. The controlling agency should secure full cooperation and support from 'user' agencies and should not be perceived as 'belonging' to any participant or user;
  - Improved agency participative arrangements, through the adoption of various 'advisory' committees;
  - Introduction of improved 'high technology' aircraft and equipment, including a requirement for night surveillance capability;
  - Improved intelligence liaison and exchange arrangements;
  - Vesting of responsibility for the determination of civil coastal flight patterns, frequency etc, with the Coastwatch agency, to 'maximise the benefit to all users considered as a whole'; and
  - Integration of the previous quarantine littoral and fisheries offshore surveillance effort into a single, multi-client service.

The government accepted the Hudson review and implicitly recognised that the transfer of surveillance responsibilities to the AFP had been a mistake. Overall management of the civil surveillance program (including policy development, operational control, resource management and civil contract administration) transferred to Customs and continued as 'Coastwatch'. This occurred on 1 August 1988.

- In 1990 the House of Representatives Committee on Finance and Public Administration reviewed the Australian Customs Service and devoted one chapter of its report to Coastwatch.[16] The committee recommended some effort be put into setting in place meaningful performance measures to ensure client requirements were measured as effectively as possible, but overall the committee concluded that: 'The 1988 decision to transfer responsibility for civil coastal surveillance to the Australian Customs Service has been vindicated. The subsequent bringing together of policy, operational control, contract administration, intelligence assessment and funding into one semi-autonomous agency has resulted in a streamlined and improved administration more able to respond to the needs of client agencies.'[17]

Current Arrangements

Since commencing operations in August 1988 the Coastwatch organisation has developed it role as an independent program within Customs, coordinating the national surveillance effort on behalf of at least eight client agencies.[18] Between 1988 and 1993 foreign fishing vessel apprehensions have exceeded 200, 16 suspect illegal entrant vessel incidents have been recorded and Coastwatch has provided major support to joint ACS and AFP drug operations. In all Coastwatch has documented in excess of 340 major and 360 lesser incidents actioned or coordinated on behalf of client agencies during this time.[19] The dedicated Coastwatch budget for 1993/94 is $23.546 million.[20] The RAN and RAAF fund their own assets as does the Customs Barrier program when providing Customs Service marine assistance for Coastwatch coordinated actions.

Coastwatch flying hours and air assets consist of:[21]

- Visual surveillance—a minimum of 7,450 hours using eight Aero Commander 500 Aircraft—two aircraft based at Broome, one at Darwin, three at Horn Island and two at Cairns—four supplementary aircraft support this capability;
- Inshore electronic surveillance and support—1,300 hours using three Nomad aircraft, one each at Broome, Darwin and Cairns;
- Offshore electronic all weather surveillance—3200 hours using three SeaScan twin jet aircraft, one each based at Broome, Darwin and Cairns;

- Torres Strait helicopter support—at least 250 hours using one Aerospatiale 350B Squirrel helicopter based at Horn Island;
- Supplementary AFZ surveillance—250 hours of RAAF P3C Orion support, primarily in southern areas; and
- The government has approved of Royal Australian Navy support to Coastwatch at a rate of 1,800 patrol boat days per annum.

The 1988 Hudson review emphasised the necessity for the coordinating agency to be regarded by the clients as 'their' agency. This objective appears to have been satisfied to a reasonable extent. According to the recent Conroy review on the Customs Service, Coastwatch carries out client perceptions surveys and achieves highly on all important elements such as planning abilities, quality of services, management satisfaction of clients, timely and accurate information and positive liaison with clients.[22] While this assessment suggests that appropriate open avenues are available for client departments to participate in the planning process some recent events have suggested that the coordination process does not always work as intended.

For example, the arrival on the Western Australian coast at Montague Sound early in 1992 of a group of 52 Chinese nationals claiming refugee status achieved great media prominence and was the subject of a formal government inquiry into how the vessel evaded the Coastwatch net. The subsequent report found that although Coastwatch is generally providing an efficient and effective civil surveillance service to government clients, on this occasion they failed to detect a significant and sensitive target vessel illegally landing in Australia.

