Philippine Air Force Visiting Fellow Program
The Role of the Long-Range Patrol Aircraft in National Security

P. Gerard C. Custodio
The Role of the Long-Range Patrol Aircraft in National Security:

Philippine Scenario

P Gerard C. Custodio

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RAAF Fairbairn
Canberra
2000
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About the Author

Captain P Gerard Correa Custodio 0-9452 Philippine Air Force is a graduate of the Philippine Air Force Flying School Class 85-B, wherein he graduated with honours receiving the Presidential Sabre, for finishing top of the Cadet Corps and was also awarded, the Chief of Staff Sabre as the First Captain of his class.

After a short stint as an instructor pilot in the 100th Training Wing, he was assigned at the 220th Heavy Airlift Wing. Following six years of transport flying in Mactan Air Base, he became an instructor pilot in the N-22 Nomad aircraft and a first pilot in the C-130H, C-130B and the L-100-20 aircraft. Captain Custodio is also an instructor pilot, test pilot and a flight examiner in the Fokker F-27 type of aircraft.

His flying career was momentarily put on hold in 1995 when he was selected to attend the Squadron Officers School at Maxwell Air Force Base, Alabama, USA and the Academic Instructor Course at Keesler Air Force Base, Mississippi, USA where in he was awarded as a Distinguished Graduate. After the completion of his course in the USA, he became a member of the Corps of Professors at the Air Command and Staff College.

Captain Custodio is now posted with the 250th Presidential Airlift Wing as part of the Presidential Flight Crew flying the F-27 and F-28 aircraft and has been privileged to have flown two of the Presidents of the Republic of the Philippines. He is also currently on special duty with the Office of Special Studies dealing with the creation of PAF doctrines.

Captain Custodio is now a Fellow at the Aerospace Centre at RAAF, Fairbairn, Australia writing on the tactical aspects dealing with the Philippine Air Force's Long Range Patrol Aircraft program.

Captain Custodio is happily married to the former Ma. Lourdes Molina of Binan, Laguna and they are blessed with four children: Geoff, Gale, G-Ann & Gari.
Preface

In the early 1980s the Philippine Air Force (PAF) procured four RF-27 Long-Range Patrol Aircraft (LRPA) for the primary purpose of patrolling the domain of the Philippines', particularly its maritime borders. However, due to the undefined utilisation of the said assets, it resulted to the deterioration of the on board surveillance equipment not to mention the decline in the proficiency of sensor specialists, and by 1999 the last of the RF-27 was re-configured as an ordinary transport aircraft.

With the loss of the RF-27s, the bulk of the air surveillance mission fell on the shoulders of the 303rd Reconnaissance Squadron. Equipped with an ageing TC-690 Aero Commander, surveillance requirements of the various government agencies was impossible to satisfy. This in effect has left a void in the national security of the Philippines.

It is the responsibility of the Armed Forces of the Philippines (AFP) as mandated in the Philippine Constitution to be the 'protector of the people and the state'. To uphold territorial integrity the AFP should be able to maintain control over national territory, airspace and surrounding waters. With the brewing of a 'Maritime Cold War' in the South China Sea where the Spratlys are located, aggravated by the cautious flexing of muscles by regional powers like China and India, the Philippines should be able to demonstrate border control or eventually surrender some of its territory as a consequence. Corollary to this is the income lost by the national government through illegal fishing and the wanton destruction of natural resources not to mention the proliferation of piracy in the area.

The national government should institute measures to immediately prevent this impending crisis situation through pro-active solutions. One effective way of accomplishing this task is through the employment of a dedicated LRPA that can gather and relay real time information, and at the same time be an instrument of force projection to deter would be intruders.

On 23 February 1995, Republic Act Number 7898 better known as the AFP Modernisation Act was passed giving a glimmer of hope to the very limited air surveillance capability of the Philippine Air Force and the Armed Forces in general. Included in the PAF's Modernisation Plan is the procurement of six Long-Range Patrol Aircraft with the appropriate equipment fits for air surveillance capability. This book will give an insight on the significance of acquiring a dedicated LRPA and provide basic tactical guidelines for the employment of the LRPA. The information in this book eventually can be used as one of the bases for the development of the doctrine for air surveillance in the Philippine Air Force.

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1 The Philippine Constitution, Article II, Section 3.
2 In Defence of the Philippines, 1998 Defence Policy Paper, Department of National Defence, Republic of Philippines, Quezon City, p 85.
Acknowledgments

It is with deep gratitude and sincerity that I acknowledge all those who in one way or another supported me in my endeavour while writing this book. Special thanks to Lieutenant Colonel Oscar Rabena the Director of the Office of Special Studies and his able Asst-Director Major Noel Patajo who initially guided me in the development of my project.

‘Maraming Salamat’ to Wing Commander Colin Price, my mentor, for his untiring effort of editing and re-editing my drafts turning my project into a book. Not to mention Maureen, his lovely wife who cooked us a sumptuous dinner making me momentarily forget how I miss home.

I offer my profound appreciation to the Director of the Aerospace Centre, Group Captain Allan Crowe, his staff; Dr Alan Stephens, Dr John Mordike, Dr Adam Cobb, Wing Commanders Ian MacFarling and Keith Brent, Warrant Officer Mike Hinton, Mrs Sandra Di Guglielmo, Mr Phil Hastic, Mrs Roz Bourke and Mr Richard Bain for their professionalism, but most especially for giving us a sense of belonging.

I would also like to thank the personnel of No. 292 and 10 Squadron under the 92 Wing for the lectures and observation flight they afforded us. Special mention is in order for Squadron Leader Steve Hanrahan who acted as our host during the duration of our stay at RAAF, Edinburgh. The same goes for Mr. David Rendell of Coastwatch, Australia, Mr John Crowe and Mr Mike Johnson of Surveillance Australia for the comprehensive briefings they gave us.

To my wife Lou, who I missed so much, my inspirations; Geoff, Gale, G-Ann and Gari (who turned one year old while I was here), the thought of them kept me warm through the cold winter nights here in Canberra. Thank you family from the bottom of my heart for simply being there.

But most especially I thank the Almighty Father, for touching me with the grace of the Holy Spirit giving me the power to accomplish this new challenge.
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Acronyms and Abbreviations

ACAUST  Air Commander Australia
ACofAS  Assistant Chief of Air Staff
ADC  Air Defence Command
ADF  Australian Defence Force
AEM  ASEAN Economic Managers
AFP  Armed Forces of the Philippines
AFSO  Air Force Safety Office
AFTA  ASEAN Free Trade Area
AFZ  Australian Fishing Zone
AISG  Air Intelligence Surveillance Group
ALSE  Aircrew Life Survival Equipment
AOR  Area of Responsibility
APEC  Asia Pacific Economic Cooperation
AO  Area of Operations
ARF  ASEAN Regional Forum
AS  Airlift Squadron
ASEAN  Association of Southeast Asian Nations
ASW  Anti Submarine Warfare
ASuW  Anti-Surface Warfare
AW  Airlift Wing

BAKORKAMLA  Coordinating Board for Maritime Security (Indonesia)
BFAR  Bureau of Fisheries and Aquatic Resources
BID  Bureau of Immigration and Deportation
BUCUS  Bureau of Customs

C²  Command and Control
CAP  Combat Air Support
CEPT  Common Effective Preferential Tariff
CG  Commanding General
CISA  Civil Intelligence and Security Agency
C,JOOC  Chief of AFP Joint Operations Centre
CLE  Container Land Equipment
CMC  Crisis Management Committee
CNS  Chief of Naval Staff
COMSEC  Communications Security
CS  Chief of Staff

DA  Department of Agriculture
DENR  Department of Environment and Natural Resources
DF  Direction-finding
DFA  Department of Foreign Affairs
DI  Director for Intelligence
DILG  Department of Interior and Local Government
DND  Department of National Defence
DO  Director for Operations
DOF  Department of Finance
DOJ  Department of Justice
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<td>DOTC</td>
<td>Department of Transportation and Communications</td>
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<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
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<td>ECM</td>
<td>Electronic Counter Measures</td>
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<td>EEZ</td>
<td>Exclusive Economic Zone</td>
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<td>EM</td>
<td>Electro-Magnetic</td>
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<td>EMCON</td>
<td>Emission Control</td>
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<td>ESM</td>
<td>Electronic Surveillance Measures</td>
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<td>FAX</td>
<td>Facsimile</td>
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<td>FLIR</td>
<td>Forward Looking Infra-Red</td>
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<td>FM</td>
<td>Frequency Modulation</td>
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<td>FOIC</td>
<td>Flag Officer in Command</td>
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<td>GEZ</td>
<td>Gun Engagement Zone</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>GUSKAMLA</td>
<td>Sub-Area Coordinating Centres (Indonesia)</td>
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<td>GUSKAMLABAR</td>
<td>Western Area Coordinating Centre (Indonesia)</td>
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<td>GUSKAMLATIM</td>
<td>Eastern Sub-Area Coordinating Centre (Indonesia)</td>
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<td>HF</td>
<td>High Frequency</td>
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<td>HPAF</td>
<td>Headquarters Philippine Air Force</td>
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<td>HQAST</td>
<td>Headquarters Australian Theatre</td>
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<td>ICAO</td>
<td>International Civil Aviation Organisation</td>
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<td>ICB</td>
<td>Interdepartmental Coordination Branch</td>
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<td>IFF</td>
<td>Identification Friend or Foe</td>
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<td>INS</td>
<td>Inertial Navigation System</td>
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<td>IR</td>
<td>Infra-Red</td>
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<td>IRDS</td>
<td>Infra-red Detection System</td>
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<td>ISAFP</td>
<td>Intelligence Service Armed Forces of the Philippines</td>
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<td>ISAR</td>
<td>Inverse Synthetic Aperture Radar</td>
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<td>ISG/CBM</td>
<td>Support Group on Confidence Building Measures</td>
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<td>ISO</td>
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<td>KIG</td>
<td>Kalayaan Island Group</td>
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<td>LOAC</td>
<td>Laws of Armed Conflict</td>
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<td>LRPA</td>
<td>Long-Range Patrol Aircraft</td>
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<td>MAD</td>
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<td>MARCOM</td>
<td>Maritime Command</td>
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<td>MASRG</td>
<td>Maritime Air Surveillance Review Group</td>
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<td>MECC</td>
<td>Maritime Enforcement Coordinating Centre</td>
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<td>MEZ</td>
<td>Missile Engagement Zone</td>
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<td>MF</td>
<td>Medium Frequency</td>
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<td>MPG</td>
<td>Maritime Patrol Group</td>
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<td>MPS</td>
<td>Maritime Patrol Squadron</td>
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<td>MTI</td>
<td>Moving Target Indicator</td>
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<td>MTW</td>
<td>Malaysian Territorial Waters</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>NATO</td>
<td>North Atlantic Treaty Organisation</td>
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<td>NICA</td>
<td>National Intelligence and Coordinating Agency</td>
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<td>NMSO</td>
<td>National Maritime Surveillance Office</td>
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<tr>
<td>NSC</td>
<td>National Security Council</td>
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<td>OPAC</td>
<td>Operations and Program Advisory Committee</td>
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<td>OPCOMD</td>
<td>Operational Command</td>
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<td>OPCON</td>
<td>Operational Control</td>
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<td>PA</td>
<td>Philippine Army</td>
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<td>PAB</td>
<td>Program and Administrative Branch</td>
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<td>PADCS</td>
<td>Philippine Air Defence Communications System</td>
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<td>PAF</td>
<td>Philippine Air Force</td>
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<td>PAFARU</td>
<td>Philippine Air Force Affiliated Reserve Units</td>
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<td>PD</td>
<td>Presidential Decree</td>
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<td>PFR</td>
<td>Post Flight Report</td>
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<td>PN</td>
<td>Philippine Navy</td>
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<td>PNP</td>
<td>Philippine National Police</td>
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<td>POB</td>
<td>Program Operational Branch</td>
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<td>POI</td>
<td>Program of Instruction</td>
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<td>POL</td>
<td>Petroleum/Oil/Lubricant</td>
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<td>RA</td>
<td>Republic Act</td>
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<td>RADALT</td>
<td>Radar Altimeter</td>
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<td>RAN</td>
<td>Royal Australian Navy</td>
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<td>RC</td>
<td>Rescue Centre</td>
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<td>ROE</td>
<td>Rules of Engagement</td>
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<td>SAR</td>
<td>Search and Rescue</td>
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<td>SAR Mode</td>
<td>Synthetic Aperture Radar Mode</td>
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<td>SATCOM</td>
<td>Satellite Communication</td>
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<td>SLR</td>
<td>Single Lens Reflex</td>
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<td>SOA</td>
<td>Speed of Advance</td>
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<td>TACCOMD</td>
<td>Tactical Command</td>
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<td>TACS</td>
<td>Tactical Control System</td>
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<td>TOC</td>
<td>Tactical Operations Command</td>
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<td>UHF</td>
<td>Ultra High Frequency</td>
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<td>US</td>
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<td>Very High Frequency</td>
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'A man could see a great deal more of the landscape from the air than he could from the ground. Victory belongs to the general who can guess what's happening on the far side of the hill.'

Duke of Wellington
Chapter One

Introduction

Situation Update

The Philippines' security environment is essentially maritime and its geography provides a substantial natural defence due to the lack of shared land boundaries with any country and the large number of islands suitable for basing strategic defence forces. In addition, the waters throughout the archipelago can serve as a venue for cooperation with other countries, thereby facilitating mutual benefits in terms of economic and cultural development. Ironically, while these large bodies of water separating the islands offer numerous benefits, they also present numerous vulnerabilities that could be exploited by an adversary.

One major concern is the continuing problem of maritime jurisdiction, especially in the marginal seas, due to the lack of agreed maritime boundaries, conflicting claims to off-shore islands and the overlapping Exclusive Economic Zones (EEZ) of neighbouring states such as Indonesia, Malaysia, Vietnam, the Philippines, China and Taiwan.\(^1\) The instability in the area was compounded by the United Nations Convention on the Law of the Sea (UNCLOS) which culminated in 1982 giving countries an additional 200-nautical mile exclusive economic zone. Also, neutralising forces such as the Soviet Union and the United States are now virtually non-existent in the Southeast Asian Theatre, signalling a red light for the Cold War but a green light for regional powers like China, Japan and India to cautiously flex their muscles.

Without any doubt the Southeast Asian region, in particular the ASEAN countries, has become the fastest growing arms market in the world. What is true of the ASEAN market is also generally true of the Asia-Pacific countries.

On balance, the two most important factors affecting the defence acquisitions by the ASEAN states over the past five years or so are external threat perceptions resulting from the end of the Cold War, and from the perspective of the ASEAN members, an essentially impending Maritime Cold War. The second factor relates to the internal non-threat dynamics of the ASEAN countries themselves.\(^2\) Take for example the Philippines which is on the threshold of crushing the local secessionist and insurgency problems.

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On 15 May 1996, China ratified the UNCLOS becoming the 87th country to adopt the international maritime convention, which took effect in 1994. Almost simultaneously however, on 16 May 1996 China released the coordinates of 78 base points, which form the baselines of parts of its claimed territorial sea, which are not in accordance with the UNCLOS guidelines. The detailed baselines included the Paracel Islands, and in effect expanded their territorial sea from 370,000 square kilometres to about 2.6 million square kilometres.

The bloody conflict between Chinese and Vietnamese forces in the Chigua Reef area of the Spratlys in the late 1980s and the recent Chinese maritime activities (expounded in Chapter Two) in the Mischief Reef and Scarborough Shoal are examples of the strategic interplay in the region that may give way to further confrontations.

Figure 1-1: Conflicting Territorial Claims in the South China Sea
(Source: Huerto, Dexter, Command and Control of the Philippines, Air Power Studies Centre, Canberra, 1998)
The Philippines is not exempted from feeling the pressures of this so-called Maritime Cold War. Upon the implementation of the UNCLOS in 1982, the Philippines’ Area of Responsibility (AOR) increased to 652,000 square nautical miles making it the twenty-third largest EEZ in the world. After signifying its claim over some islands in the disputed Spratly group it extended the Philippine AOR by another 360,850 square nautical miles, giving the Philippines an abundance in maritime resources. An additional result, however, was an overlapping of territorial borders as shown in Figure 1-1 leading to sovereignty disputes.

Compounded by the possibility of submarine intrusions, piracy on the high seas, environmental protection and other local concerns, which I will be discussing in the succeeding chapters, these problems can effectively be checked with the deployment of a dedicated Long-Range Patrol Aircraft (LRPA) platform.

The Need For A Long-Range Patrol Aircraft

The primary objective of this paper is to propose tactical procedures that can be adopted upon procurement of a dedicated LRPA platform. To achieve my objective, the following questions will be answered in the subsequent chapters:

- Where will be its area of operation?
- How is the LRPA going to be used?
- The question of command and control? And finally,
- What are the equipments necessary for the LRPA to be responsive in the performance of its assigned task?

In 1982 the Philippine Air Force (PAF) procured four RF-27 maritime aircraft to serve as the lead Long Range Patrol Aircraft platforms assigned with the 220th Heavy Airlift Wing, under the 221st Airlift Squadron. But due to the lack of resources these aircraft have to perform multi-role functions augmenting transport missions and administrative flights. At the same time, information acquired during surveillance and reconnaissance missions was not properly handled since no database to store and process gathered reports was properly maintained. To date, three of the RF-27 maritime aircraft have already been decommissioned leaving a void in the security of our territorial domain.

Another unit tasked to perform air surveillance and air reconnaissance missions is the PAF’s 303rd Air Reconnaissance Squadron, equipped with a TC-690 Aero Commander. However, with the numerous needs of the different government agencies coupled with the burden of maintenance/spare requirements and an ageing equipment fit, additional LRPA's dedicated to their roles are overdue and are essential for the PAF and the security of Philippine maritime borders.

As defined, Air Surveillance is a close or continued observation by any means, of an area, place, airspace, lane of approach, or field of activity in order to accrue information or take action when the situation warrants.\(^3\)

It should also provide data to ensure that the Armed Forces of the Philippines maintain a picture of the current maritime situations and trends.

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\(^3\) PAF Air Power Manual (Draft-Interim), Office of Special Studies, Headquarters Philippine Air Force, Villamor Air Base, Pasay City, p. 111.
Information gained from the surveillance is mainly used to support strategic intelligence in peacetime or operational intelligence in times of conflict. Surveillance information is processed by intelligence staff to provide accurate and timely knowledge of a potential adversary’s capabilities and intention.\(^4\)

*Air Reconnaissance*, as defined, is an examination or observation of an area, territory or airspace from the air either visually or with the aid of photography or electronic devices.\(^5\)

Air Reconnaissance is the collection of information via a specific mission, usually conducted over a limited period and directed against specific targets. It is used to secure information regarding the terrain, the strength and disposition of enemy troops, resources or activities, the location and layout of targets or of enemy installations and strong points, the results of air operations or other operations, the disposition of friendly troops, the weather, or any other information regarding the situation usually in the combat area or in the enemy territory. As such, the success of military operations is dependent on the ability of the military commander to determine the aforementioned data as basis for future planning. These data are used in the intelligence assessment of capabilities and intention of the enemy. Reconnaissance is a regular military activity undertaken openly by undisguised military personnel and is distinguished from espionage.\(^6\)

Unfortunately, without any LRPA asset to perform these tasks territorial integrity is compromised not to mention the revenues lost and the unchecked destruction of marine habitats.

