COMMAND AND CONTROL OF PHILIPPINE MARITIME AIR SURVEILLANCE

Dexter O. Huerto
The Air Power Studies Centre

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About the Author

Lieutenant Colonel Dexter O. Huerto joined the Philippine Air Force with a professional licence in Mechanical Engineering. He was commissioned to the Regular Force as a Second Lieutenant in 1974 and was assigned to the Air Force Research and Development Center. In the course of his assignment to this Unit, which lasted for almost twenty years, he handled major projects in the field of aircraft, munition and ground support equipment development. He also held major positions in the Unit: the Chief of the Aerospace Development Division, the Chief of the Quality Assurance Office and the Deputy Commander of the Center. He undertook foreign and local technical courses: Air Maintenance and Munition Course at USAF Training Command, Texas, USA; Aircraft Maintenance and Avionics Course at Jet Technical School, Philippines; Manufacturing Engineering Course (M-16 rifle) at Elitool, Philippines. He was also assigned to the Armed Forces of the Philippines Research and Development Center as member of a monitoring team at the M-16 rifle production plant. After graduation from General Staff Course in 1996, he was designated as Executive Officer of the Office of the Assistant Chief of Air Staff for Materiel Development, Headquarters Philippine Air Force, until his appointment as a Visiting Fellow at the Royal Australian Air Force Air Power Studies Centre in 1998.
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- Squadron Leader Roger McCutcheon of the HQACAUST

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<tbody>
<tr>
<td>ACOT</td>
<td>ASEAN Center for Transnational Crime</td>
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<tr>
<td>ADC</td>
<td>Air Defense Command</td>
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<tr>
<td>ADF</td>
<td>Australian Defence Force</td>
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<tr>
<td>ADFP</td>
<td>Australian Defence Force Policy</td>
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<td>AFMA</td>
<td>Australian Fisheries Management Authority</td>
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<td>AFP</td>
<td>Armed Forces of the Philippines</td>
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<td>AFP</td>
<td>Australian Federal Police</td>
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<td>AIROPS</td>
<td>Air Operations</td>
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<tr>
<td>AOC</td>
<td>Air Operation Center</td>
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<tr>
<td>AQIS</td>
<td>Australian Quarantine and Inspection Service</td>
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<tr>
<td>ARC</td>
<td>Air Reserve Command</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South-East Asian Nation</td>
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<tr>
<td>ASuW</td>
<td>Anti-Surface Warfare</td>
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<tr>
<td>ASW</td>
<td>Anti-Submarine Warfare</td>
</tr>
<tr>
<td>A-2</td>
<td>Assistant Chief of Air Staff for Intelligence, PAF</td>
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<tr>
<td>A-3</td>
<td>Assistant Chief of Air Staff for Operations, PAF</td>
</tr>
<tr>
<td>BFAR</td>
<td>Bureau of Fishery and Aquatic Resources</td>
</tr>
<tr>
<td>CA</td>
<td>Civil Agencies</td>
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<tr>
<td>CALABARZON</td>
<td>Cavite-Laguna-Batangas-Rizal-Quezon</td>
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<tr>
<td>CARUs</td>
<td>Civil Agencies Response Units</td>
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<tr>
<td>CG, PAF</td>
<td>Commanding General, Philippine Air Force</td>
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<tr>
<td>CISA</td>
<td>Civil Intelligence and Security Agency</td>
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<tr>
<td>CNS</td>
<td>Chief of Naval Staff</td>
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<tr>
<td>COC</td>
<td>Command Operation Center</td>
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<tr>
<td>COMAST</td>
<td>Commander, Australian Theatre</td>
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<tr>
<td>Comdr/Cmdr</td>
<td>Commander</td>
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<tr>
<td>CRC</td>
<td>Control Reporting Center</td>
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<tr>
<td>CS, AFP</td>
<td>Chief of Staff, Armed Forces of the Philippines</td>
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<tr>
<td>Customs</td>
<td>Australian Customs Service</td>
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<tr>
<td>C4I</td>
<td>Command, Control, Communication, Computer, Intelligence</td>
</tr>
<tr>
<td>DA</td>
<td>Department of Agriculture</td>
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<tr>
<td>DENR</td>
<td>Department of Energy and Natural Resources</td>
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<tr>
<td>DEST</td>
<td>Department of Environment, Sport and Territories</td>
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<td>DFA</td>
<td>Department of Foreign Affairs</td>
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<tr>
<td>DILG</td>
<td>Department of Interior and Local Government</td>
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<td>DIMA</td>
<td>Department of Immigration and Multicultural Affairs</td>
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<td>DoF</td>
<td>Department of Finance</td>
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<td>DoJ</td>
<td>Department of Justice</td>
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<tr>
<td>DoTC</td>
<td>Department of Transportation and Communication</td>
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<tr>
<td>DTI</td>
<td>Department of Trade and Industries</td>
</tr>
<tr>
<td>EA</td>
<td>Environment Australia</td>
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<tr>
<td>EEZ</td>
<td>Exclusive Economic Zones</td>
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</table>
FM          Field Manual
FO          Field Office
FOIC        Flag Officer-In-Command

GBRMPA      Great Barrier Reef Marine Park Authority
GDP         Gross Domestic Product
G-2         Assistance Chief of Staff for Intelligence, PA
G-3         Assistance Chief of Staff for Operation, PA

ICB         Interdepartmental Coordination Branch
Interpol    International Police
ISAFP       Intelligence Service of Armed Forces of the Philippines

JOC         Joint Operation Center
JOMSRE      Joint Oceanographic Marine Scientific Research Expedition
J-2         Deputy Chief of Staff for Intelligence
J-3         Deputy Chief of Staff for Operations

LGU         Local Government Unit

MAG         Maritime Air Group
MARICOM     Maritime Command
MARINA      Maritime Industry Authority
MECC        Maritime Enforcement Coordinating Center
MCMV        Mine Counter Measures Vehicle
MCS         Monitoring, Control and Surveillance
MOA         Memorandum of Agreement
MPA         Maritime Patrol Aircraft
MPG         Maritime Patrol Group
MPS         Maritime Patrol Squadron
MSRG        Maritime Surveillance Review Group
MTW         Maritime Territorial Waters

NATO        North Atlantic Treaty Organisation
NGO         Non Governmental Organisation
NICA        National Intelligence Coordinating Agencies
NIB         National Intelligence Board
NOC         Naval Operation Center
NSC         National Security Council
NMSO        National Maritime Surveillance Office
N-2         Assistance Chief of Naval Staff for Intelligence, PN
N-3         Assistance Chief of Naval Staff for Operations, PN

OC          Operation Center
OODA        Observation, Orientate, Decide, Action
OPAC        Operation and Program Advisory Committee
OPCOMD      Operational Command
OPCON       Operational Control
OPRC        Oil Pollution Preparedness, Response and Cooperation
OTH         Over the horizon
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>PA</td>
<td>Philippine Army</td>
</tr>
<tr>
<td>PAB</td>
<td>Program Administration Branch</td>
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<tr>
<td>PADCC</td>
<td>Philippine Air Defense Control Center</td>
</tr>
<tr>
<td>PAF</td>
<td>Philippine Air Force</td>
</tr>
<tr>
<td>PAFARUS</td>
<td>Philippine Air Force Affiliated Reserve Units</td>
</tr>
<tr>
<td>PDR</td>
<td>People’s Democratic Republic</td>
</tr>
<tr>
<td>PLA</td>
<td>People’s Liberation Army (China)</td>
</tr>
<tr>
<td>PN</td>
<td>Philippine Navy</td>
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<tr>
<td>PNP</td>
<td>Philippine National Police</td>
</tr>
<tr>
<td>POB</td>
<td>Program Operation Branch</td>
</tr>
<tr>
<td>RAAF</td>
<td>Royal Australian Air Force</td>
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<tr>
<td>RAN</td>
<td>Royal Australian Navy</td>
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<tr>
<td>ROE</td>
<td>Rules of Engagement</td>
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<td>RP</td>
<td>Republic of the Philippines</td>
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<tr>
<td>SAR</td>
<td>Search and Rescue</td>
</tr>
<tr>
<td>SEANWFZ</td>
<td>South-East Asia Nuclear Weapon-Free Zone</td>
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<tr>
<td>SOC</td>
<td>Sector Operation Center</td>
</tr>
<tr>
<td>SOLAS</td>
<td>Safety of Life at Sea</td>
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<tr>
<td>SOPs</td>
<td>Standard Operating Procedures</td>
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<tr>
<td>SQN</td>
<td>Squadron</td>
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<tr>
<td>TACOMD</td>
<td>Tactical Command</td>
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<tr>
<td>TACON</td>
<td>Tactical Control</td>
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<tr>
<td>TF</td>
<td>Task Force</td>
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<tr>
<td>RA</td>
<td>Republic Act</td>
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<tr>
<td>RIC</td>
<td>Regional Industrial Centers</td>
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<tr>
<td>UAV</td>
<td>Unmanned Aerial Vehicle</td>
</tr>
<tr>
<td>UC</td>
<td>Unified Command</td>
</tr>
<tr>
<td>UHF</td>
<td>Ultra High Frequency</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>US</td>
<td>United States (America)</td>
</tr>
<tr>
<td>USN(Ret)</td>
<td>United States Navy (Retired)</td>
</tr>
<tr>
<td>VHF</td>
<td>Very High Frequency</td>
</tr>
<tr>
<td>VTMS</td>
<td>Vessel Tracking Management System</td>
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<tr>
<td>WG</td>
<td>Wing Group</td>
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CHAPTER ONE

INTRODUCTION

Aim and Objectives

The aim of this paper is to propose a command and control system for maritime air surveillance for the Philippines. This aim will be achieved through the following objectives:

- to identify the maritime air surveillance needs and tasks for both civil and military;
- to identify the difficulties, options and priorities for these needs and tasks;
- to envisage a maritime air surveillance concept of operation;
- to evaluate the different forms of command and control;
- to design a general concept of command and control system for the AFP; and
- to determine the optimal organisation and arrangements to meet the Philippines’ needs and tasks.

This chapter will provide a strategic overview of the region, which has a direct bearing on the Philippines overall national security interests and concerns, addressing aspects of defense, security, economic development and protection. Another aspect that will be covered is the international commitment of the Philippines government, in particular concerning its relationship with other nations and the joint problems confronting them. Considering these threats and risks, a common factor towards addressing these problems can be viewed by controlling the sea. Again beyond the nation’s control, the modernization program it tried to implement could not be realised due to the economic downturn in the region.

The second chapter is a discussion of the needs, tasks and present capabilities of the country’s maritime air surveillance. The basis of the discussion will address the overall objectives of the AFP Modernization Law. These objectives are defence and security of territorial integrity; assistance to other governments in economic development and environmental protection; and protection of its people from natural and artificial calamities. Details of various civil agencies’ concerns and interests in the maritime regime are also outlined.

The third chapter is a discussion of basic definitions and principles of command and control. It covers the elements of command and control including; organisation, process and facilities. Some new concepts such as the information age are also briefly discussed.

The fourth chapter explores the different issues regarding the establishment of command and control of maritime air surveillance. These
issues include: the utilisation of the armed forces for maritime air surveillance; the appropriate level of coordination and control; the surveillance requirements; the surveillance resources; the surveillance product and the use of the civil system in contingency operations. Within this baseline, four countries are analysed and from this analysis conclusions pertinent to the Philippines are derived.

The fifth chapter is an assessment of the command and control needs of the Philippines with reference to the different issues discussed in Chapter Four.

The sixth chapter covers the proposed command and control for the Philippines' maritime air surveillance system. The previously discussed elements and basic principles are applied to develop an integrated approach addressing the overall maritime air surveillance requirements. Also covered in this chapter is the recommended concept of operation and corresponding technologies addressing specific tasks. Finally, the chapter includes a recommended action plan. The plan sees the establishment of an overarching organisation and the resultant changes in some military and civil government offices.

The last chapter summarises all the discussion in previous chapters and reinforces the importance of unambiguous and integrated command and control of maritime air surveillance.

The Regional Scenario

Three years ago, Admiral David E Jeremiah, USN (Ret) stated:

And I think most depressing of all, is the total humanitarian catastrophe throughout much of Africa, particularly south of the Sahara. Many people believe this is simply the 'hangover' after the Cold War and that things will settle down soon. I hope they're right, but frankly I don't believe that's going to happen. I think we are seeing the emergence of an entirely new world situation. A world situation in which regional conflict, chronic instability and persistent change is going to be characteristic of the future to a far greater extent than will be peace and tranquility.\(^1\)

Admiral Jeremiah's words have been prophetic not only to Africa but also to the instability that continues to develop in Asia. In South-East Asia today, there are unprecedented degrees of uncertainty and the possibility of conflict on several fronts. Political hostilities and economic downturn exist in numerous areas throughout the region, many of which have the potential to impact on the Philippines.

Examples of the instabilities in the region abound. Of all the uncertainties affecting the region, perhaps the greatest are the sovereignty claims by several countries over the Spratley and Paracel islands chains. One

\(^1\) In his address during the Fourth Foresight Conference on Molecular Nanotechnology, 9 November 1995.
geologist from the American Association of Petroleum has commented that the islands not only have enormous potential for hydrocarbons but also have an enormous potential as a powder keg for political and military conflicts.\(^2\) Despite the replacement of President Suharto in Indonesia, predictions are for massive poverty and the threat of a total breakdown in social order in that country. In Cambodia, there is the continuation of civil hostilities with the potential for this to increase and erupt into mass civil war. Economic uncertainty threatens Thailand and Malaysia with the latter facing political and civil disorder. A major concern for other countries within the region is the growing force projection capability of the Chinese People’s Liberation Navy fleet and its military presence in the South China Sea. In addition to this presence, it conducts aggressive and intimidating maneuvers directed against Taiwan and has established structures in one of the Spratley Islands. Japan continues to increase its role and power projection capabilities while North Korea and South Korea remain deadlocked in resolving their own internal dispute. Finally, the internal insurgency problems in the Philippines caused by Islamic fundamentalists and the New People’s Army still persist.

These issues are some of the more significant potential sources of conflict that the South-East Asian region currently faces. Related to these issues are the concerns that result from the reduced presence of the United States and the former Soviet Union. These forces, although previously principal enemies were also stabilising factors within the region. Their withdrawal adds a new dimension to the balance of power, providing opportunities for power projection and influence by smaller powers, something that would have been thought impossible during the dominance of the superpowers.

An examination of the region highlights not only the potential for conflict but also the unprecedented power and destructive forces that much of the region’s nations now possess. As a whole, the region’s defence expenditure has largely increased over the past decade. Much of this expenditure has been devoted to the procurement of power projection capabilities such as multi-role fighter aircraft, modern surface combatants with anti-ship missiles, submarines and rapid deployment forces. Just recently, North Korea showcased and tested its new multi-stage missile, penetrating Japanese airspace and drawing severe protests. Unfortunately for the region, the numbers of these weapon types are growing and, in many cases, the acquisitions are leading to speculation concerning how realistic are their needs. Inevitably, some nations will always doubt the real motive behind their neighbour’s possession of superior force projection capabilities.

Adding to the delicate balance of stability within the region is the uncertainty, if not obvious confusion, resulting from the 1982 United Nations Convention on the Law of the Sea. The particular concern relating to this convention is the interpretation of the detail surrounding the drawing of Exclusive Economic Zones (EEZ). Overlapping EEZ claims, for example, could be a source of potential conflict in the region. Furthermore, it is within

the maritime environment where the greatest enhancements to force capabilities are being made with nations such as Japan, South Korea, China and India developing significant blue water capabilities. With the Philippines geographically located in the middle of the South China Sea, and with the potential for conflict and dispute to occur in this area, the Philippines bears a heavy burden in not only ensuring its own national security but also in contributing to regional security.

International Commitment and Low Level Security Problems

Of significant importance, the Philippines is a signatory to various maritime international laws, treaties and conventions, such as the:

- ASEAN Declaration of Principles on Drug Abuse Control.
- Convention against Illicit Traffic in Narcotics Drugs and Psychotropic Substances.

The Philippines government is therefore committed to pursue and implement programs to achieve the aims and objectives of these laws. Relative to this program, a wide range of intensive maritime surveillance activities needs to be undertaken by various sectors or agencies of the government. Added to this complexity, there are several activities and issues that may create low level security problems in the region. These include:

- increasing volume of shipping in the region resulting in congestion;
- increasing ethnic unrest within some developing countries;
- marine pollution caused by oil and industrial waste;
- influx of boat people refugees, brought about by political unrest in several countries within the region;
- commodity smuggling, resulting from an imbalance in the economic development of neighbouring countries; and
- illegal exploitation of marine resources and illicit drug trafficking.

The Essence of Controlling the Sea

The fundamental responsibility of government is to develop, secure and defend national interests. To attain this, a government should maintain constant surveillance of its territory and beyond, as part of an information-gathering capability. This capability should provide relevant information on

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current and developing events to promote the nation’s well being and to enforce its laws. Throughout the region, such capabilities have long been established by many countries and are institutionalised within the bureaucracies of their governments. Furthermore, government programs generally involve the participation of both military forces, and other government agencies and civilian entities.

Keeping in mind the geographical status of the Philippines, as well as the geo-strategic changes and economic development, control of the sea can be attained by establishing a system of maritime surveillance and enforcement. In the late 1970s, the Philippine government enacted Presidential Degree No. 1599, officially laying claim to an EEZ as provided by the United Nations Convention on the Law of the Sea. It was then that the Philippines started to develop a surface surveillance system through the acquisition by the Philippine Air Force (PAF) of four Fokker F-27 maritime long-range patrol aircraft. These aircraft were assigned to the 220th Heavy Airlift Wing.

However associated with this establishment there was a lack of direction, command and control, and communication among other maritime units of the military, as well as among other government and civilian entities. Added to these problems was a lack of data processing facilities, equipment and trained personnel. These problems resulted in sub-optimal accomplishment of the assigned mission and utilisation of the procured assets. Currently, only one of these F-27s is operational, which greatly reduces the capacity for maritime surveillance.

An additional but different air asset was procured in the early 1980s and assigned to the PAF’s 303rd Air Reconnaissance Squadron. A twin engine TC-690 Aero Commander fitted with aerial wet-film cameras, is utilised to conduct various photographic missions, but is limited to fair weather reconnaissance. To support this capability, a ground photogrammetric processing facility was established. The aircraft and the facility are currently still functional, but their effectiveness is limited due to their obsolescence.

There are also other distinct agencies within the government with mandated regulatory responsibilities that are devoted or related to the effective management and protection of sovereign ocean and coastal waters. These are:

- the Philippine National Police, under the Department of Interior and Local Government;
- the Bureau of Fisheries and Aquatic Resources, under the Department of Agriculture;
- several Bureaus under the Department of Energy and Natural Resources;
- the Maritime Industry Authority under the Department of Transportation and Communication;
- the Bureau of Customs, under the Department of Finance;
- the Department of Foreign Affairs; and
- the Bureau of Immigration and Deportation, under the Department of Justice.
Most of these agencies conduct only law enforcement functions by performing, among other functions, their own monitoring and surveillance over the maritime areas relative to their specific interest. The largest part of the surveillance and response operation, however, is being undertaken by the Armed Forces of the Philippines (AFP) utilising its Navy and Air Force.

Economic Constraints Towards Development

Former US Commerce Secretary, Robert Mosbacher stated, ‘challenge number one is the rising importance of economic power in the equation of national security and world leadership’.4 Applying this statement, the military capacity of any nation is proportionate and subordinate to its economic capacity. Any factor that influences a nation’s economic well-being therefore affects its ability to sustain a credible defence force. Mosbacher’s statement displays quite a degree of insight and relevance to the Philippines. The Philippines had been steadily growing economically; basically from its land-based industrial and agricultural development and, to some extent, from its rich maritime resource development.

On 23 February 1995, the government passed Republic Act Nr 7898, known as the AFP Modernization Act, to pursue its desired state of security and defence of its territory. Additionally, other government agencies are progressing with their own modernization programs. Unfortunately, the present economic crisis within the nation and across the region has created problems that are currently restricting the progress of these modernization programs. These crises and their resultant restrictions bear heavily on those decision-makers within the modernization programs to acquire the most effective and economical maritime air surveillance capability. With these acquisitions comes the pressure to achieve the most effective and efficient utilisation of assets. Such utilisation can be achieved only by establishing an effective and efficient command and control system for these very limited and expensive capabilities in the performance of their very complex and multifarious tasks.

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CHAPTER TWO

NEEDS, TASKS, AND PRESENT CAPABILITIES

Objectives of the AFP Modernization Act

The AFP Modernization Act provides operational planners with the basic foundations required to develop a defence organisation for the achievement of national objectives. The Act indicates clearly the overall maritime security needs and tasks that the AFP has to address not only on military purposes but also for civil purposes. The following are the Act's objectives: ¹

- To develop its capability to uphold the sovereignty and territorial integrity of the Republic and to secure the national territory from all forms of intrusion and encroachment.

- To develop its capability to assist civilian agencies in the preservation of the national patrimony, including the country's living and non-living marine, submarine, mineral, forest and other natural resources located within its territory and its exclusive economic zone.