The main problem related to the lack of clear intelligence. This meant that instead of searching for a target Coastwatch was forced into large area searches which historically have a low probability of success. The vessel was already on the coast before the search really commenced. It was the absence of definitive intelligence, more than anything else, which led to Coastwatch not flying in the area and at the time the vessel approached Australia. The report pointed out that; 'Despite very good inter-agency communication there is a strong support from Coastwatch, defence, immigration and quarantine agencies to the proposition that liaison and cooperation arrangements could be better structured and streamlined in anticipation of possible future incidents'.[23]

Similarly, while no level of surveillance will guarantee that all illegal movements into or out of Australia will be detected, the abduction in July 1992 of two Australian children from the Australian mainland (involving a boat leaving Weipa in Cape York for Irian Jaya) raised public outrage in Australia. The incident suggested that there may well be some problems with coordination procedures between Coastwatch and the AFP. To facilitate appropriate arrangements for intelligence interchange Coastwatch is understood to have established a committee of appropriately cleared personnel from Defence and key civil agencies which can be

called together at short notice to consider sensitive, surveillance related, tactical intelligence.[24]

For aerial surveillance the current coordination by Coastwatch of a fleet of nineteen aircraft operating from three regional offices in Broome, Darwin and Cairns as well as an outpost on Thursday Island appears to be working well. Because of budget constraints every opportunity is taken to 'multi-task' surveillance assets to maximise the benefits to all users within a single surveillance sortie. The focus of Coastwatch flying is (correctly) offshore where transiting vessels can be detected prior to landing.[25] This approach, however, leaves a shortfall against the civil surveillance coverage requested. More worrying though is that any commitment of Coastwatch resources to a significant extended response operation, involving drugs for example, means that the ongoing national program has either to be scaled down or virtually abandoned to facilitate focus on the priority area.

The new Coastwatch contracts for aerial surveillance were announced by the government on 9 September 1994.[26] The aircraft/sensor performance required beyond 1995/96 will permit the search of a 50,000 sq mile area, up to 300 miles from base, every 12 hours. There will be an additional requirement to search 25,000 sq miles with a visual/electronic aircraft, 100 miles from base, every six hours. The contracts for the nine year period 1995/96–2003/4 were awarded to National Jet Systems of Adelaide through its special purpose company Surveillance Australia for the fixed wing tasks. Reef Helicopters of Cairns won the right to provide a helicopter service for the Torres Strait area. Both are 100 per cent Australian owned and controlled companies. Details of the contracts are provided in the Appendix to the paper. It should be noted that the contractors will provide new aircraft and a new helicopter. The annual cost of the new contract will be $26.4 million for the fixed wing surveillance and $83 million for the helicopter, a total of $27.23 million. The previous contracts were $21.3 per annum, but the extra money buys increased coverage in southern areas, greater early warning of approaching targets, increased probability of detecting small vessels because of better radar, increased night capacity (particularly in Torres Strait), greater reserve capacity and increased response times. The total area coverage will increase by 2.5 times.

The fact that Coastwatch will soon be regularly operating out to 300 miles offshore instead of 200 miles, has led one prominent defence analyst to argue that Coastwatch has no need to go out this far because: 'You can't arrest anyone; they are not in Australian waters'.[27] This criticism should be rejected. The driving force here is warning time and a target sighted 300 miles offshore is more likely to be intercepted before it makes landfall than a target sighted at 200 miles. As explained by the former National Manager of Coastwatch, it takes around 30 hours to arrange responses.[28] A 200 mile sighting gives authorities 20 hours notice which is not adequate; 30 hours gives Coastwatch some chance.

For the coordination of surface surveillance assets the Conroy review recommends that the Customs maritime fleet comprising 14 vessels deployed in 13

locations be transferred to an expanded Coastwatch organisation, with added functions covering both coordination and control of marine operations, using the operating principles of the existing Coastwatch organisation.[29] Those funds would be accounted for separately within the new Coastwatch to ensure that costs may be continually assessed and contained. It recommends that a three phase implementation program as detailed in a consultant's report to the review be adopted over the next four years. The consultant argued that because of the magnitude of the task, in the case of sea response enforcement, patrol and intelligence gathering there are 'serious shortcomings evident in the present allocation, duplication, capabilities and operation of surface marine resources'.[30] The proposed solution envisages three phases:

- The first is to integrate into the management and control of one organisation, a Civil Coastal Control Agency (CCCA), the functions and responsibilities of Coastwatch and the ACS sea going fleet;
- The second phase is to integrate the sea going vessels of other Commonwealth agencies into the CCCA; and
- The third phase is to arrange the mechanism to coordinate, within the same control and tasking structure, the activities of State owned and operated sea-going vessels.