The Philippines is now facing a decline in fisheries production and rapid deterioration of our marine habitat areas. This phenomenon is mainly attributed to land and marine-based pollution, greatly affecting our economy and at the same time decreasing breeding areas for future fish-stock.

Total economic loss from illegal activities at sea has been estimated at 40B Philippine Pesos annually, including 600,000 metric tons of fish worth another 15B Philippine Pesos, with the remainder made up of coral destruction, income forgone for local fishermen, illegal trade and unrealised tourism potential. It is estimated that of the original 27,000 square kilometres of coral reef area, about 70 per cent has been damaged mainly due to dynamite fishing and pollution. Similarly, of the original 450,000 hectares of mangrove forests have been reduced to less than 140,000 hectares.\(^7\)

A noted Australian expert on the Law of the Sea, Professor Anthony Bergin\(^8\) has identified five areas in which government must establish control in a country’s maritime regions:

1. The management of marine resources,
2. The maintenance of territorial integrity,
3. The protection and preservation of marine environment,
4. The prevention of illegal activity, and
5. The safety of life at sea.

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\(^4\) Ibid.
\(^5\) Ibid, p. 113.
\(^6\) Ibid.
\(^8\) Ibid.
He further noted that in order to achieve this control, the coastal state must be capable of three basic tasks:

1. Surveillance,
2. Monitoring, and
3. Enforcement.

Maritime surveillance, monitoring and enforcement refers to the systematic observation and monitoring of an area in order to detect and deter violations of specific rules. Professor Bergin continued by saying that, in order to demonstrate a nation’s resolve and capability to exercise control over its sovereign territory, there must be a real expectation by perpetrators that the breaking of the rules within the nation’s maritime domain will be discovered and punished. To create such an expectation requires a surveillance system that is perceived as being capable of both detecting and apprehending offenders on a regular basis. If these tasks are not carried out effectively, there will be a serious loss to the national economy, with impact felt on trade, fisheries, loss of life, etc. It should be noted however, the cost penalty of not having this level of deterrence is difficult to quantify.

The Armed Forces of the Philippines (AFP) is mandated by the constitution to be the protector of the people and the state. Its goal is to secure the sovereignty of the state and the integrity of the national territory.\(^9\) It is the responsibility of the Chief of Staff (CS), AFP to implement the legal requirements of the national government and this is done through delegation to the involved major service commands (Air Force, Navy, Army). The Philippine Navy (PN) is the prime agency when it comes to patrolling and securing the national waters and the adjacent shorelines around the Philippine Archipelago, with the Philippine Air Force (PAF) playing a significant supporting role. To this end, the PAF should have the equipment capable of maritime patrol for surveillance and or reconnaissance missions. An LRPA has the speed, endurance and technology to provide real time information to the concerned agency for immediate action if necessary.

The reconnaissance role of the PAF is both strategic and tactical. In peacetime, the strategic objective of the PAF is to collect data for assessment and identifying the changes in the pattern of activity in the vast area of interest. In times of conflict, strategic reconnaissance will focus on the forward basing activity of the enemy in terms of troop disposition and infrastructure which is also true for enemy maritime activities. Tactical reconnaissance will be required to provide information on the enemy position, accurate targeting and bomb damage assessment. The PAF will shoulder the main responsibility of providing the Army and the Navy of vital information while satisfying its own operational requirements.\(^{10}\)

In order to carry out its assigned mission, the Philippine Air Force is tasked to perform primary and collateral functions. Included in these functions are air surveillance, air reconnaissance, aerial photography and sub-surface monitoring.\(^{11}\) Without a capable platform to perform all these tasks will greatly affect the efficiency and effectiveness of the Air Force will be greatly degraded, not to mention the lack of credibility and the required capability to react to territorial security situations especially for an archipelagic country like the Philippines.

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\(^9\) The Philippine Constitution, Article II, Section 3.
\(^{11}\) Philippine Air Force Basic Doctrine, Headquarters Philippine Air Force, PAFM 0-1.
On 23 February 1995, the government passed Republic Act Number 7898, which is better known as the AFP Modernisation Act, which provides the assurance of a better-equipped AFP. However, due to the economic crunch that subsequently hit the Philippines and the whole region, priorities had to be re-assessed and initial funding of the budget was allocated for the Philippine Army (PA) which is actively involved in ground operations against the secessionist and insurgent elements. The result of this was a big delay in the funding for the proposed projects of the PN and the PAF.

Nevertheless, a modest amount of Air Force projects are starting to be realised and the PAF recognises the significance of not only patrolling our territorial waters but the numerous roles an LRPA can contribute to the accomplishment of the Air Force mission. With this in mind, the PAF has included in its purchase list, a number of LRPAs for acquisition. In line with this, a special study group has been organised to determine the most efficient and cost-effective platform together with the necessary equipment fit that will be appropriate for the Philippine scenario. It is essential that the PAF has procedures to effect the standard use of these aircraft.

Outline of Succeeding Chapters

Chapter Two will be defining the Maritime Area of Responsibility (AOR) of the Philippines in reference to local decrees and internationally accepted treaties. It will also be discussing on the boundaries to include a chart showing the overlapping national boundaries for better understanding. These inputs are deemed necessary because it will become the official reference on where the area of operation for the proposed LRPA will be.

Chapter Three is a discussion on the actual employment of the LRPA, which will include the following:

- A brief definition on the various levels of doctrine and their relationships will be incorporated to give the readers a careful understanding on the approach intended by the paper;
- Elements involved in a surveillance model;
- Flight procedures for different mission requirements;
- Relevant factors that will affect airborne surveillance like:
  - operating area size,
  - aircraft performance,
  - contact density, and
  - aircrew limitations will be outlined.
- The necessity of post-flight reports;
- A general view on training and safety issues; and
- The Philippine surveillance effort and different surveillance efforts being practiced by neighbouring countries particularly those that are archipelagic in nature like the Philippines will be integrated to serve as models.

Chapter Four will deal with the proposed command and control procedures for the LRPA. Definitions with reference to the basic command and control terminologies and principles as utilised by the military hierarchy will be included. Missions performed jointly with either another branch of the military service or with another government agency will be discussed to avoid the mistake of overlapping of authority
once the mission has commenced. To maintain the flow of continuity in this field of research by the Philippine Air Force, this chapter will be greatly influenced by the book of Lieutenant Colonel Dexter O. Huerto (Command and Control of Philippine Maritime Air Surveillance, Air Power Studies Centre, Canberra, 1998) who was also a fellow at the RAAF Aerospace Centre.

Chapter Five will discuss the characteristics of a desired Long-Range Patrol Aircraft, although it will be referred to in generic terms since there is a separate group in the Philippine Air Force which will be deciding on the actual platform. Description of the desired performance of the maritime aircraft and the desired equipment fit to be installed in the said LRPA, for optimum mission accomplishment will also be discussed.

Finally, Chapter Six will summarise the conclusions drawn from the previous chapters highlighting significant points that will be relevant in the operation of a dedicated LRPA platform in support of national security for the Philippines.
The Role of the Long-Range Patrol Aircraft in National Security
Chapter Two

Defining the Philippine Area of Responsibility

The Philippines is an archipelago of 7107 islands located in East Asia and situated across vital sea lines of communications connecting the Middle East to Northeast Asia and North America. Located from just above the equator, between 4° 30' N to 21° 20'N and from 116° 55'E to 126° 36'E. As with, Indonesia, the Philippines lies within the Torrid Zone.¹

The islands of the Philippines are bounded on the east and northeast by the Philippine Sea, on the west and northwest by the South China Sea, and on the south by the Celebes Sea. In the north, the Bashi Channel and Straits of Luzon separate the archipelago from Taiwan. In the west, the South China Sea lies between the western Philippines, and China, Vietnam and the other Southeast Asian countries. In the south, the Sulu and the Celebes Sea separate the southern Philippines from Borneo and the northern islands of Indonesia. The eastern approaches are largely empty, apart from Palau and Micronesia (Figure 2-1 is a map of Southeast Asia for better appreciation).²

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The geographical feature of the country gives it 300,000 square kilometres (115,800 square miles) of land area, with a coastline of 17,460 kilometres (10,850 square miles), which is longer than that of the United States mainland, and is one of the largest countries in terms of maritime jurisdiction. With the implementation of the United Nations Convention on the Law of the Sea (UNCLOS), it extended the Philippine boundaries to 652,000 square nautical miles. With the claiming of some of the islands in the Spratly Group or better known locally as the Kalayaan Island Group, the AOR expanded by an additional 360,850 square nautical miles.

The country stretches 1,854 kilometres from north to south, and spans 1,107 kilometres at its widest point. Y’ami, the northernmost island in the Batanes group, is 241 kilometres south of Taiwan; the southernmost island – Salauag in the Tawi-Tawi group is only 48 kilometres east of Malaysia Borneo. About 1,000 kilometres to the west, across the China Sea, lies the Chinese coast.\(^3\)

With the proximity of her neighbours it is essential that Philippine authorities have an efficient means of monitoring the national territory to detect, deter and/or update activities to ensure sovereign integrity. This capability must be instituted as a matter of urgency and should be evident to foreign counterparts. An effective Long-Range Patrol Aircraft in sufficient numbers will be an essential component of this capability.

Legal Bases For Setting the Boundaries

The establishment of the territorial boundaries of the Philippines’ is supported by the proper legal instruments, which are essential especially for settling claims to the disputed Spratly Islands.

With the culmination of the United Nations Convention on the Law of the Sea in 1982, new guidelines concerning the reckoning of maritime territorial limits of countries was expanded to include a 200 mile Exclusive Economic Zone (EEZ). With almost 90 countries as signatory, the UNCLOS agreement was an internationally accepted document. However, with the implementation of the UNCLOS, the Philippines acquired a maritime border that was overlapping with that of Taiwan, Malaysia and aggravated the Spratly issue, with China and Vietnam.

It is therefore of vital importance that claimants be able to support their territorial claims through the presentation of legal documents and not by means of force, intimidation or military action.

The following are the legal bases for the setting of the maritime boundaries surrounding the Republic of the Philippines:

- *Treaty of Paris*: reconciles the treaty between the United States (US) and Spain dated 10 December 1898, the treaty in Washington between US and Spain 1900 and the treaty between the US and Great Britain dated 1930 established the international limits of the Philippine Archipelago.
- *Republic Act (RA) 3046* as amended by *Republic Act (RA) 5446*: dated 17 June 1961 which in turn establishes the Republic of the Philippines’ territorial baseline which is drawn on the outermost islands and the dying reefs, including internal/inland and territorial waters.

\(^3\) Ibid.
Defining the Philippine Area of Responsibility

- **Presidential Decree (PD) 1596**: dated 11 June 1978 declaring the Kalayaan Island Group (KIG) (a part of the disputed Spratly Islands) as a municipality of Palawan.
- **Presidential Decree (PD) 1599**: dated 11 June 1978 establishing the 200 mile Exclusive Economic Zone (EEZ) from the Philippine baseline.
- The 1982 **United Nations Convention on the Law of the Sea (UNCLOS)**: wherein Article 55 – 75 defines the concept of an EEZ strengthening the claim of the Philippine government to the Kalayaan Island Group.

The 1982 Convention on the Law of the Sea (UNCLOS) created a number of guidelines concerning the status of islands, the continental shelf, enclosed seas and territorial limits. Three of the most relevant to the South China Sea and also concerning the Philippines are:

1. Article 3, which establishes that ‘every state has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles’.
2. Article 55 – 75, defines the concept of an Exclusive Economic Zone (EEZ), which is an area up to 200 nautical miles beyond and adjacent to the territorial sea. The EEZ gives territorial states ‘sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to “(above)” the seabed and of the seabed and its subsoil...’.
3. Article 121, which states that rocks that cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf.

For visual appreciation on the evolution of the Philippine maritime boundary, refer to Figure 2-2.

![Figure 2-2: Interpretation of the National Territory of the Republic of the Philippines](image)

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The Spratly Conflict

More than anywhere else, the pressure of the Maritime Cold War is greatly felt in the Southeast Asian region. Guided by the UNCLOS definition of the EEZ, a geostrategic rivalry for maritime border expansion came into process, making islets and rocks rising out of the ocean of great importance, thus the emergence of the Spratly Conflict.

But, what are the Spratly Islands and why are they so important? Who are the different protagonists to the said discord and how do they justify their claims? Is this just a diplomatic issue or have there been instances of armed clashes?

The Spratly Islands and its importance:

The Spratly Islands

The Spratly group of Islands consists of 12 main islands and 390 islets, banks, reefs, shoals and cays, of which only 33 permanently rise above the sea and only seven of these have an area of more than 0.5 square kilometres. The islands and other features lie in an area of about 400 nautical miles from east to west and about 500 nautical miles from north to south. The sea areas contained by these features constitute about 38 per cent of the South China Sea.

According to legal experts, the 33 features, which are permanently above the sea, would be entitled, under international law, to have 12 nautical miles of territorial sea, while 26 of these could have Exclusive Economic Zones and continental shelf claims. None of the other features could have any such entitlement since they are not permanently above the sea.

The Kalayaan Island Group (KIG) as referred to by the Philippines, are actually islands within the Spratlys scattered west of the Philippine mainland, well within the 200-mile EEZ. Since 1968, Filipino troops were deployed to occupy some of the islands in the KIG (refer to Figure 2-3, for visual appreciation of the Spratlys).

Figure 2-3: The Spratly Islands

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Oil and Gas Deposits in the Spratlys

Aside from the expansion of territorial limits, widely conflicting estimates of huge oil and gas deposits in the area, which could make it as rich as the Kuwait region, are yet to be proven by exploration. Amongst those to have made such claims are the Chinese Ministry for Geology and Mineral Resources (oil and gas reserves of 17.7 billion tonnes as against Kuwait’s 13 billion tonnes), some scientists of the Russian Research Institute of Geology of Foreign Countries (at least 10 billion tonnes), Ji Guoxing, Director of the Asia-Pacific Department of the Shanghai Institute for International Studies (10 billion tonnes of oil and 25 billion cubic metres of gas) and the book (author anonymous) ‘Can China’s Armed Forces Win the Next War?’ (35 billion tonnes).

Among the sceptics doubting these estimates is E.F. Durkee, General Manager of the E.F. Durkee and Associates of Manila, who had worked as technical adviser to the Crestone Energy Corporation of the US during its negotiations with Beijing in 1992 on exploration rights. Durkee wrote in the Far Eastern Economic Review of 9 March 1995, as follows: ‘Though media and politicians love to talk about oil in the Spratlys, there is not one shred of evidence to support the claim. Other than a small amount of gas and a few barrels of condensate produced at Sampaguita 1 and 3A in 1976 at Reed Bank, within Philippine territory, there have been no reported hydrocarbons ever produced from the Spratly islands.’

The South China Sea

Another significant factor is the South China Sea which encompasses a portion of the Pacific Ocean and stretches roughly from Singapore and the Strait of Malacca in the southwest, to the Strait of Taiwan (between Taiwan and China) in the northeast. Since the Spratly Islands is located in the heart of the South China Sea, establishing military outposts in these islands will provide strategic military advantage both defensively and offensively against threats within the region.

More than half of the world’s annual merchant fleet tonnage passes through the Strait of Malacca, Sunda and Lombok, with the majority continuing on into the South China Sea. Tanker traffic through the Strait of Malacca leading into the South China Sea is more than three times greater than Suez Canal traffic, and well over five times more than the Panama Canal. Virtually all shipping that passes through the Malacca and Sunda Straits must pass near the Spratly Islands.

Claimant Countries and their Justifications

There are seven countries within the region involved in the Spratly Islands controversy, a list is provided together with a synopsis of their involvement:

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6 Ibid.
8 Ibid.
Brunei

➢ Does not claim any of the islands, but claims part of the South China Sea nearest to it as part of its continental shelf and Exclusive Economic Zone (EEZ). In 1984, Brunei declared an EEZ that includes Louisa Reef.

China

➢ Refers to the Spratly Islands as the Nansha Islands, and claims all of the islands and most of the South China Sea for historical reasons. These claims are not marked by coordinates and are not clearly defined, nor do they accord with UNCLOS EEZ boundaries.

➢ Chinese claims are based on a number of historical events, including the naval expeditions to the Spratly Islands by the Han Dynasty in 110 AD and the Ming Dynasty from 1403–1433 AD. Chinese fishermen and merchants have worked the region over time, and China is using archaeological evidence (like ceramic pots and pans claimed to be from China) to bolster its claim of sovereignty.

➢ In the 19th and early 20th century, China asserted claims to the Spratly and Paracel islands. During World War II, the islands were claimed by the Japanese. In 1947, China produced a map with nine undefined dotted lines, and claimed all of the islands within those lines. A 1992 Chinese law restated its claim in the region.

Chinese has occupied some of those islands.

➢ In 1976, China enforced its claim upon the Paracel Islands in the north by seizing them from Vietnam. China refers to the Paracel Islands as the Xisha Islands, and includes them as part of its Hainan Island province.

Indonesia

➢ Indonesia is not a claimant to any of the Spratly Islands. However, Chinese and Taiwanese claims in the South China Sea extends into Indonesia’s EEZ and continental shelf, including Indonesia’s Natuna gas field.

Malaysia

➢ Malaysia’s claims are based upon the continental shelf principle, and have clearly defined coordinates.

➢ Malaysia has occupied three islands that it considers to be within its continental shelf. Malaysia has tried to build up one atoll by bringing soil from the mainland and has built a hotel there.
Philippines

- The Philippine's Spratly claims have clearly defined coordinates, based both upon the proximity principle as well as on the explorations of a Philippine explorer in 1956.

- In 1971, the Philippines officially claimed eight islands that it refers to as the Kalayaan Island Group, partly on the basis of this exploration arguing that the islands:
  1. Were not part of the Spratly Islands, and
  2. Had not belonged to anybody and were open to being claimed.

- In 1978, the Kalayaan Island Group was designated as part of Palawan province.

Taiwan

- Taiwan's claims are similar to those of China, and are based upon the same principles. As with China, Taiwan's claims are not clearly defined.

Vietnam

- Vietnamese claims are based on history and the continental shelf principle.

- Vietnam claims the entire Spratly Islands as an offshore district of the province of Khanh Hoa.

- Vietnamese claims also cover an extensive area of the South China Sea, although they are not clearly defined. The Vietnamese have followed the Chinese using archaeological evidence to bolster sovereignty claims.

- In the 1930s, France claimed the Spratly and Paracel Islands on behalf of its then colony Vietnam.

- Vietnam has occupied a number of the Spratly Islands. In addition, Vietnam claims the Paracel Islands, although the Chinese seized them in 1974.

