



Republic of the Philippines
DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS

PRE-FEASIBILITY STUDY AND MASTER PLANNING FOR NEW LEGASPI AIRPORT

FINAL REPORT

2003

**PRE-FEASIBILITY STUDY AND MASTERPLANNING
FOR THE
NEW LEGASPI AIRPORT**

TABLE OF CONTENTS

| | |
|--|------------|
| PROJECT LOCATION MAP | i |
| | |
| Chapter 1 BACKGROUND OF THE PROJECT | 1-1 |
| 1.1 INTRODUCTION | 1-1 |
| 1.1.1 Background | 1-1 |
| 1.1.2 Objectives of the Study | 1-2 |
| 1.1.3 Scope of the Services | 1-2 |
| 1.2 SOCIO-ECONOMIC CONDITIONS | 1-3 |
| 1.2.1 Population | 1-3 |
| 1.2.2 Economic Growth and Industrial Structure | 1-6 |
| 1.2.3 Tourism Demand | 1-6 |
| 1.3 THE AIR TRANSPORT SECTOR | 1-7 |
| 1.3.1 The Airport System | 1-7 |
| 1.3.2 Administration of Civil Aviation | 1-10 |
| 1.3.3 Air Traffic Services | 1-10 |
| 1.3.4 Development in the Air Transportation Sector | 1-11 |
| 1.4 SURFACE TRANSPORTATION | 1-12 |
| 1.4.1 Sea Transport | 1-12 |
| 1.4.2 Road Transport | 1-13 |
| 1.4.3 Rail Transport | 1-14 |
| 1.5 RELEVANT ENVIRONMENTAL LAWS AND REGULATIONS | 1-14 |
| 1.5.1 Introduction | 1-14 |
| 1.5.2 Legal Framework of the Philippine EIS System | 1-15 |
| 1.5.3 Implication to the Project | 1-16 |
| 1.5.4 Requirements of the EIA Study | 1-16 |
| | |
| Chapter 2 CONDITION OF THE EXISTING LEGASPI AIRPORT | 2-1 |
| 2.1 GENERAL | 2-1 |

| | |
|---|------------|
| 2.2 ENVIRONMENTAL CONDITIONS | 2-1 |
| 2.2.1 Natural Environment | 2-1 |
| 2.2.2 Social Environment | 2-2 |
| 2.2.3 Pollution | 2-3 |
| 2.3 AIR TRAFFIC VOLUME AND SERVICES | 2-4 |
| 2.3.1 Historical Data | 2-4 |
| 2.3.2 Weather Cancellations and Delays | 2-7 |
| 2.4 EXISTING CONDITIONS OF THE FACILITIES | 2-7 |
| 2.4.1 The Existing Facilities | 2-7 |
| 2.5 PROBLEMS OF THE EXISTING AIRPORT | 2-13 |
| 2.5.1 Compliance with International Standards of Safety and Reliability | 2-13 |
| 2.5.2 Environmental Hazards from Mayon Volcano | 2-14 |
| 2.5.3 Noise | 2-20 |
| | |
| Chapter 3 AIR TRAFFIC DEMAND FORECAST | 3-1 |
| 3.1 INTRODUCTION | 3-1 |
| 3.1.1 Previous Studies | 3-1 |
| 3.1.2 Forecast Methodologies | 3-2 |
| 3.2 ANNUAL PASSENGER TRAFFIC FORECAST | 3-4 |
| 3.2.1 Forecast Air Passenger Volume at Legaspi Airport | 3-4 |
| 3.2.2 Allocated Sector Passenger Forecast | 3-5 |
| 3.3 ANNUAL AIR CARGO FORECAST | 3-6 |
| 3.4 PEAK-HOUR AIR TRAFFIC VOLUMES | 3-6 |
| 3.5 FORECAST OF AIR TRAFFIC MOVEMENT | 3-7 |
| | |
| Chapter 4 AIRPORT FACILITY REQUIREMENT | 4-1 |
| 4.1 SUMMARY | 4-1 |
| 4.2 PLANNING PARAMETERS | 4-2 |
| 4.2.1 General | 4-2 |
| 4.2.2 Design Aircraft | 4-3 |
| 4.2.3 Aerodrome Reference Code | 4-3 |
| 4.2.4 Approach Category of Runway | 4-4 |
| 4.3 RUNWAY STRIP AND OBSTACLE LIMITATION SURFACES | 4-6 |
| 4.3.1 Runway Strip | 4-6 |
| 4.3.2 Runway End Safety Area | 4-6 |
| 4.3.3 Obstacle Limitation Surfaces | 4-7 |
| 4.4 RUNWAY, TAXIWAY AND APRON | 4-9 |