According to the consultant the main reason for integrating only the sea-going elements of Commonwealth agency's existing marine resources is the experience of other nations which have formed similar policing organisations. Experience has shown that the combined organisations have not been able to perform efficiently the individual agency-specific tasks in harbours and sheltered waters. Therefore, the client agencies have been forced to reinstall marine units to do these tasks. In this proposal these agency-specific tasks, ACS sheltered waters tasks for example, will remain the responsibility of individual agencies.[31]

The creation of Civil Coastal Control Agency, an agency that looks very much like a Coastguard service, may have some attraction in so far as it improves coordination of surface operations between Navy, Customs vessels, other Commonwealth agency vessels and charter craft. But this is surely policy by inadvertence. A 'fall out' of a review of the Customs marine fleet should not be the creation of a new coastguard service without a proper examination of all the consequences. All major stakeholders, particularly Navy, Immigration and Quarantine need to be consulted before such a serious issue is decided. Such an important development in national oceans policy, namely the effective creation of a Coastguard service, should not be accepted as an incidental outcome of a review of the customs marine fleet.

Defence Involvement in Civil Maritime Policing

As noted above, Defence participation in the civil program is significant because it acts as a major service provider for agreed levels of offshore civil surveillance and response assistance. Defence also supplies intelligence and associated data in support of operations and can of course be a potential user of the surveillance information generated by the civil program. For example, in surveillance of some of the northern approaches which Coastwatch now does fairly well, Defence for certain requirements becomes a client.[32]

Navy provides 1800 days of RAN Fremantle Class patrol boat effort, dedicated to civil surveillance and response requirements Australia wide, while Air Force provides 250 hours of RAAF P3C Orion patrol effort , primarily in southern waters. Defence sits on the Operations and Program Advisory Committee which develops all civil surveillance planning. Army (Land Headquarters) has also been on the committee for the last two years in recognition of the potential role Army land patrols can have in the overall surveillance effort. Coastwatch has established day to day strategic intelligence liaison with various elements in Defence (as well as with other key civil agencies involved with the civil program). While command and control arrangements between Coastwatch and Defence have been in place for some time and while Coastwatch coordinates defence assistance, command of both RAN and RAAF assets remains at all times with Defence. A defence force headquarters liaison officer works with Coastwatch in Canberra to assist in the development of both civil surveillance policy and operational procedures. Reports from Coastwatch flights are available to Defence. Defence supports the Coastwatch operations as the central coordinator of the national civil program.[33]

RAAF participation in deep offshore fishing zone surveillance has declined significantly since 1988/89 when it was contributing 700 hours of offshore surveillance. Since 1991 it has provided only 250 hours per year, contributing typically two missions per month to the civil program from its base at RAAF Edinburgh, and covering primarily southern areas between Perth and Sydney, including Tasmania. This level of effort does not satisfy present agency tasking bids for southern areas and requires regular civil surveillance supplementation by Coastwatch aircraft deployed from the north.[34] This diversion of flying effort obviously diminishes the surveillance coverage of recognised threat areas in the north. Because of priority defence commitments and maintenance problems, the programming of Orion aircraft to conduct specific missions on specific days has not been readily achievable. Coastwatch could not do the southern surveillance without the P3Cs because of current resource constraints. But Coastwatch does have its own jets which do surveillance out to 300 nm and further. The new contracts will allow for greater frequency in Coastwatch flights in southern areas.