As of now, a lot of islands and shoals in the Spratlys have been occupied by the different claimant countries with some islands just a stone throw away from the other but inhabited by another nation. This situation can lead to the possibility of armed conflict if not settled diplomatically within the near future (see Figure 2-3).
Armed Encounters in the Spratly Islands

International disputes are almost always settled through diplomatic processes, however, in the Spratly Island conflict, numerous incidents of armed clashes have been documented between the claimant countries. Table 2-1 will give a chronological summary of some of the documented skirmishes within the Spratly Islands.\(^9\)

Unfortunately, the Philippines has been involved in frequent military engagements along the Spratly area, with most of its encounters being with the Chinese forces who are cautiously projecting geostrategic control over the South China Seas.

The security in the area of the Spratlys and the South China Sea will prove to be a great challenge not only for the Armed Forces of the Philippines (AFP) but to the National Government. Territorial integrity of the Philippines including national pride is at stake in this predicament.

One way of effecting the necessary control to discourage and or deter possible future intrusions is through the institution of an efficient airborne monitoring capability. A Long-Range Patrol Aircraft that has the speed and endurance to patrol a large area, the proper surveillance and communications system to coordinate with other agencies and, if necessary, the ability to strike when needed is required to provide this capability.

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\(^9\) Ibid.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>COUNTRIES</th>
<th>MILITARY ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>China, Vietnam</td>
<td>Chinese seize Paracel Islands from Vietnam</td>
</tr>
<tr>
<td>1988</td>
<td>China, Vietnam</td>
<td>Chinese and Vietnamese navies clash at Johnson Reef in the Spratly Islands. Several Vietnamese boats are sunk and over 70 sailors killed.</td>
</tr>
<tr>
<td>1994</td>
<td>China, Vietnam</td>
<td>China and Vietnam have naval confrontation within Vietnam’s internationally recognised territorial waters over oil exploration blocks 133, 134 and 135. Chinese claim area as part of their Wan’ Bei-21 (WAB-21) block.</td>
</tr>
<tr>
<td>1995</td>
<td>Taiwan, Vietnam</td>
<td>Taiwanese artillery fire on Vietnamese supply ship.</td>
</tr>
<tr>
<td>1996</td>
<td>China, Philippines</td>
<td>In January, three Chinese vessels engage in a 90-minute gun battle with a Philippine Navy gunboat near Campones Island.</td>
</tr>
<tr>
<td>1997</td>
<td>China, Philippines</td>
<td>The Philippine Navy orders a Chinese speedboat and two fishing boats to leave Scarborough Shoal in April: Philippine fishermen remove Chinese markers and raise their flag. China sends three warships to survey Philippine occupied Panata and Kota Islands.</td>
</tr>
<tr>
<td>1998</td>
<td>China, Philippines</td>
<td>In January, the Philippine Navy arrests Chinese fishermen off Scarborough Shoal.</td>
</tr>
<tr>
<td>1998</td>
<td>Philippines, Vietnam</td>
<td>In January, Vietnamese soldiers fire on a Philippine fishing boat near Tennet (Pigeon) Reef.</td>
</tr>
</tbody>
</table>

Table 2-1: Skirmishes Within the Spratly Islands

Regional Cooperation

The Southeast Asian countries are aware of the volatile situation they are in. For them to be united in their effort to avert any full-blown military action on the issue of sovereignty and at the same time to cultivate an atmosphere of cooperation for regional growth, a range of alliances have been established.
Association of Southeast Asian Nations (ASEAN)\(^{10}\)

The Association of Southeast Asian Nations (ASEAN) was formed in 1967 by Indonesia, Malaysia, the Philippines, Singapore and Thailand to promote political and economic cooperation and regional stability. The ASEAN Declaration signed in 1976 by ASEAN leaders in Bali, Indonesia, and considered ASEAN’s foundation document, formalised the principles of peace and cooperation to which ASEAN is dedicated. Brunei joined in 1984, shortly after its independence from the United Kingdom, and Vietnam joined ASEAN as its seventh member in 1995. Laos and Burma were admitted into full membership in July 1997 as ASEAN celebrated its 30\(^{th}\) anniversary. Although Cambodia was also scheduled to join at that time, its admittance was postponed due to turmoil in that country.

The association exercises far greater influence on Asia-Pacific trade, political and security issues than its members could achieve individually. ASEAN’s success has been based largely on its use of consultation, consensus and cooperation.

Asia Pacific Economic Cooperation (APEC)\(^ {11}\)

APEC is a public sector forum established in 1989 to promote greater economic trade cooperation in the Pacific Rim. Activities, programs and objectives are adopted upon approval on a consensus basis of its eighteen members, which include Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Mexico, New Zealand, Papua-New Guinea, Philippines, Singapore, Chinese Taipei (Taiwan), Thailand and the United States. In November 1996, APEC leaders agreed to a timetable that would see the addition of a small number of additional members by 1999. Because APEC includes political entities other than countries, such as Hong Kong and Taiwan, the term ‘member economies’ is used in place of ‘countries’. In addition, as part of the negotiations, which allowed simultaneous entry to Taiwan and China, Taiwan agreed to use the name Chinese Taipei within the APEC.

APEC is governed by an annual Ministerial meeting (the delegates are the Foreign Ministers and the Trade Ministers of the member economies) that tasks and delegates responsibilities to APEC Senior Officials. Senior Official Meetings (SOMs) are held about four times a year, and it is in the SOMs and related meetings that most of the work is progressed.

A summit, or ‘Leader’s Meeting’, has become an annual event since President Clinton invited Leaders to Blake Island in 1993. The Philippines hosted the SOMs in 1996, and the Leaders Meeting was held in November the same year at Subic Bay. Canada will host the SOMs in 1997 and the Leaders Meeting will be held at Vancouver. Malaysia hosted in 1998, New Zealand in 1999, and Brunei in 2000.

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\(^{10}\) Fact Sheet released by the Bureau of East Asian and Pacific Affairs US Department of State, 26 October 1998; http://www.usconsulate.org.hk/apec98/1026e.htm.  
ASEAN Regional Forum (ARF)\textsuperscript{12}

The ASEAN Regional Forum is the outgrowth of the annual Ministerial Level dialogue between the Southeast Asian Nations (ASEAN) and its Dialogue Partners. The inaugural ARF Ministerial Meeting held 25 July 1994, in Bangkok, Thailand established the ARF as the first region-wide multilateral forum for official consultations on Asia-Pacific security issues. Today, the Forum is truly an ‘Asian’ regional forum and its membership spans the Asia-Pacific region. The ARF meet annually (in July) at the Ministerial level and at the support group level during the intercessional period. The most active of the support groups is the Intercessional Support Group on Confidence Building Measures (ISG/CBM). Other technical-level groups focus on Disaster Relief, Search and Rescue, and Peacekeeping Operations.

Members include; Australia, Brunei, Burma, Cambodia, Canada, China, European Union, India, Indonesia, Japan, Republic of Korea, Laos, Malaysia, Mongolia, New Zealand, Papua-New Guinea, Philippines, Russia, Singapore, Thailand, United States and Vietnam.

ASEAN Free Trade Area (AFTA)\textsuperscript{13}

At the fourth ASEAN Summit in Singapore in January 1992, the ASEAN heads of government formally agreed to establish an ASEAN Free Trade Area (AFTA) and signed the Singapore Declaration and the Framework Agreement on Enhancing ASEAN Economic Cooperation. The ASEAN Economic Ministers signed the agreement the Agreement on the Common Effective Preferential Tariff (CEPT) Scheme for AFTA. This scheme is the main mechanism for the realisation of AFTA.

According to the CEPT Agreement, the countries of ASEAN would reduce intra-regional tariffs on all manufactured items including capital goods and processed agricultural products and remove non-tariff barriers over a 15-year period commencing I January 1993.

However, in view of the economic challenges, the AEM Meeting on 22-23 September 1994 in Chiangmai, Thailand agreed to shorten the time frame for the realisation of the AFTA from 15 to 10 years, finishing by 1 January 2003 instead of 2008, and to include unprocessed agricultural products into the CEPT Scheme.

The ultimate objective of AFTA is to increase ASEAN’s competitive edge as a production base geared for world market. Through the elimination of intra-regional tariffs and non-tariff barriers, ASEAN’s manufacturing sectors are expected to become more efficient and competitive.

There are six original members of AFTA, those being Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand. Now, AFTA has ten members with the inclusion of Vietnam (joined in 1995), Laos and Myanmar (joined in 1997) and Cambodia (joined in 1999).


\textsuperscript{13} ASEAN Free Trade Area: AFTA; http://www.moe.go.th/thai/dbe/AFTA-NET.html.
Regional Declarations and Treaties

During the different meetings and conferences wherein regional problems are being discussed, there will always be Declarations or agreements that will be made to bind the countries closer together. Here are some of them:

ASEAN Declaration on the South China Sea:¹⁴ Manila, Philippines, 22 July 1992

This declaration embodies the necessity to resolve all sovereignty and jurisdictional issues pertaining to the South China Sea by peaceful means, without resort to force. To resolve without prejudicing the sovereignty and jurisdiction of countries having direct interests in the area, to explore the possibility cooperation in the South China Sea on matters relating to the safety of maritime navigation and communication, protection against pollution of the marine environment, coordination of search and rescue operations, efforts towards combating piracy and armed robbery as well as collaboration in the campaign against illicit trafficking in drugs.

Zone of Peace, Freedom and Neutrality (ZOPFAN) Declaration:¹⁵ Kuala Lumpur, Malaysia, 27 November 1971

This declaration known as the Kuala Lumpur Declaration of 1971. The ZOPFAN Declaration was a statement of political intent to be achieved by building national and regional resilience over the years following the establishment of ASEAN. The ZOPFAN Declaration committed all the ASEAN Member Countries to 'exert initially necessary efforts to secure the recognition of and respect for Southeast Asia as a Zone of Peace, Freedom and Neutrality, free from any manner of interference by outside powers'. Furthermore, ZOPFAN called on all of Southeast Asian countries 'to make concerted efforts to broaden the areas of cooperation, which would contribute to their strength, solidarity and closer relationship'.

Declaration of ASEAN Concord:¹⁶ Indonesia, 24 February 1976

Embodied in the Preamble of this Declaration is: the reaffirmation of commitment to the Declarations of Bandung, Bangkok and Kuala Lumpur, and the Charter of the United Nations. It also endeavours to promote peace, progress, prosperity and the welfare of the peoples of the member states.

Its objective states that this declaration shall take into account, 'the stability of each member state and of the ASEAN region is an essential contribution to the international peace and security. Each member state resolves to eliminate threats posed by subversion to its stability, thus strengthening national and ASEAN resilience...'.

¹⁴ ASEAN Declaration on the South China Sea, Manila, Philippines, 22 July 1992; http://www.asean.or.id/politics_AGi5.htm
¹⁵ Political Achievement; http://www.asean.or.id/general/pa305.htm
¹⁶ Association of Southeast Asian Nations (ASEAN), Declaration of ASEAN Concord, Indonesia, 24 February 1976; http://www.itcilo.it/english/actrav/telelearn/global/ilo/blokit/aseacord.htm
Treaty of Amity and Cooperation in Southeast Asia: Indonesia, 24 February 1976

Embodyed in the Preamble of this treaty is the desire of each signatory to enhance peace, friendship and mutual cooperation on matters affecting Southeast Asia consistent with the spirit and principles of the Charter of the United Nations, the Ten Principles adopted by the Asian-African Conference in Bandung on 25 April 1955, the Declaration of the Association of Southeast Asian Nations signed in Bangkok on 8 August 1967, and the Declaration signed in Kuala Lumpur on 27 November 1971.

Chapter One, Article 1, in the Purpose and Principles of this Treaty states, "The purpose of this Treaty is to promote perpetual peace, everlasting amity and cooperation among their peoples which would contribute to their strength, solidarity and closer relationship.


This Treaty states that the signatory parties are determined to take firm action, which will contribute to the progress towards general and complete disarmament of nuclear weapons, and to the promotion of international peace and security.

Bilateral Linkages

The Philippines values its bilateral linkages and arrangements with various countries for the promotion of regional peace and stability. It has various defence cooperation arrangements with Indonesia, Malaysia, Singapore, South Korea, Australia, the United Kingdom, France and the United States.

Generally, these various defence cooperation arrangements provide a framework for the development of bilateral relationships between the Philippine Department of National Defence, and the Armed Forces of the Philippines and their counterparts with the countries mentioned above.

In summary the Philippines’ AOR boundaries undeniably is maritime in nature. It is from these waters that almost 60 per cent of Filipinos get their livelihood, tourists flock to the Philippines to bathe in the magnificent blue waters of the local beaches, the country also boasts of the natural resources that abound from the surrounding waters (corals, exotic fishes) and with the UNCLOS, the Philippines was able to extend its waters further. However this did not mean that everything would be a bed of roses, for corollary to the expansion of the maritime domain was a dilemma in national security.

The South China Sea, which is the western border of the Philippines, is the setting of a maritime cold war. Not only because of the alleged mineral (oil and gas) deposits in this area, but at the same time because of a group of islets and rocks known as the Spratly Islands giving rise to border disputes among seven claimant

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17 Ibid.
18 UNOG Treaty Archive: Treaty on the Southeast Asia Nuclear-Weapon-Free Zone (Bangkok Treaty); http://www.unog.ch/frames/disarm/distreat/asean.htm
countries (Brunei, China, Indonesia, Malaysia, Taiwan and Vietnam) within the area to include the Philippines.

Armed clashes have been recorded in these areas since the early 1970s up to the present with China being the most aggressive. Ironically, the Philippines is not exempted from this predicament. Philippine sovereignty issues have been tested, making the Philippines react both through diplomatic means and armed force.

With the growing unrest in this part of the Southeast Asian region a genuine intention of solving these disputes peacefully was instituted through the setting up of regional alliances. This in a way toned down the heating situation in the South China Sea and fostered to a limited degree a feeling of kinship among the regional countries. However, with the economic crisis that ravaged the region and the population increase, this has resulted in more mouths to feed, and more land needed for habitation, the riches of the sea and the additional land area is deemed worth fighting for.

Frequent patrols from the different claimant countries are observed within the disputed areas, most visible is that of China.

The Philippines, for its part, is trying its best to project sovereignty over its territory, but due to the limited resources of both the PN and PAF not all intrusions can be checked.

As a solution a good LRPA which will serve as a deterrent will surely be a big factor. Not only will it be capable of giving real time development in critical areas but it would also dissuade would be intruders from encroaching in the territory. In the succeeding chapter the importance of having an effective and efficient LRPA will be discussed to show how it will operate in maritime scenarios.

In a statement made by President Joseph E. Estrada during the first Command Conference of the AFP last 21 January 2000, he stated that: 'In our external defence, we should enhance our air and naval surveillance but direct military confrontation should be avoided'. He also continued by saying 'This did not mean, however, that the military should abandon the right to defend itself when attacked and give up trying to explore ways of expanding defence ties with friendly nations'.

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Chapter Three

Concept for Employment of LRPA in the PAF

With the end of the Cold War and the brewing of the Maritime Cold War, which has been felt the most within the Southeast Asian region, the build up of military capability is now part of the strategic plan of the countries within the area. The fluidity of the uncertain security environment compels the Asia-Pacific nations to allocate millions of dollars for the purchase of new technology hardware for their military.

The Philippines, with the signing of Republic Act (RA) 7898 known as the Armed Forces of the Philippines (AFP) Modernisation Act, has joined the caravan of regional nations in improving the military capabilities of their armed forces. However, with the problem brought about by the economic crisis, funding for the different projects was delayed.

The Philippine Air Force (PAF) for its part has produced its own modernisation plan. Included in this plan is the purchase of a number of Long-Range Patrol Aircraft (LRPA) for the purpose of air surveillance and reconnaissance.

Upon acquisition of these LRPA's the proper guidelines on the employment of these air assets is essential. Therefore, the tactical procedures that will be included in this paper can serve as part of these guidelines and at the same time aid in the development of the Tactical Doctrine necessary to insure proper employment of these aircraft and supporting systems.

In order to further understand this chapter's intention, definitions regarding the different levels of the military doctrine and their relationship with each other should be appreciated.

_Doctrine is every action that contribute to unity of purpose... It is what warriors believe in and act on._

Captain Wayne P Hughes, Jr USN

Levels of Doctrine

The military doctrine has three levels: Strategic, Operational and Tactical.

**Strategic Doctrine.** Strategic doctrine states the fundamental principles for employment of air forces to attain national objectives in peace and war. It serves as a reference or authority for all other doctrines; information for instruction in military service schools; material for public and internal information programs; and positions

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to support budgetary procurement programs. It establishes the framework and foundation for the effective use of air power.

**Operational Doctrine.** Operational doctrine *establishes principles and rules governing organisation, direction and employment of air forces in the accomplishment of basic combat operational missions in conventional and unconventional warfare, counter-insurgency, special operations and various military tasks consonant with military preparedness.* It embodies the concepts and principles derived from the strategic doctrines. It also serves as a guide for the air force in the organisation and employment of its forces to perform its function in a particular type of conflict within authorised entitlement.

**Tactical Doctrine.** Tactical doctrine *establishes detailed tactics, techniques and procedures that guide the use of specific weapons to accomplish specific objectives.* It presents guidance on how the air force should be employed in engagements and battles. It should address how to accomplish tactical objectives and how combat conditions such as threat, weather, terrain and available weapons influence tactics.

**Inter-relationship.** The three levels of doctrine are interrelated. In air power doctrine, for example, they are neither mutually exclusive nor rigidly limited to precise boundaries. Some examples will help to illustrate this:

a. **Strategic Doctrine.** The strategic air strike campaign uses air power to strike directly and with precision at the enemy centres of gravity. Selection of targets is fundamental to this campaign.

b. **Operational Doctrine.** To prosecute the strategic air strike campaign, an air commander employs air forces in air strike operations by orchestrating a variety of roles. These may include fighter escort, combat air patrol, suppression of enemy air defences, air to air refuelling, long-range reconnaissance, command and control airfield attack, etc.

c. **Tactical Doctrine.** As part of the force-mix required for the strategic air strike campaign, F-5s are used to provide fighter escort to the strike aircraft. Tactical doctrine describes how the F-5s perform this role and how they would be integrated and coordinated with the actions of the other weapon systems of the force-mix.

**The Surveillance Model**

Tactical employment of the LRPA will focus on maritime operations, however, due to the lack of resources of the PAF, inland operations with the LRPA will also be possible, but the degree of effectiveness will be dependent on the equipment to be fitted in the platform.

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2 Based on the notes, briefings and lectures of the 292 Training Squadron, 92 Wing, RAAF.
A surveillance model will detail how valuable a well-planned LRPA surveillance mission is in the pursuit of national security. This model will also show the continuous process of information gathering as determined by the national government.