- To enhance its capability to fulfil its mandate to protect the Filipino people not only from armed threats but from the ill effects of life-threatening and destructive consequences of natural and man-made disasters and calamities, including typhoons, earthquakes, volcanic eruptions, major accidents in far-flung or inaccessible terrain or at sea and from all forms of ecological damage.

- To improve its capability to assist other agencies in the enforcement of domestic and foreign policies as well as international covenants against piracy, white slavery, smuggling, drug trafficking, hijacking of aircraft and seacraft and the transport of toxic and other ecologically harmful substances taking place in or through Philippine territories and to enhance its capability to fulfil the country's international commitments.

- To enhance its capability to assists the Philippine National Police in law enforcement and Internal security operations.

- To develop its capability to support national development.

A discussion will now trace the events and the related strategic impact resulting from these objectives.

¹ Republic Act Nr 7898, An Act providing for the Modernization of the Armed Forces of the Philippines and for other Purposes, Congress of the Philippines, 23 February 1995, Sec 3.
Objective A - Uphold Sovereignty and Territorial Integrity

The archipelagic nature of the Philippines poses a profound problem in internal security and overall defence. Fortunately, the same obstacle poses a greater problem to other nations such as those experienced by both the US and Japanese fleets during their encounters in Philippine waters during World War II.² With a coastline of 6997 miles that is the second longest in South-East Asia, the Philippines comprises 7100 islands and islets subdivided into three major groups: Luzon, the Visayas and Mindanao. When the United Nations Convention on the Law of the Sea was adopted, the Philippines's total area of interest and concern expanded to 652,000 square nautical miles, making it the twenty-third largest EEZ area in the world.

With the Philippine claim over Kalayaan Island group, internationally called the Spratly Islands, this adds an additional area of about 360,850 square nautical miles to the Philippines's EEZ. This vast body of water is a source of rich marine and mineral resources but at the same time is also a source of inevitable dispute on the overlapping maritime claims. As shown by the national boundaries in Figure 2.1, the Spratly island group is being claimed also by five other nations: China, Taiwan, Vietnam, Brunei and Malaysia.

Several other areas within the South China Sea are also potential zones of conflict. The first of these, the Paracel Islands, includes a 2700 meter airstrip constructed by the China People's Liberation Army (PLA) on Woody Island. Any aircraft operating from this airstrip could reconnoitre that part of the Paracels occupied by South Vietnam. While South-East Asian states do not seriously challenge the Chinese claim to the Paracels, they are concerned that China might use the islands as a base for possible southward power projection. The second potential zone of conflict is the Gulf of Tonking and an area further south along Vietnam's continental shelf where Vietnam claims jurisdiction based on an 1887 Sino-French convention. While Vietnam conducts oil exploration in this area, China has allotted exploration leases to oil prospecting companies in same areas.³

All the areas identified provide the potential for disputes, hostilities and conflict that could adversely affect the flow of traffic in terms of maritime trade, commerce and military transport. Within the South China Sea, the region ports are now linked into shipping networks and, effectively, into port-shipping systems called the hub and feeders as shown in Figure 2.2.⁴ For the Philippines, the Manila maritime region - mainly from the North Harbor to the regional ports including Cebu, Davao plus domestic ports - is an extremely important regional sub-system. Both feeder and regional container traffic provide the basis for intra-Asian shipping networks.

⁴ Robinson, Dr. Ross, ‘Shipping and Port Development in East and South-East Asia’, Australia’s Maritime Bridge into Asia, Allen & Unwin Pty Ltd., Australia, 1995, p. 63.
Figure 2.1. Conflicting Claims in the South China Sea

(Ref: Rodis, Lieutenant Colonel Manuel T. PAF, The Surface Air Surveillance Function in the Philippine Air Force, Air Command and Staff College, Philippines, 1997, p. 31.)
Recently, it has been suggested that four sub-systems can be identified with the Philippines being within the following two:  

- **East Asia—South-East Asia Service**: Centred on Hong Kong and Kaohsiung or Keelung or Taichung. Services link these ports with places such as Bangkok and Sattahip, Ho Chi Minh City, Manila, Port Kelang, Penang and Johore, China Ports and others.

- **East Asia Shore Sea Service**: Taiwan-Hong Kong-the Philippines-China. These services tend to be two or three port shuttle services: Kaohsiung-Manila; Kaohsiung-Hong Kong-Manila; Hong Kong-Manila, Hong Kong-China-Tainjin, Shanghai, Xingang.

Future development will see an increase in the capability to handle international shipping requirements. These developments are aimed at bolstering the Philippines's position and contribution to the hubs and feeders system. These developments are:

- **The Batangas International Port**: As an entity the provinces under the Cavite, Laguna, Batangas, Rizal and Quezon (CALBARZON) special economic zone, Batangas will contribute towards the government's program of development. This contribution will take three forms. Firstly, it will act as a haven for two giant refineries owned by Caltex and Shell. Secondly, it will encourage the second level of development by the country's top land developers such as Fil-State, Jose Go's and Tan Yu's groups of companies, and construction giant DM Consunji with Metro-Pacific Corp, JG Summit, Republic Glass, First Philippine Holding Corporation. Finally, and what sets Batangas apart, is that it has its own international seaport. Apart from entry and exit of economic trade it is the only viable docking location for supertankers up to 300,000 tons.  

- **The Cebu Development**: From Cebu, the northern and southern ports of the country are easily accessible by sea. As a long-established shipping region, it has 44 domestic ports and one international port. The international port for passengers and cargo can handle an estimated three million tons of cargo per annum. It could easily accommodate 85 per cent of the country's inter-island shipping requirements. Currently in the planning stage is the development of an international containerised port as a transhipment hub for American and European goods to and from South-East Asia. Some large foreign companies, such as the Singapore's Keppel Group and Japan's Tsuenshi Group, operate shipbuilding, maintenance and repair plants in Cebu. However, shipping activity in the province remains largely local. Within the area is the Mactan-Export Processing Zone that generated exports of US$891 million in 1995. Two more

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5 Robinson, Dr. Ross, 'Shipping and Port Development in East and South-East Asia', *Australia's Maritime Bridge Into Asia*, Allen & Unwin Pty Ltd., Australia, 1995, p. 66.

economic zones are under construction, one for heavy industries such as shipbuilding and shipbreaking. Another important factor is that between 1991 and 1993 the Philippines imported more than 60 per cent of its oil requirements. This proportion is increasing annually by an average of two per cent to generate the nation's energy requirements. All of these imports were shipped via the South China Sea.

**Figure 2.2: Hub/Main/Feeder Network East and South-East Asia**

(Ref: Robinson, Dr. Ross, 'Shipping and Port Development in East and South-East Asia', *Australia’s Maritime Bridge into Asia*, Allen & Unwin Pty Ltd, Australia, 1995, p. 66.)

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8 *The Philippine in Figures*, National Statistic Office, Philippines.
The strategic location of the Spratly Islands could be used to harass and control shipping lanes in the South China Sea, as well as being used for such varied military purposes as radar sites, communication stations, recovery bases and forward staging areas. Any country exercising sovereign control over the Spratly Islands and their attendant territorial seas and EEZs present a potentially commanding position in the region.

Emerging and related concerns to military establishments in the South-East Asian region are the developments in the various regional navies and their force projection capabilities. In the last 20 years, the security focus within the Asia-Pacific region, particularly in South-East Asia, has moved away from the threat of internal insurgency or land-dimensioned threats towards maritime-dimensioned threats. Nations now have a requirement not only for the defence of ports and coastlines, but also for the surveillance and control of fixed assets offshore, such as oil rigs, and the dynamics of resources within their EEZs. Accordingly, most navies within South-East Asia have developed capabilities from the constabulary role to that of medium regional force projection. Table 2.1 illustrates this hierarchy and the associated capabilities.

<table>
<thead>
<tr>
<th>Hierarchy of Navies</th>
<th>Description</th>
<th>Possible Assets</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adjacent force projection</td>
<td>able to project force into deep ocean areas</td>
<td>Aircraft carriers, nuclear submarines, replenishment ships</td>
<td>China</td>
</tr>
<tr>
<td>2. Trade Defence</td>
<td>able to project force offshore</td>
<td>ASW systems, MCV, MPA, large escorts</td>
<td>Thailand, Malaysia, Singapore, Indonesia, Taiwan</td>
</tr>
<tr>
<td>3. Offshore territorial defence</td>
<td>capable of defence of EEZ</td>
<td>corvettes with OTH missiles and targeting systems shipborne helicopters, submarine</td>
<td>Vietnam</td>
</tr>
<tr>
<td>4. Coastal territorial defence</td>
<td>capable of coastal defence against a sophisticated aggressor</td>
<td>fast attack craft with gun, torpedo or missile</td>
<td>Brunei</td>
</tr>
<tr>
<td>5. Constabulary</td>
<td>police functions only and limited functions</td>
<td>patrol craft, landing ships</td>
<td>the Philippines</td>
</tr>
</tbody>
</table>

Table 2.1: Revised Hierarchy (highest attained capability) of Navies in South-East Asia

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Furthermore, Professor Desmond Ball of the Australian National University's Strategic and Defence Studies Centre highlights nine characteristics of regional defence acquisition patterns; at least eight of which have strong maritime focuses.\textsuperscript{10} These are:

- the increased focus upon sophisticated command, control and communication systems;
- the expansion in technical intelligence operation particularly on signal intelligence;
- the acquisition of possibly 3000 multi-role fighter aircraft with maritime attack as well as air defence capabilities and the upgrading of avionics and armaments of existing fleets;
- the acquisition of up to 200 new major warships in addition up to 200 new minor surface combatants;
- the fitting of new and retro-fitting of existing warships with modern stand-off anti-ship missiles and the fitting of new multi-role and maritime reconnaissance aircraft with such missiles;
- the planned acquisition of 30-40 new submarines in North Asia and South-East Asia;
- the development of electronic warfare, including maritime electronic warfare capabilities; and
- the development of rapid deployment forces up to brigade or light division strength with maritime deployment assets and equipment in some cases for amphibious assault operations.

Maritime threats, therefore, are currently the principal and over-riding concern of defence establishments and this concern is anticipated to continue into the future. The AFP has adopted a strategy that hinges on two concepts: Defense-in-Depth and Credible Deterrence, as illustrated in Figure 2.3. The principle of Defense-in-Depth involves the defence of the country throughout the depth and breath of maritime and air approaches. Such defence is aimed at the denial of enemy access to inland areas, and the interdiction of hostile forces well forward of their intended targets.\textsuperscript{11} To this end, the PAF would have the primary mission of air defence as well as support to ground and naval forces. The PAF would also be responsible for the main effort in repelling or destroying hostile surface attacks and intrusions, or amphibious forces enroute in the outer and intermediate zones. This effort would require early detection and identification through coordinated air and sea surveillance, the aim being to repel or destroy a hostile enemy, or to apprehend any illegal intrusion or encroachment.


Inner defense

Naval defense focus on: coastal defense; defense of internal waters; protection of key harbors and ports; protection sealing the choke points and entry points of the ILSC; joint operations against amphibious assault.

Intermediate

Aside from primary mission of air defense and support to ground/ naval forces, the Air Force's main effort is to repel or destroy hostile surface attacks, intrusions, or amphibious forces enroute to the outer and intermediate zone.

Outer Defense

Figure 2.3: Defense Zone Under Defense-in-Depth Strategy
Presently, the PAF performs an air-to-surface surveillance role with its fundamental task being target detection, acquisition and identification in support of air, maritime and ground operations. As well as military usage, surveillance products are used for map revision, base and camp development, and various socio-economic requirements of other government agencies. The capability, however, is limited to one squadron conducting aerial reconnaissance using one dedicated aerial platform and support photogrammetry facility to process, compile and disseminate information. Other aircraft in the PAF inventory are employed as the need arises. While this may paint a gloomy picture, the Modernization Program promises, among other things, the acquisition of long-range maritime patrol aircraft for the Philippines, however, this has yet to be realised.

To augment the AFP mobile surveillance assets, the Philippine Navy (PN) also operates and maintains a maritime surveillance network or coastwatch system, as illustrated in Figure 2.4. This system consists of land-based monitoring stations in various strategic locations, and in particular along choke points and sea border zones. Assigned units are tasked to monitor the movement of vessels transiting these sensitive areas. They are equipped with microwave surface surveillance radars, radio direction finders and other types of communications equipment. The Philippines Navy intends to establish at least another four coastwatch stations as part of its modernization program.

Objective B - Assistance to Civil Agencies

The wide range of activities conducted within the vast sea areas surrounding the Philippines is currently managed by almost all the governmental sectoral agencies. With these individual agencies goes a high degree of complexity and overlapping interests encompassing coastal and offshore areas, causing some jurisdictional problems. The following are some of the government agencies and their roles and responsibilities in managing maritime affairs and some related strategic circumstances.

Department of Agriculture

The Department of Agriculture is mandated to ensure the stable supply of food derived from land or sea. Under this Department, the agency most concerned with maritime interests is the Bureau of Fisheries and Aquatic Resources (BFAR). It manages and supervises the development of fisheries and aquaculture to guarantee the supply of food derived from the living resources of the sea. Some of the economic statistics for these activities are:
- The Philippines ranked twelfth among the largest fish producers in the world for 1993 as per Infophs Fact Sheet, August 1995.

- The Philippines was the second largest producer of tuna and tuna-type fish in the Indian Ocean and South-East Asian Region in 1991, with Indonesia and Thailand as the first and third largest producers respectively.
NEEDS, TASKS, AND PRESENT CAPABILITIES

- In 1995, the fishing industry accounted for 3.7 per cent and 4.2 per cent of Philippine Gross Domestic Product (GDP) at current and constant prices, respectively.

- The fishing industry provided livelihood to about one million, or five per cent of the country's labor force and their dependants. About 258,840 or 26 per cent of fishers were engaged as individual producers, with municipalities employing 675,677 or 68 per cent and commercial fisheries employing 58,715 or six per cent.

- Total fish production for 1995 was 2.740 million metric tons valued at P83.639 billion, registering an increase of two and three per cent respectively. Figure 2.5 illustrates the Philippines fishing areas and total production.

- The Philippines exported a total of P15.6 billion in 1995.

With the implementation of the United Nations Law of the Sea Convention, the Philippines will have sovereign economic rights over an EEZ area of about 652,800 square nautical miles and the resources therein. With the gains that accompany this extra area go the responsibilities of maintaining its maritime security and developing potential industries. With the increased emphasis on marine industries, the Philippine government approved the 1998 Fisheries Code for the continuous development of aquaculture, or the raising and culture of fish and other species. This code provides limitations to protect the environment, prevent overfishing and create boundaries for municipal and commercial fishing. Also, this approval mandated the creation of incentives for aquaculture in both fresh and marine waters using fish pens, cages and ponds. Aquaculture is a promising activity and currently contributes as much as P18.967 billion per year.

To maintain the current productivity levels and the conservation of marine natural resources, the BFAR monitors and controls all fishing activities. In 1998, the Bureau closed Lingayen Gulf, one of the nation's nine gulf regions with an area of 2609 square kilometres to commercial fishing. This closure was due to overfishing and the unauthorised use of fish cages causing environmental degradation and resource depletion. Commercial fishing vessels regularly encroach into shallow waters supposedly reserved for municipal fishers, resulting in the overfishing of 11 out of 50 major fishing grounds. Regulation RA 8550 empowers the Department of Environment

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12 Primer on the UNCLOS, Department of Foreign Affairs, Republic of the Philippines, 1991, p. 13.
Total Production - 2,699,399 metric ton
Total Nr Bancas/Vessel - 464,385/4,014

0.4% 0.7/4.2%
2.7% 0/0
9.0% 0.8/0%
21.9% 31.3/47.1%
3.5% 10.6/3.6%
2.4% 8.7/6.5%
14.6% 28.7/28.3
4.2% 13.9/2.9%
63.5% 40.0/24.6%

Figure 2.5: Fish Production and Number of Vessels/Bancas Used by Percentage
and Natural Resources (DENR), through the BFAR, to implement the following provisions:

- issue moratorium on commercial fishing and other related activities;
- issue and implement orders;
- coordinate and monitor illegal fishing movements as the Bureau has no power to issue, permit or license fishing activities which is the responsibility of local government;
- rehabilitate and renew the fishing industries through the provision of loans and alternatives to fishers;
- ensure that coastal areas out to ten kilometres from shore are for the exclusive use of municipal fishing vessels from 3.1-20 gross tons; and
- ensure that commercial fishing is carried out in the zone between 10.1 kilometres and 15 kilometres from shore using vessels from 20.1 to 150 gross tons.

One of the major problems is illegal fishing in the nation’s protected fish sanctuaries. Four fishing boats, for example, were apprehended for blast and cyanide fishing in the Apo Reef Park, a protected fish sanctuary off Occidental Mindoro which is rich in fishing resources, including aquarium fish for exports.\(^\text{15}\) Apprehension was conducted by a composite team comprising the DENR, the Office for Conservation of Priority Protected Areas for Apo Reef, Batanes and Northern Sierra Madre, the Philippine National Police (PNP), the Philippine Coast Guard, and other minor non-government organisations. All the fishers were Philippine nationals from the southern part of the Philippines. Although illegal fishing still occurs in protected areas, the reduction has decreased significantly by about 80 to 90 per cent.

Another phenomena that needs to be continuously monitored is the effect on marine resources produced by El Nino climatic variations. Recent observations indicate that prized fish and algae can shrink in size due to drought. For example the rare and prized Lugong fish, commonly found at the Cagayan River and other municipal waters of La Union and worth P1200 to 1500 per kilo in Manila, has decreased from a normal size of four kilograms to only two kilograms. Another reduction is in the Gamet seaweed or red algae, found mostly along the shorelines of Ilocos Norte, and exported to Thailand, Japan, China, Korea, Taiwan and Vietnam, where it is used for its medicinal value.

Overall Effect. The overall economic loss to the Philippines from illegal activities, and environmental degradation and denudation is estimated to be about P40 billion annually, including 600,000 metric tons of fish worth P15 billion.\textsuperscript{16} To strengthen its enforcement functions, the BFAR established Monitoring, Control and Surveillance (MCS) for the Philippines in 1994.\textsuperscript{17} Approved through an Executive Order, the MCS empowers the various agencies to execute national and international ocean sector policies and plans. Some of the objectives and components of the MCS are:

- to provide a credible deterrent to violations of fishery laws and regulations, and to prevent unlawful foreign and domestic fishing in Philippine territorial waters and the EEZ;

- to collect information on fishing and catches, vessel traffic and ocean sector activities, and other data needed for:
  - formulating national policies or laws; and
  - making strategic and tactical decision regarding ocean planning and management, including enforcement.

- to pursue the program with inter-agency cooperation; and

- to acquire the necessary facilities and equipment such as ships and patrol boats, maritime patrol aircraft, communication system and vessel tracking equipment.

Note: In 1998, the BFAR established four initial pilot monitoring and control survey stations in the provinces of Palawan, Batanes, Davao and Tacloban, as illustrated in Figure 2.6. As a result of the current economic crisis in Asia, the surveillance to be acquired for the performance of MCS tasks have been delayed.

**Department of Energy and Natural Resources**

The DENR is mandated to develop, manage and administer programs for the harnessing and conservation of the nation’s natural resources and protection of the environment. Two regional offices (Mines and Geosciences Sector and the Environmental and Protected Areas Sector) have been established to implement laws, policies, plans, programs and DENR legislation relating to marine resources and other environmental matters.


Mines and Geosciences Sector

The Mines and Geosciences Sector enforces laws on mining, the environment and pollution control, as well as implementing policies, plans, programs, projects, rules and regulations issued by the DENR Secretary. More importantly, this Sector controls the development and conservation of energy resources. Over this century, the nation’s energy supply has been markedly characterised by its large dependence on imported oil. However, since 1973 the national net oil dependency has steadily decreased from a high of 95.2 per cent in 1973 to 87.7 per cent in 1990.

Figure 2.8: BFAR Pilot Monitoring and Control Station

21
The major indigenous sources of energy consist primarily of oil, coal, hydropower, geothermal and non-conventional sources such as bagasse and agriwastes. Estimated oil reserves are conservatively estimated to be 218.8 million barrels of which 81.3 million barrels are recoverable. Offshore oil exploration is being undertaken in El Nido, Cadlao, Tora Galoc, and Matinloc-Pandan-Libo in Palawan as illustrated in Figure 2.7. A leading oil industry analyst, County Natwest Woodmac, conducted a study in late 1993 on the comparative merits of oil development economies between Australia, South-East Asia and the North Sea, and produced the following conclusion about Philippine prospects:

- the Philippines ranks third behind Australia on comparative economics of development;

- the Philippines ranks fourth behind Malaysia on prospectivity; and

- the Philippines finished first with Australia second and the United Kingdom third on a combined rate of return and prospectivity.

This promising prospect was negated by a significant decline in total offshore drilling activity during the first quarter of 1993 because of low oil prices and matured production from fields in the most productive regions of the world. Increases in costs associated with exploration could also halt the search for new fields. In addition, any reductions in the state of maritime security could add to the cost of accessing or operating these resources. If the risks become too great, the prospect looms of a complete shut down.

For the exploitation of minerals in marine areas, the only activity currently is the mining on the foreshore of sand, cobbles, boulders and pebbles for use as building materials. Within the Philippines EEZ, minerals estimated to have considerable value are not being currently exploited due to cost constraints. The cost constraints would be further exacerbated by the additional costs resulting from a reduced state of maritime security.