Navy's commitment to the current effort is essential, comprising the long range offshore surface capability as well as the response for targets detected by Coastwatch aircraft. (The four larger 20 metre Customs vessels are not designed to operate for extended periods offshore). Coastwatch has adopted a policy of coordinating available aerial surveillance with RAN and Customs surface patrols. The 1800 patrol boat days allocated to the civil program are in fact spread between actual patrol time at sea

and operational response vessel (ORV) time spent primarily in port on four to eight hours notice to sail. Figures for 1991/92 show 1257 days on patrol and 554 days ORV, for a total of 1811 days designated for civil requirements.[35] Should Navy reduce or withdraw its patrol boats from the civil program a suitable form of civil, offshore surface patrol and response vessel would need to be funded by government.

The RAN plans to acquire 12 new offshore patrol ships and to phase out the 15 Fremantle Class patrol boats. They are due to commence paying off in 1997, with all 15 boats being retired by 1999. It is unclear at this stage whether Navy will definitely commit itself to undertaking civil maritime surveillance when the vessels are in service , possibly as early as 1998 (if a joint project with Malaysia to build the Royal Malaysian Navy requirement for 27 ships goes ahead) but otherwise with first delivery in about 2004.[36] The new vessels will carry a helicopter, will be able to defend themselves and will be much larger and heavier than the Fremantles. The armaments, sensors and systems have been described as being similar to those of a corvette.[37] While Navy is seeking 12 vessels, budget pressures will make this figure difficult to achieve; with nine being a more likely number. The inclusion of a medium size helicopter will give extra surveillance capabilities, certainly important for early detection of an adversary's activities in the northern and north-western maritime approaches. With Navy operating fewer patrol vessels, however, the response capability will be less than that provided with 15 Fremantles. (Although arguably while the vessels are new they should, in theory, be available for a greater proportion of time). On the other hand, as the vessels will be based in Darwin their response time in southern areas could be reduced. Given these uncertainties it would no doubt be sensible for Coastwatch, Navy and other stakeholders in the civil surveillance area to consider how the new vessels may best be utilised in the peacetime policing role. It may well be that Coastwatch concludes that in certain areas it should be looking to acquire its own offshore surface patrol assets.[38]

One of Australia's leading commentators on Defence matters, Professor Desmond Ball, has recently argued that Coastwatch requirement for surveillance out to 300 nm is a task which should be provided by Defence. With the build up of Australia's military surveillance capacity (the introduction of Jindalee operational radar network (JORN), improvements to the radar capacity of the P-3C Orion aircraft and purchase of airborne early warning and control (AEW&C) aircraft) Defence could do the job for Coastwatch. Ball argues that: 'I do not see the point in spending that $100 million when we are spending $2 billion on technology which will be available to approved users'.[39]

The suggestions that Defence will be able to meet the surveillance needs of Coastwatch clients should be rejected. Coastwatch requires immediate access to aircraft and other resources, which will be difficult to obtain from Defence. As the former National Manager of Coastwatch has argued: 'The priorities of the military are different from civilian agencies. They have reasons for being off Australian shores and looking [for] what's going on that an organisation that's equipped to

defend the country is not attuned to'.[40] Suggesting that the military can do the *entire* job should be rejected. Military assets have a major role in surveillance, particularly beyond 200nm given their high reliability, long endurance and very good sensor performance coupled with high levels of crew training. Coastwatch, for example, would certainly use JORN when it comes online. However, these scarce and very expensive assets (in both purchase and operating costs) should be supplemented in less demanding roles by civilian *or* military resources—it is a matter of balancing costs and effectiveness. The example provided by the problems associated with private contracts for surveillance in the past,[41] should be used to improve contract management and not to dismiss the principle of using civilians and civil assets to undertake the surveillance task.

There is no denying that the areas to be covered in the civil surveillance effort are large and that weather conditions across the north test aircraft capabilities. However, that is not to say that more resources are necessary. (As noted already, the Conroy review recorded that client agencies are satisfied with the level of Coastwatch service.) Certainly, clear intelligence and good risk analysis will remain crucial, but it will be unrealistic to expect 100 per cent guarantees that all illegal activities will be detected. Just as law enforcement does not assume a 'cop on every corner' Coastwatch will never have the resources to be everywhere all the time. Nevertheless, resource levels will have to considered in the light of threat assessments and here both Immigration and Quarantine believe that the number of arrivals in Australia of illegal vessels will increase in the future.[42] Airborne smuggling too is an emerging concern for all law enforcement agencies, though there is no hard evidence that criminals are currently using light aircraft for extensive smuggling into Australia. The political sensitivities of illegal landings are high and of course the impact of the introduction of pests and disease through animals, plants, foodstuffs and/or infestations in the vessels could be enormous.