The employment of the LRPA will depend on the dictates of the National government policy requirements, which in turn are established on the various needs of the different agencies/branches of government. An executive order is then issued serving as the guideline on the conduct of operations, in this case air surveillance or reconnaissance. Therefore, it is the national government through the executive branch that:

1. Determines various departments’ activities, and establishes their areas of responsibilities and authority.
2. Dictates the resources, provides the funding and orders the use of various assets.
3. Establishes operating limits, assesses the situation for both safety and for international diplomacy, and provides guidance on the extent to which tasks can be conducted.
4. Ensures that the conduct of surveillance is in accordance with set political goals.

Objective

In effect, the executive branch may establish the objective of the air surveillance effort, which is the result of the needs of the different agencies like Defence, Customs, Fisheries and others. These different agencies will have different requirements for air surveillance.

Before any military operation starts, which would involve the use of manpower and expensive equipment or assets, standard procedures, are implemented to ensure that optimum mission results are be achieved. Hence, mission planning is of vital importance.

Mission Planning

The efficient and effective use of surveillance and reconnaissance resources requires a systematic and comprehensive approach for determining those tasks that can be undertaken by the available resources. It will include executive guidance, intelligence information, legal aspects and especially expected results.

Intelligence Collection Plan

The primary driver for surveillance and reconnaissance tasks will be the intelligence collection plan. This plan will identify information needed for analysis to meet commanders’ intelligence requirements, sources that could provide the desired information, and the time by which information is required. Also, incorporated in the intelligence collection plan, is any tasking from superior, subordinate and cooperating/flanking headquarters, as well as requirements to support counter-
intelligence, counter-surveillance, deception and counter-deception plans. In addition to intelligence requirements, a commander may require surveillance specifically to provide security for his force by covering areas where he has limited resources.

**Surveillance and Reconnaissance Plan**

The surveillance and reconnaissance plan provides the means to coordinate and to direct allocated surveillance and reconnaissance assets to collect the information required. Before tasking and detailed planning can proceed, an appreciation should be undertaken. The purpose of this appreciation is to produce a plan that allocates resources to specific tasks. When selecting the surveillance or reconnaissance asset best suited to acquiring the required information, the following factors should be considered:

- **Suitability.** The selected sensor should be assessed for its ability to operate in the likely operational environment, as well as to acquire information at an accuracy level suitable for the derivation of the intelligence being sought. In matching sensors to tasks, considerations should be given to each sensor’s technical capabilities and the number of each available.

- **Risk.** The risk to the asset should be weighed against the potential value of the information, and the availability and reliability of alternative sources.

- **Operational Security.** Consideration should include the secrecy of the plan, as well as supporting materials such as the deception plan and counter-intelligence being compromised.

- **Sustainability and Endurance.** The nature of the tasks, the aircraft’s performance and a sensor’s ability to conduct continuous surveillance or reconnaissance should be considered.

- **Handling of Information.** Information obtained is fused with other intelligence data and analysed, and that dissemination of information and intelligence to all affected elements must be conducted in a timely manner.

**Planning Considerations**

When planning an air surveillance or reconnaissance mission different factors have to be considered especially since high value equipment will be at stake not to mention the safety of the aircrew who will be performing these missions. Missions should be conducted systematically with the optimum deployment of sensors to maximise operational output. These factors are discussed below.

**Operating Area size**

The performance of an LRPA, together with the sensors fitted in the aircraft and expected disposition of targets will determine the operating area size. In mission planning the surveillance area or operating area size is calculated as a direct function of the following:
1. sensor sweep width,  
2. track spacing,  
3. aircraft speed of advance, and  
4. aircraft endurance.

Therefore, a lot will be dependent on the type of platform, its performance, the equipment fit and its capabilities. This means that the operating area size of an aircraft that is faster and has a longer endurance or 'on task time' will be bigger than that of an aircraft with lesser performance. Likewise, an equipment fit/sensor, let us say a radar when it is the search sensor, that has a better detection range will have a larger operating area size as compared to a less capable radar (a diagram of an operating area size is shown in Figure 3-1). The aircraft’s speed and range is coordinated with the capabilities of on-board sensor.

Figure 3-1: Example of an Operating Area Size

1. **Sensor Sweep Width (W)** – is the term used to describe the width of search that a surveillance platform achieves. This will be entirely dependent on the type of sensor employed because different sensors have different detection ranges, and the size of the target.

   - The detection range will be dependent on how good the radar or sensor is and the size of the target. If aircraft is fitted with Electronic Support
Measures (ESM), it will also depend on whether target is radiating, which would mean a greater detection range. Environmental factors like, weather and the sea state affects the limits of the detection range.

- Target size is also a factor in determining the sensor sweep width. The smaller the target, the smaller the detection range for a better chance of acquiring the target.

- Sensor sweep width is equals two times detection range.

Radar however, may not be always the sensor used for calculating sweep width. There may be instances when radar is not used due to Emission Control Policy, or unforeseen circumstances where an aircraft's radar becomes unserviceable. In this case sweep width could be based on visual, infra-red or ESM sensors.

As earlier mentioned larger targets can be easily picked up by sensors and a larger sweep width is possible, however for smaller targets, to have a higher percentage of finding it, a smaller sweep width is necessary. Figure 3-2 will illustrate the detection range and the sweep width.

![Detection Range Diagram](image)

Figure 3 – 2: Illustration of Sweep Width and Detection Range

2. **Track Spacing** – is the distance between search legs. Track spacing is one of the components to determine the **coverage factor**.

- The Coverage Factor is used to estimating what portion of a geographic area has been searched.

- The formula $C = \frac{W}{S}$, is used to calculate the Coverage Factor. Where sweep width is denoted by the letter W, and track spacing is denoted by the letter S.
• In order to achieve 100 per cent coverage, the distance between track spacings should not be greater than the sweep width (see Figure 3-3 for illustration).

![Diagram showing relationship between track spacing and sweep width.](image)

**Figure 3 – 3: Relationship Between Track Spacing and Sweep Width**

In some operations like Search and Rescue, the sweep width is larger than the track spacing in order to increase the chance of detection of a target. An example is when searching for an aircrew who parachuted from his aircraft and landed at sea. In this type of situation coverage of 150 per cent can be applied for better chances of recovery.

3. **Speed of Advance (SOA)**—is the rate the platform advances in reference to its surveillance track. The SOA is used in calculating the operating area size.

• SOA takes into account the time necessary to investigate targets/contacts (such as identifying ships), which means a deviation from the desired search track.

• In order to insure that there are no gaps in the search track, the platform will have to return to the point of deviation where it will again resume its surveillance function, which will reduce the SOA. Therefore the more targets/contacts for investigation the slower the speed of advance, and if more targets than expected are encountered it could be that the planned area may not be covered due to fuel, endurance and or daylight considerations (see Figure 3-4 and Figure 3-5).
4. **Aircraft Endurance** (Time) – is the capability to stay airborne and continue a surveillance or reconnaissance mission ("on task") without refuelling. The final factor in computing the operational area size.

- This means that the longer the aircraft endurance the larger the area that can be searched
- An option when an aircraft with a long endurance is not available is to split the task between a number of smaller aircraft.
- Aircraft endurance is used to calculate the length of time that the asset can remain on task.

With the sweep width of the sensor in use, speed of advance and the endurance or the on task time of the platform, we will be able to satisfy the formula of getting the operational area size.
Tasking

Tasking involves the assignment of assets, in terms of crews and aircraft, to accomplish the mission. Based on guidance from the Executive level through to operational and planning levels, tasking is done at the tactical or line level where operator input is important to enable missions to be conducted in the most effective, efficient and safe manner. The tasking authority should liaise closely with the planning authority to choose the most safe and efficient way of conducting the mission.

The tasking authority must consider the mission to be performed in order to take into account the availability and the capability needed in choosing an air asset (a more detailed discussion in this regard will be done in the next chapter). In our case, the LRPA platform should be used in conducting the surveillance mission. As maximum effectiveness otherwise will not result.

For an air surveillance mission, which is PAF directed, the flow of tasking will start with the Assistant Chief of Air Staff for Operations (A-3) who is responsible in directing the implementation of the surveillance mission as approved by the Commanding General PAF (CG, PAF). It is also the responsibility of A-3 to coordinate with other AFP units concerned and international entities if necessary for the mission. A-3 will give details on the objective of the surveillance mission including:

- Area of search
- Target to search
- Nature of target (Friendly, Enemy)
- Asset/platform to be utilised
- Time to initiate search

The Wing Commander (WC) of the Unit involved will then give tasking to Director for Operations (DO) to make a comprehensive plan of the surveillance mission in coordination with the Director of Intelligence (DI). The DO in turn will task the Squadron to provide the aircraft and aircrew to perform the mission.

A diagram to illustrate the flow of command form Headquarters Philippine Air Force to the Wing involved is shown in Figure 3-6, and the flow of command from Wing level to the Squadron involved is shown in Figure 3-7.
Planners should ensure the maximum utilisation of assets by planning the mission at the right time of the year, and where possible, merge surveillance activities with other agencies concerned in the same area of operation. For example an LRPA conducting military surveillance over a certain area can include a fisheries mission or a customs mission when appropriate. This ensures maximum advantage of an LRPA’s inherent flexibility and multi-role capability depending on sensors fitted. However, care must be exercised in balancing the number of tasks given. It is important to set priorities to ensure that the completion of the most important tasks is not compromised.
Task Execution

During the conduct of the maritime surveillance task, the crew is required to give updates on the ongoing surveillance mission. Status of the mission through inflight reports should be sent to relay any data, which needs immediate action. After the completion of the mission, the crew is required to submit a Post Operation Report, which in effect provide details of less urgent data and confirming inflight reports.

All information obtained are recorded in various databases to be made available for access by the various surveillance agencies. A very important component, databases should be incorporated in the maritime surveillance effort of the Philippines to advance system efficiency. Access would include inter-departmental agencies and in some cases overseas agencies.

A separate database however, for sensitive military information with limited access should be established for security purposes.

Reports

Air reports should be done to relay vital information that needs immediate action. It is imperative to send the necessary message to enable authorities to intercept or shadow any illegal vessel or activity.

Upon completion of the mission a post mission report should be submitted to validate initial reports. The post mission reports should be structured so that they can be fed straight into data management systems and therefore be used to create a useful database for future reference.

It must be noted that included in the advantages of air surveillance is real time reporting of events for immediate action, and the necessary intelligence information gathering essential for data build up.

Intelligence

The product from the surveillance mission is intelligence both strategic and tactical (in these situations operational changes will be influenced by strategic planning):

- **Strategic Intelligence** is required for the formation of policy and military plans at national and international levels. It examines the ability of potential enemy nations to wage war, plus peacetime intelligence on such things as fisheries exploitation, environmental degradation maritime traffic and others. It may cover such subjects as manpower, industry, power, ports, Petroleum/Oil/Lubricant production (POL), transportation and strategic forces.

- **Tactical Intelligence** relates to the activity and immediate enemy potential within a limited area. This type of intelligence relates to the particular battle area. It covers areas such as airfields, POL depots, military headquarters, radar installations and other defences, communications and transportation in so far as they support the movement and control of forces within the battle area. Tactical intelligence is mainly required for short term planning and will decisively affect a battle, but can also contribute to peacetime related initiatives.
All intelligence information gathered during the duration of the air surveillance mission whether of value for strategic or tactical purposes would be put into a database for filing assessment and ready access.

**Surveillance Database**

The maintenance of a surveillance database is essential since information entered will aid in establishing trends in the activities of shipping and sea-going vessels in the different areas of interest. Likewise, access to information will be easier and simpler.

Over time the volume of data accumulated will be helpful in analysing and forecasting the types of activity likely to occur in a specific area. The database will be able to predict the volume of traffic, areas of importance, likely target/vessel types and traffic movement within the national boundaries. Therefore, the database will be a significant tool for policy revision and accurate planning.

**Data Analysis**

Information retrieved from the database will be analysed for expected trends in contacts/targets, shipping and other vessels and in turn will be able to assist in compiling an operator's list for future reference.

Likewise an analysis of principle areas of interest, an example in the Philippines would be the area of the South China Sea, which is where the Kalayaan Islands are.

Analysed information from the database will then be distributed to the agencies concerned for proper action (a representation of the surveillance model is shown in Figure 3-8).

![Figure 3-8: Representation of Surveillance Model](image)

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3 Ibid.
As new data is collected and analysed, the strategy for future surveillance can be developed, and therefore the cycle continues.

We have discussed the process by which an air surveillance or reconnaissance mission is initiated and the cycle it goes through until eventually its product becomes the basis for strategic planning of a nation. Next we will discuss how the LRPA would operate in different mission scenarios in compliance with government policy.

Routine Patrols (Peacetime)\(^4\)

First and foremost, it should be realised that all missions performed with regards to surveillance and reconnaissance will always have to adhere with the national government policy, which provides overall guidance.

Although, international law of the sea does not restrict any nation from performing surveillance missions in international waters, it still however, imposes territorial limits, which should not be violated. It should always be the policy of any government to avoid international disputes brought about by overflying other nations' territorial borders.

To preclude diplomatic incidents of border trespassing or misunderstanding intentions, agreements may be reached between nations to regulate and even performing joint operations in the conduct of surveillance activities within border limits.

During the performance of routine air surveillance sorties, the LRPA will proceed to a pre-determined region as instructed by higher authorities to carry out its tasking of surveillance over the assigned area of interest.

The purpose of the surveillance mission during peacetime scenarios would be the gathering of information and to exhibit air surveillance capability to would be violators of local laws.

A typical search pattern that can be used during routine searches is the ‘Track Line Search’, where the flight path of the aircraft is to search only within detection range either side of the track (Figure 3-9, is an example of a ‘Track Line Search’).

\[^4\] Ibid.

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**Figure 3 - 9: Track Line Search**
In a track line search, the aircraft simply transits through the area of interest and looks for shipping traffic, targets/contacts either side of the detection range. The Track Line Search is the most common method of surveillance along established narrow shipping route, an example in the Philippines would be that of the South China Sea, wherein almost a half of the world traffic in shipping passes.

To build up information to be stored in the database, aside from written reports done either through air reports or after mission post operation reports, camera photography is also of vital importance for validation. During peacetime surveillance missions, visual passes are flown at low level to allow photography of target/contact. Various methods of photography are practiced depending on the equipment available in the LRPA.

Aside from handheld cameras (SLR and digital cameras), infra-red footages, acoustic signature information and electronic intelligence can also be acquired depending on sensors fitted in the aircraft. All this information will be stored in a database for future reference and easy access.

As an example, Australia’s P3C aircraft would fly at low level at approximately 500 yards horizontal separation at altitudes of 500 feet and below to enable handheld camera photography. This enables good visual identification on merchant deck cargo vessels to sometimes identify exactly what sort of cargo is being transported. Arms carriers have sometimes been identified by this method (Figure 3-10, an example of a ‘ship run’ photo).

Figure 3–10: Sample Photographs Taken by a Handheld SLR Camera from RAAF P3C LRPA
Air surveillance missions during peacetime provide good opportunities to conduct proficiency sorties for LRPA crew to keep them adept in surveillance procedures and prepared for actual crisis situations. Also, of course, this information in peacetime is vital to provide current data in the Philippine maritime area of interest.

Manoeuvres Against Aggressive Targets
(Times Of Crisis/Conflict/War)\(^5\)

During times of crisis/conflict or in a wartime situation the surveillance platform will almost always be close to enemy lines monitoring their every movement. This being the case, it is quite probable that the LRPA could be responsible for starting the ‘shooting match’.

Unwarranted manoeuvres like switching from overt surveillance, to a covert posture of monitoring may be all that is required to escalate hostilities. In these cases all actions by the LRPA should be in accordance with the existing Rules of Engagement (ROE). The chart below will distinguish overt surveillance from covert surveillance.

<table>
<thead>
<tr>
<th>OVERT SURVEILLANCE</th>
<th>COVERT SURVEILLANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition:</strong></td>
<td><strong>Definition:</strong></td>
</tr>
<tr>
<td>• No effort or attempt is made to disguise the presence of the surveillance platform</td>
<td>• The aim of the surveillance platform is to disguise its presence and deny the target, intelligence and knowledge of the aircraft position and tasking.</td>
</tr>
<tr>
<td><strong>Purpose:</strong></td>
<td><strong>Purpose:</strong></td>
</tr>
<tr>
<td>• Alter target’s readiness state</td>
<td>• Alter target readiness state</td>
</tr>
<tr>
<td>• Assert airborne superiority</td>
<td>• Force target to radiate its sensors</td>
</tr>
<tr>
<td>• Deter target from conducting clandestine operations</td>
<td>• Reduce target attack opportunities</td>
</tr>
<tr>
<td>• Deter target from conducting an attack</td>
<td>• Decrease surveillance platforms risk from airborne engagement</td>
</tr>
<tr>
<td>• Reduce risk of stumbling over an Emission Control (EMCON) silent target</td>
<td>• Disguise arrival of incoming attack</td>
</tr>
<tr>
<td>• Monitor conduct of illegal activity</td>
<td>• Monitor conduct of illegal activity</td>
</tr>
<tr>
<td><strong>Disadvantages:</strong></td>
<td><strong>Disadvantages:</strong></td>
</tr>
<tr>
<td>• Gives away intelligence</td>
<td>• Unable to remain completely silent, risk of stumbling into enemy forces</td>
</tr>
<tr>
<td>• Enable Electronic Surveillance Tracking (ECM) of platform</td>
<td>• Surface contacts/targets can merge and split without the knowledge of the platform due to silence</td>
</tr>
<tr>
<td>• Allows intercept by airborne support (CAP)</td>
<td>• Low level operations, tiring to crew and trade-off aircraft endurance</td>
</tr>
<tr>
<td>• May prevent observation of illegal activity</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 – 1: Overt and Covert Surveillance

\(^5\) Ibid.
In conflict or wartime situations whether performing overt or covert surveillance, the purpose of the airborne surveillance platform is to identify the target in order to have an idea on the location, intent, armament and capability of the enemy force.

It will be the tasking of the LRPA to give information on the strength and capability of the adversary so that tactical advantage can be gained. To be able to accomplish its mission, a LRPA should have the proper equipment to achieve its task.

A well-equipped LRPA will have a number of ways of identifying its target/contact through different sensors such as:

- Visual
- Electro-Optics (IRDS)
- Electronic Support Measures (ESM)
- Radar Imagery (profiling Radar)

- Acoustic Signature
- Communications Intercept
- Target Characteristics

Visual identification is the most positive method of identifying a target. When this is not possible, the real value of good tactical intelligence becomes immediately apparent.

A combination of non-visual sensors can be used to identify the target; IRDS, ESM, RADAR and Acoustic libraries can be consulted to gain an identification match on the suspect target if it is in the database. Further discussion on the function of these sensors will be taken up in Chapter Five.

**Risk Control**

During times of conflict, a Long-Range Patrol Aircraft is always at the risk of being shot down. In order to minimise risk during hostilities, higher authorities must impose guidance on the limit of target identification by the LRPA.

A 'stand-off' range must be established for risk control purposes. The stand-off range during hostilities must always be greater than the Missile Engagement Zone (MEZ) or the Gun Engagement Zone (GEZ) of the enemy vessel.