Environmental and Protected Areas Sector

One of the pressing concerns of the Environmental and Protected Areas Sector is the mangroves resource. Forest resources in the coastal zone consist primarily of the mangrove cover and, to a limited extent, the beach vegetation. Recent estimates place the Philippine mangrove forest area at 139,725 hectares, compared to 500,000 hectares in 1918. Over the past decade, the average rate of mangrove forest denudation has been about

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Figure 2.7: Major Oil Fields in the South China Sea

10,700 hectares per annum caused by population growth in coastal areas.\textsuperscript{20} As a result of these assessments DENR has recommended strict implementation of existing rules and regulations through DA 34591, requiring the coordinated efforts of the Department, NGOS, LGUS, the Philippine Coast Guard and the AFP.

Another concern is the continuing coral reef destruction due to silting, natural calamities, agricultural pollution, collection of corals for decorative or construction purposes, and destructive fishing practices. With an area of about 27,000 square kilometres, the coral reef forms a part of the inner coastal ecosystem. Estimates are that coral reef areas contribute 10 to 15 per cent of total marine fisheries production in the Philippines but because of destructive fishing, only 30 per cent of these reefs remain in good condition.\textsuperscript{21} Therefore, the DENR has had to work closely with the Department of Fisheries and Aquatic Resources towards the protection and control of marine protected areas.

\textit{Future Directions}

Among the ten-point action program established in the first 100 days of the Estrada presidency, a welcome change of direction for the two sectors concerning environmental protection was made. Included in these action points, the DENR is directed to design and implement a natural resource accounting system for the measurement and recovery of social costs caused by environmental damage. This action would require the development of a database, followed by the continuous monitoring and surveillance of the areas and environment. For this capability, aerial photogrammetry and other remote sensing equipment will be required.

At present, the Department does not possess any air surveillance capability. Instead, it depends on the AFP’s reconnaissance capability through the existing DND-DENR Memorandum of Agreement (MOA). In some cases, it depends on contracts with private firms. Currently, the Department receives related data from the National Mapping and Resource Information Authority, the nation’s central mapping and resource information provider. The Authority acquires related data and information from local civilian surveying firms and foreign state-of-the-art satellite imagery companies. While the Authority has no plan to acquire aerial platforms, its modernization plan includes the acquisition of a satellite imagery receiving station.\textsuperscript{22}

Department of Transportation and Communication (DOTC) and Department of Trade and Investment (DTI)

Both the DOTC and the DTI have maritime interests and areas of concern. Under the DOTC is the Maritime Industry Authority (MARINA) whose responsibilities include the administration, planning, policy formulation, and management of information on maritime industries, and the enforcement of maritime safety. Under the DTI is the Philippine Shippers Bureau with responsibility for the registration and accreditation of ships, and the monitoring of shipping operations.

As discussed earlier, fishing and trade contribute to the nation’s overall economic status to the extent that there are almost 500,000 bancas or indigenous vessels, 4000 commercial fishing vessels and 774 merchant vessels employed. Detailed figures are shown in Table 2.2 and Table 2.3. To conduct surveillance and enforcement of related local and international maritime laws and regulations for this amount of shipping requires enormous effort and resources. As both the DOTC and DTI have no air or surface surveillance platforms, they rely on information from their regional offices.

Department of Finance (DOF) and the Department of Justice (DOJ)

Under DOF are the Bureau of Customs, and Bureau of Immigration and Deportation, while under the DOJ is the National Bureau of Investigation. All of these government line agencies need air surveillance information to facilitate the monitoring of illegal entries, prohibited imports and exports including narcotics, drugs and fauna, and other activities contrary to Philippine laws that result in revenue losses. As these agencies have no air or surface surveillance platforms, they rely instead on intelligence inputs from their operatives deployed across the nation. They also rely on cooperative exchanges of information from other internal government and non-government agencies, as well as international agencies including Interpol and Diplomatic and Trade Attaches. When information indicates a need for response and enforcement operations, these agencies may seek assistance from the AFP and PNP.23

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### Command and Control of Philippine Maritime Air Surveillance

<table>
<thead>
<tr>
<th>Region</th>
<th>Municipal Bancas</th>
<th>Commercial Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>%</td>
</tr>
<tr>
<td>NCR</td>
<td>3,553</td>
<td>0.8</td>
</tr>
<tr>
<td>I</td>
<td>12,720</td>
<td>2.8</td>
</tr>
<tr>
<td>II</td>
<td>3,085</td>
<td>0.7</td>
</tr>
<tr>
<td>III</td>
<td>21,433</td>
<td>4.6</td>
</tr>
<tr>
<td>IV</td>
<td>54,617</td>
<td>11.8</td>
</tr>
<tr>
<td>V</td>
<td>49,303</td>
<td>10.6</td>
</tr>
<tr>
<td>VI</td>
<td>28,327</td>
<td>6.1</td>
</tr>
<tr>
<td>VII</td>
<td>64,740</td>
<td>13.9</td>
</tr>
<tr>
<td>VIII</td>
<td>40,702</td>
<td>8.7</td>
</tr>
<tr>
<td>IX</td>
<td>113,459</td>
<td>24.4</td>
</tr>
<tr>
<td>X</td>
<td>20,370</td>
<td>4.4</td>
</tr>
<tr>
<td>XI</td>
<td>35,174</td>
<td>7.6</td>
</tr>
<tr>
<td>XII</td>
<td>16,912</td>
<td>3.6</td>
</tr>
<tr>
<td>ARMM</td>
<td>35</td>
<td>0.9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>464,385</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Summary by major islands**

<table>
<thead>
<tr>
<th>Major Areas</th>
<th>Bancas (% nr)</th>
<th>Vessel (%/ nr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luzon</td>
<td>31.3/ 145352</td>
<td>47.1/ 1649</td>
</tr>
<tr>
<td>Visaya</td>
<td>28.7/ 133278</td>
<td>28.3/ 1135</td>
</tr>
<tr>
<td>Mindanao</td>
<td>40.0/ 185755</td>
<td>24.6/ 1230</td>
</tr>
</tbody>
</table>

**Table 2.2: Number of Bancas and Vessel for Marine Fish Production**

(Ref: 1995 Philippine Fisheries Profile, Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Republic of the Philippines)

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of Vessels</th>
<th>Total DWT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>16</td>
<td>345,607</td>
</tr>
<tr>
<td>Indonesia</td>
<td>762</td>
<td>3,005,349</td>
</tr>
<tr>
<td>Malaysia</td>
<td>304</td>
<td>3,071,178</td>
</tr>
<tr>
<td>Philippines</td>
<td>770</td>
<td>14,223,381</td>
</tr>
<tr>
<td>Singapore</td>
<td>633</td>
<td>16,300,537</td>
</tr>
<tr>
<td>Thailand</td>
<td>277</td>
<td>1,516,011</td>
</tr>
</tbody>
</table>

**Table 2.3: ASEAN Merchant Fleets (>500GRT)**

(Ref: Hamzah, Dr B.A., 'A Survey of Economic Opportunities and an Overview of the Geostrategic in the Maritime Sector of South-East Asia', *Australia's Maritime Bridge into Asia*, Allen & Unwin Pty Ltd, Australia, 1995, p. 28.)

**Objective C - Protection of the Philippine People**

Currently, the government has an integrated response capability for national disasters. The National Disaster Coordinating Center provides the direction and coordination for all efforts from different sectors, government agencies,
and local government and non-governmental organisations. To assist the Center, the AFP provides personnel, assets and facilities. The Philippines is also a signatory to the International Convention on Maritime Search and Rescue. The main purpose of the Convention is to facilitate cooperation among Governments and also among those participating in search and rescue (SAR) operations at sea through the establishment of an international SAR plan. A considerable demand is placed on Philippine resources not only for the SAR coverage of an enormous area of territorial waters but also for meeting the following requirements of the Convention:

- coastal watching including the establishment, operation and maintenance of facilities;
- encouragement of neighbouring country agreements on the establishment of regional SAR facilities, common procedures, training and liaison visits;
- measures to expedite entry into neighbouring territorial waters by rescue units from other parties; and
- establishment of rescue coordination centers and sub-centers, and their command and control arrangements.

**Objective D - Domestic and Foreign Commitments**

Maritime threats are the principal and over-riding concern of many defence establishments today and into the future. For archipelagic states, acts considered hostile and not in the national interest include the use of the seas by insurgents as a primary means of communication, piracy or terrorism, smuggling, and the unlawful movements of goods, drugs and other commodities to evade economic regulations. Other related violations of maritime laws include illegal exploitation of the country's marine resources and mineral wealth, and activities causing pollution. To conduct detection and enforcement activities as part of national security requires multi-disciplinary actions from all sectors of government. Additionally, the Philippine government pursues bilateral cooperation and agreements with similarly concerned nations in recognition of the difficulty of enforcing both domestic and international laws.

The first example of bilateral cooperation is ASEAN's interest in crimes that transcend national borders and the need for agreed regional rules of behaviour and cooperative measures to deal with transnational crimes. At the ASEAN Conference on Transnational Crime held in Manila on 22 December 1997, discussions focussed on coordinated and joint efforts to address the problems of terrorism, illicit drug trafficking, arms smuggling, money laundering, the trafficking of individuals, and piracy in the region. Among the

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measures being considered is the establishment of an ASEAN Center on Transnational Crime (ACOT) which will coordinate regional efforts through intelligence sharing, the harmonisation of policies and the coordination of operations.

Another concern for the Philippines is border security and cooperation with other ASEAN nations in order to promote regional stability and cooperation. In 1997, the Philippines held border consultations with Indonesia and Malaysia. In January 1998, the Philippines actively pursued Joint Commission Meetings with Vietnam, and similarly in April 1998 with Thailand. The RP-Vietnam Oceanographic Marine Scientific Research Expedition (or JOMSRE) and the RP-Malaysia Joint Management Committee Meeting of Turtle Islands Heritage Protected Area are among the bilateral undertakings in the South China Sea. During the state visit of President Ramos to the Lao PDR and Myanmar in mid-October 1998, several agreements were signed covering among other things anti-drug trafficking, trade and development cooperation, and agriculture cooperation.

As the Philippines is a signatory to various other international laws related to maritime environment and safety, it is responsible for programs in pursuit of the objectives of those laws. The Philippines is also a member of the International Maritime Organization, a permanent international body that promotes maritime safety. All of these agreements require policing and surveillance capabilities. Some of the relevant treaties are:

- **The Treaty on the South-East Asia Nuclear Weapon-Free Zone**
  This Treaty was signed by all South-East Asian countries in December 1995 and came into force in March 1997 when the seventh instrument of ratification was deposited with the government of the Kingdom of Thailand. The treaty is an instrument of ASEAN to move towards general and complete disarmament of nuclear weapons, and promotion of international peace and security. Some of the basic undertakings of this Treaty are:25

  - Each State Party undertakes not to, anywhere inside or outside the Zone and also not to allow in its territory, any other State to:
    - develop, manufacture or otherwise acquire, possess or have control over nuclear weapons;
    - station nuclear weapons; or
    - test or use nuclear weapons.

  - Each State Party also undertakes not to:
    - dump at sea or discharge into the atmosphere within the Zone any radioactive material or wastes;

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25 *Treaty on the Southeast Asia Nuclear Weapon-Free Zone*,
dispose of radioactive material or wastes on land in the territory of or under the jurisdiction of other States except as stipulated in Article 4 of this Treaty (Use of nuclear energy for peaceful purposes);
- allow, within its territory, any other State to dump at sea or discharge into the atmosphere any radioactive material or wastes.

Within Asia and close to the Philippines, several nations either possess weapons of mass destruction or have sought to acquire or to develop such weapons. China has such weapons and nuclear technology. Taiwan and South Korea sought to acquire the weapon technologies but only desisted under strong US pressure. South Korea and Japan both have nuclear power programs and gain considerable nuclear expertise from such programs. If ever any of these countries acquire, deploy and ultimately employ such weaponry, it will require highly sophisticated sensor systems to detect them.

- **The Convention of the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal.** The Philippines ratified this Convention on 21 October 1993 and it came into force on 19 January 1994. The Convention basically aims to prohibit transboundary movements of hazardous wastes destined for final disposal in other States. The transboundary movement of hazardous wastes carried out in contravention of states’ obligations under the Basel Convention is considered illegal traffic and further articles of the convention emphasise that Parties must deem illegal traffic to be criminal. Parties are obliged to adopt and enforce national legislation for the prevention and punishment of illegal traffic. Fighting environmental crime is complex because it requires understanding elements of law, public health, science as well as the technical requirements for prosecution.26

- **The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.** The date of deposit for this Convention in the Philippines was 10 August 1973 and it entered into force on 30 August 1975. It deals with all forms of marine pollution from ships, except the disposal of land-generated waste into the sea by dumping. The Convention has five technical annexes; the first two deal with oil and bulk noxious liquid substances and are mandatory, while the last three deal with harmful substances in packaged forms; sewage and garbage are optional. The convention requires the reporting of discharges or probable discharges of oil, chemical or harmful packaged substances in excess of discharge rates permitted by the convention. This will require remote sensing for pollution incidents particularly in the offshore zone. Airborne

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remote sensing systems are efficient methods of detecting discharges of oil at sea and supplying images for use as evidence in the prosecution of the offenders. Aside from airborne remote sensing, still photography and video cameras (high and low resolution) annotated with date, time and geo-referenced position, provide an excellent means of surveillance and the provision of evidence.  

- **The International Convention for the Safety of Life at Sea (SOLAS).** This Convention initially entered into force in 1965 but was terminated in 1980 and a completely new Convention was adopted in 1974. The main objective of SOLAS is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety. Flag States are responsible for ensuring that ships under the flag comply with these requirements and issue the required certificates as proof that this has been done. Any signatories to this convention, could inspect ships if there are clear grounds of non-compliance to the requirements of the convention.  

**The International Convention of Oil Pollution Preparedness, Response, and Cooperation (OPRC).** This Convention entered into force on 13 May 1995. Its objectives are: to prevent marine pollution incidents by oil; to advance the adoption of adequate response measures in the event an oil pollution incident does occur; and to provide for mutual assistance and cooperation between States in the adoption of these aims. Mutual assistance and cooperation could be in the form of advisory services, technical support and equipment. Additionally the convention obliges parties to establish a national system for responding promptly and effectively to oil pollution incidents.

**Objective E - Assistance to the Philippine National Police**

The Philippine National Police, through its Maritime Command (MARICOM), is mandated to conduct Internal Security Operations, enforcement of maritime laws, rules and regulations within the municipal waters up to 15 kilometres from the shore, and to assist in search and rescue operations. Assistance is in the form of surveillance and reconnaissance activities and, under certain circumstances airlift and close air support. The Command currently employ various forms of shipping to conduct maritime patrol operations within its area of jurisdiction. Although the Command recognises the need for an air surveillance capability, it lacks such a capability, having only a small number of helicopters and light fixed-wing aircraft, that are used.

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28 Ibid., p. 49.
for administrative requirements and are unsuitable for sustained reconnaissance operations.

Objective F - Support of National Development

The concept of Regional Industrial Centers (RIC) is part of Philippines 2000, the government’s vision for the next millennium. Identified as developmental areas to serve as the hub of local and foreign investment in the nation’s key regions, the RIC is supported by regional growth networks or cores, as illustrated in Figure 2.8. These networks have been identified for development in an order of priority. This program requires extensive engineering information in terms of mapping, geology, topography and hydrology, something that could be provided by accurate interpretations of aerial photographs. Such photographs can be further processed into contour maps and three-dimensional models that can be invaluable for infrastructure projects. These products are also important for other government agencies pursuing infrastructure development projects. Such agencies are the Department of Public Works and Highways, the Department of Agrarian Reform, the Department of Transportation and Communication, and the National Irrigation Administration. All these agencies currently purchase commercially available remote sensing products or contract private surveying firms to meet their aerial surveillance requirements.\(^{30}\)

Summary

Overall, the Philippines has enormous natural resources that can be developed to ensure its future prosperity but they need protection in both peace and conflict. With so many agencies and instrumentalities of government having overlapping jurisdictions in these maritime areas of interest, the responsibility for protection as well as other functions is indeed complex. Unfortunately, the current organisations, infrastructure and capabilities, particularly in terms of sensors and platforms necessary to conduct surveillance, are either insufficient or non-existent. Additionally, there seems to be no unified effort to conduct surveillance activities, except for some agreements established among some agencies. It is noteworthy that some agencies have plans to acquire some surveillance capabilities but these assets would be minimal compared to the long-range patrol capability being sought by the AFP as mandated by its modernization program.

Figure 2.8: Regional Industrial Centers
CHAPTER THREE
COMMAND AND CONTROL OVERVIEW

Securing the wealth, resources and sovereignty of a nation in an increasingly complex security environment will demand the highest quality of command and control. The commander who continues to exercise effective command and control will have a decisive edge over his opponent. To achieve the decisive edge, commanders must be able to understand and to apply such concepts as decisive maneuver, rapid deployment, joint warfare, information warfare and rules of engagement. For the maritime environment, some of these concepts may need modification or adaptation.

Defining Command and Control

Any discussion on command and control must begin with defining its meaning. The definitions given hereafter are from the Australian Defence Force Publication Doctrine Manual - ADFP1 (Draft 3) which also agree with the definition adapted by the Philippine Air Force (Interim Draft) Air Power Manual.

The term command is 'the authority which a commander in the military Service lawfully exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources, and for planning the employment of, organising, directing, coordinating and controlling military forces for the accomplishment

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1 Majority of the definitions from this chapter are from PAF Air Power Manual (Draft-Interim) and ADFP1 (Draft 3), unless otherwise stated.
2 As defined in Australian Warfighting Concepts, Interim Edition, published by the ADF, 2 January 1998, p. 3-2, decisive manoeuvre is the conduct of synchronised operations using assets from and within any or all environments to defeat the adversary by positioning in time and space the most appropriate force to threaten or attack critical vulnerability thereby unhinging the centre of gravity and obtaining maximum leverage.
3 As described in article titled 'The AFP Maneuver Force: A Proposal Towards Modernization' by Col Emmanuel R Teodosio PN (M) GSC published by the National Defense College (Philippines) on its National Security Review on first quarter of 1997, on pp 49-50, rapid deployment is the mobilisation of a generally designed force to 'out of area' over great distances outside the national territories.
4 As defined in the article 'Not Accident' by Michael C. Vitale published by the Air War College, Reading: Volume III Academic Year 1997,USA, Alabama, 1997, p. 456, joint warfare is the military activities or operations in which elements of more than one service of the same nation participate.
5 Information warfare appears in a lot of documents but definitional problems exists at the moment. Based on Cornerstone of Information Warfare, Department of the Air Force (USA), reprinted by Air War College, USAF, Alabama 1997, p. 467, Information Warfare is any action to deny, exploit, corrupt, or destroy the enemy's information and its function; protecting ourselves against those actions; and exploiting our own military information functions.
of assigned missions. It also includes responsibility for health, welfare, morale and discipline of assigned personnel.\textsuperscript{6}

Control is the authority exercised by a commander over part of the activities of subordinate organisations, or other organisations not normally under his command, which encompasses the responsibility for implementing orders or directives. All or part of this authority may be transferred or delegated.

When the two terms are then combined, the following definitions of 'command and control' from the doctrine of various armed forces are worthy of consideration:

- **Armed Forces of the Philippines.** Command and control is the exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission.

- **Australian Defence Force.** Command and control is the system that empowers designated commanders to exercise lawful authority and direction over assigned forces for the accomplishment of mission and task.

- **United States Army.** Command and control is the process through which the activities of military forces are directed, coordinated, and controlled to accomplish the mission.\textsuperscript{7}

An analysis of all these different definitions indicates three basic requirements of command and control:

- First, it states what the commander does, inferring a person of authority. This is necessary so that any of the commander’s directions and orders would have the moral and legal force to be obeyed and followed by subordinates. What the commander or the mission does, refers to direction/s taken by the commander from such policy, directive or task issued by a higher person of higher authority.

- Second, the commander’s activities are administration, and decision-making processes for the strategic, operational and tactical levels.

- Third, there are arrangements of people, equipment and procedures to assist the commander accomplish the mission.

**Elements of Command and Control**

The extent and variety of the tasks confronting a commander in achieving a mission require the cooperative endeavours of many people in organic or attached forces, the support from other services, the integration of many

\textsuperscript{6} ADFP\textsuperscript{1}, *Doctrine*, Australian Defence Force Operations Series, ADFWC, 1993.

complex systems, and a sensible division of work. A command and control system comprised of the following three interrelated elements is required to accomplish these tasks:

- a command and control organisation,
- a command and control process, and
- command and control facilities.

Command and Control Organisation

It is the organisation of the headquarters and staff at the various levels that contributes to mission accomplishment. This organisation includes the role, relationship, authority, responsibilities and functional grouping of the staff. Importantly, the organisation and all its levels should reflect these essential principles.