| | |
|--|------------|
| 4.4.1 Runway | 4-9 |
| 4.4.2 Taxiway and Taxiway Strip | 4-9 |
| 4.4.3 Apron | 4-9 |
| 4.5 PASSENGER AND CARGO TERMINAL BUILDINGS | 4-10 |
| 4.5.1 Passenger Terminal Building | 4-10 |
| 4.5.2 Cargo Terminal Building | 4-10 |
| 4.6 OTHER BUILDINGS | 4-10 |
| 4.6.1 Control Tower Building | 4-10 |
| 4.6.2 Administration Building | 4-10 |
| 4.6.3 Fire Station Building | 4-11 |
| 4.7 ROAD AND CARPARK | 4-11 |
| 4.7.1 Access Road | 4-11 |
| 4.7.2 Car Park | 4-11 |
| 4.8 AIR NAVIGATION | 4-12 |
| 4.9 RESCUE AND FIRE FIGHTING SERVICES | 4-14 |
| 4.10 AIRPORT UTILITIES | 4-14 |
| 4.11 AVIATION FUEL SUPPLY SYSTEM | 4-15 |
| 4.12 WORLD GEODETIC SURVEY 1984 (WGS-84) | 4-15 |
| 4.12.1 Geodetic Control Stations | 4-15 |
| 4.12.2 Airfield Features | 4-17 |
| 4.12.3 Frangible Objects | 4-18 |
| 4.12.4 Survey Accuracy and Precision | 4-18 |
| 4.12.5 Survey Data Acquisition Report/Publication | 4-19 |
| 4.13 AERODROME DATA | 4-21 |
| Chapter 5 DEVELOPMENT STRATEGY AND SELECTION OF NEW AIRPORT SITE | 5-1 |
| 5.1 REVIEW OF DEVELOPMENT STRATEGIES | 5-1 |
| 5.1.1 General | 5-1 |
| 5.1.2 Implications of Option I (Improving the Existing Legaspi Airport Facilities) | 5-2 |
| 5.1.3 Implications of Option II (Developing the New Southern Luzon Airport) | 5-4 |
| 5.1.4 Implication of Option III (Developing a New Legaspi Airport) | 5-9 |
| 5.2 EVALUATION OF ALTERNATIVE STRATEGIES | 5-13 |
| 5.2.1 Development Option I | 5-13 |
| 5.2.2 Development Option II | 5-13 |
| 5.2.3 Development Option III | 5-14 |
| 5.3 COMPARATIVE ANALYSIS OF SELECTED SITES FOR NEW LEGASPI AIRPORT | 5-14 |
| 5.3.1 Barangay Alobo, Daraga, Albay | 5-14 |