MEZs and GEZs are the terms given to the maximum radius away from each weapons' range of fire, that an aircraft can safely operate without the risk of being shot down (see Figure 3-11).

In cases when weapons release is unavoidable, it may be able to be done without having to visually identify the target vessel by exact type and class as the combination of sensor information may be enough for a classification of enemy warship to be reached. An extreme threat would have to exist to permit an attack without positive identification (visual). The identification level will always be in accordance with the existing Rules of Engagement.

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6 Ibid.
Search and Rescue Operations (SAR)\textsuperscript{7}

In all these operations and many others that involve flight across the water, there is always the risk that aircraft and aircrew will ditch into the sea. The operation of quick reaction, air sea rescue is another capability than a LRPA should be able to perform. Nowadays, land-based fixed-wing aircraft are generally used to drop initial provisions and survival equipment such as dinghy radios and provide the on-scene control function to manage rescues by helicopters or sea vessels. With the vast expanse of water bordering the Philippines not to mention the rugged mountainous terrain inland, a respectable SAR capability is advisable. Therefore, SAR missions will also be one of the numerous tasks that a Long-Range Patrol Aircraft can perform making it a valuable national asset.

**Definition**

SAR is defined as a service provided by units to search for and rescue personnel in distress on land or at sea. The service or operation may involve aircraft, surface craft, submarines and special rescue teams and equipment. The service covers the whole sequence of measures coordinated and directed by each government's Rescue Centre (RC) to search for and rescue personnel in distress.

**Function of Search and Rescue**

The primary function of SAR is to save lives, and military SAR is aimed at saving lives of military personnel. However, under the International Civil Aviation Organisation (ICAO) obligations, SAR is also provided by the PAF for civil aviation.

This secondary function of the SAR for the LRPA is subject to the availability of assets, to assist in the relief of maritime and general civil distress. In fact, the majority of SAR operations today serve this wider purpose.

Coordination

With the employment of numerous facilities and equipment/assets (aircraft, ships, command and control, personnel manning, etc.) involved in a SAR operation, coordination is very important to guarantee an effective and speedy rescue. The search will usually be controlled and coordinated by the RC, but it may be that a number of participants and the scale of the rescue are such that the RC cannot exercise control effectively. In this case, the RC will nominate one of the search units to act as the ‘on-scene’ commander.

The on-scene commander will now be responsible to the RC for the control of communications and the SAR operation at the scene of the action. The on-scene commander always remains subordinate to the RC.

Search Considerations

Once the RC has been alerted that a genuine need exists and has decided to call upon the air assets available to conduct a search and rescue operation, the conduct of the search will depend upon several factors:

- The accuracy of the datum, or how much faith can be placed on the first report. Was the report from a participant in the incident, a separate observer or a survivor and, if so, what navigational system did he use to calculate a position?

- If the initial report was from someone not directly involved but who was an observer, how did he assess the position of the incident?

- How long ago was the data assessed?

- Enhancement of the datum or the extent by which the survivors could make the datum more obvious. This includes visual aids such as pyrotechnics and dye markers, and electronic or radio aids such as, radio-locator beacons.

- The size of the target to be rescued, for example, whether it is a crashed aircraft or a single person, and the environment or background. An orange, single seat dinghy is quite difficult to see on the surface of a choppy sea, but will stand out clearly on snow in bright sunlight.

- The state of the weather will also play a part in the SAR operation. Low cloud, mist or fog or even driving rain will restrict visibility and will hamper a search. Similarly, strong wind driving spray off wave tops will not help a search for a survivor in the sea.

- The time of the day will dictate whether the search is to be conducted in daylight or under cover of darkness. Night searches are not impossible provided non-visual aids are available such as radio beacons and infra-red systems. However, searches in daylight will offer more opportunities to more pairs of eyes.

- The number and types of search units available will affect the conduct of the search, and provided they are coordinated properly, the greater number of search elements available the quicker the area will be searched.
The time involved to search an area is a function of all these factors, which together determine the type of search and the size of the area to be covered.

**Types of Search**

**Electronic Search**

The easiest and generally the quickest search pattern an aircraft can employ is that used for radio-locator beacon. If the aircraft is fitted with direction-finding (DF) equipment, the aircrew merely fly direct towards the beacon and keep refining the position as they pass overhead. As the aircraft descends, one of the visual lookouts will eventually sight the survivor or the origin of the beacon signals. Even without DF equipment, an aircraft can home to a general ‘on-top’ area by flying the procedure described on Figure 3-12.

![Diagram of search pattern](image)

**Figure 3 – 12: Procedure for Electronic Search**

**Sector Search**

When there is no locater-beacon available, but when there is deemed to be an accurate datum and the search aircraft can reach the datum in good time, the preferred search method is the sector search. The advantage of this search is the abundance of coverage over the centre, the accurate datum reported. See Figure 3-13.

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8 Ibid.
Expanding Square Search

If the area around the known datum is relatively small or if a sector search over a datum has been completed without success, the expanding square search is the next option. This search method uses multiples of track spacing to determine the area searched. Track spacing is derived from the detection range of the sensor. See Figure 3-14 for illustration.
The Creeping Line Ahead Method

If the positional information of the search is poor, the area to be searched will expand dramatically. The creeping line ahead method is illustrated in Figure 3-15. If the area is large but the detection range and therefore the track spacing is very small, a variation of the creeping line ahead search can be flown as illustrated.

Figure 3 - 15: Creeping Line Ahead Variations
The Track Crawl Search

The track crawl search may be flown when the intended track of the lost aircraft or vessel is known, but the precise position of the incident along the track is not clear, the spacing between the search tracks depends on the desired detection range. See Figure 3-16 for illustration of the track crawl search.

![Diagram of the Track Crawl Search]

Figure 3 – 16: The Track Crawl Search

An example of a LRPA with good SAR capability is the RAF Nimrod. This aircraft has an extensive communications fit, including HF, V/UHF, VHF (FM) and MF. It is equipped with a UHF D/F set and has a homing facility. It can carry the droppable survival equipment known as the Lindholme gear comprising a large dinghy and many survival accessories. For an overland search, the Nimrod can carry container land equipment (CLE) in place of the Lindholme gear. The crew may fire pyrotechnics and drop sonobuoys to aid homing to positions and the aircraft is also fitted with a powerful searchlight. The Searchwater radar, one of its sensors, is ideal for detecting small contacts on the surface of the sea and combined with it is an IFF interrogator. Finally, but by no means of least importance, there are several visual look-out positions on the aircraft and usually a large crew to permit effective shifts of searchers to cover the designated area. This type of aircraft can rapidly fly a transit distance of approximately 1000 nautical miles and then search a designated area for four hours before returning to base.
Post Flight Responsibilities\textsuperscript{9}

Post Flight Report

After completion of any sortie, or upon landing from a mission it is mandatory to accomplish Post Flight Report (PFR) as soon as possible. It is compulsory to submit the PFR at once so that concerned agencies can react immediately to matters that concern them.

A standard PFR Form should be developed in order that a computer system or database will find it easy to extract the different information needed. Standard PFR Forms must always be available in the aircraft or in the operations centre of each squadron.

However, there are situations that also call for in-flight reporting. Some of the examples would be during the sighting of vessels polluting territorial waters, illegal fishing/activities or unexpected naval activities.

Securing of Classified Material

Aside from completing the PFR, the crew should also make sure that classified materials that were gathered during the course of the surveillance mission are secured. Materials such as the navigation log and charts, photos taken during the air surveillance mission cameras, IRDS tapes and others will need to be secured.

\textsuperscript{9} Based on the notes, briefings and lectures of the 292 Training Squadron, 92 Wing, RAAF.
Crew De-brief

A crew de-brief should always be conducted after each sortie to evaluate the mission performed. This would validate effective procedure and at the same time criticise outdated techniques for refinement. The de-brief is also the right forum to maximise training benefits gained from the previous tasks performed, this will greatly enhance crew performance. The de-brief can be done by the crew or by the tasking authority of the mission upon returning to home station.

LRPA Related Training and Standards

Due to the nature of operating a LRPA, which involves multi-roles, multi-sensors and multi-crew qualifications, training and standards are essential. A training unit/squadron should administer the upholding of standards and the training of LRPA crew to ensure preparedness in the performance of their flying duties. The training unit/squadron should be provided with the appropriate teaching aids in order to be effective. Required equipment include:

- Squadron Headquarters;
- Operations section;
- Intelligence section;
- Classrooms, for academic instructions;
- Training Aircraft, for the flying phase and check rides for qualifications;
- Simulators, capable of replicating the different missions performed by the LRPA; and
- Maintenance support.

Specialists in the field of air surveillance and reconnaissance for the development of tactics should be posted into the squadron. At the same time, a pool of qualified instructors for the electronics and sensor fit and for pilots should be assigned to the training unit/squadron to oversee and maintain the standards as set by higher authorities. Constant re-evaluation of these standards should be performed to be assured of safe and effective mission accomplishment.

The training unit/squadron should be able to provide training to courses (both classroom and flying phase) related to the operation of the LRPA, such as:

- Basic Aircrew Training
- Conversion Training
  - Pilots
  - Flight Engineers
  - Radar Operators
  - Navigators
  - Electronic Sensors Specialists
  - and other LRPA related continuation training

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10 Ibid.
A time schedule and grading system should be instituted to maintain performance standards that should be emphasised in the program of instructions (POI) for the different courses. These standards will be the basis for qualification of an individual aircrew. Non-compliance of the set standards will mean disqualification for an aircrew.

Safety Issues

Safety is another area that must be paramount. The profession of flying airplanes can be a risky business if safety issues are not properly addressed.

A separate office should be in charge of the safety aspects of any unit’s operation. Safety standards should be instituted by the said office in coordination with the command Director for Safety. In the PAF, this office is referred to as the Air Force Safety Office (AFSO).

The AFSO gives rules and regulations through an annual Safety Program, which should be strictly followed to avoid, unwanted accidents or incidents. The unit’s safety office or Wing Safety Office in turn monitors and makes sure that the different squadrons under its command strictly adhere to these policies.

All units of the PAF are also required to formulate their respective programs, which they deem will be appropriate for their type of operation. The wing program will then be submitted to the AFSO for approval. Upon approval of the proposed program, it will then supplement the general Command Safety Program.

Safety Programs concentrate on both Ground Safety and Flight Safety, covering all PAF operations, although it is also the responsibility of the safety office to create a Safety Investigation Board to investigate accidents and incidents.

Ground Safety

Ground Safety will deal with the working environment involving ground operations. Matters dealt within the office or the work area include:

- Fire prevention,
- Vehicle movement in different areas,
- Flight line safety,
- Ground safety equipment (in the office, or maintenance areas),
- Safety on handling of firearms and explosives,
- Safety lectures and briefings, and
- Other areas as specified in the Command and Unit Safety Program.

Flight Safety

Flight Safety on the other hand, focuses on concerns directly related to flying activities such as:

- Physical fitness of aircrew,
- Aircrew Life Survival Equipment (ALSE),
- In-flight procedures,
- Aircraft safety equipment,
• Safety lectures and briefings, and
• Other areas as specified in the Command and Unit Safety Program.

Accident Investigation Board

The creation of an Accident Investigation Board is also the responsibility of the Wing Safety Office. The Wing Accident Investigation Board is to be chaired by the Wing Commander (WC), with the safety officer as adviser. The members will include; a secretary of the board, a medical officer, a maintenance officer, an instructor/test pilot of aircraft involved (if flight accident), legal officer, a photographer, the Wing Sergeant Major and others as deemed necessary by the WC.

The Board will be in charge of investigating incidents and accidents concerning either ground safety or flight safety within the wing. However, an officer acting as a board member will inhibit himself from the investigation if it will involve his own squadron/unit. Findings from the investigation conducted by the Wing Accident Investigation Board will then be submitted to AFSO for further investigation and for recommendations.

The AFSO however, is not punitive with its decisions, but rather, it is preventive. It must be understood that recommendations made by the AFSO are intended to avert future accidents and incidents so as to save valuable lives and equipment. As the present Director of AFSO, Lieutenant Colonel Rolando Hautea has said, ‘Safety management should always be pro-active and not re-active’.11

The variety of tasks a LRPA will be able to perform will always be dependent on the type of air asset and the equipment fit that the military decides to acquire. Whatever the configuration a Long-Range Patrol Aircraft is an indispensable asset when it comes to national security.

It is now time to examine where the Philippines stand in its current capability for border security.

This will be followed by a look at the maritime surveillance programs and aircraft used by some of the neighbouring countries like Australia, Malaysia and Indonesia, which can serve as models for future modernisation of Philippine air surveillance effort.

Present Philippine Effor In Maritime Surveillance12

The Philippines, being a maritime nation, has a number of distinct agencies with mandated regulatory responsibilities that are either devoted to or related to the effective management and protection of sovereign ocean and waters, mostly in support of maritime constabulary functions. Among the major stakeholders are:

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11 During graduation ceremony Officers Safety Management Course, AFSO, VAB, Pasay City, December 1999.
Armed Forces of the Philippines (AFP), Department of National Defence (DND)
Philippine National Police (PNP), Department of Interior & Local Government (DILG)
Bureau of Fisheries & Aquatic Resources (BFAR), Department of Agriculture (DA)
Department of Environment and Natural Resources (DENR)
Department of Transportation & Communications (DOTC)
Bureau of Customs (BUCUS), Department of Finance (DOF)
Bureau of Immigration and Deportation (BID), Department of Justice (DOJ)

Under the current system, most of these agencies carry out their own monitoring and surveillance over the maritime areas relative to their specific interests. There should be an effort to somehow integrate air surveillance missions so that they will be coordinated and interactive to get the best surveillance effort from the assets involved. At present, the largest part of the surveillance and response operation is being undertaken by the Armed Forces of the Philippines with its Navy and Air Force, under the aegis of the DND (which is the major provider of surveillance resources for both routine and response surveillance activities).

The Philippine Air Force, primarily through its 303rd Air Reconnaissance Squadron equipped with an ageing Aero Commander TC 690 aircraft provides maritime air surveillance support to the AFP and other government agencies. With the large number of missions to conduct, maintenance is becoming a problem for the Aero Commander.

The 220th Airlift Wing used to shoulder the lion’s share of the air surveillance and reconnaissance missions through its 221st Airlift Squadron with its fleet of LRPA RF-27 aircraft. But with the last of the surviving RF-27 re-configured to satisfy another tasking requirement, a big void was left in terms of LRPA capability, and in effect greatly reduced the effectiveness of border patrolling.

Photograph 3 - 2: Philippine Air Force RF–27 Friendship aircraft during one of its last air surveillance missions.
Other aircraft such as the Nomad N-22s assigned with the 223rd Airlift Squadron were tapped to fill in the gap left in the surveillance effort, but the Nomad's range was very limited. The OV-10 Bronco aircraft was also recruited into the reconnaissance mission but had the same problem as the Nomad, including the fact that both aircraft were ill equipped in terms of maritime surveillance standards.
While aircraft can patrol larger areas and respond more quickly over greater distances, a surface platform or vessel is required to make contact with the target vessel in order to investigate, board and effect an apprehension, if necessary. A balance between aircraft, surface ships and land-based sensors is therefore needed to provide operational flexibility. Thus the Navy through its fleet and coastguard units conduct regular barrier patrols of territorial waters and some portions of the EEZ as part of its constitutional mandate to safeguard territorial integrity and sovereignty. The Navy currently employs a number of fast patrol craft and patrol gun boats for policing the internal and territorial waters while a handful of larger platforms, such as offshore patrol vessels, are tasked to operate in the outer fringes of the EEZ.

To augment its mobile surveillance assets, the Navy also operates and maintains a maritime surveillance network or coastwatch system consisting of land-based monitoring stations in various strategic locations, particularly along choke points and sea border zones, to monitor the movement of vessels transiting these sensitive areas. Four coastwatch stations have been established and these are located at:

1. Cape Melville in Balabac, Palawan, in the west;
2. Lower Calarian, Zamboanga, in the south;
3. Capul Island, Northern Samar, in the east and;
4. San Miguel, Zambales in the northwest (see Figure 3-17).
These facilities are equipped with microwave surface surveillance radars, radio
direction finders and various types of communication equipment.

Another major participant in the government’s surveillance effort is the
Maritime Command (MARICOM) of the PNP. Its primary function is to prevent and
suppress violators of maritime laws, rules and regulations within municipal waters
(the area up to 15 kilometres from shore) and assist in search and rescue operations in
times of disasters. MARICOM currently employ several catamarans and other small
sea crafts in the conduct of its maritime patrol sorties within its area of jurisdiction.

Other stakeholders have no or very limited surveillance assets and facilities
and depend on the services provided by the AFP and the PNP.

The Australian Model\textsuperscript{13}

The civil surveillance program in Australia is managed and coordinated by the
government agency called Coastwatch. Coastwatch utilises a combination of
contracted civilian aircraft, defence patrol boats and aircraft and sea going vessels of
the Australian Customs Service for, and on behalf of, at least eight client agencies
(Fisheries, Customs, Quarantine, Environment, Police, Immigration, Foreign
Affairs/Trade and Primary Industry).

Coastwatch is a semi-autonomous operational branch of the Australian
Customs Service and commenced operations in 1988. It has a head office in Canberra
and regional offices in Darwin, Broome, Cairns and a sub-centre on Thursday Island
in the Torres Strait. The Minister for Science, Customs and Small Business within the
portfolio of the Minister for Industry, Science and Technology is responsible for its
operation, however, the National Manager in Canberra is responsible for its day-to-
day administration. The National Manager determines the national direction and focus
of surveillance efforts based on the priorities identified by its client agencies. The
Regional Managers on the other hand are responsible for the direct coordination and
control of the surveillance assets to address client priorities. It must be noted however,
that Coastwatch is a service provider and does not determine threat areas or determine
client’s surveillance interests. The client agencies remain responsible for the
development of threat assessments or surveillance requirements in relation to their
respective program objectives. This client generated assessment form the basis of
operational planning and the subsequent conduct of surveillance operations by
Coastwatch.

Surveillance requirements are submitted by the client agencies through a
formal committee system – the Operations and Program Advisory Committee
(OPAC) composed of representatives from major client agencies. OPAC convenes in
Canberra every month to plan the Commonwealth’s offshore civil surveillance
program. Client organisations submit bids for the use of resources and the Committee
representatives finalise and determine overall priorities for all tasking submitted. A
network of regional committees assists the OPAC in the formulation of the national
surveillance program based on the requirements of the various regions.

Coastwatch’s operational area covers the Australian coastline, its offshore
islands and the Australian fishing zone (AFZ) and EEZ surrounding these waters
which amounts to approximately 37,000 kilometres of coastline and an offshore
maritime area larger than the Australian mainland. To maintain an acceptable

\textsuperscript{13} Ibid.
probability of detection against an unknown threat, surveillance efforts are concentrated on identified priority areas with a high incidence of activities of interest to the client agencies. The Coastwatch program is focused on a wide range of client concerns, which include:

- Drug importation
- Illegal immigration
- 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
- Any other breaches of Commonwealth or related offences in coastal and offshore areas falling within the capacity of Coastwatch to provide.