Unity of Command

Whether a command and control process is functionally or geographically arranged, its successful execution depends on establishing a command and control organisation composed of a commander and support staff. At the highest level of a military force, only one overall commander is responsible to higher authority for all operational matters, defined in terms of duties and responsibilities. The commander's support staff should reflect the composition of the resources under command. This staff assists the commander in the decision-making process by acquiring, analysing and coordinating information; and most importantly, the essential element of this information is then presented to the commander. Additionally, the staff provide a recommendation to enable the commander to make the best decision. Under the unity principle, the military staff is organised as a single, cohesive unit to assist the commander in accomplishing the mission. For air power, a commander has centralised control at the highest level to shift air assets and to concentrate air power to meet any changing requirements rapidly. This control ensures continuity of action and a single authority that is responsible and accountable for results. Also under this principle, the commander could delegate operational control to the most appropriate level to achieve an organisational and combat potential balance. At the tactical level, decentralised execution allows flexibility without losing effectiveness. With it goes the full responsibility for actions.

Span of Command

This principle recognises the limits in the number of subordinate elements that a commander can effectively control. This number depends on a range of factors such as tasks and the attendant responsibilities. At various levels, the different decision-making processes, combined with the commander's number of tasks and responsibilities, need to be applied to reduce time for making effective decisions to a minimum. While automated systems may
assist coordination and reduce the processing time, there is still a limit to the amount of information that a commander can effectively absorb as part of the decision-making process.

*Chain of Command*

Chain of command in ADFP1 is referred to as clarity. It defines the hierarchical organisation, which is established as part of the decision chain at the strategic, operational, and tactical levels. The chain defines the command and control arrangements between the superior headquarters, the subordinate headquarters and the other elements within the organisation. Within this organisation, orders and tasking are passed downwards and information flows upward, enabling commanders at the lower level to respond to directions and exercise responsibility for subordinate elements.

*Continuity of Command*

In ADFP1 continuity is referred to as redundancy. Application of this principle requires the establishment of an alternate commander and a corresponding headquarter in the event of losing the primary headquarters or commandeer. Procedures for succession should be established and practised so that operations are not adversely affected if authority has to be transferred.

*Delegation of Authority*

Delegation of authority is referred to as the equivalent of delegation of command. This principle implies that commanders at the lower levels should be given authority, as well as directions and resources. The commander given the delegation is responsible for the detailed planning, tasking and execution to accomplish specific missions or tasks. Delegation of authority does not free the higher level commander of the responsibility for the task.

*Levels of Command and Control*

For maritime air surveillance in the Philippines, a number of major problems exist in establishing a command and control organisation using the principles discussed so far. The first problem is that the surveillance is not only a military concern in relation to the security and defence of the nation but also a civil concern in relation to the protection of the nation's resources and environment. This problem is compounded by the multitude of government agencies responsible for the various issues concerning environment and resources. Furthermore the AFP is becoming increasingly tasked with a constabulary function such that its current doctrine is not suitable and requires change. An appropriate command and control organisation must address all the issues existing at the three levels:
- **Strategic Level.** The strategic level is concerned with the overall conduct of war, resolution of conflict, development and protection of national resources, security of its people and sovereignty, the generation and application of national power within a national, political, diplomatic, economic, legal, and social framework.

- **Operational Level.** The operational level is concerned with how to achieve the strategic ends. It includes:
  - detailed planning and direction of operations
  - sustainment and protection of assigned forces or resources
  - assignment of forces or maritime air surveillance resources

- **Tactical Level.** The tactical level includes the application of air power against specific military or civil objectives in the most effective manner. It includes:
  - translation of an operational plan into tactical procedures
  - local direction of maritime air surveillance tasks

**Command and Control Process**

The command and control process is a decision-making process. It includes procedures and techniques used to determine what is occurring in the battlespace - what this means, what action to take, what directions must be issued, and how the execution of these directions is to be supervised. Support for the process includes records, reporting systems and briefings.

Commanders at all levels must have access to a large amount of information. Included in this information are mission objectives, the status and capabilities of friendly forces, the environment in which the mission will be performed, infrastructure data, logistics support capabilities and status, operational plans, and standard operating procedures. Also needed is the capability to develop, to analyse and to select courses of action quickly, and to direct operational forces efficiently. After directing forces, commanders then need information on the current situation and how the execution of the plan is progressing so that unforeseen problems can be quickly resolved.

In the command and control of Philippine maritime surveillance, the decision-making process could be hampered through the three levels by a lack of integration with the multiple agencies. Problems affecting the process include the different tasks of the various organisations, their values, perceived threats to these values and their priorities. Information required on threats include: whether they are internal or external; their origins; and their time scales. After analysing all these factors, planners can focus maritime air surveillance resources in accordance with the priorities determined.
Command and Control Facilities

Command and control facilities include command posts, supporting automated and communications systems, and the necessary sensors. These facilities provide information, processing and the transmission directions necessary for effective command and control. Whatever form the command and control facilities take, they must fulfill the following criteria:

- **Survivable.** Survivable facilities must incorporate self-protection consisting of defensive and passive counter-measures, back-up systems and redundant sub-systems.

- **Responsive.** A responsive facility incorporates the ability for the system to extract and process real-time data, and to allow rapid reactions with a wide range of options in times of crises or conflict. This ability should provide sufficient lead-time to deter conflict or limit its scope from the very onset of a threat.

- **Flexible.** A flexible facility is able to perform a variety of tasks, and to move quickly from one course of action to another in accordance with the capability of the systems employed.

- **User Oriented.** Facilities need to be user-friendly in terms of the ease of system operation and accessibility of information. The displays, graphics and decision aids should be simple and should not require extensive interpretation skills.

- **Interoperable.** Interoperability of facilities refers to the ability of a system to provide services to and receive support from other systems and to use these services to enable them to operate effectively together.

- **Compatible.** Compatible facilities are those with a capability for two or more items or components of equipment or materials to exist or to function in the same system or environment without mutual interference. This is synonymous with the commonality of equipment to reduce the cost and waste in training times for different equipment and to minimize excessive inventories of spare parts.

**Information Management**

While all of the criteria for command and control processes contribute towards overall system effectiveness, this can be further improved through recent technological developments, particularly with computer systems where there are currently dramatic improvements. Although these developments provide great promise, they come at very high costs. Additionally, there is now an emerging threat of information warfare that, in its various forms, can delay, disrupt or corrupt the decision-making process. Also referred to as the
third paradigm of warfare, its aims, modes and outcomes are illustrated in Table 3.1.

<table>
<thead>
<tr>
<th>Modes</th>
<th>Attrition</th>
<th>Maneuver</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims:</td>
<td>Exhaustion</td>
<td>annihilation</td>
<td>paralysis</td>
</tr>
<tr>
<td>Epitomised by:</td>
<td>Industrialisation</td>
<td>mechanisation</td>
<td>computers and communication</td>
</tr>
<tr>
<td>Example:</td>
<td>World War I</td>
<td>World War II</td>
<td>Gulf War</td>
</tr>
</tbody>
</table>

Table 3.1: Paradigms of Warfare

As the latest form of warfare, information control warfare aims to remove the enemy’s ability to effectively control his forces. The control of information is measured by the decision or OODA cycle time. The ‘OODA’ cycle is the time taken from Observation of the event, to then Orientate or place the event into context, to then Decide the response required, and to complete the Action. All other things being equal, the side able to accomplish this process quickest will hold the advantage. The commander should be able to weigh and balance the need to secure the information and to attain a shorter OODA cycle time. Inappropriate emphasis on security of information could create undue delays on the OODA cycle.

Analysing the OODA cycle raises the issue as how to best manage the enormous amount of information and data that needs to be shared and distributed. This management determines the capability for maritime air surveillance of surface and sub-surface areas to detect activities, objects, and people. Such varied requirements necessitate different sensors on board the aircraft. The numerous products of surveillance also need to be transmitted either in real-time or stored for later analysis, integration and distribution, depending on their importance or urgency. In either case, it is important to establish an integrated network of support facilities. This network includes operation centers with the attendant communications and database facilities, and photographic development and interpretation facilities. At a minimum, these facilities should allow data analysis, interpretation, integration, storage and interchange in a wide range of formats. These formats include voice, video, electronic data and hard copy. Furthermore, these facilities should be able to process data before, during or after the operation of the platform.

At the core of this basic requirement is the importance of managing information. At the moment there are two ways in which this can be done: hierarchical-based and network-based methods. The effectiveness of either

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9 Hayes, Group Captain Peter, 'How Air Command is Responding to the Information Warfare Challenge', Regional Air Power Workshop Canberra, Air Power Studies Centre, Canberra, September 1997, p. 40.

10 Westwood, Chris, The Future is not what is used to be, Conflict in the Information Age, Air Power Studies Centre, Canberra, 1997, pp. 109-120.
method can be measured by the relevance of the information provided to the user and its timeliness. Using the description in Figure 3.1, the hierarchical-based method works on a hierarchical structure where data and information are sequentially processed up and down the various levels. Each level in the overall process performs its respective intelligence activity, filtering out assumed meaningless information before passing the processed information to the next higher level and finally to the decision-maker. Before an action can be decided, some discussion between the decision-maker and the users may be required to determine if important information was prematurely filtered. For these situations, an inability to access this filtered information initially perceived to be irrelevant fails to acknowledge the differences in individual decision-making styles and knowledge requirements. This method is often referred to as the 'push' method.

The second method works on the concept that anyone who obtains information can place it on the network and anyone that needs information can extract it from the network. As this system allows an unrestricted flow of information, a hierarchical arrangement is not required. This method, often referred to as a 'pull' information management system, is similar to the Internet and is illustrated in Figure 3.2. In a network-based system, individuals, be they the source, user, or decision-maker can have access to whatever information they need quicker than using a hierarchical-based system.

![Diagram of Hierarchical Information Management System](image)

**Figure 3.1: Hierarchical Information Management System**

(Ref: Westwood, Chris, *The Future is not what is used to be, Conflict in the Information Age*, Air Power Studies Centre, Canberra, 1997, p. 112.)
Figure 3.2: Network-based Information Management

(Ref: Westwood, Chris, *The Future is not what is used to be*, Conflict in the Information Age, Air Power Studies Centre, Canberra, 1997, p. 116.)

Using this information on the different systems, the question must now be addressed as to what maritime air surveillance system and its inherent command and control structure is most suited to the Philippines?
CHAPTER FOUR

ISSUES FOR COMMAND AND CONTROL OF MARITIME AIR SURVEILLANCE

Introduction

As an archipelagic nation with an extensive coastline and a vast Exclusive Economic Zone, the Philippines should have an enduring concern for its maritime security and prosperity. To deter any actual or potential threat from arising, the nation may be able to control or influence the behaviour of others by what it does in protecting its maritime interests. The areas of concern and interest would include intrusions and encroachments of its territory, the operation of merchant shipping, unapproved exploitation of offshore resources, and other illegal activities.

Maritime security has two basic subsets: detection and enforcement. One without the other or degradation of either would be detrimental to the overall effectiveness of maritime security efforts. Detection is a result of surveillance, the systematic observation of aerospace, surface or sub-surface areas, places, persons or things by visual, aural, electronic, photographic or other means. Surveillance gathers information and data used to derive intelligence. An effective maritime surveillance system will have two fundamental characteristics: the capability to see what is happening at all times and the mechanism to distribute the information appropriately.

Maritime surveillance generally is a major component of a littoral nation's overall surveillance effort. At the forefront of this effort is maritime air surveillance due to air power's strengths of ubiquity, speed, versatility and responsiveness.

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1 Generally, the concepts and definitions were derived from an article titled ‘Concepts of Military and Civil Surveillance’ by Air Commodore Jeffrey McCulloch, RAAF, in the book, Policing Australia’s Offshore Zone, Wollongong Papers on Maritime Policy No. 9, published by Centre for Maritime Policy, University of Wollongong, Australia, 1997, pp. 11-27; unless otherwise indicated.

2 Definition from The Air Power Manual, 3rd Edition, Air Power Studies Centre, February 1998: Ubiquity or pervasiveness is a strength of aerospace power derived from its characteristics of reach, perspective, speed and penetration. It allows air power to be employed in almost every facet of warfare. Speed is its ability to cover distance quickly and to apply force with little delay. Versatility is the air power characteristic which allows aircraft to be: diverted in-flight from one task to another or from one target to another; re-configured for alternative roles; multi-specialist task during single sortie; employ in a wide range of effects and tempos. Responsiveness is air power characteristic due to its versatility, reach, speed and pervasiveness. It can be deployed rapidly from its home base or from a forward operating base, and undertake operations almost immediately.

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Establishing a Command and Control Organisational and System

An envisioned command and control organisation system should be efficient and effective across its complete area of responsibility. Efficiency requires integration and coordination of limited resources, good planning, and the prioritisation of activities. Effectiveness, however, is highly dependent on appropriate equipment and technology. Effective and efficient command and control systems need to address a number of relevant issues:

Appropriate Use of Armed Forces

In western democratic societies, the principal role of armed forces is to provide security against external dangers, especially military threats to the territorial integrity and political independence of the state. Police forces enforce a nation's laws through such activities as arrest, search, detention and the bringing to justice of individuals, including both nationals and aliens. Some countries, however, constitutionally allow the military to conduct following roles:

- **Military Aid to the Community.** Armed forces can undertake military aid to the community as major response to natural disasters or serious accidents.

- **Military Aid to the Civil Power.** When serious threats occur beyond the capability of the national police, the armed forces may then be directed to conduct appropriate peace and order operations to assist the civil power.

- **Military Aid to Government Policy.** The armed forces may be directed to conduct activities or to perform tasks of national importance where other government agencies or the non-governmental sectors are unable to do so or are considered inappropriate. Such tasks may be the provision of water supplies and medical services to a stricken community, or the use of armed forces resources to break a strike.

- **Use of the Military for Law Enforcement.** The capabilities of armed forces, particularly for offshore incidents, make them suitable to conduct enforcement. Enforcement activities may include the arrest of individuals, the detaining of ships, interrogation, and the gathering of evidence for prosecution and related activities such as fishing, customs, immigration and environmental protection in offshore zones. Communications, surveillance and intelligence skills are invaluable for crime detection,

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monitoring and response on land, at sea or in the air. Armed forces also have appropriate assets such as ships, aircraft and sensors and trained personnel that can be directly applied to law enforcement operations.

Appropriate Coordination and Control

For the various levels, the complexity of surveillance requires an appropriate organisation for coordination and control. A national surveillance system is required to plan and to coordinate the overall effort at the national strategic level and perspective. Such a system requires an organisation that has the responsibility and authority not only for planning but also for developing capabilities, integrating all national resources, and coordinating the implementation of plans. Options for providing coordination and control for a national surveillance organisation or authority, ranging from strategic level committees to an operational level coordination center, including agencies or offices at the national or strategic level. They are differentiated according to the following:

- **Strategic Level Committee.** A strategic level committee is an ad hoc organisation that conducts business only when required. This is in contrast to the requirements of national surveillance activities that require continuing and consistent efforts. Also, there is a need for a continual contact and liaison at the appropriate level between the provider and user of surveillance products, something not available from a committee-type organisation.

- **National Level Agency.** A national level agency is either a legislative or executive form of entity, distinct from other established government agencies in that its sole purpose is to manage the national surveillance effort. Establishing such an agency, however, comes at a cost in terms of additional manpower, facilities and equipment. Such an agency also adds another level to the bureaucratic process, possibly adding delays to the decision-making process.

- **Strategic Level Office.** Much smaller than a strategic level agency, a strategic level office employs only a small staff and limited resources to serve the different strategic users through the management of tasks.

- **Operational Coordination Center.** An operational level coordination center or office is a structure with an appropriate level of authority to link the product provider and user. While such an office is necessary for the formulation and refinement of surveillance plans, it does not have the authority to set priorities or rationalise the employment of assets on tasks.
Transition from Peace to Conflict

A vital characteristic of any developed organisation must be the ability to transition from peacetime operations to the operations required during times of increasing tension or conflict. During peacetime the national surveillance program will be determined predominantly by civilian imperatives and the long-term objectives of the armed forces. Attention must be paid to platform and resource vulnerabilities and appropriate steps taken to ensure the safety of non-military assets.  

Surveillance Requirements

In determining surveillance requirements, the first and most important action is the identification of customers and their specific requirements. The main users of surveillance information are the leaders or commanders at all levels, intelligence organisations, and government departments and agencies. Other important customers are those entities involved with allied and international arrangements. If a country subscribes to such arrangements, it has a commitment to support them. Such a variety of customers, however, often lead to a wide range of surveillance requirements. Importantly, the requirements should be the result of diligent intelligence assessments, and the close cooperation between producer and user. These requirements need to be clearly defined, practicable, measurable and realistic. For contingencies, the requirements need to be focussed and prioritised so that risk management strategies can be applied in assessing the threat to surveillance platforms and resources. The two customers essentially are the military and civil sectors.

Military Requirements. Military requirements are information for intelligence purposes and combat information for commanders' decision-making processes. These purposes require awareness of activities in all areas of interest and the early detection of changes to those activities, including equipment and methods of operation. At the three levels, the same sensors and methods are used to gather information.

Civil Requirements. Civil requirements are generally similar to those of the military. They also require an awareness of activities in areas of interest which, in relation to the military, generally tend to be more focused and precise in area and interest during peace. Other factors such as the seasons, and threat levels drive the requirements. As discussed in Chapter 3, the threats and risks that require maritime air surveillance are environmental,

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fisheries, maritime safety, maritime crime, illegal immigration and territorial claims.  

**Surveillance Resources**

With the considerations cited in the earlier paragraphs, the availability of resources, platforms and sensors need be evaluated. The employment of available resources should match the requirements and be optimised. For example, a particular platform employing, or capable of being fitted with, a range of sensors could perform multiple tasks. The matching of capabilities to requirements therefore ensures effective and efficient utilisation of resources.

**Maritime Air Surveillance Planning**

Combining the determination of requirements with subsequent resource matching to produce a prioritised schedule of tasks is the essence of the maritime air surveillance plan. The efficient and effective use of surveillance resources requires a systematic and comprehensive approach to determine those tasks that can be undertaken by the available resources. Furthermore, planning at all levels of surveillance should consider the following:

- operations are conducted systematically and efficiently with the optimum deployment of sensors,
- information obtained is fused with other applicable information and analysed for its significance, and
- the dissemination of information and intelligence to all affected elements is conducted in a timely manner.

A completed maritime air surveillance action plan requires the distribution of the product to the requesting agency or commander.

**Surveillance Products Distribution**

As the tasks listed on the maritime surveillance plan are completed, the products of these tasks need to be distributed. At the same time, there should be a promotion of the products to ensure their use is optimised. For these functions, a distribution system is required and this should be under a national level coordinating body for surveillance systems. The fusion of information would normally be the responsibility of the major users, particularly intelligence agencies and senior command staffs. An important quality of a distribution system is the pace of dissemination. Of all the users, the military will always need the fastest possible dissemination of surveillance products, particularly in a contingency when tactical level decisions are highly likely to

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be influenced by the information received and the repercussions for delay are high. While civil agencies are unlikely to face the same repercussions, they still have a need for flow of information, especially for the prevention of illegal activities and the apprehension of offenders.

The Use of the Civil System in Contingency Operations

The air power of any nation includes all available air assets within its jurisdiction. Armed services and civil agencies, therefore, should complement each other in times of peace, conflict or war. In peacetime, the military resources could contribute to civil requirements. Correspondingly, civil air assets may be required to support armed forces operations. For these operations, special arrangements either through contract or legislation should be in place to ensure that the civil systems can react to and support the more complex and demanding military requirements. Another option is for the use of civilian operators who are also members of the reserve forces. Irrespective the security of civil systems should be insured in time of peace while in time of conflict or war it should be used in low threat areas and situations. This option allows a seamless and secure transition from peace to conflict.

Overseas Models on Command and Control of Maritime Air Surveillance

Australian Model

In Australia, most of the civil coastal and offshore surveillance is undertaken by the Coastwatch organisation of the Australian Customs Service. The Australian Defence Force (ADF) still conducts some maritime air and patrol boat surveillance, as well as providing other substantial support. Coastwatch manages and coordinates Australia’s civil and coastal surveillance program using a combination of contracted aircraft, ADF patrol boats and aircraft, and sea-going vessels of the Customs marine fleet. The activities of Coastwatch are determined by the surveillance needs of the various government agencies that form its client base. These include:

- Department of Foreign Affairs and Trade,
- Australian Fisheries Management Authority (AFMA),
- Australian Quarantine and Inspection Service (AQIS),
- Department of Immigration and Multicultural Affairs (DIMA),
- Department of the Environment, Sport and Territories (DEST),
- Great Barrier Reef Marine Park Authority (GBRMPA),
- Environment Australia (EA),

• Australian Federal Police (AFP), and
• Australian Customs Service (Customs).

**ADF Participation in Maritime Air Surveillance**

In the past a substantial role was performed by the ADF in conducting maritime air surveillance of Australian waters. This surveillance was conducted by aircraft of the Royal Australian Air Force (RAAF) and the Royal Australian Navy (RAN) Fleet Air Arm. Three major arguments contributed to the decision for civil agencies to take over much of the air surveillance tasks from the ADF, these were the political and legislative, cost-effectiveness, and ADF core functions.