Ultimately, the cost-effectiveness of the national effort on coastal surveillance will be a political judgement. Right now, the judgement would appear to be that Coastwatch has achieved a high level of success in coordinating the national program. This in the face of the perception in some quarters that Coastwatch guarantees that all illegal targets approaching Australia will be detected.[43] There appears to be little political interest in recommending dramatic changes to a system that has taken many years to finally 'get its act together'. On balance this judgment merits broad support.

Conclusions

This paper set out to consider the Australian experience on national coordination of ocean policy matters. However, the idea that one can seek a perfect national coordinated oceans policy in the sense of one that is integrated, rational and comprehensive is not realistic. The policy process is too complex and the range of impacts from both internal and external forces are simply too great. The vision of

close coordination among the various sectors of ocean matters and harmonising of planning and cooperation at the implementation stage is certainly a laudable aim, but the final judgement on the current system for ocean policy making will need to be a *relative* judgement.

Certainly, when one looks at the vast array of national, state and local government agencies that have some responsibility for coastal and offshore areas in Australia one is tempted to conclude that the complex tangle of laws, programs and agencies results in policy gaps and management inefficiencies. However, greater centralisation of oceans policy away from sectoral agencies is not necessarily the best course. Centralisation, given the federal system, is likely to be a very complex problem politically as well as a process that would require a serious political commitment for the long haul. Where there are conflicts amongst oceans sectors, and management inefficiencies and jurisdictional gaps as well, it may be better to focus on particular oceans policy problems and to devise well coordinated solutions to those problems. The 'big fix' approach that seeks grand plans for centralisation as the answer should be treated very cautiously.

The trouble in Australia is we have not got a particularly good grasp on what coordinating mechanisms currently exist and how well they work and why, how serious the problems are and why, the costs and outcomes of different agencies approaches to oceans matters and how better integration among laws and agencies should be achieved. Certainly there has been no study that considers how the experience of other nations that have attempted to coordinate their national level bureaucracies on oceans and coastal issues have worked out and what relevance this has to the Australian situation. One area that might repay close study here is the potential value of a regional approach to these issues. Just as there are regions on land so too are there oceanic regions. Regional maritime authorities having responsibility for multiple-use planning covering the entire Australian EEZ may produce better coordinated oceans policy than the current framework of Commonwealth and State responsibilities.[44]

Notes

1   P.A. Symonds and J.B. Willcox, 'Australia's Petroleum Potential in areas beyond an Exclusive Economic Zone', *BMR Journal of Australian Geology and Geophysics*, 11, 1989, pp. 11–36.

2   See Resource Assessment Commission, *Coastal Zone Inquiry, Final Report*, November 1993, AGPS, Canberra.

3   Ibid.

4   See for example, Anthony Bergin, *Aboriginal and Torres Strait Islander Interests in the Great Barrier Reef Marine Park*, Research Report No. 31, GBRMPA, Townsville, November 1993.

5   Industry Commission, *Cost Recovery for Managing Fisheries*, AGPS, Canberra 1992, p. xix.

6   Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, *Fisheries Reviewed*, December 1993, p. 31.

7   K.R. McKinnon, *Review of Marine Research Organisation*, October 1993.

8   *Draft National Strategy on Aquaculture*, Australia and New Zealand Aquaculture Council, December 1992, p. 9.

9   K.R. McKinnon, *Review of Marine Research Organisation*, October 1993, p. 21.

10   Ibid.

11   Resource Assessment Commission, *Coastal Zone Inquiry Final Report*, November 1993, AGPS, Canberra.

12   *Integrated Resource Management in Australia*, RAC Information Paper No. 6, Canberra, March 1993.