The principal components of Australia’s current surveillance effort are:

- Visual and electronic aerial surveillance provided by civilian contracted fixed-wing and rotary aircraft;
- 250 hours of dedicated RAAF P3C Orion offshore patrol of the Exclusive Economic Zone inaccessible to Coastwatch aircraft;
- 1800 days provided by Naval patrol boats (Fremantle Class) for civil-related, offshore surveillance purposes;
- Complimentary effort by the Customs sea going vessels, particularly to provide an operational response capacity for inshore sightings or incursions detected by Coastwatch assets; and
- Capacity to charter or hire additional air or surface resources if required.

Photograph 3 - 5: RAAF P3C Orion over Adelaide
General aviation contractors undertake the majority of aerial surveillance. The contracts can be described as ‘turn key’ operations whereby the contractor provides aircraft and aircrew together with the administrative and engineering support to meet Coastwatch requirements. The training of observers however is undertaken by Coastwatch. The annual costs of these contracts in 1994 was A$27.23M consisting of A$26.4M for fixed wing surveillance and A$.83M for helicopter surveillance. All operational funds for civil surveillance are directly budgeted for, allocated to and managed by Coastwatch. In broad terms, these funds (A$35M for 1998-99, projected expense for 1999-2000 is A$42.5M\(^{14}\)) cover:

- the costs associated with the contracted aircraft,
- the costs associated with chartering additional general aviation and marine assets, and
- the administrative costs and salaries of Coastwatch staff.

The costs however of operating the RAN Fremantle Class patrol boats and the RAAF P3C Orion aircraft (about A$133M in 1998-99\(^{15}\)) for civil surveillance are presently borne by the Australian Defence Force (ADF) through Cabinet direction.

[Photograph 3 - 6: P3C Orion Crew prior to flight over South of Australia](image)

(Photo courtesy of ARDU and 92 WG RAAF Base Edinburgh; author is front row third from left to join as observer)

\(^{14}\) Briefing folder from Coastwatch Headquarters, Canberra, June 2000.

\(^{15}\) Ibid.
The Malaysian Model\textsuperscript{16}

After Malaysia's declaration of the 200-mile EEZ on 25 April 1980, the Malaysian government issued a directive (Prime Minister's Directive Dated 06 October 1982) delineating the responsibilities of providing security in Malaysian waters as follows:

- Malaysian Territorial Water (MTW) - Police (Marine and Air Wing)
- Exclusive Economic Zone (EEZ) - Navy assisted by the Air Force

\textit{Photograph 3 - 7: Beechcraft 200T SuperKingAir (above) and the (Photograph 3 - 8): PC-130H (below) used by Malaysia in Maritime Patrol (from http://maf.mod.gov.my/english/tudm/maritimeELatest.htm)}

\textsuperscript{16} Abogado and Yoma, 'Development of a Philippines Maritime Surveillance Capability'.
Although these two agencies play a major role in the surveillance and enforcement of law and order in the MTW and EEZ, the other enforcement agencies/departments (Fisheries, Environment, Marine Department, Royal Customs and Excise and Immigration) continue to be fully responsible for carrying out their respective roles and functions pertaining to the enforcement of their relevant laws. Surveillance assets and manpower however were provided and operated by the Navy, Air Force, Police and Fisheries so that there was a need for a coordinated and effective scheme to optimise the utilisation of the limited resources available.

To address the problem of limited assets, the Maritime Enforcement Coordinating Centre (MECC) under the Prime Minister's Department was created in 1985 through National Security Council Directive No. 14. Its objective was to coordinate the activities of the various maritime law enforcement agencies and to ensure that the national assets involved in maritime operations are utilised competently, swiftly and efficiently.

As a coordinating agency, MECC is responsible for the formulation of standard operating procedures to enable the various maritime enforcement agencies to operate jointly when the need arises. To fulfil this requirement, MECC conducts various courses, dialogues and joint operations on a regular basis.

The MECC is headed by a senior naval officer and is comprised of ten officers and twenty-three supporting staff from the Royal Malaysian Navy, Royal Malaysian Air Force, Royal Malaysian Police, Fisheries and Civil Service. The MECC is organised into five sections as follows:

- MTW Section (headed by a Police Officer);
- Coordination and Operations Section (headed by a Fisheries Officer);
- EEZ Section (headed by a Naval Officer);
- Air Surveillance Section (headed by an Air Force Officer); and
- Administration and Finance Section (headed by a Civilian Officer).

For effective operation, MECC is equipped with a range of communication facilities that include landline telephones, radios, facsimile and computers interconnected with the other marine enforcement agencies. The operations room is manned 24 hours, thereby ensuring an ability to respond quickly to any urgent matter.

MECC however, has no maritime assets under its command or control. It depends on the decisions made at their various committee meetings for the implementation of the maritime law enforcement requirement. It is not vested with legislative or executive authority to actively enforce maritime laws. The responsibility for enforcement is presently distributed to the various ministries and departments. As such, there are too many controlling agencies and some agencies possess assets that could do much more but are restricted by law.

The Indonesian Model

Maritime safety and surveillance in Indonesia is managed by BAKORKAMLA (Coordinating Board for Maritime Security) which is an inter-agency body established in 1972 by a joint Ministerial Decree of Defence, Justice and Communication. It is responsible for security issues such as piracy, fishing intrusions

\[17\] Ibid.
by foreign vessels, trans-boundary marine pollution and smuggling in offshore maritime areas. This organisation comes under the Chief of the Armed Forces who is assisted by the Chief of Naval Staff who has oversight of the day-to-day operations. BAKORKAMLA is based in the Armed Forces Headquarters in Jakarta and employs a combination of patrol ships and aircraft from the Navy, Air Force and the Police. Other government agencies with maritime-related concerns however assist the Armed Forces in the national surveillance effort employing mainly patrol ships and boats.

For efficient surveillance coverage of the entire maritime area of operations, BAKORKAMLA is divided into two Sub-Area Coordinating Centres (GUSKAMLA). The Western Area Coordinating Centre (GUSKAMLABAR) is based in Tanjung Pinang, Bintan Island and the Eastern Sub-Area Coordinating Centre (GUSKAMLATIM) is based in Udjung Pandang in the south of Celebes Island. Each Sub-Area Coordinating Centre is headed by a senior naval officer with the rank of First Admiral (Commodore).

The Sub-Area Coordinating Centres exercise direct control over the naval assets based in their area of operations and coordinate with the nearest Air Force base if air support is required. The Western Fleet based in Jakarta and the Eastern Fleet based in Surabaya provides ships and maritime patrol aircraft from the Air Force to both Sub-Area Coordinating Centres for continuous year-round operations. Both fleets also maintain forward bases for various strategic areas to support the logistic requirements for surveillance assets.

The maritime patrol aircraft provided by the Air Force are managed by the BAKORKAMLA. It also decides on the scheduling of flights based on surveillance requirements from various military units. Surveillance assets however, are readily attached to the Sub-Area Coordinating Centres when there is an urgent need for these assets.

Photograph 3 - 9: CN-235 of Indonesia
Contribution to the surveillance effort from other government agencies is coordinated through the conduct of regular committee meetings with the Armed Forces and other concerned groups, however the responsibility for enforcement of respective laws is presently distributed to the various government departments/agencies. Joint patrol operations are regularly conducted by the various government departments and the Armed Forces and are managed by the Sub-Area Coordinating Centres.

There are also joint patrol operations with the naval and police forces from friendly neighbours like Malaysia and Singapore in the Malacca and Singapore Straits in the west and with the Philippines in the Celebes Sea in the East.
Chapter Four

Command and Control

Command and control is an integral part of any military operation and this is a significant factor in the management of maritime air surveillance missions. In air surveillance missions wherein frequent joint operations are conducted with either other units of the AFP, or civil government agencies, defining the flow of tasking is essential for the smooth conduct of operations. A clear organisational flow of command should be charted to establish the duties and responsibilities of the different offices and commanders to form a concerted effort towards mission accomplishment. An important feature in an organisational command and control system is the existence of a single commander responsible for coordination of unity of action for the accomplishment of the mission. At the same time, the command and control organisational structure was created to avoid duplication of effort and to be flexible as the mission situation dictates.

With the introduction of advanced technology, it is envisioned that a more effective and efficient command and control system be established to be able to utilise limited resources to the optimum.

The PAF is in the process of improving its command and control system and therefore, for the purpose of maintaining continuity in this field of research, this chapter will reflect to a large degree, information in the book by Colonel Dexter O. Huerto (who was also a fellow at the Aerospace Centre in 1998) entitled Command and Control of Philippine Maritime Air Surveillance, and the PAF Air Power Manual (Draft-Interim) unless otherwise indicated.

To start with, it is essential that command and control terms are defined and relevant issues be discussed for better understanding of the topic.

Definition of Terms¹

Command is the authority that a commander in the military service lawfully exercises over subordinates by virtue of rank or assignment. It includes the authority and responsibility for effectively using remarkable resources and for planning the employment of, organising, directing, coordinating and controlling military forces to accomplish assigned missions. International law and the Laws of Armed Conflict (LOAC) specify the commanders’ ethical responsibility in military operations.

Control on the other hand, is defined as the authority exercised by a commander over part of the activities of subordinate organisations or other organisations not normally under his command. Such authority encompasses the responsibility for implementing orders or directives.

¹ PAF Air Power Manual (Draft-Interim), Office of Special Studies, Headquarters Philippine Air Force, Villamor Air Base, Pasay City.
Command and Control is the exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities and procedures employed by a commander in planning, organising, directing, coordinating and controlling forces and operations in the accomplishment of the mission.

General Principles of Command and Control\(^2\)

Command and control in the Philippine Air Force (PAF) is based on five basic principles.

1. **Unity of Command**

Through the unity of command, centralised control of air power is achieved. Centralised control at the highest level provides the means to shift air efforts and concentrate air power to meet the changing requirements rapidly. It also ensures continuity of action and provides a single authority responsible for results.

On the other hand, operational control should be delegated to the most appropriate level to achieve organisational and combat potential balance. Delegating control allows the exploitation of the characteristics of air power without loss of effectiveness or efficiency.

Unity of command enables the PAF to achieve a coordinated employment of air assets towards a common military objective. Centralised direction on command of all air power capabilities should be vested in a single air commander while decentralised execution should be vested in the joint force commands, his nominated air component commander or other subordinate commanders if appropriate. At the tactical level, a squadron commander should be given full responsibility for his actions.

2. **Span of Command**

The principle of span of command requires that the number of subordinate elements be limited to secure the most effective control. The introduction of automated systems may assist in the coordination; however, the ability of the commander to absorb relevant information and make timely decisions will ultimately limit his span of command. At the strategic and operational levels, the key factor is the range of activities for which the commander has responsibility. At the tactical level, the key factor is the number of subordinates and the span of command especially at this level should be kept as narrow as possible.

3. **Chain of Command**

An effective command and control relies heavily on a hierarchical chain of command where orders and tasking are passed downwards and information flow upwards. The principle of Chain of Command enables a commander and his staff to

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\(^2\) Ibid.
respond to directions from higher authority and exercise responsibility for subordinate elements. The chain of command should be kept as short as possible.

4. Continuity of Command

The principle of Continuity of Command implies that there should be no interruption to command. To attain this, each commander should nominate an alternate commander and headquarters in anticipation of either one being rendered inoperative. Command succession and transfer of control procedures must be provided to ensure continuity of command.

5. Delegation of Authority

The principle of Delegation of Authority ensures that a commander has appropriate control and authority over forces assigned to him at all times. He may delegate that authority whenever appropriate. Delegation of authority does not free the higher level commander of responsibility.

The command and control system, while centralising the ability to shift, deploy and re-deploy forces, should ensure appropriate delegation of authority and decentralised execution to the maximum extent possible. This implies that the air commander should delegate detailed planning, tasking and execution for missions to his tactical commanders. The large variety and scope of air operations restrict one commander from performing all detailed planning and execution tasks.

Figure 4-1: General Principles of Command and Control

Levels of Command and Control

Strategic Level

The strategic level of command is concerned with the overall conduct of war, the generation and application of military power within a national, political, diplomatic, economic, legal and social framework. This level involves the close and direct links between the PAF and the Philippine government. The Chief of Staff, AFP has full command of the PAF and, as the strategic level commander, has the responsibility for the application of military force in accordance with national guidelines in the

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3 Ibid.
resolution of the conflict. The strategic level commander translates political objectives and constraints into broad guidance for military activities.

Operational Level

The operational level of command is primarily concerned with how to achieve the strategic ends of war/conflict. This involves campaign planning and directions of operations. It is also concerned with positioning, sustaining and providing security for assigned forces. A joint commander or an air commander is the operational commander who has the responsibility to ensure that the concept for the conduct of air operations is in accordance with the strategic guidance received. The operational level commander thus translates the higher level guidance into more specific instructions and directions that can be used at the tactical level.

Tactical Level

The tactical level of command includes the application of air power against specific military objectives in the most effective manner. At the wing and squadron level, the tactical level commander has the responsibility to ensure that the actual conduct of operations is in accordance with the instructions and directives received from the operational level. The tactical level commander translates these instructions and directives into tactical procedures.

![Levels of Command and Control](image)

**Figure 4 – 2: Levels of Command and Control**

Command and Control System Criteria

The following criteria were set for the PAF command and control to attain an effective and efficient system:

1. **Survivable** – Self-protection features such as defensive counter-measures, back up systems and redundant sub-systems will enhance the survival of command and control systems. Moreover, hardening, decoys, dispersion, reduced size and reduced electronic signatures will increase the survivability of the system.

2. **Responsive** – This relates to the ability of the command and control system to extract and process real time data that is achieved through an efficient and reliable system. This allows PAF forces to react rapidly with a wide range of

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4 Ibid.
options to crisis and armed conflict. Responsiveness will give our forces more lead-time to deter or control the scope of conflict at the very onset of attack.

3. **Flexible** – To be flexible means to be able to carry out a variety of tasks. This allows the commanders to move quickly from one course of action to another. Commanders can exercise great flexibility in directing their forces through an integrated command and control system.

4. **User Oriented** – This relates to the user friendliness of the system and the accessibility to information it provides. The displays, graphics and decision aids should be simple and should not require extensive analytical decisions.

5. **Interoperable** – This 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.

6. **Compatible** – This criterion refers to the capability of two or more items or components or equipment or material to exist or function in the same system. This is synonymous to commonality of command, control and communications equipment to reduce cost and waste in man-hours of training for different equipment. This also minimises excessive inventory of equipment.

![Hierarchical Diagram]

Figure 4 – 3: Command and Control System Criteria

**Key Principles**

Experience has shown that unified action is essential for effective use of air power. However, the inherent speed, reach and flexibility of air power allow it to be employed in easing the effort. Moreover, there may not be sufficient air resources to meet all demands, and tasking priorities will invariably have to be set. To achieve unified air action and to ensure that air power capabilities are used as the overall operational situation demands, certain key principles must be applied:

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5 Ibid.
Centralised command and control.

Exercise command and control from the highest practicable level.

Decentralised execution.

**Centralised Command and Control.** Centralised command and control promotes an integrated effort and enables forces to be employed to meet the recognised overall priorities. It also allows air action to be re-focused quickly to exploit fleeting opportunities, to be responsive to the changing demands of the operational situation and to be concentrated at the critical place and time to achieve decisive results. Centralised command and control is essential if air power is to be employed in unified action; it helps to avoid air power from being:

- Divided into fixed ‘penny-packets’ which would inhibit flexibility and hinder speedy concentration of force.

- Employed in uncoordinated actions or for impractical objectives.

**Exercise of Command and Control at the Highest Practicable Level.** Unity of air effort is best achieved when authority for command and control is exercised from the highest practicable level under a designated air commander. The factors, which determine that level, include the commander's operational responsibilities, the combined or joint force objectives, the composition and capabilities of the force involved and the degree of control, as these will inhibit flexibility and create inefficiency. For example, the most appropriate level for operational control of the air effort will be a situation wherein the relative priorities of combined/joint demands on air resources can best be assessed. For different types of aircraft, the level at which command and control is best exercised will depend on the reach and capability of the aircraft. In general, the greater the reach and capability, the higher the level at which command and control should be exercised. For example, fighter-bombers are highly capable and can reach targets across a theatre of operations; thus, they are best controlled at theatre level. In comparison, small observation helicopters have far less reach and capability and are best controlled at a far lower level, typically at wing or division level.

**Decentralised Execution.** No single commander can personally direct all of the detailed actions of a large number of air units or individuals. Therefore, decentralised execution is essential and this is accomplished by delegating appropriate authority to execute tasks and missions. Decentralised execution allows subordinate commanders to use their judgement and initiative within the overall pattern of employment laid down by their superiors. It becomes especially important when command and control systems are lost through enemy action. Decentralised execution can lead to subordinate commanders taking divergent initiatives, which would weaken the cohesion of a campaign. But this effect can be avoided if doctrines and the overall operational objectives are properly understood at all levels of command.
Command and Control Organisation

Effective implementation of the key command and control principles depends heavily on organisational arrangements. These consists of two basic elements:

- An organisational structure
- A command and control process

Organisational Structure

The successful execution of the planning process depends on establishing a command and control organisation composed of a commander, his staff and his facilities.

- **Commander.** There should only be one commander at the highest level of military force. He alone must be responsible to higher authority for all operational matters. His responsibilities should be defined in terms of duties and areas of responsibility. Unity of command is essential for effective decision making; it not only, fosters effective decision-making, but also provides single points of contact for lateral and subordinate commanders. Command and control organisations should at all levels reflect the principle of unity of command, whether they are functionally or geographically arranged.

- **Staff.** Each commander should be supported by a staff. The structure of this staff should reflect the composition of the resources under his command.

- **Facilities.** Commanders and their staffs must have the necessary facilities to execute their command and control functions. These include operations centres and appropriate range of communications.

![Diagram of Command and Control Structure](image)

**Figure 4 - 4: The Command and Control Structure**
Command and Control Process

The process of commanding and controlling air forces normally falls into four main phases: analyse, plan, direct and control.

✦ **Analyse.** Effective analysis of the situation is fundamental; to the process of commanding and controlling air forces. It involves a continuous effort to collect evaluate all available information on the location, nature and actions of friendly and hostile forces.

✦ **Plan.** The planning phase of the command and control process is based on the situation analysis. It examines the scope for cooperation and coordinated action with other commands, seeks to exploit fully the forces available, develops and assesses alternative options and as a result, sets out the best course of action. The net result is an outline plan, which provides guidance in terms of space and time for organising and coordinating the forces to be employed. This allows a detailed operations plan to be drawn up which selects the required resources, regroups missions, personnel and equipment, assigns responsibilities (usually on a functional or area basis) and delegates authority within the organisational structure.

✦ **Direct.** Once the planning phase is complete, operational directives and orders must be promulgated to all participating units and agencies for implementation.

✦ **Control.** The progress of the operation must be monitored and the results assessed. The effectiveness of friendly force action s should be gauged, deficiencies corrected and any further steps taken that may be needed to achieve the desired objective.