• **Political and Legislative Argument.** The Constitution and the Defence Act place significant constraints on the use of the ADF in civil law enforcement tasks. Three issues relate to these constraints. First, the possibility exists that the ADF would use maximum force to achieve goals quickly as a means to give the least cost outcome. This is at odds with the normal requirement of resolving a civil problem with the minimum use of force. The second issue relates to the unconstitutional use of the ADF in civil matters where the use of Defence assets, particularly in a maritime environment, may increase diplomatic tensions. Finally, the Department of Defence is also a customer for surveillance products. As such, other government departments were wary that with Defence having the responsibility for maritime surveillance and the centralised control of resources, a possibility existed that its own requirements might always attract the highest priority.

• **Cost Effectiveness.** There are many issues affecting cost-effectiveness. First is the unnecessary cost associated with the use of expensive, sophisticated military equipment and highly trained military personnel on surveillance work requiring lesser technologies and skills. Second, the employment of the armed forces below their capabilities reduces the life-of-type of equipment and the opportunities for military personnel to maintain proficiency on higher level skills. The creation of the separate Coastwatch organisation has produced long-term savings for the ADF by minimising the under-utilisation of military capabilities and the wear and tear on sophisticated military equipment. Third, the lesser capabilities required by Coastwatch for its task allow it to meet its national responsibilities with a leaner organisation of about 40 staff plus contractors. Finally, the unique requirements of the armed forces with its responsibilities for core and specialist military training, and benefits such as housing and superannuation result in the base cost of each military person being higher than that of a civilian employee with the government or a contractor.

• **Role of ADF.** The primarily role of ADF is the defence of national interests, mainly from external threats. Except for special circumstances, the ADF does not have a mandate to become involved in internal security or police
functions. Therefore, the ADF should not be responsible for the conduct of civilian surveillance for policing purposes.

**Organisational Implications**

For maritime air surveillance in Australia, the concept of operations is developed from a detailed review of civil and military air surveillance needs as prescribed by the various clients. This concept provides a statement of the desirable operational parameters for surveillance activities, taking into account the priorities of current and predicted surveillance needs. Furthermore, the overriding considerations in formulating the conceptual surveillance center provided a cost-effective solution to Australia’s unique and significant geographical difficulties, and the specific types of targets envisaged in the area of operations. Additionally, the concept relies on a structured operational plan that provides security through depth. Executing this plan is accomplished using a mixture of sensors on surface and air platforms operated by the ADF and civil agencies. An important part of tasking and coordinating these sensors is the type of organisation required.

**Coastwatch Air Surveillance Organisation**

The organisation of Coastwatch is illustrated in Figure 4.1. At the head of the organisation is the National Manager, who controls and coordinates the civil surveillance program through a structure of central and regional offices. To coordinate and prioritise civil surveillance activities, the Operations and Program Advisory Committee (OPAC) was established, chaired by Coastwatch. The members of OPAC include those government agencies listed earlier and the Department of Defence. In accordance with priorities identified by client agencies, the central office through OPAC determines the national direction and focus for surveillance activities. Regional offices are then responsible for the direct coordination and control of the surveillance assets to address client priorities. A key feature of this national approach is that Coastwatch aircraft are not allocated to specific locations. Rather, aircraft are relocated to meet changing circumstances as they arise. Within the Coastwatch program itself, operational command principles have been adopted to prescribe the command procedures applied in operations conducted by Customs. These principles broadly parallel command arrangements used Australia-wide by Customs.

**ADF Maritime Air Surveillance Organisation**

In the ADF, the Maritime Air Surveillance Review Group (MASRG) has been established to provide a forum for maritime air surveillance bids by military agencies (See Fig 4.2, ADF Air Maritime Surveillance, Command and Control.⁹) At the operational level, the MASRG is chaired by a Headquarters Australia Theatre (HQAST) representative and liaises with OPAC.

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⁹ Briefing Materials, HQACAUST provided during Official visit on 21 September 1998.
Fig. 4.1: Maritime Surveillance Australian Coastwatch Model


Figure 4.2: Australian Defence Maritime Air Surveillance Command and Control

(Ref: Briefing Materials, HQACAUST)
On behalf of the Chief of the Australian Defence Force, it issues a Surveillance Directive to the Air Commander Australia (ACAUST), who is also the Air Component Commander for Headquarters Australian Theatre. As well, MASRG reviews the results of the previous year's surveillance and adjusts priorities as required on the annual program. The Surveillance Directive is implemented by No 92 Wing of the RAAF’s Maritime Patrol Group. For specific surveillance operations, No 92 Wing conducts air surveillance in support of either the Naval Component or the Land Component, as shown by the example in Figure 4.3.

![Diagram showing command and control structure for surveillance operations](image)

**Figure 4.3: Specific Surveillance Operation (Example)**

(Ref: Briefing Materials, HQACAUST)

**Surveillance Requirements**

**Coastwatch.** As a service provider, Coastwatch focuses its program on a wide range of client concerns. Each client agency is responsible for the development of threat assessments and surveillance requirements that then become the basis for operational planning and the subsequent Coastwatch surveillance operations. The civil surveillance program comprises two basic elements: strategic surveillance and tactical surveillance. Strategic surveillance forms the majority of the flying program and is developed two or three months in advance. Tactical surveillance comprises tasks resulting from specific operational intelligence, usually received without warning, and presenting a more demanding scenario than routine, strategic surveillance. The following are some of the client concerns, not necessarily in order of priority:

- drug importations,
- illegal immigrations,
- foreign fishing activity,
- quarantine breaches,
• flora/fauna smuggling,
• national and marine park/wildlife monitoring and protection,
• environmental protection in coastal/offshore areas,
• monitoring of historic shipwrecks, and
• any other breaches or potential breaches of Commonwealth or State laws in coastal or offshore areas.

**ADF**. For the ADF, surveillance requirements are submitted by the different Services to the MASRG. Using these requirements COMAST's Surveillance Directive is derived based on the OPAC requirements, the reviewed results of the previous year, military agency bids and adjusted military surveillance priorities.

**Surveillance Resources**

The principal components of Australia’s current civil surveillance effort are visual and electronic aerial surveillance provided by fixed-wing aircraft operated by civilian contractors and, for the Torres Strait area, contract helicopter surveillance. Approximately 250 hours surveillance of the offshore Australian Fishing Zone is performed by the 19 AP-3C Orion aircraft in the RAAF’s Maritime Patrol Group. Patrol boats of the Royal Australian Navy (RAN) perform 1800 sea-days of surveillance per annum primarily for civil response purposes. The naval effort is complemented by Customs sea-going vessels, providing an operational response capacity for any inshore sightings or incursions detected by Coastwatch assets. Customs also maintains a capacity to charter or to hire additional air or surface resources as required. The surveillance capacity of all these resources is over 80 million square kilometres per annum. In addition some elements of the new Coastwatch fleet are able to conduct all-weather searches out to 300 miles offshore.

**Surveillance Products**

Coastwatch has implemented formal arrangements with clients, contractors, Defence and Coastwatch regional offices to ensure that clear lines of communication, reporting, and command and control are in place nationally. Through its surveillance sorties, Coastwatch is a collector of information on a daily basis. This information is passed immediately to all clients to enable them to maintain accurate and current threat and risk assessments.

Formal Standard Operating Procedures (SOPs) are issued to all Coastwatch field units participating in the civil surveillance program. This includes agreed sharing of communication facilities including secure communication equipment, reporting of sightings, exchange of information, agreement on message reporting formats, delivery of pre-mission and post-mission briefings, and general operational interface between cooperating field assets.
The military surveillance priorities at the tactical level are formally translated into a Surveillance Plan. This plan defines specific tasks and the corresponding priorities. When each mission is completed, the results are immediately reported to the operational headquarters. An effective communication system is established to enable the effective reporting and immediate evaluation of results. Communication links are established from the surveillance platform to its parent unit, Headquarters Australian Theatre, and supported agencies or units.

Use of the Civil System in Contingency Operations

Coastwatch has established a committee of appropriately cleared personnel from Defence and key civil agencies who can be called together at short notice to consider sensitive surveillance-related tactical and operational intelligence. This specialist committee facilitates the exchange of information and intelligence to assist in the planning of an operational response coordinated by Coastwatch. Like any other operator of aircraft in Australia, Coastwatch also provides operational support to search and rescue authorities. In conflict, the civilian surveillance system, consisting mainly of Coastwatch, may be required to support Australian Defence Force operations. But under current contractual arrangements, the civil system would only be useful in a secure environment.

Indonesia’s Model and Experiences\(^\text{10}\)

Use of the Armed Forces in Maritime Air Surveillance

The Department of Security and Defence has responsibility for the management, administration and development of maritime security. It is also responsible for the production of hydrographic data and nautical charts in particular by the Naval Hydrographic and Oceanographic Services. As such, the Chief of Armed Forces has overall command of the maritime surveillance effort.

Organisational Implications

The Chief of the Armed Forces manages the surveillance effort through a Coordinating Board for Maritime Security as illustrated in Figure 4.4. Other government agencies provide requirements for surveillance, while the board manages and decides on a tasking program. The contributions from these agencies are coordinated through regular board meetings. Two coordinating centers - Western Sub-Area and Eastern Sub-Area - monitor and control operations on a daily basis. Senior naval officers command these centers. Joint patrol operations by the Armed Forces and other government agencies

are regularly performed, managed by the sub-area coordinating centers. The responsibility for enforcement of respective laws still remains with the various government departments and agencies. Also, there are joint patrol operations with the naval and police forces from regional neighbours such as Malaysia, Singapore and the Philippines.

![Diagram: Maritime Surveillance, Indonesian Model]

Figure 4.4: Maritime Surveillance, Indonesian Model


The overall organisation is under the Chief of the Armed Forces, assisted by the Chief of Naval Staff (CNS) who is responsible for the daily operations. The Sub-Area Coordinating Centers exercise direct control over the naval assets based in their area of operations and coordinate with the nearest Air Force units for any air support as required. Maritime patrol aircraft provided by the Air Force are managed by the Board. The Board also decides on the scheduling of flights based on the surveillance requirements from various military units. In times of urgent need, these assets are readily attached to the Sub-Area Coordinating Centers. Coordination of surveillance efforts by other government agencies is done through regular committee meetings with the Armed Forces and other concerned groups.
Surveillance Requirements

There are about twenty government departments and agencies in addition to the Department of Security and Defence that have roles and responsibilities in the management of maritime affairs. With this number, there is a high degree of complexity and overlapping interest on maritime issues that could possibly result in conflicting jurisdictions over the coastal and offshore areas. The major concerns of the Coordinating Board include security issues such as piracy, fishing intrusions by foreign vessels, trans-boundary marine pollution and smuggling in offshore areas.

Surveillance Resources

Two naval fleets – the Western Fleet and the Eastern Fleet - provide the surveillance effort using patrol ships and aircraft. The Maritime Fleet is operating several N-22 and N-24 Nomad aircraft and NC-212 locally manufactured aircraft. Other government agencies contribute assets, mainly comprising ships and boats, such as the Police with its marine and air wings. Only in times of urgent need does the Air Force (TNI-AU) provide support. The Air Force operates three specially modified Boeing 737s for long-range surveillance.11

Surveillance Product Distributions

The sub-area coordinating centers provide the facilities for the distribution of surveillance products to users, ie. from the maritime air surveillance operators to the coordinating centers to the users.

Maritime Air Surveillance, Canadian Model12

The Use of the Armed Forces for Maritime Air Surveillance

The Canadian Forces Maritime Air Group (MAG) contributes to the protection of the national economic, environmental and national security interests. This Group conducts continuous maritime air surveillance of the maritime approaches to Canada’s three oceans (Atlantic, Pacific and Arctic). This corresponds with the objective of the Defense White Paper 1994, whereby it will protect the national will by maintaining the ability to use or deny others the use of the aerospace medium. Specifically, accurate surveillance and intelligence collection, rapid and responsive global transportation, maritime surveillance and control, tactical support to land forces, precision attack, and airspace control are key capabilities provided by effective air power.13

Organisational Implications

The Maritime Air Group is responsible for the provision of combat-ready Maritime Forces for operational employment by the Commander of Maritime Command (MARCOM). The MAG is under operational command of the Commander, Air Command but under the operational control of the Commander, MARCOM. The MARCOM has responsibility for over 11,000,000 square kilometers of seabed.\textsuperscript{14} The Commander of Maritime Air Group, is also the Chief of Staff (Air) for MARCOM. In this capacity, he is the chief advisor to the Commander of Canada's Navy on air matters and is responsible for the operational tasking of maritime aircraft. Under the Group are two Wings, who respectively have responsibility for maritime patrols on the east and west coasts of Canada and correspondingly to the two MARCOMs; the MARCOM Atlantic and MARCOM Pacific.\textsuperscript{15} Figure 4.5 describes organisational and support arrangements both in military and civil agencies.

The MAG works closely with other government departments and agencies. The Commander, MAG, liaises with the different government departments and agencies regarding the civil maritime air surveillance requirements.\textsuperscript{16} Through Memoranda of Understanding with the Department of Fisheries and Oceans (DFO) it performs thousand of hours of support to fisheries patrols and counter-drug surveillance operations. Under the DFO is the Canadian Coast Guard making it the only federal department with an ‘ocean’ mandate. Responsibilities for the Canadian Coast Guard include managing aquatic resources, the marine environment and enroute maritime safety services. Within this department, the government’s two main civilian marine programs are integrated into one program.\textsuperscript{17}

MAG also provides part of the undersea surveillance and Anti-Submarine Warfare (ASW) force committed to North Atlantic Treaty Organisation and to the defence of North America.

\textit{Surveillance Requirements}

Canadians have long recognised the many threats to their ocean that could possibly have important sovereignty and security implications. In recent years, the importance of protecting the ocean from economic and environmental threats has increased. To counter these threats, the following tasks are being performed:

- air patrols to protect Canada’s sovereignty by verifying the presence and monitoring the movements of ships and submarines;

- operations to ensure the free and safe passage of shipping for legitimate purpose; and

- support of other government departments and agencies; particularly with respect to fisheries, drug interdiction, environmental monitoring of maritime economic zones and arctic regions, and exploration and exploitation of mineral and fuel reserve in the continental shelf areas.

\textit{Surveillance Resources}

The MAG is one of the operational groups under the Air Command. Air Command, unlike other Air Forces, operates all Canadian Forces aircraft and provides integrated support to the Army and the Navy.\textsuperscript{18}

It operates two of the air force’s fleets of multi-purpose combat aircraft: the Aurora long-range maritime patrol aircraft and the Sea King maritime helicopter. Although the 18 Aurora and 18 Sea Kings are now aging, they are still highly capable and are the most sophisticated platforms in the

\textsuperscript{16} Based on an interview with Major John Mitchell, Royal Canadian Navy, currently a GSC student at the Royal Australian Air Force College, 24 November 1998.
Canadian Forces inventory. With these assets, the MAG possesses some of Canada’s only resources able to effectively monitor such vast areas of ocean, as well as the enormous expanses of Arctic wilderness.

From the civil government, the Canadian Coast Guard maintains and operates a fleet of helicopters, strategically placed in four locations around the Maritimes. It is employed for fisheries patrol/surveillance, aids to Navigation work, SAR, resupply or ice surveillance. There are also several civilian companies contracted for surveillance requirements by the DFO. They employ light aircraft, like the Beech King Air, with necessary sensors.

**Surveillance Product Distribution**

The Headquarters of the Maritime Patrol Group is co-located with MARCOM and MARLANT in Halifax. Halifax has had a long history of being a major seaport complete with adequate facilities. This provides and facilitates better communications between the three major units involved in maritime surveillance and control.

**Use of the Civil System in Contingency Operations**

The prospect of employment of the civil system can be seen from the current Industrial Air Reserve Program. The program was conceived, developed and implemented in 1994 as a logical and efficient ‘partnering’ arrangement between Air Force and the civilian aerospace sector. Under the terms of this program, the local Air Reserve Augmentation Flight or Air Reserve support facility enrolls volunteer employees from major Canadian aerospace companies in the Air Reserve. The Air Reserve will become a more vital element of the Air Force restructuring.

**The Malaysian Model**

**Use of Armed Forces in Maritime Surveillance**

The Navy assisted by the Air Force performs a major role in the surveillance and enforcement of law and order in Malaysia’s Exclusive Economic Zone.

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20 Based on interview with Major John Mitchell, Royal Canadian Navy, currently a GSC student at the Royal Australian Air Force College, 24 November 1998.
Organisational Implications.

Under the Prime Minister Directive dated 6 October 1982, the responsibilities for providing security in Malaysian waters were allocated to different agencies. As a result, the Police with its Marine and Air Wing is responsible for the security requirement within Malaysian Territorial Waters. Within the Exclusive Economic Zone, the Navy assisted by the Air Force is responsible for the security requirement. Although these two agencies play the major role in surveillance and enforcement within the specified areas, other government agencies and departments are fully responsible for enforcing their respective laws and regulations. In 1985, the Maritime Enforcement Coordinating Center (MECC), a coordinating agency, was created and placed under the Prime Minister's Department. Figure 4.6. illustrates the organisational structure of the MECC.

![Diagram ofMECC organisational structure](image)

Fig 4.6: Maritime Surveillance, Malaysian Model


Surveillance Requirement

The surveillance requirements addressed by the MECC are those that have been agreed upon during various committee meetings. They are generally requirements from agencies and department such as Fisheries, Environment, Marine Department, Royal Customs and Excise, and Immigration.

Surveillance Resources

Surveillance resources are those assets operated by the Navy, Air Force, Police and Fisheries. Under the Navy is the WASP squadron that operates WASP type HAS MK 1 helicopters. The Air Force has four Beech Super King Air B200T. The Department of Fisheries is operating the Vessel Tracking Management System which is a computer-based system using Information and Satellite Technology to track and manage deep-sea fishing vessel fleets. Apart from that, it also acts as a management tool to enable the activities of
these deep-sea vessels to be monitored. See Figure 4.7 for the graphical presentation of this system.

![Diagram of Vessel Tracking Management System](image)

**Figure 4.7: Vessel Tracking Management System Employed by Malaysia**


**Surveillance Products Distribution**

The MECC was established for the sole purpose of coordinating the activities of the various maritime law enforcement agencies. As the coordinator, it is able to ensure that the national assets involved in maritime operations are utilised competently, swiftly and efficiently. It is also responsible for the formulation of standard operating procedures to enable the various maritime enforcement agencies to operate jointly when the need arises.

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Effective coordination and control are possible with the available range of communication facilities; landline telephones, radios, facsimile and computers inter-connected with the operating maritime agencies. Operations centers operate on a twenty-four hour basis to ensure immediate operational responses and coordination. Since the MECC is only a coordinating agency, it neither possesses any maritime assets nor has command and control authority over any of the maritime assets. The available communication facilities provide immediate distribution of information.
CHAPTER FIVE

COMMAND AND CONTROL NEEDS OF THE PHILIPPINES

Use of the AFP in Civil Maritime Surveillance

The utilisation of the Armed Forces of the Philippines (AFP) for maritime surveillance is determined by the nation's legal and institutional framework. Examination of the four surveillance models in the previous chapters demonstrated that each government uses their armed forces for maritime air surveillance to varying degrees. For example, the Australian Defence Force provides a minimal maritime air surveillance effort as a contribution to the civil-managed maritime air surveillance program. In Indonesia, assets from two Naval Fleets, supplemented by Air Force and Police resources on a needs basis, are employed to conduct maritime air surveillance addressing both military and civilian requirements. Malaysia also employs Armed Forces and Police assets in its maritime surveillance program. For Canada, the Air Force performs a major role in maritime air surveillance using its Maritime Air Group for both military and civilian requirements.

Prior to the enactment of the AFP Modernization Act, the Constitution mandated that various government agencies and departments operate their respective programs relating to the maritime environment. As part of the AFP's mandate to protect the people and secure the territorial integrity of the country, it conducts maritime surveillance through the Philippine Air Force and the Philippine Navy. The AFP also provides support to other agencies by way of Executive direction and legislative authorisation. Several government agencies conduct their surveillance by contracting civilian aviation companies.

A significant change has been made with the enactment of the Modernization Act through Republic Act Nr 7898. This Act mandates that the AFP should develop its capability to perform major roles related to maritime concerns. The Act specifically mandates the AFP to conduct the following roles:

- Through the Navy, defend the Philippine territorial seas, all its internal waters, as well as its 200-mile Exclusive Economic Zone from all forms of illegal intrusions or passage. It should also protect all domestic and internal lines of communication likely to be threatened by submarines.

- Through the Philippine Coast Guard, protect and preserve all living and inorganic marine resources in coastal and river areas.

- Through the Air Force, conduct maritime patrol and reconnaissance. In its joint capacity, the AFP should develop its capability to conduct search and rescue, and other disaster relief operations. It should be able to assist civil
agencies concerned with the marine environment and the enforcement of domestic and foreign policies and international covenants against transnational crimes.

Another provision of the Act worthy of examination is the employment of affiliated reserve units. The Act mandates the identification, organisation, training and development of reserve force and affiliated reserve units in the AFP, especially in the Navy and Air Force. Additionally, there are civilian companies with maritime and air assets that could be employed to augment AFP assets on maritime surveillance.

Organisational Implications

The different models indicate a very important feature for a total system to be effective, efficient and cost-effective. In Australia, a strategic level organisation is established for the provision of the necessary direction and policy to ensure that the utilisation of resources for maritime air surveillance is effective and efficient. At the highest level is the Minister for Science, Customs and Small Business, assisted by a committee that examines the overall surveillance requirements. This committee finalises and determines the overall priorities for all tasking.