13   For one account up to 1985, see Anthony Bergin, 'Australian Coastal Surveillance: the Beginnings, Beazley and Beyond', in W.S.G. Bateman and Marion Ward (eds), *Australia's Offshore Maritime Interests*, Australian Centre for Maritime Studies, Canberra, 1985, pp. 65–81.

14   House of Representatives Standing Committee on Expenditure, *Footprints in the Sand*, AGPS, Canberra, 1985.

15   Hugh Hudson, *Northern Approaches: A Report on the Administration of Civil Coastal Surveillance in Northern Australia*, AGPS, Canberra, 1988.

16   House of Representatives Standing Committee on Finance and Public Administration, *Risky Business-The 37,000 Kilometre Challenge*, AGPS, Canberra, October 1990.

17   Ibid, p. 43.

18   They are the Australian Fisheries Management Authority, Australian Quarantine and Inspection Service, Department of Immigration and Ethnic Affairs, Australian Federal Police, Customs, Great Barrier Reef Marine Park Authority, Australian Nature Conservation Agency, Department of the Environment, Sport and Territories.

19   Briefing by Coastwatch April 1994.

20   Frank J. Conroy (Chairman), *The Turning point: Review of the Australian Customs Service, Committee of Review into the Australian Customs Service*, Canberra, AGPS, December 1993, p. 185.

21   Ibid, 186–87.

22   Ibid, p. 187. Liaison takes place through multi-agency membership of the Coastwatch operations and program advisory committee which meets monthly in Canberra, plus regional counterpart meetings held in Queensland, WA and the Northern Territory. Agencies involved in bidding for surveillance assets also participate in a monthly planning forum which formulates the national civil

surveillance plan. Coastwatch has also developed individual memorandums of understanding with a number of client agencies which has served to clarify expectations of both clients and Coastwatch. It is understood that MOU's will be completed with all civil surveillance clients of Coastwatch in due course.

23   *Report on Investigation into Arrival of Suspect Illegal Entrant Vessel (SIEV) into Montague Sound,* by Australian Customs Service, Department of Immigration, Local Government and Ethnic Affairs and Australian Quarantine and Inspection Service, February 1992, p. 11. The report recommended that these departments develop more formalised arrangements to discuss the formative stages of targeting suspect illegal entrant vessels.

24   Briefing from Coastwatch, April 1994.

25   Coastwatch's approach to flying is detailed in the report on the illegal entry vessel in 1992. As this is the only publicly available statement on the Coastwatch approach to aerial surveillance it is worth quoting in full:

The Coastwatch concept of operations relies on a structured operational plan which affords security through depth. Using this concept, offshore (3 SeaScan jets), inshore (3 Nomad Searchmaster aircraft) electronic and visual surveillance aircraft (12 Shike Aero Commander aircraft) combine to form an operational matrix which facilitates increasing probabilities of detection of a target as the coastline is approached. In general terms, the high speed, medium endurance of the SeaScan allows rapid transit and large area search to be achieved. The Shike (and Helicopter in the Torres Strait) are more adept at concentrated, visual search in situations where electronic sensor application is inappropriate. The Nomad fits between these two categories—it can search medium sized areas effectively and has additional attributes such as short take off and landing capacity, equipment deployment and command/communications characteristics. Coastwatch aerial surveillance activities are conducted in two broad categories, viz: Strategic and Tactical/Response. Strategic surveillance is the normal/routine coverage of areas of interest. The aim of strategic surveillance is to determine traffic problems, detect objects of interest and to display a national determination to protect Australian areas of interest and comprises 80 per cent of Coastwatch effort and activity. The second category of surveillance is Tactical and/or Response missions, which are operations targeted specifically to a known or intelligence designated objective. As operations in the latter category are incident driven they are reactive and do not lend themselves to long term planning or the establishment of broad operating principles. Aircraft must also be in the vicinity of a target to have the opportunity to detect it. For even the most sophisticated of Coastwatch assets, the SeaScan jet, this can be up to 20 miles away. From the perspective of Coastwatch strategic flying there are hundreds of close coastal areas such as Montague Sound. Due to the time it would take to fly in and around each one they are generally only covered at the mouth and not further inshore unless tasked otherwise. For example, to adequately cover all these inshore areas would involve Shrike aircraft based on the western coast over 3 days and that only covers those areas once. *Report on Investigation note 23.* The new contracts continue with this layered approach. That is the most sophisticated aircraft are kept offshore as the first point of contact, the second layer is a relatively fast twin engined aircraft fitted with the same radar as the

offshore aircraft but also capable of visual surveillance and the third layer is the slower visual surveillance aircraft.