![Diagram of Command and Control Process]

*Figure 4–5: The Command and Control Process*
Levels of Assignment

Air assets can be assigned at one of four levels:

1. **Allotment.** Allotment is the temporary change of assignment of air forces between subordinate commands. The authority to allot is vested in the commander having operational command. The process of allotment is used to provide the balance of forces needed to achieve the objectives stipulated by that command.

2. **Apportionment.** Apportionment is the determination and assignment of the total expected effort by percentage and/or by priority that should be devoted to the various air operations and/or geographic areas for a given period of time.

3. **Allocation.** Allocation is the translation of the apportionment into total numbers of sorties by aircraft type available for each operation/task. When external or other forces become available for use by a AFP/PAF commander, he will allocate them, by sorties within a given period of time, to a subordinate commander or commanders in much the same way that he would allot assigned forces.

4. **Tasking.** Tasking is the process of translating the allocation into orders and passing those orders to the units involved. Each order normally contains sufficient detailed instructions to enable the executing agency to accomplish the mission successfully.

![Figure 4 - 6: Levels of Assignment](image)

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6 Ibid.
Combined/Joint Operations

When air operations act in support of land or sea objectives, or when land or naval forces act in support of air objectives, the supporting commander and the supported commander and their staffs must work as a team throughout the period from the creation of joint/combined surface/air plans to their final execution. A combined or joint headquarters should be established with separate command centres under the control of the headquarters. When these alternatives are not possible, it is essential that adequate communications and coordinating procedures be established between them.

Communications

Communications to be complete must encompass strategic operations and tactical and administrative networks. Reliable, adequate and rapid communications are a must in a modern air force. The PAF communications network must be able to sustain widely dispersed operations while being flexible and responsive. The ability for efficient data transfer as well as voice communications is necessary in any comprehensive communications network.

Tactical Communications

Fixed and transportable tactical communications are vital for the effective conduct of air operations in the Philippines. In air defence operations, for example, rapid and effective communications are necessary, to the extent that information obtained from air intercept radars may be communicated to the aircraft’s self defence weapons system automatically. Facsimile (FAX) and commercial telephones provide an additional capability in meeting broad air defence requirements and contribute to the health, morale and welfare of deployed forces. However, security of these communications may be an issue in conflict.

Strike and reconnaissance operations rely primarily on information from radar surveillance, navigation and bombing aids being communicated to the weapon system or aircraft. Additionally, early warning of a threat and electronic counter-measures are increasingly important. Air-to-surface operations, because of their joint nature, will rely on a joint communications organisation, like the Philippine Navy (PN) operations centre being linked with the PAF Long-Range Patrol Aircraft, Philippine Army (PA) operations centre, PA surface forces and PN surface forces. The Tactical Control System (TACS) provides transportable tactical communications, air coordination, mission control, tasking request and confirmation, and intelligence updates.

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7 Ibid.
8 Ibid.
Airlift operations depend primarily on radio and radar navigational aids, with radar beacons often being used to indicate landing or dropping zones. With continuing technological improvements, Global Positioning Satellites (GPS) Navigation System, with its proven accuracy and passive nature, will be used more often.

The Philippine Air Defence Communications System (PADCS) is used for communicating with aircraft being deployed from the main support area to an area of operations (AO), maintaining a flight-following watch and for operational control of aircraft within a designated area of activity. The PADCS should use satellite communications whenever possible with microwave and HF communications in other cases. At the same time the PADCS should be able to monitor units from other agencies.
Communications Security

All forms of communication may be intercepted by an enemy. These systems must be protected by effective Communications Security (COMSEC) measures to prevent valuable information from being collected by enemy monitoring organisations. It is vital to the success of air operations that COMSEC is achieved. COMSEC measures include the correct use of security classifications, rigid adherence to security restrictions, protecting cryptographic systems and safeguarding the physical security of cryptographic facilities.

The process of structuring an effective command and control system is a significant factor in order that maximum information distribution can be achieved especially in times of conflict. The organisational flow must be stressed in order to make information distribution efficient.

A number of command and control set-ups from countries like Australia, Indonesia and Malaysia will be presented to serve as a model in proposing one that will be suitable for the Philippines.

Australian Defence Force (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. At the operational level, the MASRG is chaired by a Headquarters Australia Theatre (HQAST) representative and liaises with the Operations and Program Advisory Committee (OPAC). It must be noted that OPAC is the civil structure under Coastwatch, which controls and coordinates the civil surveillance requirements. 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. MASRG as well, 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. Figure 4-8 is an interpretation of the ADF’s Maritime Air Surveillance Command and Control organisational flow.

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Australian Coastwatch

The Coastwatch organisation of the Australian Customs Service undertakes most of the civil and offshore surveillance missions with the ADF in a supporting role. 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. OPAC was established to coordinate and prioritise civil surveillance activities. The members of OPAC include the different government agencies (Australian Fisheries Management Authority, Australian Quarantine and Inspection Service, Department of Immigration and Multicultural Affairs, Department of Environment, Sport and Territories, Great Barrier Reef Marine Park Authority, Australian Nature Conservation Agency, Australian Maritime Safety Authority, Australian Federal Police, Customs and Environment Australia) involved in air surveillance 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 the 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 all over Australia by Customs (see Figure 4-9).
Indonesia’s Maritime Air Surveillance Command and Control\textsuperscript{10}

The Department of Security and Defence have 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 the Armed Forces has overall command of the maritime surveillance effort.

The Chief of the Armed Forces manages the surveillance effort through a Coordinating Board for Maritime Security. Other government agencies provide requirements for surveillance, while the board manages and prioritises on a tasking program. The contributions from these agencies are coordinated through regular board meetings. Two coordinating centres; Western Sub-Area and Eastern Sub-Area, monitor and control operations on a daily basis. Senior naval officers command these centres. Joint patrol operations by the Armed Forces and other government agencies are regularly performed, managed by the sub-area coordinating centres. The responsibility of enforcement of respective laws still remains with the various government departments and agencies. At the same time, there are joint patrol operations with the naval and police forces from regional neighbours such as Malaysia, Singapore and the Philippines.

\textsuperscript{10} Ibid.
The overall organisation is under the Chief of Armed Forces, assisted by the Chief of Naval Staff (CNS) who is responsible for the daily operations. The Sub-Area Coordinating Centres 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 Centres. Coordination of surveillance efforts by other government agencies is done through regular committee meetings with the Armed Forces and other concerned groups.

![Diagram of Command and Control System]

**Figure 4–10: Indonesian Armed Forces Command and Control**

**Malaysia’s Maritime Air Surveillance Command and Control**¹¹

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.

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 are responsible for the security requirement within the Malaysian Territorial Waters (MTW). The Navy assisted by the Air Force is responsible for the security requirements within the Exclusive

¹¹Ibid.
Economic Zone (EEZ). Although these two agencies play the major roles 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 Centre (MECC) was created and placed under the Prime Minister for the purpose of making priorities for surveillance requirements. The surveillance requirements addressed by the MECC are those that have been agreed upon during previous committee meetings. They are requirements from agencies and departments such as Fisheries, Environment, Marine Department, Royal Customs and Excise and Immigration.

![Diagram of MECC structure]

**Figure 4 – 11: Malaysian Maritime Surveillance Organisation**

Proposed Command and Control Organisation for the Philippines\(^\text{12}\)

Just like the previous three models discussed in this chapter, the Philippines' surveillance requirements will be a combination of military and civil need for information.

It is fitting therefore 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.

**Strategic Level**

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

\(^{12}\) Ibid.
responsible for its supervision and administration. For the President to meet these responsibilities, the National Security Council (NSC) assists him. The council is comprised of military and other departmental heads that advice 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 NSC. Currently within the NSC 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 coordinated by NICA: the Civil Intelligence and Security Agency (CISA) and the AFP Intelligence organisation. It must however be clear that tasking for the PAF LRPAs will be defined and will remain under the control of the AFP/PAF at all times. A further recommendation is that these two organisations should perform functions aligned with the maritime air surveillance program.

Under the proposed office (NMSO), the following three branches would be established for conducting the necessary administrative, planning and operational functions.

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

Interdepartmental Coordination Branch (ICB). The ICB will 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. The essential roles 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 programs to the President and Security Council. The yearly surveillance program would be the major basis for the annual budget for this activity. This committee will convene twice a year or as required by the Director General, NICA.

Program and Administrative Branch (PAB). The PAB will 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 designated departments/agencies is also recommended. This branch will provide advice to the Director General NICA on operational and administrative issues and will 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 will provide financial and general support to the NMSO.

Program Operation Branch (POB). The POB will 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 centre 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. Figure 4-12 illustrates the overall maritime air surveillance organisational structure incorporating all the departments concerned.

Figure 4–12: Proposed Philippine Maritime Organisational Structure
(Strategic Level)
Operational Level

Civil Maritime Air Surveillance Requirements. The CISA is responsible for the coordination and integration of all intelligence activities by civilian government agencies. In its current form, this Agency can generate cooperative efforts and thus undertake the overall consolidation and coordination of peacetime maritime air surveillance requirements for the civil agencies concerned. In conjunction with these functions, the Agency can 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 Requirements. Military forces and governments 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. The Chief of Staff (CS), AFP would ascertain the overall maritime air surveillance requirement of the force. These include the requirements of the various armed 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 should include the J-2, the heads of the intelligence organisations of the different armed services and the Chief of ISAFP. The J-2 will represent the CS, AFP with the ICB.

![Diagram](image)

**Figure 4 – 13: Commanders and Staff (for proposed Air Surveillance Program)**
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 will supervise the implementation and execution of approved maritime air surveillance programs by CS, AFP. At the same time, the J-3 will 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 Centre (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 operations centres and the overall review of military surveillance efforts. The JOC will be the point of contact for the POB, NICA and OC, CISA.

Commander and Staff. (Philippine Air Force)

A-2. The Assistant Chief of Air Staff for Intelligence will be responsible for the administration of the maritime air surveillance effort by the PAF, including the development of its surveillance capabilities and attendant supporting equipment. At the same time, the A-2 will 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. A-2 will also conduct the periodic evaluation of these activities for consideration of the CS, AFP.

A-3. The Assistant Chief of Air Staff for Operations will be responsible for the 24-hour centralised coordination and monitoring of all maritime air surveillance and response operations. The A-3 will be responsible for the development and compilation of the Air Force surveillance plan, program review, accomplishments and database requirements for the PAF surveillance effort. A-3 will be responsible for supervising in the implementation and execution of the plan.

A similar arrangement and staffing should be arranged with the Philippine Navy and Philippine Army for coordination. Figure 4-13 illustrates the relationship.

Reorganisation of the PAF 300 Air Intelligence Surveillance Group (AISG). With the acquisition of the LRPAs through the Modernisation Program of the AFP, the said air assets will be assigned to the 300 AISG (used to be under A-2) and renamed as the Maritime Patrol Group (MPG). Furthermore, the reorganisation will create three
Maritime Patrol Squadrons (MPS) each with a forward deployment station to cover the three island groups in the Philippines.

- **Main Operating Base.** The proposed main operating base is Benito Ebuen Air Base in Mactan, Cebu for two reasons. First, is because strategically the base provides a strategically central location from where air assets can easily be deployed, and secondly, because this is where the planned establishment of depot maintenance level for heavy aircraft (which should include the LRPA) is proposed.

- **Forward Deployment Stations.** The three MPSs will each have their assigned forward deployment areas. PAF bases have been selected so that they can accommodate the deployment of air assets using existing facilities. Another significant consideration is the bases being in close proximity to present areas of interest, thus reducing transit time and giving more time on task.

**Proposed Forward Deployment Areas for MPS:**

- 1st Maritime Patrol Squadron at Clark Air Base
- 2nd Maritime Squadron at Antonio Bautista Air Base
- 3rd Maritime Squadron at Edwin Andrew Air Base

**Command and Control Arrangements**

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

*Operational Command (OPCOMD).* The Commander, MPG will have the operational command of the subordinate units and can assign missions or tasks to subordinate commanders to deploy 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 increased conflict, the Commander will have the operational control of assigned units or air assets of the Philippine Air Force Affiliated Reserve Units (PAFARU) which are civilian air facilities that provide basic air services.
Figure 4-14: Proposed Main Operating Base and Forward Deployment Stations for the Proposed Maritime Patrol Group
**Tactical Command (TACOMD).** The Commander, MPS for each of the three MPSs can 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 (TACCON).** Tactical control will be a delegated authority by the Commander, MPG to Commander, MPS for detailed and usually local direction and control of movements or manoeuvres necessary to accomplish the mission or tasks assigned. In times of contingency or increased tension, the Commander, MPS will have the tactical control of the assigned units of the PAFARUs.

**Administrative Control.** The Commander, MPG will still exercise authority over the deployed MPS units in respect to administrative matters such as personnel management and logistics matters.

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

- basic services such as water, electricity, sanitation, billeting;
- discipline;
- local movement of personnel and materiel;
- local road traffic and movement
- security to include measures against theft or vandalism;
- allocation of training area and recreation facilities; and
- the supervision and maintenance of safety.

**Technical Control.** The MPG will have technical control over the PAFARU in matters of maritime air surveillance. This is not a command or operational authority but it designates the MPG to provide the PAFARU with specialised and professional operating procedures essential for the proper management and operation of capabilities. Figure 4-15 will illustrate the command and control structure.
Figure 4–15: Proposed AFP Maritime Air Surveillance Command and Control Structure

In essence the proposed Maritime Patrol Group through the Maritime Patrol Squadrons can provide support to the Philippine Navy (PN), Philippine Army (PA), the Philippine Air Force (PAF) and the civil government agencies requiring air surveillance and intelligence information gathering as long as a tasking order is issued.

Support can be given to the PN in its drive against maritime issues like locating enemy vessels or Anti Surface Warfare (ASW) and if capable Anti-Submarine Warfare (AsuW). For the Army, LRPA support for ground troops conducting Internal Security Operations (ISO) in pinpointing land targets and the monitoring of rebellious activities by both secessionist and insurgents. For the PAF, by means of supporting the Air Defence Command (ADC) and the Tactical Operations Command (TOC) with air-to-air related missions. Finally, support of the different civil enforcement agencies based on the strategic program established by the NMSO and approved by the NSC. Figure 4-16 will present the proposed command and control structure for maritime air surveillance for the Philippines.
Figure 4-16: Proposed Command and Control Structure for the Maritime Air Surveillance Effort in the Philippines
It is expected that with the creation of a Maritime Patrol Group there will be better management of the LRPAs. At the same time, a clearly defined mission and function geared towards being dedicated to air surveillance and reconnaissance will ensure optimum positive mission feedback. The past will teach us that misuse of equipment will hasten deterioration and greatly reduce service life of any air asset.

While a defined Command and Control structure will avoid the overlapping of authority and tasking, which is a waste in terms of manpower, money and time. A command and control structure will specify the flow of tasking resulting in an efficient implementation and execution of assigned missions.

Revisions are expected in any organisational structure to continue upgrading the work output for mission accomplishment.
Chapter Five

The LRPA and Possible Equipment Fits

With the geographical situation of the Philippines, which is archipelagic in nature, the employment of a dedicated LRPA is an essential element of the national maritime surveillance/reconnaissance requirements. This is because the Philippines’ is bordered by great bodies of water, aggravated by the developing maritime cold war west of the Philippine area of concern and the numerous illegal activities which is maritime related like; piracy, fishing violations, environmental degradation and border intrusion is a clear indication of the necessity of ‘eyes over the seas’. At the same time, the benefit of a force projection capability and the value of an LRPA in joint operations are vital for air power.

However, there are factors to consider in deliberating the procurement of a Long-Range Patrol Aircraft to be part of the air surveillance effort of the Armed Forces. To decide on what type of platform and the equipment to be incorporated in the LRPA, we first have to determine the role it will perform and the available funding for the project.

The strategic role of the LRPA is determined by the national policy as approved by the executive branch of government. The guidelines on what the platform is required to do during different missions/taskings are then developed in consonance with the general policy established by the national government. Once the role is identified then a clearer idea on what type of platform and the equipment that will be fitted to satisfy the missions/tasking will be. Aside from the platform/aircraft type the sensors that will be installed in the LRPA should be in line with the defined and agreed roles and tasking in order to fully utilise the capability of the platform as a LRPA. It should be emphasised that in choosing the LRPA the capability of performing the assigned role should supersede all other conditions.

Another determining factor is the funds available for the air surveillance asset or the LRPA as the funding will limit the platform and equipment fit that can be acquired. Cost-effectiveness plays a large part in the acquisition of new air assets and the maintenance schedule, spare part prices and the training of aircrew vis-à-vis the platform’s mission performance should be analysed. The platform itself and the equipment fit capability should satisfy the present roles required and be flexible for future upgrades in order to be a good investment. One method of cost cutting by the PAF was when it operated a fleet of F-27s wherein some were used for troop transport while a number were fitted with sensors for air surveillance operations. This way there was a compatibility of equipment giving the PAF savings in maintenance requirements and pilot training, as compared to having different aircraft types. However, too much concern on the price involved may result in acquiring a LRPA that cannot satisfy its assigned role. This in turn will be costing the government more and the aircraft itself might be used for other functions rather than the role it is assigned to perform.
The Role of the Long-Range Patrol Aircraft in National Security

The approach of this chapter will be purely generic in nature because there is a separate office within the Philippine Air Force tasked to determine the actual platform and sensors that will be purchased. The desired LRPA characteristics and performance will be enumerated and then the available equipment fits with their capabilities will be discussed as a reference for the decision makers on what will be the appropriate platform and sensor fit for the Philippine scenario.

Platform Considerations

♦ Ability to Accomplish Assigned Roles and Tasks

In the selection of the appropriate platform to be employed as the LRPA, the first and foremost consideration will be its ability to achieve the assigned task and roles assigned to it. It does not necessarily mean that a much faster and more far-reaching aircraft will do the job but rather, its adaptability in reference to the assigned tasks will be the primary consideration. Chapter Three has given us a range of the various missions that a desired LRPA platform should be able to achieve in the Philippine scenario.

♦ Finances Involved

Another important factor in the selection process would be the cost or the finances involved in acquiring a certain platform type. With the economic slump that the Philippines is recovering from, a platform with low acquisition cost, low maintenance and operational cost is the most desired. However, we should be careful that we do not compromise the capability of the platform in accomplishing its primary role. This merely suggests that the decision-makers should come up with a wise decision because acquiring this capability is a costly endeavour.

♦ Endurance

The second edition of the Macquarie Dictionary defines ‘endurance’ as a noun which means; ‘lasting quality; duration’ and when related to flying it means; ‘the time an aircraft can continue flying under given conditions without refuelling’. In the last chapter we have proposed three strategic locations in the Philippines where the LRPA Squadrons will be deployed. This is important to be able to account for the ‘transit time’ or the period it takes for the LRPA to travel from a certain point to the assigned surveillance area and back to its point of departure, and the actual ‘time on task’, which is how long the platform can do the actual mission over the area. Endurance in effect means the length of time an aircraft can remain in sustained flight without refuelling. In an air surveillance mission, the longer the endurance of the aircraft the larger the area it will be able to cover. A suggested desired endurance capability of a LRPA is between 7-12 hours for the Philippine area of responsibility.