Also at the operational level of organisation, Coastwatch is established to be responsible for daily operations. This agency implements the program decided by the coordinating committee. In Thailand and Malaysia, there is a similar group that determines and consolidates the requirements, and prioritises the surveillance tasking. The only major difference is the manner of control of the operation. In Indonesia, the naval staff heading the coordinating committee has command and control of the maritime air surveillance assets but in Malaysia, the coordinating committee has no control over the maritime air surveillance assets.

For Canada, two Federal departments conduct major roles in maritime air surveillance: the Department of Defense and Department of Fisheries and Oceans. Support is provided by the former to the later by means of a Memorandum of Agreement.

In the Philippines, the PAF and the PN perform their respective military surveillance requirements based on the yearly program compiled by their respective headquarters and approved by higher headquarters. The PAF conducts civil maritime air surveillance based on a 'per request basis' and, in the case of the DENR, through a Memorandum of Agreement. Although the PN does not have the capability for maritime air surveillance, it complements other maritime surveillance efforts through its fleet and Coastguard units. Additionally, civil agencies perform their own monitoring and surveillance of their specific concerns and interests over the maritime areas but without using any major air surveillance capabilities. In this overall effort, a problem that exists in terms of coordination during operations is the incompatibility of communications among the various agencies.
As a result of the limited capabilities and a lack of integrated effort, the country is loosing much of its maritime resources, and experiencing the unabated destruction of its maritime environment. More importantly, the very limited military effort in securing Philippine territory and its maritime resources is an indication of the nation’s deterrent capability. The Modernization Act concerns not only the development of AFP capabilities but also reflects the Philippines’ intention to protect, secure and develop its marine resources as well its territorial integrity. Therefore, the establishment of a national surveillance system is imperative, taking into account the following considerations:

- the system should address the maritime air surveillance requirement in terms of national perspective;

- the establishment of such a system should entail minimal financial support;

- the organisation of the system must generate cooperation at the strategic, operational and tactical levels to ensure that producers satisfy user requirements with optimal use of resources;

- the heads at the three organisational levels of the system should have the authority to ensure adequate coordination; and

- the system should be established in such a way that the transition from peacetime operations to operations required during times of increasing tension or conflict is accomplished with ease and minimal adaptation.

Surveillance Requirements

The countries examined in this study have almost the same concerns in regard to the security, development and exploitation within the vast area of the territorial seas and, to some extent, international commitment on maritime issues. Malaysia has the same concerns and these relate to the Philippine territorial claim. In the South-East Asia region, an increasing population and a decreasing food supply from the land brought about by industrialisation are two of the main reasons why the people are now turning to resources from the sea. Because of these reasons, some fishers are now exceeding their authorised limits and encroaching on the territory of other nations. Additionally, some fishers conduct prohibited practices such as overfishing, catching endangered species and disrupting the fish environment. Another concern is the increased shipping resulting from the growth in trade. This shipping is producing increased sea pollution, thus endangering the fish environment, and the potential for collisions with the attendant problems. Additionally, most of the countries have also growing concern on transnational crimes such as smuggling of goods, illegal drug trafficking and illegal entry.
All of the AFP's modernization objectives outlined in Chapter 2 address these maritime concerns and indicate the need for maritime air surveillance. Importantly, close examination indicates a major role in civil maritime air surveillance for the AFP during peace.

**Surveillance Resources**

For the four maritime air surveillance models examined, the respective governments established surveillance programs optimising the employment of all the appropriate national air assets from civil government, the military and commercial agencies. The size of these contributions depends on what is authorised by the legal and institutional framework. For example, the ADF contributes a minimum number of flying hours for civil maritime air surveillance while the civil government agencies contribute the majority of hours. In Indonesia, Malaysia and Canada, the military provides maximum participation based on their respective mandates. Canada provides a whole Air Force Group dedicated to maritime air surveillance. Additionally, the Coastguard performs maritime air surveillance functions with its helicopter fleet. On some occasions, government departments, through contracts, employ civilian maritime air surveillance resources. In Malaysia, the government delineates its area into two maritime zones, one patrolled by the Armed Forces and the other patrolled by the Police. Furthermore Malaysia employs a vessel tracking management system which controls surveillance of deep-sea vessels within its territory and EEZ. In Indonesia, the navy performs the major role through its two major fleets. The Air Force assets are utilised on a needs basis.

The PAF has only one aircraft being used for reconnaissance photomapping purposes, and the air assets of other armed services are employed on tasks other than maritime reconnaissance. None of the civil government agencies have air assets for maritime reconnaissance. Some maritime air surveillance requirements are being contracted to commercial companies and, in one case, this is achieved by the PAF through a Memorandum of Agreement.

To match the surveillance requirements and also to comply with the requirements of the Modernization Act, the PAF has to acquire maritime patrol and reconnaissance aircraft. These aircraft should have the capabilities to conduct surveillance, reconnaissance, target acquisition, interdiction, patrol, search and rescue, and environmental control. These multiple capabilities address both the civil and military spectra of surveillance requirements.

**Surveillance Products**

All the countries maritime surveillance models examined have established to varying degrees processes for the comprehensive distribution and sharing of information gathered in the maritime environment. These processes incorporate clear, formal and well-defined command, control and communications procedures and arrangements. Such procedures and
arrangements are usually specified in the Standard Operating Procedures (SOPs) applied by all field units.

For the Philippines, there is no integrated command and control system for the various agencies at the strategic level. Instead, the only benefit is the synergistic cooperation resulting when agencies work together on activities of national interest. In many instances, the PAF conducts maritime surveillance operations on an ‘as required’ basis in cooperation with the civil agencies. For military operations, difficulties are encountered in the immediate relay of information because of incompatibilities in equipment, particularly between PAF and PN. Better prospects are ahead for the AFP regarding this matter as the Modernization Act mandates the development of a general headquarters, together with a control, communication and information system network.

Utilisation of Civil Maritime Air Surveillance during Contingency

Although the possibility of utilising Coastwatch during contingencies has been recognised in Australia, no arrangement has yet been made. In Canada, the Air Reserve is an important element of Air Force Restructuring. The Air Force is developing reserve links to the aerospace industry, specifically with companies that have major connections to, and natural affiliations with Air Command equipment and activities. Utilisation of this reserve during a contingency would therefore be a possibility but at the moment this is not being done.

For the Philippines, as some of the commercial aviation companies and its employees in the Philippines are members of the Philippine Air Force Air Reserve Unit, they could be employed on maritime air surveillance tasks during contingencies.
CHAPTER SIX

PROPOSED COMMAND AND CONTROL SYSTEM

The present day scenarios for civil and military affairs pose significant challenges to leaders or commanders at the strategic, operational and tactical levels of command. To meet these challenges, commanders need to be highly competent across a range of leadership and management issues applicable to both the civil and military arenas. Of all these issues, command and control is perhaps the most important, especially for the optimal employment of limited resources on an expanding range of diverse tasks. Implicit in the effective command and control is a thorough understanding of basic organisational structure, command and control principles, the processes and arrangement required, and the necessary facilities.

Command and Control Concept

The command and control concept recommended for maritime air surveillance is based on the fundamental principle of centralised control and decentralised execution. Centralised control is exercised by determining the national surveillance requirement, developing a program with agreed priorities, and finally having this program approved at the national level. Accordingly, concerned agencies will finalise their individual plans, incorporating the adjusted surveillance priorities. Owing to constantly changing circumstances, these plans will need to be reviewed at regular intervals. All concerned agencies will need to be informed well in advance of any changes so that the service provider can immediately determine any changes to resource requirements. The execution of plans will then be undertaken by the different agencies according to these priorities. At the tactical level, the different operating units will generate operations plans in accordance with the specifications of the specific tasking and complete the required missions. The mission results will be immediately reported to the operational level and to the surveillance product user.
BASIC CONCEPT OF MARITIME AIR SURVEILLANCE

Basic Concept of Maritime Air Surveillance

Before going into detail, let me first propose a basic concept of maritime surveillance by putting forward the summary of major issues as discussed in the preceding chapters.

Level of Coordination and Control

A strategic level of organisation should be established. This will ensure that all national requirements will be considered; there will be no overlapping of effort; maximisation of the use of national resources; the erasing of the thinking of ‘ownership’ of the organisation responsible for the conduct of surveillance. There is the perception by the other user that whoever has the ownership will be able to have the precedence in the use of such resources. To minimize the additional administrative cost to the government, the existing government agencies or office at the strategic level should be utilised. Such agencies or offices should be able to generate cooperative efforts from other agencies concerned with the maritime air surveillance.

Another important matter to be considered is the universal thought that the maritime surveillance capability is a strategic asset and that its utilisation should be managed at the highest level of authority.

Use of Military Capability

There are no legal impediments for the use of the military in the Philippines both for surveillance and enforcement since the new law mandates such efforts. There should be maximum participation by the military and specifically in the area of offshore and EEZ maritime patrol and air surveillance, but also in support of maritime air surveillance on coastal areas when required.

Surveillance Requirements

The recommended organisation will address both the military and civil requirements and such requirements should be properly defined, visible and prioritised. The organisation should bear in mind that the surveillance requirement theoretically comes from threat and risk assessment, and each agency involved is responsible for this.

Surveillance Resources

There will be maximum utilisation of air assets of the PAF as well as civilian aviation entities, particularly those that are contracted members of the Philippine Air Force Reserve Units.
Surveillance Products and Its Distribution

The proposed national level organisation should have a national level of database collation and act as the focal point for information distribution. Existing operations centers and facilities should be capable of undertaking communications links to all resources for immediate distribution and sharing of information. Civil government agencies should also establish parallel capabilities. The military should review the present Rules of Engagement (ROE) to correspond to the requirement of maritime air surveillance/reconnaissance operations. Standard Operating Procedures should be established to assure a uniform and smooth implementation of tasks. Another important aspect is that the organisation should adapt an information management system that appropriately addresses the requirement of all users at the various levels and ultimately the decision-makers. The network-based information management system could well address this requirement.

Use of the Contracted Civilian Aviation Entity

Civilian air facilities that provide basic air services are being organised by the Philippine Air Force Affiliated Reserve Units (PAFARUs). They are being trained to ensure continued provision of this essential public service in times of contingency, however they should be covered by some form of legal order or legislation. If there will be insufficient numbers to form such an entity, immediate arrangements and understandings should be established with the contracted parties.

Elements of the Proposed Command and Control Structure

Organisational Structure and Related Command and Control Process

Strategic Level

As a guide to the development of an appropriate organisational structure for addressing the maritime surveillance program, a conceptual framework as illustrated in Figure 6.1 has been adopted. This framework is a cycle in itself. As a start to describing the framework, the Philippine government provides policy about maritime requirements in term of security and economic development. This policy is based on inputs from different military and civil government agencies that are derived from earlier gathering and evaluation of data and information. From this policy, objectives are derived addressing military and civilian concerns. The different agencies compile their respective programs or missions to attain these objectives. These programs or missions are defined in terms of tasking and their corresponding priority. All the tasks are inserted into a surveillance database so that results can be analysed and evaluated. At the tactical level, each task is executed and its results or products are distributed to the agencies concerned and are also inserted into
the surveillance database against the tasking. After the surveillance products are analysed and evaluated, the results are used as the basis either for modification of government policy or for conducting additional surveillance tasks. This cycle is then repeated.

![Diagram](image)

Figure 6.1: Maritime Surveillance Conceptual Framework

The surveillance effort and its products, illustrated at the center of Figure 6.1, are critical to the overall decision-making process not only at the operational level but also at the strategic level. Furthermore, they again emphasise the importance of the threat and risk assessment necessary to established a maritime air surveillance requirement. This is in essence the field and forte of intelligence.

It is fitting that the maritime surveillance effort should be under the national intelligence structure. In the Philippine governmental structure, national intelligence embraces those departments, bureaus, offices and agencies of the government that contribute directly to the national intelligence picture. The President of the Philippines is at the apex of this structure with a dual capacity as the Chief Executive of the government and the Commander-in-Chief of the AFP. He provides the policy and overall direction for national intelligence, and is responsible for its supervision and administration. For the president to meet these responsibilities, the National Security Council assists him. The Council is comprised of military and other department heads that advise the President on the integration of domestic, foreign and military policies, and other matters relating to national security.

As an acknowledgment of the national importance of maritime air surveillance, the proposed organisational structure should be under the aegis of the Council. Currently within the Council as its operating arm is the National Intelligence and Coordinating Agency (NICA) which is charged with the overall coordination and integration of all government intelligence.
activities with respect to national intelligence. NICA also prepares intelligence summaries of both local and foreign situations for dissemination to the President and the National Security Council. The Director-General of NICA is appointed by the President.

To specifically address the maritime surveillance needs, the recommendation is that a dedicated office, titled the National Maritime Surveillance Office (NMSO), be established under NICA. The intelligence activities of two established agencies are then directly coordinated by NICA: the Civil Intelligence and Security Agency (CISA) and the AFP Intelligence organisation. A further recommendation is that these two organisations should perform functions aligned with the maritime air surveillance program. Figure 6.2 illustrates the overall maritime air surveillance organisational structure incorporating all the departments concerned. Under the proposed office, the following three branches would be established for conducting the necessary administrative, planning and operational functions:

- the Interdepartmental Coordination Branch,
- the Program and Administration Branch, and
- the Program Operation Branch.

Interdepartmental Coordination Branch (ICB).\(^1\) The ICB would be responsible for conducting interdepartmental committee forums, attended by the senior representatives from the participating departments; and making appropriate recommendations from discussions on surveillance cooperation and development. One essential role of the ICB would be to review interdepartmental arrangements, to oversee the overall effectiveness of the surveillance program, and to review and recommend approval of the yearly surveillance strategic plans and program to the President and Security Council. The yearly surveillance program would be the major basis for the annual budget for this activity. This committee would convene at least twice a year or as required by the Director-General, NICA.

Program and Administration Branch (PAB). The PAB would be responsible for regular reviews of the surveillance program and the preparation of the proposed annual program, based on the outcome of the interdepartmental forum. A monthly meeting with designated representatives from participating departments/agencies is also recommended. This branch would provide advice to the Director-General NICA on operational and administrative issues and would oversee the development and compilation of the national surveillance program, program review, and database requirements for national surveillance. It would also be responsible for the formulation of contracts and standards covering civilian aviation companies conducting coastal maritime air surveillance. Finally, the Branch would provide financial and general support to the NMSO.

Program Operation Branch (POB). The POB would be responsible for the daily monitoring of established strategic surveillance requirements, compiling database information, and liaising with the AFP intelligence structure and CISA. An operations center should be established within the POB to provide 24-hour centralised monitoring of all surveillance and response operations. For urgent tactical surveillance requirements, a Crisis Management Committee (CMC) should be organised. The CMC should comprise authorised personnel from Defence and key civil agencies who can be called together at short notice to consider sensitive surveillance-related tactical intelligence.

Maritime Air Surveillance Program
Organisational Structure (proposed)
Strategic Level

![Organisational Structure Diagram]

Figure 6.2: Strategic Organisational Structure
Operational Level

Civil Maritime Air Surveillance Requirement. The CISA is responsible for the coordination and integration of all intelligence activities by civilian government agencies. In its current form, this Agency could generate cooperative efforts and thus undertake the overall consolidation and coordination of maritime air surveillance requirements for the civil agencies concerned. In conjunction with these functions, the Agency could perform additional tasks if suitably equipped facilities are established. These additional functions may, for example, require the Agency to seek extra air assets from commercial, government, or civilian entities. As such, the Agency should be authorised to enter into contracts for the utilisation of these air assets, as established by the ICB, as well as being responsible for their overall control. When the time arises to operate such assets in a hostile environment, they would be under the operational control of the CG, PAF. For such organisation and arrangements to be effective, each government department and agency concerned should identify appropriate representatives. In addition they should also identify appropriate points-of-contact for effective liaison and coordination with CISA.

Military Air Surveillance Requirement. Military forces recognise the strategic value of a maritime surveillance capability and therefore accept cost considerations and the limited number of platforms that can usually be purchased. Owing to the importance and cost, there is also an acceptance that decisions for employing the capability should reside at the highest possible echelon of the command and control structure. A proposed AFP organisational structure is illustrated in Figure 6.3. In this structure, the Chief of Staff (CS), AFP would ascertain the overall maritime air surveillance requirement of the force. These include the requirements of the various arm services, as well as the evaluation of results from previous efforts. To meet these requirements, the CS, AFP should organise and chair a review board. Members of this Board would include the J-2, the heads of the intelligence organisations of the different armed services, and the Chief, ISAFP. The J-2 will represent the CS, AFP with the ICB.
Figure 6.3: Military Organisational Structure for Maritime Surveillance Regime
Maritime Patrol Group - Organisational Structure

The current thrust of the Modernization Act, specifically relating to maritime security, needs to be translated into organisational change that permeates to the lowest level. To perform the major role in maritime patrol and surveillance, the 300AISG should be reorganised and allocated the long-range patrol aircraft that will be acquired. Furthermore, the organisation should comprise three Maritime Patrol Squadrons (MPS), each with a forward deployment station to cover the three major areas as illustrated in Figure 6.4. The following proposed main operating bases and forward deployment stations would cover specific areas of concern:

- **Main Operating Base.** The main operating based proposed is Mactan Air Base, Cebu for two reasons. First, the base provides a central location from which main maritime surveillance resources could deploy. Secondly, this is the area identified for the planned establishment of depot maintenance of heavier aircraft.

- **Forward Deployment Stations.** These following bases are proposed as forward deployment stations as they are close to the areas of greatest concern. Such locations save transit time, thus allowing more time for surveillance or reconnaissance activities.

- MPS at Clark Air Base
- MPS at Antonio Baustista Air Base
- MPS at Edwin Andrew Air Base
Commander and Staff - Joint Level. The following staff, with their functions and responsibilities as illustrated in Figure 6.5, would assist the commander in the decision making process at the various headquarters level:

- **J-2.** The Deputy Chief of Staff for Intelligence, AFP should be the representative for the Interdepartmental Advisory Forum. Primarily, the J-2 is responsible for the administration of the overall military surveillance effort. This administration includes the development of the overall surveillance capability of the AFP, the attendant facilities and support equipment, the compilation of all service bids for maritime air surveillance requirements, and the integration to the national surveillance program. The J-2 is the primary adviser to the CS, AFP on matters of maritime air surveillance.

- **J-3.** The Deputy Chief of Staff for Operations, AFP should be the representative during the meeting called by the Program Advisory and Administration Branch. Primarily, the J-3 would supervise the implementation and execution of approved maritime air surveillance programs by CS, AFP. Also, the J-3 would be responsible for the development and compilation of the military surveillance plan, the program review, accomplishments, and the database requirements of military surveillance.

**Chief of AFP Joint Operation Center (C,JOC).** The C,JOC is responsible for the daily monitoring of the surveillance activities and response coordination, compiling database information through the various Command Operation Centers, and the overall review of military surveillance efforts. The JOC will be the point of contact for the POB, NICA and OC, CISA.
Figure 6.4: Area of Concern for the Respective Maritime Patrol Units
**Commander and Staff - Air Force Level.** At the single-Service level, the following staff, with their functions and responsibilities, as illustrated in Figure 6.5, would assist the commander:

- **A-2.** The Assistance Chief of Air Staff for Intelligence would be responsible for the administration of the maritime air surveillance effort by the PAF, including the development of its surveillance capabilities and attendant support equipment. Also, the A-2 would be responsible for the annual programming of the PAF's maritime air surveillance activities, based on the priorities approved by the NSC and CS, AFP. A2 would also conduct the periodic evaluation of these activities for consideration of CS, AFP.

- **A-3.** The Assistant Chief of Air Staff for Operations would be responsible for the 24-hour centralised coordination and monitoring of all maritime air surveillance and response operations. To support these operations, the A-3 would be responsible for the development and compilation of the Air Force surveillance plan, program review, accomplishments, and database requirements for PAF surveillance. Flowing from this plan, the A-3 would be responsible for supervising its implementation and execution.

A similar organisation and staffing arrangements should be established within Navy and Army.

Maritime Air Surveillance Program  
Commander and Staff (proposed)  
Operational Level

![Diagram of Commander and Staff](image-url)

Figure 6.5: Commander and Staff
Command and Control Arrangements

Operational Authority

Full Command

The CS, AFP will have full command of the maritime air surveillance capability and will delegate the command and control to the CG, PAF. The CG, PAF will have the complete operational and administrative authority and responsibilities. These include the authority to raise, train, maintain and operate the surveillance elements and to advise the CS, AFP on their employment.

Operational Command (OPCOMD)

The Commander, MPG will have the operational command of the subordinate units and could assign missions or tasks to subordinate commanders to deploy the units, and to retain or delegate operational or tactical control as deemed necessary. It includes responsibility for administration and logistics.

Operational Control (OPCON)

The Commander, MPG, will have the authority to direct assigned forces to accomplish missions or tasks that are usually limited by function, time or location. The Commander could also deploy subordinate units or air assets, retain tactical control or assign tactical control of those units or assets to its subordinate units. It neither includes the authority to assign separate employment of components of the units concerned nor includes administrative and logistic control. In time of contingency or increase conflict, the Commander will have the operational control of assigned units or air assets of the PAFARUs.