26   'New Coastwatch Contract Announced', News Release, Senator Chris Schact, Minister for Small Business, Customs and Construction.

27   Professor Desmond Ball as quoted in 'Watching the Watchers' *The Bulletin,* 17 May 1994, p. 17. The article states that Coastwatch's new contract specifies that occasionally aircraft will need to patrol up to 600nm. For the future, as is the case now, the AFZ extends 600 miles from the mainland in the Coral Sea adjacent to Cairns. Coastwatch surveils that area, mainly for fisheries from Honiara in the Solomon Islands because it is more efficient. There is no other place where Coastwatch interest extends 600 miles.

28   Mr Phil Burns, quoted in ibid.

29   Conroy report, op cit, p. 191.

30   Ben Dunn *Report on the Australian Customs Service Marine Resource Requirements,* 22 October 1993, p. 14, (available from the ACS).

31   Loc cit.

32   The latest strategic review notes in the context of surveillance of maritime areas and northern Australia: 'Coastwatch in particular makes a significant contribution, including valuable skills in visual surveillance and local knowledge'. See *Strategic Review 1993,* Department of Defence, December 1993 p. 61.

33   See *Risky Business,* op cit, p. 42.

34   Briefing by Coastwatch, Canberra, April 1994.

35   Ibid.

36   See *Force Structure Review,* Department of Defence, May 1991, p. 16.

37   See A.W. Grazebrook 'Malaysia and Australia agree on patrol boat capabilities' *Asia Pacific Defence Reporter,* April-May 1994, p. 34–35.

38   The option of Coastwatch taking over the Fremantles would not be very attractive: they are near the end of their life and would therefore be expensive to run.

39   Cited in 'Watching the Watchers', op cit.

40   Mr Phil Burns, as cited in ibid.

41   The Ammam affair saw the government award the Coastwatch contract to, and then stripped from, the US-based company. Ammam later won a $6 million damages claim against the government for unlawfully terminating the contract.

42   Report on the Investigation of SIEV, op cit, p. 15.

43   Coastwatch has run a 'free' hot line service to enhance public awareness on how and where to report any suspicious events or sightings in coastal and offshore areas. The telephone service is fully funded by Coastwatch. The Conroy review termed the service a 'successful innovation'. See Conroy Report, op cit, p. 187.

44 This approach has been argued by a senior official with the Great Barrier Reef
Marine Park Authority. See Wendy Craik 'Large Multiple-Use Managed Areas:
The solution for integrated marine management'. Paper presented at *Ocean
Outlook Congress*, 16–17 November 1994, Canberra.

Technical Description Of New Coastwatch Aircraft

Task 1—Visual Surveillance

Aircraft:	Pilatus Britten-Norman Islander (new aircraft)
Manufactured:	England
Model:	BN2B–20
Quantity:	6
Engines:	Lycoming IO–540–K1B5
Search Capacity:	Visual—732 nautical track miles
Operating Heights:	100–5,000 feet
Operating Speeds:	Surveillance between 120 and 130 KTAS
Crew:	1 Pilot, 2 Observers
Passengers:	2
Surveillance Fit:	Large bubble windows, special seats, operator console, intercommunication system, cameras, gyro-stabilized binoculars
Radio/Navigation Fit:	HF (2), VHF-AM, VHF-FM, UHF-AM/FM, DF, Combat Data Terminal and Printer, GPS
Operating Bases:	Broome (2 aircraft), Darwin (1), Horn Island (2), Cairns (1)
Special Features:	Short take-off and land capability, low stall speed