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1 Based on the notes, briefings and lectures of the 292 Training Squadron, 92 Wing, RAAF.
速度

第二版的《Macquarie Dictionary》将“speed”定义为“移动体内所覆盖的比时间的比率”。速度与耐力有关，因为它涉及时间。飞机的速度在决定它是否能到达一个特定区域时是必要的。速度是LRPA的一个因素，如果LRPA必须立即从一个地点撤离；一个例子是在搜索和救援操作中，当生命处于危险之中时。另一个例子是，当速度与相关性有关时，当敌机接近时，LRPA必须立即撤离该区域。对于菲律宾场景，一个Dash速度在250-400节范围内是所需的。

机动性和耐用性

第二版的《Macquarie Dictionary》将“manoeuvrability”定义为“借助技能或灵巧来操作”。将此定义应用于飞机，性能和能力将取决于平台的结构能力，以吸收从控制输入要求的任何变化，例如：不损害机翼或任何组件的平台。一个例子是，如果控制输入要求飞机在坡度上进行急转弯，或者高速下降，可以用于大型和重型飞机，就像LRPA。

第二版的《Macquarie Dictionary》将“durability”定义为“有质量的持续性，或持久性”。耐用性与飞机的结构能力有关，可保持在任何天气和白天或夜晚的条件下，它应该具有能够在任何情况下执行当前定义的任务并能够修改未来的角色的能力。

根据第三章的讨论，视觉识别是识别目标/接触的最积极方式。然而，LRPA必须非常接近目标/接触，这可能会危及机组人员和平台的安全。为了解决接近目标/接触时，不同的传感器可以安装在LRPA中，用于识别目的，允许更大的距离。同时，全潜力的监视平台可以被利用。以下是重要的设备适配，对于空中监视平台来说是必要的：

可能的设备适配

2 Ibid.
Non-Acoustic Sensors

The non-acoustic sensors are equipment fits that do not rely on sound to acquire a target/contact. The following are widely used non-acoustic sensors that are recommended for a LRPA in the Philippine area of operation:

Electronic Support Measures (ESM)\(^3\)

The ESM or the sensors passively scan the radio frequency spectrum for intentional electronic transmissions from hostile forces. These electronic emissions originate from land sites, ships and aircraft and can also be detected from submarines. These sensors are sophisticated versions of radar detectors. The ESM provides all the details necessary to classify and localise the type of electro-magnetic emission that has been detected. The potential presence of this type of sensor deters the operation of radars from hostile crafts. Although the ESM are not normally one of the primary sensors, its flexibility for detecting aircraft and naval vessels at long ranges make it an effective sensor for all air warfare missions. The use of ESM also assists in detecting the emitting source before the LRPA can be detected by that source.

Radar Sensors\(^4\)

The fitting of an effective radar is essential for an LRPA, the airborne radar system is capable of Anti Submarine Warfare (ASW) operations, long range detection and surveillance of surface vessels over a wide range of sea-state conditions, airborne navigation and weather avoidance. The capability of the radar system will be dependent on how advanced the system is. The following are suggested functions that should be incorporated in the radar system to be purchased for the PAF LRPA:

- **ISAR Mode**\(^5\). Inverse Synthetic Aperture Radar processing which allows two dimensional imaging of sea surface contacts/targets in very high to zero sea states at very long stand-off ranges. ISAR imaging allows a surveillance platform to classify contacts and greatly improve mission efficiency (save fuel and time), and monitor ship activity at safe stand-off ranges from potentially hostile adversaries.

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\(^4\) Ibid.

\(^5\) Definitions and pictures were lifted from Raytheon TI Systems, document dated, 20 October 1997. However, this does not mean that the author is in favour of any specific company, proponent or dealer.
Photograph 5 – 1: Example of ISAR Image

✓ SAR Mode. Synthetic Aperture Radar imaging for multiple resolution imaging of stationary targets, land areas and ocean surface imaging. SAR uses aircraft motion to stimulate a very large synthetic antenna along the flight path of the aircraft. As the aircraft traverses a straight-line path, the radar antenna points at a right angle to the flight path and collects radar data to form a strip map image. SAR imagery allows the monitoring of low/no motion targets in harbours, bays and land areas with highly defined features. There are two modes for the SAR function:

- **Strip Map Mode.** For large area surveillance, and

- **Spot SAR Mode.** For detailed imaging of smaller areas.

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6 Ibid.
Photograph 5 – 2: Example of SAR Images (Strip and Spot Mode)

✓ MTI Mode\(^7\). Moving Target Indicator for detection of moving targets on land areas. This mode alerts the radar operator of moving targets in an area of tactical interest.

Photograph 5 – 3: Example of a MTI Image
(Contacts/Targets overlayed on a Spot SAR Image)

\(^7\) Ibid.
Infra-Red (IR) Sensors

IR sensors are used to detect the heat signatures that extend beyond the visible light spectrum. They are commonly called either FLIR (Forward Looking Infra-Red) or IRDS (Infra-Red Detection System). The major difference between FLIR and IRDS is that FLIR passively scans for IR sources forward of the aircraft whereas IRDS searches all around the aircraft. IR systems for night-time search have replaced the previous method of illuminating the search area with either a searchlight or flares.

Visual Sensors

Many contacts are still detected through visual scanning by the look-out crew. With the aid of sophisticated binoculars like the gyro stabilised binocular and other electro-optical devices such as night vision goggles for night-time searches visual scanning is done.

Magnetic Anomaly Detection (MAD) Sensor

MAD sensors are used to detect the natural and manmade differences in the earth’s magnetic fields and normally for localised detection of a submerged submarine in ASW operations. Some of these differences are caused by the earth’s geological structures and sunspot activity. Other changes can be caused by the passing of large ferrous objects, such as ships, submarines or even aircraft through the earth’s magnetic field. The aircraft must almost be essentially overhead or very near the target/contact’s position to detect the change or anomaly. Additionally, the direction travelled by both the aircraft and the target/contact relative to the earth’s magnetic field is also a factor. Nevertheless, the close proximity required for magnetic anomaly detection makes the MAD system an excellent sensor for pinpointing a target/contact’s position prior to an air-attack.

Figure 5 – 1: Illustration of Sensors Detection Range

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9 Ibid.
Longer-range sensors are used for initial detection while short-range sensors are used for localisation of targets/contacts.

**Acoustic Sensors**

Acoustic sensors rely on the detection of underwater sounds. Each sound we hear is the result of an object that vibrates. The sound travels through the complex ocean medium and arrives at the hydrophone sensor (an underwater microphone). This type of sensor is effective for anti-submarine warfare.

**Sonobuoys**

Sonobuoys are expendable devices, they are never recovered after they are launched from the aircraft. A sonobuoy is a cylindrical metal tube about three feet long and nearly five inches in diameter. The sonobuoy is launched from the aircraft either through an explosive charge, pneumatically or by gravity through an open chute door. Upon hitting the water the battery is activated by seawater which causes a CO$_2$ bottle to inflate a plastic float. The plastic float returns the sonobuoy back to the surface where the attached uplink antenna becomes energised and the hydrophone is released to its pre-assigned depth. After several hours of operation, the sonobuoy battery fails and water soluble seals dissolve which allows the sonobuoy to sink to the bottom.

![Sonobuoy](image)

**Figure 5-2: Sonobuoy**

**Radar Altimeter (RADALT)**

Radar altimeter will give the LRPA an edge in safety. When it comes to low-level manoeuvres and poor weather conditions the RADALT will be a very efficient aid in monitoring height above the surface. The RADALT is actually a single frequency radar system that broadcasts a pulse tone directly downward. The time it takes for the reflected tone to be received directly translates into the height of the aircraft above the terrain. Depending on the technology of the RADALT some units will give the aircraft crew a visual or aural warning or both depending on the desired

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11 Definition based on Radars, by Eastern Avionics International, [http://www.avionix.com/ralt.html](http://www.avionix.com/ralt.html). However, this does not mean that the author is in favour of any specific company, proponent or dealer.
altitude to maintain. The RADALT have three basic components, an antenna, a receiver transmitter and an indicator. The better the receiver transmitter, the more accurate your readings will be.

- **Inertial Navigation System (INS)**

  The INS is used for precise reference on a continuous basis with external data being used to periodically update the system. An INS does not require any external device or signal in order to compute solutions to the navigation problem. The INS provides instantaneous outputs of present position, ground speed, true heading, distance to go and relative bearing to the destination. The INS uses gyroscopes and accelerometers (inertial sensors) to measure the state of motion of the aircraft starting position and noting the change in its direction and speed, one can keep track of the aircraft’s present position. Generally, the accuracy of any INS depends on how well the system is pre-conditioned and aligned. Today, the inertial navigation systems are among the most accurate system in the field of instrumentation and are capable of operating for extended periods of time and in all weather conditions. Dual Inertial Navigation System is suggested to be installed in an LRPA platform.

- **Global Positioning System (GPS)**

  The Global Positioning System (GPS), is the only system today able to show you your exact position on the earth anytime, in any weather, anywhere. The GPS will give you present position, time and distance to destination, winds aloft, ground speed, desired track and bearing to your destination in a flick of a button. GPS satellites, 24 in all, orbit at 11,000 nautical miles above the earth. They are continuously monitored by ground stations located worldwide. The satellites transmit signals that can be detected by anyone with a GPS receiver. Using the receiver the aircraft can determine its location with great precision. It is suggested that Dual Global Positioning System be installed in the LRPA platform.

- **Communications**

  As discussed in Chapter Three, one of the major advantage of operating a LRPA is the capability of relaying ‘real time’ information for appropriate agencies to be able to react immediately if needed in crisis situations. That is why a reliable (top of the line if possible) communication equipment is a must to be fitted in the LRPA platform. The following are suggested communications fit for the LRPA platform:

  - **HF (High Frequency, 2 sets).** Capable of long range communications over the horizon, able to transmit and receive worldwide broadcasting, used by military and civilian aviation and for sea vessel’s ship to shore communications.

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13 The definition was based on, GPS Primer, The Aerospace Corporation, http://www.aero.org/publications/GPSPRIMER/WhatisGPS.html, 29 March 1999. However, this does not mean that the author is in favour of any specific company, proponent or dealer.
14 Based on the notes, briefings and lectures of the 292 Training Squadron, 92 Wing, RAAF.
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- **VHF** (Very High Frequency, 2 sets). Short range communications for civil and military aircraft, frequency used for mobile telephones, the police, the aircraft navigation aids and to pick up sonobuoy signals. This type of communication system does not suffer from ionospheric disturbance.

- **UHF** (Ultra High Frequency, 2 sets). Mostly military communications, television and mobile communications. Just like the VHF radio, it does not suffer from ionosphere disturbance.

- **SATCOM** (Satellite Communication). This type of communications is capable of long range transmissions in the UHF spectrum and has high levels of security with line of sight to satellite, which would increase its range. Power supply demands are lower.

- **Radio Tele-Type on HF and UHF Radios.** This type of communication can provide the receiver a hard copy of the communications. Ideal especially when there is a change of tasking or for weather information. An automated one will be better since it is capable of a high rate of word per minute. Unlike voice communications, the radio tele-type has no language or accent problems.

- **Encryption.** This type of communications is one means of passing sensitive information without the risk of being deciphered by non-friendly forces.

- **Data Link.** A secured data link should be installed in the LRPA platform to be able to directly feed information to the ground database even while the mission is still ongoing.

Arming the LRPA

It would seem radical to suggest that the PAF LRPA be modified to include provisions that will enable the platform to carry selected weapons. This is so because of the additional expenses it would incur, the thought that there are other available air assets capable of these roles or, probably since no significant local study was done to actually realise the substantial contribution to air power projection that this capability will provide.

During actual maritime strike missions, joint air operations with strike aircraft being guided to target by a LRPA with its suite of effective sensors are able to engage the surface target, providing a force multiplier effect (minimum of two air assets) for this type of operation. However, there would be instances when one asset can do the job without compromising safety and at the same time being less expensive for the government. For a multi-role fighter aircraft to do this alone is not logical because then it would need the sophisticated sensors and the endurance similar to a LRPA to first locate the target, engage it and then return back to base. On the other hand, if we arm the LRPA with a "stand-off" weapon that will enable the LRPA to perform selected vital maritime strikes without compromising the platform, this will often be a more effective and safe application of air power.

The LRPA ideally will be capable of locating a target at a safe range and at the same time being forewarned of approaching hostile aircraft with its sensors allowing
the LRPA to leave the area immediately if needed. The LRPA would have the endurance to seek, make a devastating strike and then return to base. At the same time a ‘stand off’ weapon such as a Harpoon anti-ship missile can be released at a safe distance without jeopardising the LRPA. This in turn will not only maximise the flexibility and multi-role capability of a LRPA, but at the same time is a display of a nation’s air power. A description of a possible ‘stand-off’ weapon (the Harpoon) suitable for fitment to the LRPA will follow.

❖ Harpoon Anti-Ship Missile

Photograph 5 – 6: Harpoon Anti-Ship Missile

The Harpoon is designed for deployment on surface ships, aircraft, submarines and ground-based installations and can be launched from stand-off ranges in excess of 67 nautical miles. The multi-platform flexibility and ease of installation have resulted in the selection of the harpoon weapon system by cost conscious military services throughout the world. The Harpoon has demonstrated exceptional reliability in flight test and has had a 100 per cent success rate in combat launches. Air launch kits adapts the Harpoon missile airframe for integration in various type of aircraft such as the P-3, CN-235, F-50 and F-27.

Even though the Harpoon is used as an example, it is recognised that the selection of anti-shipping or anti-surface missile will need to take into account the anticipated target scenario, funds available, weapon performance and integration requirements.

A pro-active approach should be employed in the selection of the desired LRPA together with the equipment fit that will be installed in the platform that will be procured for the Philippine Air Force. Although funding is a big consideration in the decision making process, the decision-makers should not loose sight that greater weight should be placed on the capability of the platform to satisfy the role for which it is chosen. A cheap aircraft not fully capable of performing its assigned role is not the recommended approach.

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13Descriptions and pictures were lifted from; Harpoon, The Premier Anti-Ship Missile, http://web.singnet.com.sg/~weilong/harpoon.html, 10 December 1998. However, this does not mean that the author is in favour of any specific company, proponent or dealer.
Chapter Six

Conclusion

In establishing the priorities for national security one of the primary considerations is determining where threats exist or may develop so that countermeasures can be designed to neutralise these predicaments. In assessing the Philippines’ geostrategic situation, we can agree that the natural maritime boundaries surrounding our country is a source of immense income and food supplies, but it also poses a threat to the sanctuary of our sovereignty.

The waning of the Cold War gave rise to the rekindling of tensions among Southeast Asian countries within the periphery of the South China Sea in relation to border claims. This signalled the emergence of the Maritime Cold War in the South China Sea. China is cautiously re-intensifying its eastward force projection, which it started in the 1970s when it snatched the Paracel Islands from Vietnam. In 1995, China occupied Mischief Reef, which has been claimed as part of the Philippines. To diffuse the possibility of military confrontation, regional alliances and cooperation were revitalised. But this had little or no effect at all with military powers in the region as evidenced by China’s continuing military activity during the early part of 2000 in Scarborough Shoal, which is also claimed by the Philippines.

The Philippine government has dispatched naval forces to cease foreign incursion in territorial waters. Limited resources restricted operations to repel of ongoing foreign encroachment within the borders rather than, discouraging intruders on the onset, while they are still in the planning stage. Visibility and frequency of patrols of the maritime borders are effective methods in deterring intrusion attempts. Naval vessels have this capability of patrolling the high seas, but their slower speed equates to a lesser area of coverage as compared to an aircraft. Therefore, the employment of a dedicated Long-Range Patrol Aircraft (LRPA) is a rational, effective and efficient solution.

The Armed Forces of the Philippines through the Philippine Air Force had a number of RF-27 LRPAs, which were acquired in the early 1980s supposedly tasked to perform air surveillance and reconnaissance missions. However, due to the limited resources of the PAF, the LRPAs were compelled to perform missions, which were not related to air surveillance resulting in to the extinction of the RF-27 LRPAs and the sudden demise of an air surveillance effort before it even started.

Republic Act 7898 or the AFP Modernisation Act is the cure to breathe life into the insentient air surveillance capability of the PAF. In the approved PAF Modernisation Plan, included in the list of priority equipment purchases are six LRPAs. However, prior to the arrival of these new surveillance aircraft, a more defined program on the tasking and employment must be established to avoid a repeat of the fate of the RF-27 LRPAs.
As per experience, an unstructured and disorganised surveillance effort will result in unnecessary expenses for the government with minimal results. After the national government has given the guidelines on the role/tasking for the LRPAs, a pre-conceived program for employment should be implemented to assure optimum results for every sortie flown by the LRPA. Likewise, to preclude costly visits by the LRPA to areas that have no impact on would be adversaries; a database should be established which compiles information gathered for future reference. Eventually, through the database a growing knowledge on patterns for expected activities in certain areas will be developed like border intrusion, illegal fishing, smuggling and normal sea traffic by identifying vessel markings. The database will aid in the planning of LRPA missions by pinpointing areas where surveillance efforts should be intensified.

Air surveillance is a costly but necessary undertaking, and this is because technological advances dictate the pace for military hardware superiority, especially for air power. While the Philippines’ is still slowly recovering from the economic crisis that shattered the region, cost-effectiveness is a key word for every project. Integrating civil and military air surveillance requirements into one effort is a logical step towards cost-effectiveness. This symbiosis in effect will avoid the duplication of air surveillance efforts by different agencies when performing air patrols within the same area of interest. At the same time, dividing the already limited national budget allocation for the different agencies’ air surveillance programs is no longer necessary. By coordinating the air surveillance requirements of the different civil agencies the budgetary function will also be more effectively handled. Centralising the budget rather than dividing the budget amongst the different agencies could do this. What is necessary is the creation of a well-defined organisational structure that will maintain coordination in the conduct of operation for the joint air surveillance effort. However, it should be emphasised that be it in peacetime or crisis situations, LRPAs belonging to the military will always be under full control of the AFP. Another imperative aspect to consider is that in choosing the appropriate LRPA platform, the actual cost should only come second to satisfying its desired role and tasking. It is easy to develop misconceptions by thinking that an aircraft which is faster, can carry more load or is cheaper than the previous one will suffice. The LRPA platform should conform to the distinct role it is assigned to perform and stringent measures should be applied to ensure proper utilisation in order to preserve this vital air asset but most importantly ensuring Philippine national maritime security.

Finally, the vacuum of having an almost non-existent air surveillance capability is in itself a threat. The potential contribution of a respectable LRPA to air power and a country’s national security in general will always be enormous.

The ill effects of illegal activities in the maritime border of the Philippines’ if left unchecked will not only impact on the economy but ultimately on the national pride of the Filipinos.
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