Tactical Command (TACOMD)

The Commander, MPS for each of the three MPSs would assign tasks to elements under his command for the performance of the missions. This is a delegated authority to assign tasks to units to achieve an assigned mission, to direct specific forces of the unit for assigned missions, and to delegate tactical control of the assigned units.

Tactical Control (TACON)

Tactical control would be a delegated authority by the Commander, MPG to Commander, MPS for detailed and usually local direction and control of movements or maneuvers necessary to accomplish the missions or task assigned. In times of contingency or increased tension, the Commander, MPS will have the tactical control of the assigned units of the PAFARUs.
Administrative Authority

Administrative Control

The Commander, MPG would still exercise authority over the deployed MPS in respect to administrative matters such as personnel management and logistics matters.

Local Administration

The deployed subordinate units of the MPG would be under the local administration of the deployed base or station commander. Local administration involves the following:

- provision of services and administration, such as water, light, power, sanitation, complementary fire protection;
- discipline;
- local movement of personnel and materiel;
- local road traffic and movement;
- security, including preventive measures against vandalism and theft;
- allocation of local duties;
- allocation of training area and recreation facilities; and
- the supervision and maintenance of safety.

Technical Control

The MPG will have technical control over the PAFARUS in matters of maritime air surveillance. This is not a command or operational authority but it designates the MPG to provide PAFARUs with specialised and professional operating procedures essential for the proper management and operation of capabilities.

Support Arrangements

Command, control and support arrangements provide the overall view of the support arrangements that the maritime air surveillance provider should have with the user. An example is illustrated in Figure 6.6. To differentiate the control arrangements and extent of priority on specific tasks, the tasking orders should specify the type of support in accordance with following definitions:

- **Direct Support.** Direct support is the support provided by a unit not attached or under command of the supported unit, but required to give priority to the support by that unit (within same or other service) or

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2 Definition derived from Draft Chapter 7 ADFP1, COMAST, p. 7-9.
COMMAND AND CONTROL OF PHILIPPINE MARITIME AIR SURVEILLANCE

composite unit such as a Unified Command or Task force. The unit in
direct support cannot be tasked to provide the same maritime air
surveillance resource to more than one unit or composite unit and remains
under command of its parent unit.

- **In Support.** In support is the support provided by a unit not attached or
  under command of the supported unit. The commander of the supporting
  unit assigns priority to the support given in accordance with his own
  judgement or advice given by the supported or composite unit. The
  supported headquarters does not have any responsibility or authority for
  administration or movements of the supporting unit.

The Maritime Patrol Group

The different regional MPSs may be tasked to provide support, either direct or
in support, as defined by the tasking orders. An MPS could be tasked to
provide direct support to the Coastguard on civil surveillance and
enforcement operations, to the PN for ASW or ASuW operations, and to the
PAF on ADC-related air-to-air operations. The ASuW requirements dictate
that the aircraft be capable of over-the-horizon targeting to provide a stand-off
missile firing capability to surface vessels and other aircraft.

MPSs could also provide direct support to different Tactical Operation
Command units, and Unified Command or Task Force units conducting
internal security operations involving the detection of land targets and the
monitoring of insurgent activities in coastal as well as inland areas. Another
task in support of Unified Command or Task Force units is electronic
intelligence gathering. To support the different civil enforcement agencies, the
MPSs would provide maritime air surveillance based on the strategic program
established by the NMSO and approved by the NSC.

The PAFARUs

In normal situations, strategic surveillance operations would be conducted by
the PAFARUs in accordance with the NSC-approved program and under the
control of CISA. Such operations normally would be in direct support of the
civil enforcement agencies and the Coastguard. When required to perform
maritime air surveillance in times of contingency, the PAFARUs would be
under the tactical command and control of the Commander, MPG and could
be tasked in support to Tactical Operation Command. Such tasks would be
limited by the capability of the civilian operating company.

Coordination and Liaison

**Coordinating Authority.** The J-2 would have the authority to coordinate with
the Director, CISA while the A-2, as well as other Service Intelligence Staff
officers, should also be authorised to coordinate specific functions or activities
related to surveillance with bureaus of the different civil departments. This authority does not include the authority to compel agreement.
Authority for Direct Liaison. The J-2 should liaise with the ICB in regard to military surveillance requirements and their contribution to the overall national surveillance efforts. This authority should be granted by the CS,AFP to allow direct consultation or the coordination of an action with that agency.

Command and Control Facilities

Operation Centers

Present operation centers of different military and civilian agencies, as well as those proposed by this study, will have to make some adaptations to meet the requirements discussed so far. The following are the different operation centers that would be involved in the overall maritime air surveillance effort, together with a description of their respective functions:

- National Surveillance Operations Center;
- Main Operations Center;
- Joint Operations Center;
- Command Operations Center; and
- Operations Center.

National Surveillance Operations Center (NSOC). Organised under the Program and Operation Branch of the NMSO, the NSOC would conduct 24-hour monitoring and coordination of the national maritime surveillance efforts. It should have the capability to compile database information and to distribute this information to all concerned. In times of contingency, the NSOC should provide a forum for appropriate departmental representatives to discuss urgent tactical surveillance requirements.

Main Operations Center (MOC) and Field Operations Centers (FOC). One MOC and three FOCs would need to be established under CISA to perform monitoring and coordination of surveillance and response requirements. The MOC would monitor and coordinate the overall surveillance and response requirements. On receipt of information, either from military or civilian sources, relating to potential or actual breaches of Philippine laws, the MOC would immediately consult with the appropriate civil department about their requirements. If the requirement necessitates military assistance, the MOC would coordinate with the J-3, AFP; otherwise, the civil department would conduct its own response through the Civil Agency Response Units (CARU). The MOC would continue maritime air surveillance until interception is achieved. The FOCs would monitor and coordinate respective requirements and provide regional feedback to the MOC. Locations for each of the FOCs should be in the three major sub-geographical areas, collocated with the MPSs at the three forward deployment stations.
AFP Joint Operations Center (JOC). The JOC would monitor and supervise maritime air surveillance and response requirements for military operations. For civil requirements, the Center would immediately consult with the appropriate civil department upon receipt of information of potential or actual breaches of Philippines law. As well, the JOC would inform the MOC of these requirements and coordinate other appropriate action. If naval military action or assistance is required, the JOC would consult with the superior commander, transmit the required task to the PN through its Command Operation Center (COC), and monitor the task’s execution. The JOC should have the capability to develop and to compile the military surveillance plan, program review, accomplishments, and database requirement.

PAF Command Operations Center (COC). The COC is the main facility of the Commanding General (CG), PAF for command and control of administration, logistics and operations other than air defence. For maritime air surveillance, it exercises primary and centralised operational control over all air surveillance elements. It would coordinate laterally with the Naval Operations Center in time of joint security operations and direct the necessary Air Force elements to perform either long-range reconnaissance or surveillance. For air defence operations, the Philippine Air Defence Control Center (PADCC), under the Air Defence Command, is the dedicated main air operation center and is linked to the highest government authorities and military commanders. To ensure continuity of control, the PADCC is the designated alternate main operation center. It has two sub-levels of control: the Sector Operation Center (SOC) and the Control and Reporting Center (CRC). The SOC would be the reporting point for the MPG operations center, the MPS operations center or the maritime surveillance element in the case where aircraft intrusion into territorial air space is detected.

MPG Operations Center (OC). At the tactical level, the MPG Operations Center would generate the surveillance plan to meet the direction provided by the COC. In addition to the plan, it would provides specific tasking to the MPSs and supervise the implementation or execution of missions, and report results to the COC. The COC would then coordinate with the Coast Guard Operations Center for the tactical operational planning of joint operations.

Communication and Information Management System

The effectiveness of the Commander’s decision-making and the accomplishment of missions depends very much on: accessibility to information; the timely distribution of taskings; the monitoring and direction of the current situation; and the exchange of information. For the complex maritime surveillance mission, commanders at the various levels and their facilities should be linked comprehensively. To attain this linking, the operations centers should interface and their connectivity should be as illustrated in Figure 6.7. Additionally, the communication link system should be also provided from the sensors to the different operations centers as illustrated in Figure 6.8. Fortunately, many new available technologies provide
several options to address these requirements. While these options will be described in terms of the system specifications, their technical evaluation is beyond the scope of this study. The different criteria discussed in Chapter Four should be considered in ultimate selection of the system for the AFP.

Figure 6.7: Operations Center Connectivity

Figure 6.8: Maritime Air Surveillance Command and Control Links
Communications System

Present communications technologies transmit voice, video and hard copy. As well, these technologies allow communications facilities and equipment to be highly deployable, versatile and flexible. These attributes provide a capability to manage an entire Air Task Order (ATO) cycle and its associated requirements. Video-conferencing allows personnel at different locations such as operation centers to actively interact and exchange data. An example of this system illustrated in Figure 5.9 - the deployable Air Operations Center (AOC) capability for US Air Forces in Europe and NATO - is a highly versatile and flexible C4I tool. This AOC manages the generation of the entire airspace control order (ACO) and ATO cycle, including coordination between air, land and maritime force components, target development, tasking, force execution and combat assessment. The system uses hardware such as Sun Sparc 20 and Sparc 10 workstation, Zenith Z510 and Digital DEC 3000 workstations, all linked using multi-mode fibre-optic local area network technology.3

To provide an effective and efficient communications system for maritime air surveillance in the Philippines, three major components are required. These components need to be integrated to ensure effective communication and coordination between AFP decision-makers, civil departments and the civilian agencies involved. These components are:

- the Philippine Telecommunication Support Infrastructure,
- the Strategic Communication System, and
- Tactical Communication System.

The Philippine Telecommunications Support Infrastructure. To minimize the cost of an effective communications system, optimal use should be made of the existing Philippines commercial telecommunications infrastructure with provisions made to ensure security. Such an arrangement would provide the primary communications for the network between civil departments, civilian agencies and the AFP. An example of such a concept is the recent Defence Mobile Communication Network (DMCN) being developed by Optus Network Pty for the operational units of the Australian Defence Force. Optus will develop a secure and reliable tactical satellite communications network from a non-secure network, featuring a high level of automation and operated by a minimum number of personnel. Most of the new hardware and software will be designed and developed by Australian industry.4

Strategic Communication System. The strategic communications system would consist of the established communications network already being used by the AFP. This land-based and satellite communications system is primary

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network for communications at the national strategic level. Such a system would need to be improved so as to interface better with the proposed information management system.

**Figure 6.9: A Proven Concept of Management of Airspace Control Order and Air Tasking Order Generation Cycle.**

**Tactical Communication System.** Consisting of mobile and portable communications equipment, the tactical communications system would facilitate control and coordination of the activities by forward deployed military elements. This system is the primary operations communication network for deployed AFP elements such as maritime air surveillance aircraft and naval vessels. Communication capabilities available to a deployable operational headquarters vary according to the nature of a particular mission. Such capabilities may well include fixed voice and data communications, and UHF, VHF and HF radio nets. Current technologies as illustrated in Figure 6.10 need to be incorporated to allow the interface of these systems with the proposed information management system. Aside from a communication system for command and control between ground and air platforms, a data
link system also needs to be considered. Systems are already available to allow the relay of data, imagery and sensor display information between air and surface platforms and facilities.

![Diagram of proposed command and control system]

**Note:**
- CDU - commanders' display unit
- CPU - central processing unit
- FM9000 - RNL A VHF radio (Thomson PR4G)
- HF7000 - RNL A HF radio (Harris family)
- MMU - mass memory unit
- RIM - radio interface module
- SD - storage device
- TINC - tactical Internet controller

**Figure 6.10:** Radio Communications System Interfaced with the Management Information System

**Sensors**

Comprehensive detection of varied surveillance targets, civil and military, could be accomplished using state of the art equipment such as digital surface surveillance radars, high definition television cameras with video recording, infra-red cameras, and night search or night vision equipment. For example, an increased probability of detection of an approaching target could be attained by using electronic surveillance for initial detection, followed by the use of gyro-stabilised binoculars. Some of the commonly used sensors are:

- Light Detection and Ranging Radar,
- Synthetic Aperture Radar,
- Ground Moving Target Indicator Radar,
• Forward Looking Infra-red and Low-Light TV, and
• Stabilised Optical Camera.

Some of the operational scenarios where these sensors could be utilised are summarised in Table 6.1.

**Light Detection and Ranging Radar (LDRR).** High-resolution, three-dimensional underwater images can now be obtained at high search rates using Streak-Tube Imaging (STIL). The technology has potential applications in anti-submarine warfare for air platforms, mine countermeasures and oceanic research. Flight tests using a prototype STIL and a static installation have imaged 20 centimetre and 30 centimetre wide mines in nine metres of calm water. Candidate systems for airborne bathymetry have search rates estimated at 60 square kilometres an hour with five metre sampling.⁵

**Synthetic Aperture Radar (SAR).** With state of the art resolution imaging, SAR can produce spot maps of areas measuring hundreds of metres to kilometres in size at tens of nautical miles range with resolution as fine as 30 centimetres. Such a capability could be used to produce geometrically accurate surface maps with the smallest feature size of 30 centimetres. In terms of accuracy, high resolution allows features of interest such as buildings, roads, structures, vehicles, parked aircraft, ships, fences, antennas and other features of interest to be detected, identified and accurately located in relation to the surrounding terrain, under all conditions of light and visibility. Two modes are available: Synthetic Aperture Radar (SAR) mode for mapping and reconnaissance and the Inverse Synthetic Aperture Radar (ISAR) mode for long-range discrimination of radar targets.⁶

**Ground Moving Target Indicator Radar (GMTIR).** The latest state of the art GMTIR can detect slow moving surface vehicles, taxiing aircraft and hovering helicopters. A radar that combines GMTIR with SAR can accurately detect, locate and identify virtually any surface target from a stand-off range at a very shallow slant angle, under any weather conditions. In reconnaissance operations, large areas can be mapped without the need to overfly the area of interest. This prevents the enemy from being alerted and the reconnaissance aircraft from being exposed to hostile fire. For surveillance operations, GMTIR can search up to 200 nautical miles deep into hostile airspace to detect and to track vehicular activity. The radar’s all-weather stand-off capability, combined with a good onboard C3 package, allows friendly fighters to be vectored onto hostile surface contacts. The radar can also be employed in littoral maritime operations such as the support of amphibious operations, suppression of coastal defences and extraction of surface forces. Additionally, the radar could be employed to locate small surface combatants shielded by

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terrain from shipborne radars, coastal defences and the movement of defensive equipment.\(^7\)

<table>
<thead>
<tr>
<th>I. National Development</th>
<th>SAR/ GMTI</th>
<th>LDRR</th>
<th>SOC</th>
<th>FLIR/ LLTV</th>
<th>HDTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEZ protection</td>
<td>coastal &amp; offshore patrol, poaching, migration</td>
<td>✔</td>
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<tr>
<td>Environment protection</td>
<td>fisheries, quarantine, wildlife, oil spillage, waste disposal, illegal logging</td>
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<tr>
<td>Natural and man-made disaster</td>
<td>disaster &amp; calamity areas, forest fire, search &amp; rescue</td>
<td>✔</td>
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<tr>
<td>Land Use</td>
<td>mapping</td>
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<tr>
<td>Law Enforcement</td>
<td>anti-piracy, anti-smuggling, custom control, maritime traffic</td>
<td>✔</td>
<td>✔</td>
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</tr>
</tbody>
</table>

II. Internal Security Operation

| Insurgency                       | detection of targets, monitoring of activities | ✔    | ✔   | ✔          | ✔    |
| Peace and Order                  | monitoring of terrorist activities, intel collection | ✔    | ✔   | ✔          | ✔    |

III. External Defence

| Intrusion                        | military activity, covert and clandestine threat, intel collection | ✔    | ✔   | ✔          | ✔    |
| Occupation of disputed territory | monitoring, intel collection | ✔    | ✔   | ✔          | ✔    |
| Invasion/War                     | battlefield monitoring, vectoring of ships and aircraft, intel collection | ✔    | ✔   | ✔          | ✔    |

Legend:
- SAR/GMTI - Synthetic Aperture Radar/Ground Moving Target Indicator
- HDTV - high definition television with Camera
- FLIR/LLTV - forward looking infra-red radar/low light television
- SOC - stabilized optical camera
- LDR - light detection and ranging

Table 6.1: Different Sensors and their Operational Utilisation

**Forward Looking Infrared (FLIR) & Low-Light TV (LLTV).** Both FLIR and LLTV provide real-time and recorded motion imagery and target information. The products of such surveillance can be disseminated to users via satellite communication systems.

Stabilised Optical Camera. Stabilised airborne optical camera equipment can capture visual imagery of still and moving targets. The camera integrates real-time or post-flight information with other sensors so as to gain a comprehensive appreciation of the operational scenario.

Surveillance Platforms

Manned Aircraft

Owing to air power's versatility, reach, perspective, speed, penetration and responsiveness, aircraft are the most common and effective surveillance platform. Platforms are selected in terms of mission requirements, which can then dictate size. For example, multiple tasks may require several sensor systems and onboard support equipment, thereby requiring more crew members for their operation. Examples of basic mission performance requirements include the number of surveillance hours per day, area of coverage, cruising and patrol speeds, and all-weather capability.

Aircraft sizes range from a light, single-engine aircraft or a helicopter with one pilot and one observer, up to a multi-engine aircraft or helicopter with two pilots and several crew including a tactical coordinator, sensor operator and observers. Normally, smaller aircraft are employed for coastal patrol activities and larger aircraft are employed for offshore patrol.

Unmanned Aerial Vehicle (UAV)

Although UAVs have operated mainly since World War II, they are becoming increasingly popular as technological improvements overcome some of their earlier limitations. Their characteristics of operation are similar to manned aircraft but they rely, to varying degrees, on ground control and support equipment as well as space-based communication and navigational systems. One of the many operational concepts is illustrated in Figure 6.11. Some systems that can be used within this concept will allow retasking while in flight so as to allow longer surveillance or reconnaissance time on a selected target. Less sophisticated systems are pre-programmed to cover specific targets for a specific time.

Up to 30 countries are now employing UAVs. In the USA, the effective employment of UAVs has been demonstrated in operations such as border patrols, counter narcotics, environmental monitoring and intelligence support for peacekeeping in Bosnia. Some current UAVs can carry up to three types of sensor and have endurances up to 60 hours. What complicates the employment of this vehicle is the ground control station that has to be equipped with video recorder, voice communications and other command and control features. The ground control system consists of four bays:

- Pilot bay - used to control and monitor the UAV status during flight, as well as during pre-flight procedure and automatic landing.
- Observer bay - used to control the UAV payload and to monitor the downlink video picture, on which data and graphics can be superimposed.
- Navigational bay - this includes tactical situation display used either by the mission commander, pilot or observer for efficient mission planning and mission monitoring
- User bay - it provides the equipment for processing the gathered intelligence information.

Ku-band Sat
SAR frames, EO/IR
video, AV C2)

UHF SATCOM
(EO/IR frames;
AV C2)

GPS

MAE-UAV

150 nm
line-of-sight
data link
(EO/IR video,
AV C2)

500nm (notional)
target area

Mission planning and control
Launch and Recovery

UAV ground
control station

(JTF C4I)
or
Global Broadcast
System

Imagery
tasking

COMSAT

Key:
GPS - global positioning system
SAR - synthetic aperture radar
AV C2 - aerial vehicle command-and-control
COMSAT - communication satellite
MAE-UAV - medium altitude endurance

NMJIC - National military Joint Intelligence Centre
SATCOM - satellite communication
JIC - Joint Intelligence Centre
JFC - Joint Force Commander
EO/IR - electro-optical/infrared unmanned serial vehicle

Figure 6.11: UAV's Concept of Operation
In some instances, a number of mobile receiver units (MRUs) need to be employed to allow reception of the transmitted video imagery in forward positions or command posts and observation posts. Though the UAV itself is not as expensive as an aircraft of equal or same payload (detection equipment), the support ground equipment will be a factor in determining the cost effectiveness of such platform.

Space-based Reconnaissance (satellite)

Reconnaissance satellites are one of the nine types of satellites launched into space to do a specific job. Basically there are four subtypes of reconnaissance satellites and they are:

- Optical-imaging satellites that have light sensors that detect missile launches and ‘see’ enemy weapons on the ground.
- Radar-imaging satellites that observe the earth using radar technology through cloud cover.
- Signals-intelligence or ferret satellites that are essentially super-sophisticated radio receivers that capture radio and microwave transmissions emitted from any country on earth.
- Relay satellites that make military satellite communication around the globe much faster by transmitting data from spy satellites to stations on earth.

The employment of this type of surveillance equipment for the current surveillance requirement of the Philippines would be inappropriate and not cost-effective.

Lighter-than-Air System. Some of the current in-use types are tethered aerostat systems, airships and balloons. These could carry a variety of sensors depending on intended application and capabilities such as: monitoring; broadcasting; surveillance communications and intelligence gathering. The known users of this system are the air forces, land forces, maritime forces, coast guard units, police border patrols, environmental agencies and fisheries agencies. Like other surveillance platforms, several types of ground support equipment are required, such as the mooring subsystems, tethers, electrical power subsystems, and electronic subsystems. Aircraft and UAVs have greater reach, perspective, speed, penetration and responsiveness than lighter-than-air systems.