PLUS

Aircraft:	Shrike Aero Commander (used)
Manufactured:	United States
Model:	AC 500
Quantity:	1
Engines:	Lycoming
Search Capacity:	650 nautical track miles
Operating Heights:	100–5,000 feet
Operating Speeds:	Surveillance between 130 and 150 KTAS
Crew:	1 Pilot, 2 Observers
Passengers:	2
Surveillance Fit:	Large bubble windows, special seats, operator console, intercommunication system, cameras, gyro-stabilized binoculars
Radio/Navigation Fit:	HF (2), VHF-AM, VHF-FM, UHF-AM/FM, DF, Combat Data Terminal and Printer, GPS
Operating Bases:	Cairns (1)—Great Barrier Reef Marine Park Surveillance

Task 2—Electronic Surveillance

Aircraft:	DASH 8–200 (new)
Manufactured:	Canada
Model:	DH–8–200
Quantity:	3
Engines:	Pratt and Whitney PW 120 turboprop
Search Capacity:	Electronic—80,000 square nautical miles at 300 nautical mile radius of action. Day/night electronic surveillance capability
Operating Heights:	100–25,000 feet
Operating Speeds:	Surveillance (electronic) at 245 KTAS, transit at 278 KTAS
Crew:	2 Pilot, 2 Observers
Passengers:	4
Surveillance Fit:	Large bubble windows, special seats, operator console, intercommunication system, cameras, gyro-stabilized binoculars, Texas Instruments APS 134 (LW) enhanced performance surveillance radar, Westcam 16DS pod fitted with Mitsubishi IR-M500 FLIR and daytime video sensor
Radio/Navigation Fit:	HF (2), VHF-AM, VHF-FM, UHF-AM/FM, DF, Combat Data Terminal and Printer, GPS
Operating Bases:	Broome (1), Darwin (1), Cairns (1)

Task 3—Electronic and Visual Surveillance

Aircraft:	Reims F 406 (new)
Manufactured:	France
Model:	F 406
Quantity:	3
Engines:	Pratt and Whitney PT 112 turboprop
Search Capacity:	Electronic—41,394 square nautical miles at 150 nautical mile radius of action. Visual—756 track miles. Day/night surveillance capability
Operating Heights:	100–10,000 feet
Operating Speeds:	Surveillance (electronic) at 177 KTAS, transit at 185 KTAS
Crew:	1 Pilot, 2 Observers
Passengers:	2
Surveillance Fit:	Large bubble windows and glass doors, special seats, operator console, intercommunication system, cameras, gyro-stabilized binoculars, Texas Instruments APS 134 (LW) enhanced performance surveillance radar, night vision equipment
Radio/Navigation Fit:	HF (2), VHF-AM, VHF-FM, UHF-AM/FM, DF, Combat Data Terminal and Printer, GPS
Operating Bases:	Broome (1), Darwin (1), Cairns (1)

Task 4—Helicopter Services In The Torres Strait

Aircraft:	Longranger (new)
Manufactured:	United States
Model:	B206L–4
Quantity:	1
Engines:	Allison C30
Search Capacity:	321 nautical track miles. Day/night surveillance capability
Operating Heights:	100–10,000 feet
Operating Speeds:	Surveillance at 112 KTAS
Crew:	1 Pilot, 1 Observer
Passengers:	2
Surveillance Fit:	Intercommunication system, cameras, gyro-stabilized binoculars, NVG capable
Radio/Navigation Fit:	HF (2), VHF-AM, VHF-FM, UHF-AM/FM, DF, Combat Data Terminal and Printer, GPS
Operating Bases:	Thursday Island (1)

In the latter half of 1994 Australia declared a 200 nautical mile Exclusive Economic Zone. This declaration brought with it responsibility for the management and protection of this greatly expanded offshore estate. Discussed in this book are some of the implications of this increased responsibility; the legal issues, the threat from illegal activity, the limitations and costs of different surveillance and enforcement systems, the coordination of command arrangements. This book will be of interest to all those involved in the management, surveillance and enforcement of Australia's expanded maritime domain. Contributors to *Managing and Protecting the Offshore Estate* are experts drawn from a range of relevant disciplines. They include:

- Rear Admiral Don Chalmers
- Mr John McFarlane
- Mr Peter Venslovas
- Mr Dick Wells
- Captain Michael Robinson
- Air Commodore Bob Laing
- Commodore David Shackleton
- Rear Admiral Fred Crickard, Retd