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Information Management

If our desire is to attain effective command and control and to employ new technologies in communication and detection as described above, it is essential that we have a comprehensive and integrated information management system. This could be appropriately addressed by adopting the network based information management concept or the ‘pull’ method.

As discussed previously, the aim of information management is to ensure that relevant information is provided to the user in a timely manner. Therefore our highest capability development priority is ‘knowledge’, that is, the effective exploitation of information technologies to allow us to use our relatively small force to maximum effectiveness.

First, the relatively large areas covered by EEZ and maritime approaches make surveillance particularly important for the country’s defence and economic development. If they could be made transparent to us by continuous, effective, real-time surveillance, those large areas would provide us with great strategic depth; if they are opaque to us they are a distinct strategic liability. The information revolution offers us the prospect of surveillance that, if realised, could make our approaches and EEZ more transparent than they have ever been.

Second, the Armed Forces of the Philippines will always be small relative to the large areas they need to cover and the demands we make of them. Information technology applied to command and control will enable us to use the forces to maximum effect and get the most value from each unit. Related to this, the Defence Science and Technology Organisation of Australia is currently developing Command Support Systems for the Australian Defence Force. These Command Support systems are computer-based information processing systems that help military commanders to carry out their command and control responsibilities. Through the current Defence Cooperation Program with Australia, the Philippines should consider looking into the possibility of getting access this technology and at the same time training its senior officers in this field. If this is feasible, the Advanced Science and Technology Institute (ASTI), being an agency of Department of Science and Technology Philippines in cooperation with the Department of Defence (Philippines) could be tasked to undertake such development. The ASTI was established in 1987 through Executive Order No. 128 and mandated to conduct scientific research and development in the advanced fields of studies including Communication Engineering, Microelectronics and Information Technology. Aside from doing R&D work, ASTI also provides following: consultancy services; contract research; product evaluation and training program.9

Third, the Philippines has for a long time, established the (Philippine) National Computer Center as the national database information system. This could be used as the core of the maritime database information system and have other agencies’ computer systems linked into it. One such agency is the Philippine Network Foundation Inc (PHNET), which is a consortium of

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institutions established and operates the Philippine-wide area computer network PHNET. Formerly known as the Department of Science and Technology (DOST) Philnet project, with access to the Internet, it envisions a Philippine Information Super Highway, operating around several national backbones (i.e. one for government, one for schools, and one for commercial establishments).\(^\text{10}\)

For all these reasons, the effective exploitation of information technology could provide the Philippines with a unique opportunity to develop desired capability and attain ultimate objectives.

**Proposed Action**

In the light of all these realities, possibilities and opportunities, what remains to be done is to have a presidential directive issued. A draft of an executive order, Appendix A, has to be endorsed by the Office of the President. Specifically, it is the creation of the National Maritime Surveillance Office and defines its duties and responsibilities. It would also mandate the cooperation of other civil and military establishments towards integrated effort. Furthermore, recognising resource shortages of the government agencies, the Executive Order provides for contract agreements with civilian entities. Terms and conditions would be defined by the Office of the President.

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CHAPTER SEVEN

CONCLUSION

Maritime Air Surveillance Needs, Task, Capabilities

The sea is growing in its commercial, political and strategic importance to the world community as evidenced by the rising value of trade conducted across it and of the resources extracted from it. Unfortunately, various threats such as illegal activities, growing blue forces and conflicting territorial claims hinder its full and sustainable development. These profoundly impose radical changes in the very nature of the global security, environmental and resource protection and development.

Within the Philippines jurisdiction, the sea is potentially rich with marine resources and considerable oil and natural gas reserves. The rich marine resources contribute a substantial amount to the country's finances and employment to the citizenry. The oil and natural gas extracted from its offshore rigs reduces the country's dependence supply from foreign sources. Additionally, its strategic value is emphasised by the fact it occupies the compact maritime and aerial crossroad linking the Indian Ocean, the South China Sea and the Pacific Ocean. Within it, is a dynamic and worldwide economic trade. The main seaport is part of the world trade shipping hub and feeder system that transports goods within the region and out to eastern and western countries. Instability persists in the region due to territorial disputes among ASEAN states, prevalent marine malpractices and chronic transnational crimes.

Disputes existed in the region because of the islands' symbolic political significance, commonly accepted commercial value and even in some cases strategic utility. Added to this, are the growing naval forces of countries within the region, most notably China with its adjacent force projection capability. Disputes equated to uncertainty further cause low economic prospectivity as viewed by would be investors. There is little prospect of their imminent solution. While illegal activities, cause the lost of opportunity to extract from it goods for its own use or the lost of opportunity to derive tax from such activities. Furthermore, there is great concern over the uncontrolled malpractice of extracting the marine resources that cause degradation and eventual loss of these resources. Transnational crime is also a major concern for it undermines the government effort of orderly society and even destroys its moral fibre. All nations in the region realise the importance of cooperation to at least within a legal framework. International treaties establish standards, procedures and action plans in one way or another addressing these growing problems in the maritime regime.
Under this scenario and given the realities, the Philippines has to develop and rely upon its full potential of human and natural resources to maintain security and stability in its sea territory. Additionally, it should contribute to collective security to maintain an environment of peace and mutual prosperity in the region. Economics will play an increasing role in national security and development. Economics factors will inhibit or support the proper modernization and readiness of forces. The long awaited modernization of the Armed Forces and the overall program of development through the next millennium, is an opportunity to attain such goals. On specific matters, it provides the opportunity to acquire the much-needed maritime air surveillance capability. More importantly, government planners should establish an appropriate command and control system for these vital and important assets to ensure their effective application.

Command and Control Concept of Other Countries

The studies of several countries provide a considerable basis for coming up with a concept of command and control that suite the Philippine's requirements. Most of the countries established a national level agency responsible for an integrated and coordinated maritime surveillance effort, addressing both the military and civil requirements. There are clear organisational structures and well-defined duties and responsibilities as well as appropriate support arrangements between the armed forces, civil agencies and civilian entities. Another characteristic that was also noted is the ambiguous command and control of the national surveillance efforts. These countries effectively utilise all of their national air power resources from the military, civil and civilian sectors. Another important aspect is the clear-cut distribution of surveillance products to all users through established procedures and communication facilities. Periodic evaluation of both military and civil surveillance requirements starting from the yearly strategic requirement and translated into shorter period programs that are continuously evaluated. If there is a need to conduct tactical surveillance due to a contingency immediate action could be undertaken through direction by a specially organised committee.

Maritime Air Surveillance Concepts for the Philippines

At the outset, maritime air surveillance is clearly an armed forces task but looking deeper in a period of relative peace, the civil maritime surveillance requirement would also be of prime importance. Though the AFP Modernization Law was the driving force in the development of the concept, the proposed command and control system would address both the military and civil requirements. The reason for this is that military planners face a special and particular conceptual problem about the future nature and employment of military forces. Clearly, the role of the military is being transformed from management of turmoil to security and development. After analysing the need and tasks for maritime air surveillance; nine major
departments were identified as having specific concerns and interests in the maritime regime. These agencies are the Departments of National Defence (DND), Interior and Local Government (DILG), Justice (DoJ), Foreign Affairs (DFA), Transportation and Communication (DOTC), Trade and Industries (DTI), Agriculture (DA), Energy and Natural Resources (DENR) and Finance (DoF). Based on their mandated tasks, it had been noted that in some instances a particular activity will require joint effort such as between DA and DENR regarding protected areas. Overlapping areas of interest are also noted between DoF and DoJ in matters of illegal activities. Some activities would require continuous or periodic monitoring, for example in marine protected areas, fishing activities and schedule shipping, while some will depend on developing scenarios as a result of intelligence inputs and analysis, such as in illegal activities and transnational crime.

Due to these complexities, a proposed concept of operation is put forward. The concept of operation will have elements that would address the common issues in maritime air surveillance. First of all is the use of the military in civil maritime air surveillance. With the passage of the modernization law, there is no legal impediment for the utilisation of the military forces for civil maritime air surveillance. Aside from its traditional defence role, it is even mandated to undertake a major role, cooperating and assisting civil agencies in protecting its sovereignty and its people. The military will have the major role and will contribute sizeable surveillance flying hours offshore while within coastal waters the civil and civilian agencies will conduct the major role in the surveillance effort. When so required, the armed forces resources could also be utilised. Second are the surveillance resources with the government utilising all its available national air power assets for maximum and economic effectiveness. Third is the appropriate level of coordination and control, addressed by a national structure organisation for an integrated and cooperative effort. Fourth is the surveillance product distribution. Interoperability of communication facilities and network based information management system should be established. Lastly is the utilisation of civilian resources in a contingency. Appropriate arrangements and training for the use of the civilian and assets for contingency should be established so that there will be a smooth transition from normal to contingency operations.

**Command and Control Organisation and Process**

Applying the basics of command and control and the concept of operations, the proposed organisation is a strategic level office that will integrate and coordinate effort by the different government departments. There is one unique organisation within the government that could be tapped to perform and generate cooperation among these departments, and this is the intelligence organisation. At the very top, within the Office of the President is the National Intelligence Coordinating Agency (NICA). This is the operating agency of the National Security Council. To handle and concentrate on maritime surveillance requirements will be the National Maritime Surveillance Office to be created under the NICA. Basically this office will be responsible
for the development and supervision of the overall strategic maritime surveillance plan. It will also be responsible for the monitoring of surveillance efforts of two existing distinct sub agencies. These agencies are the Military Intelligence organisation and Civil Intelligence and Security Agency (CISA). Both of which already have organised structures up to operational level. These two agencies will be responsible for the development, monitoring and supervision of maritime surveillance requirements and the coordination of responses.

On the military side, the Chief of Staff will have the command and control of maritime air surveillance capability. The same will be delegated to the Commanding General of the Philippine Air Force and as mandated by the modernization law will conduct the major role of maritime air surveillance with acquisition of maritime patrol aircraft. These aircraft are considered a strategic asset and therefore the command and control should be retained at the highest possible operational level. Furthermore, such capability should be assigned to one major unit without intervening headquarters between the owning unit and the Headquarters Philippine Air Force. On joint operations these aircraft will provide support to the Philippine Navy or the Philippine Army. A yearly planning of overall military air surveillance requirement will be undertaken at the General Headquarters (GHQ) level and continuously evaluated for its effectiveness. Additionally, the Armed Forces will contribute flying hours of maritime air surveillance to the yearly national strategic surveillance program. On the aspect of staffing, from the GHQ level down to the lowest operational level headquarters of the various Services, all the Intelligence Staff Office will be responsible for the planning, coordinating and monitoring the maritime air surveillance. While the normal operational control will be undertaken by the Operations Staff Office.

On the civil side, CISA will be responsible for coordinating, monitoring and supervision of the civil maritime air surveillance and response requirements based on the approved yearly strategic program. Aside from the support of the military, this agency will utilise civilian assets through a contract agreement. Considering that in some instances, the civilian will be operating in contingency circumstances it is therefore recommended that they will be integrated or affiliated to the Air Reserve Force. This will be an opportunity to acquaint them with such contingent situations and will provide a smooth transition from peace operations to upgraded security conditions. To address such a condition, a Crisis Management Committee should be organised. The members are security cleared and will immediately hold a special meeting to address tactical maritime air surveillance requirements.

To attain the effectiveness of this multi-layered and multi-agency organisation the two major groups will have to maintain coordination and liaison. The important function of J-2 will be liaising and coordinating with Chief, CISA regarding this matter and vice versa.
Command and Control Facilities

Another important aspect of the command and control function to be addressed is the facilities. These facilities are operations centers, communication and the various sensors and detectors. The operations centers are key factor in the effectiveness of the maritime air surveillance efforts and therefore connectivity needs to be established from the strategic level down to the operational level. The different operations centers at different levels will need to have defined functions that include tasking, transmission of surveillance products to users and coordinating and monitoring response requirements. It should also have the capability for information-based collection that could be easily accessed by decision-makers. Current technology on communication should be adapted to allow transmission of information by voice, video or electronic data. All agencies should strive to attain commonality of assets so that integration of information-based management can also be achieved. Sensors and detectors play also vital roles. Suitable equipment needs to be thoroughly evaluated to address the varied requirements and interface with the communication facilities.

Final Desired Outcome

More than ever, the government is faced with a multitude of challenges in the maritime regime within the national and regional scope. The proposed command and control of maritime air surveillance will effectively integrate the dispersed authority and responsibility among and within the different levels of government. This could be achieved within an entire governmental system, with the planning as well as the implementation and monitoring stages. There must be defined duties and responsibilities and unambiguous command and control. The maximum use of available or the ability to make available resources in the military, civil and civilian sectors along with multi-tasking should be the norm in planning and implementation. The new concept of integrated fashioned operation of maritime air surveillance will bolster the development and protection of economic gain from natural resources. Furthermore this will also show our forceful intent to deter any would be threat to national integrity and security.
EXECUTIVE ORDER NO._____  

CREATING THE NATIONAL MARITIME SURVEILLANCE OFFICE

Whereas, the government is responsible for the security and well-being of the people; uphold the sovereignty and preserve the patrimony of the Republic of the Philippines; protection and development of the country's natural resources and environment;

Whereas, the state recognises its international commitment in matters of maritime environmental security, protection and development;

Whereas, several government agencies are mandated to undertake programs for its attainment;

Whereas, this agencies needs to undertake maritime surveillance but with limited of resources;

Whereas, the Armed Forces of the Philippines is mandated to perform major rules in security and defense and within its available resources assist the other agencies to pursue the government economics programs and other non-traditional roles;

Whereas, the civilian agencies has able aviation resources that could be employ in the various civil surveillance activities:

Whereas, the government realise the need to optimise the use of this national surveillance resources through integrated and cooperative efforts;

Now therefore I, Joseph Ejercito Estrada, President of the Philippines, by the virtue of the powers vested in me by the Constitution, do hereby order and ordain:

SECTION 1. The establishment of the National Maritime Surveillance Office will integrate and coordinate the conduct of national maritime surveillance effort for the purpose of security, defence, development and protection of environment and natural resources.

SECTION 2. This Office will be under the aegis of the National Security Council and directly under the National Intelligence Coordinating Agency. The placement of the this office in the overall government structure is define on the attached National Maritime Surveillance Organisational Structure
SECTION 3. The National Intelligence Coordinating Agency will undertake administrative changes related to the function and responsibilities of this Office.

SECTION 4. Duties and Responsibilities of the Office:
In general, this office will perform administrative, planning and operational functions related to the national maritime surveillance program. Specifically this office will:

a. be responsible for conducting forum of the senior representatives from the participating departments for discussion on surveillance cooperation and development and makes appropriate recommendations.

b. keep interdepartmental arrangements under review, oversee the overall effectiveness of the surveillance program, review and recommend the approval of the yearly surveillance strategic plans and program to the President and the Council. The yearly surveillance program would be the basis of yearly budget in this aspect of activity. This committee should convene at least twice a year or as required by the Director-General, NICA.

c. be responsible for the regular surveillance program reviews through periodic meeting with designated representatives from participating departments/agencies.

d. provide advice to the Director-General, NICA on operational and administrative matters.

e. be responsible for the formulation of contract and standard for civilian aviation company for the conduct of coastal maritime air surveillance.

f. be responsible for the day-to-day monitoring of the established strategic surveillance requirements, responsible for building up database information and conduct liaising to the AFP intelligence structure and CISA.

g. develop information management system interface with other departments.

h. undertake immediate action in case of urgent tactical surveillance requirement through a Crisis Management Committee (CMC). This committee should be composed of appropriately cleared personnel from Defence and key civil agencies that can be called together at short notice to consider a sensitive surveillance related tactical operational intelligence.

SECTION 5. The Civil Intelligence and Security Agency
As established, this agency could generate cooperative effort and therefore should undertake the overall consolidation and coordination of the maritime air surveillance requirements of the concern civil agencies. Related to this, the agency will:

a. perform added functions and likewise establish facilities to undertake such tasks.

b. be authorised to enter into contract with civilian entity for utilisation of the later air assets as established by ICB and

c. also be responsible for the control of that assets.

d. be responsible for day-to-day monitoring of surveillance activities and distribution of surveillance product to the user.
e. be responsible for monitoring of response required as a result of the surveillance effort.

Section 6. Other Government Agencies
Following agencies will be involved in the National Maritime Surveillance Program:
Department of Defence
Department of Agriculture
Department of Energy and Natural Resources
Department of Justice
Department of Transportation and Communication
Department of Interior and Local Government
Department of Finance
Department of Trade and Industries
Department of Foreign Affairs

Section 7. Departments' Duties and Responsibilities
These Departments will undertake the following:

a. Make the necessary administrative changes to perform parallel action towards attaining cooperative and integrated efforts.

b. determine their appropriate representatives to the different various forums or committee to be established by NMSO.

c. identify a parallel branch or section within their respective department as liaising and coordinating point for CISA.

d. Develop information management and endeavour to link these facilities as well as communication to NMSO.

e. Prepare annual maritime surveillance requirements for submission to the NMSO.

SECTION 8. Funding.

a. NMSO will determine the overall annual budget for the civil surveillance requirements and include this to the office annual budgeting and programming. This will not include the AFP contribution to the program, which the AFP normally includes in its annual maritime air surveillance programs. If it necessitates undertaking multi-year contract, NMSO will submit the proposal for separate appropriation.

b. NMSO will determine the overall requirement for information management and communication facilities as separate program to be covered by multi-year contract. Its yearly operational requirement will be submitted as part of the yearly budgeting and programming.

SECTION 9. All existing Executive Orders, Letters of Instruction, Letters of Implementation, Rules and Regulation, which are inconsistent herewith are hereby repealed, amended or modified accordingly.

SECTION 10. This Executive Order shall take effect upon approval.
DONE in the City of Manila, this ____ day of ____ in the year of our Lord nineteen hundred and ninety eight.

JOSEPH EJERCITO ESTRADA
President of the Republic of the Philippines

BY THE PRESIDENT:

Head, Presidential Management Staff

Attachment to Executive Order_____

Maritime Air Surveillanc Program
Organisational Structure (proposed)
Strategic Level
BIBLIOGRAPHY

Speech

Admiral David E. Jeremiah, USN (Ret), in his address during the Fourth Foresight Conference on Molecular Nanotechnology, 9 November 1995

Government and Military Publications


Briefing Materials, HQACAUT provided during Official visit on 21 Sep 1998

'Command and Control', Chapter 7 ADFP 1, Theatre Command-Provisional Doctrine, Draft 3 COMAST, Australian Defence Force, 1998

Cornerstone of Information Warfare published by the Department of the Air Force (USA) reprinted by Air War College, USAF, Alabama, 1997

Field Manual 101-5, Staff Organization and Operations, Headquarters Department of Army, Washington DC, 1984

Philippine Air Force Air Power Manual (Draft-Interim, undated)

Philippine Fisheries Profile, Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Republic of the Philippines, 1995

Primer on the UNCLOS, Department of Foreign Affairs, Republic of the Philippines, 1991

Republic Act Nr 7898, An Act providing for the Modernization of the Armed Forces of the Philippines and for other Purposes, Congress of the Philippines, 23 February 1995


The Philippine in Figures, National Statistic Office, Philippines, 1993
Books, Journals, Reports, Articles, Working Papers


'Going Mobile with air operations base', Jane's Defence Weekly, Vol.28 No. 19, Jane's Information Group, 12 November 1997

Goldrick, Commander James, 'Developments In Regional Maritime Forces; Force Structure', Australia's Maritime Bridge into Asia, Allen & Unwin Pty. Ltd., Australian, 1995

Go, Vernon, 'South of Manila', Philippine Yearbook, Fookien Time, 1997


Hayes, Group Captain Peter, 'How Air Command is Responding to the Information Warfare Challenge', Regional Air Power Workshop Canberra, Air Power Study Centre, Canberra, 1997


Joya, Colonel Rodante S., PAF, Air Surveillance its role in the security of the Philippines, 1996


Kopp, Carlo, 'SAR/GMTI Radars, A Revolution in Bombing Technology', Australian Aviation, Aerospace Publication Pty Ltd., March 1998


McCulloch, Air Commodore Jeffrey, RAAF, 'Concepts of Military and Civil Surveillance', Policing Australia's offshore zone, Wollongong Papers on Maritime Policy No.9, Centre for Maritime Policy, University of Wollongong, Australia, 1997


Naylor, Peter, 'Command and Control of Civil Coastal and Offshore Surveillance', Policing Australia's Offshore Zones, Wollongong, Papers
Maritime, Policy No. 9, Centre for Maritime Policy, University of Wollongong, Printery Services, 1997


Robinson, Dr. Ross, 'Shipping and Port Development in East and South-East Asia', Australia's Maritime Bridge Into Asia, Allen & Unwin Pty Ltd., Australia, 1995


Smith, Hugh, 'The Use of Armed Forces in Law Enforcement', Policing, Australia's Offshore Zones, Wollongong Papers Maritime Policy No. 9, Centre for Maritime Policy, University of Wollongong, Printery Services, 1997

Smith, Shaun, 'The Asian Offshore Oil And Gas Scene: Current Activities And Future Opportunities For Australian Companies', Australia's Maritime Bridge into Asia, Allen & Unwin Pty Ltd., Australia, 1995


Westwood, Chris, _The Future is not what is used to be, Conflict in the Information Age_, Air Power Studies Centre, Canberra, 1997