| | |
|--|------------|
| 5.3.2 Barangay Bariis, Legaspi, Albay | 5-17 |
| Chapter 6 MASTER PLANNING FOR THE NEW LEGASPI AIRPORT | 6-1 |
| 6.1 EXISTING ENVIRONMENT OF THE NEW DEVELOPMENT SITE | 6-1 |
| 6.1.1 Seismicity and Volcanic Activity | 6-1 |
| 6.1.2 Meteorology | 6-1 |
| 6.2 DETERMINATION OF LOCATION AND ORIENTATION OF RUNWAY | 6-1 |
| 6.2.1 Planning Conditions | 6-2 |
| 6.2.2 Runway Layout Alternatives | 6-4 |
| 6.2.3 Selection of Preferred Option | 6-7 |
| 6.3 LONG-TERM DEVELOPMENT PLAN | 6-9 |
| 6.3.1 General Airport Layout | 6-9 |
| 6.3.2 Terminal Area Layout Plan | 6-11 |
| 6.3.3 Obstacle Assessment for Airspace Utilization | 6-13 |
| 6.4 MEDIUM-TERM DEVELOPMENT PLAN | 6-13 |
| 6.4.1 Land Acquisition | 6-13 |
| 6.4.2 Runway, Taxiway and Apron | 6-14 |
| 6.4.3 Design Considerations for Airport Pavement | 6-16 |
| 6.4.4 Land Preparation and Storm Water Drainage | 6-17 |
| 6.4.5 Miscellaneous Civil Works | 6-18 |
| 6.4.6 Passenger Terminal Building | 6-19 |
| 6.4.7 Cargo Terminal Building | 6-22 |
| 6.4.8 Administration Building and Control Tower | 6-24 |
| 6.4.9 Fire Station Building | 6-24 |
| 6.4.10 Navigation Aids | 6-24 |
| 6.4.11 Utilities | 6-25 |
| 6.5 AIRPORT ACCESS PLAN | 6-27 |
| Chapter 7 IMPLEMENTATION SCHEDULE AND PROJECT COST ESTIMATE | 7-1 |
| 7.1 IMPLEMENTATION SCHEDULE | 7-1 |
| 7.2 PROJECT COST ESTIMATE | 7-3 |
| 7.2.1 Preliminary Project Cost | 7-3 |
| 7.2.2 Annual Project Cost Requirement | 7-5 |
| Chapter 8 FINANCIAL ANALYSIS | 8-1 |
| 8.1 INTRODUCTION | 8-1 |
| 8.2 PROJECT COST | 8-1 |
| 8.3 PROJECT REVENUES | 8-1 |

| | |
|--|-------------|
| 8.4 FINANCING SCHEMES | 8-2 |
| 8.5 RESULT OF EVALUATION | 8-2 |
| 8.6 FINANCIAL BREAKEVEN | 8-4 |
| Chapter 9 ECONOMIC ANALYSIS | 9-1 |
| 9.1 GENERAL ANALYTICAL FRAMEWORK | 9-1 |
| 9.2 THE PROJECT OBJECTIVES | 9-1 |
| 9.3 ECONOMIC COSTS | 9-2 |
| 9.4 SOCIO-ECONOMIC BENEFITS | 9-3 |
| 9.5 RESULTS OF EVALUATION | 9-6 |
| 9.6 BREAKEVEN ANALYSIS | 9-7 |
| Chapter 10 INITIAL ENVIRONMENTAL EXAMINATION | 10-1 |
| 10.1 ENVIRONMENTAL SETTING AT THE NEW AIRPORT SITE | 10-1 |
| 10.1.1 The Physical Environment | 10-1 |
| 10.1.2 The Biological Environment | 10-5 |
| 10.1.3 The Social Environment | 10-6 |
| 10.2 EVALUATION OF ENVIRONMENTAL IMPACT | 10-8 |
| 10.2.1 Future Environmental Conditions without the Project | 10-8 |
| 10.2.2 Assessment of Environmental Impacts | 10-8 |
| Chapter 11 PROJECT IMPLEMENTATION PLAN | 11-1 |
| 11.1 EXECUTING AGENCY | 11-1 |
| 11.2 PROJECT MANAGEMENT OFFICE | 11-3 |
| 11.3 FINANCIAL PLAN | 11-3 |
| 11.3.1 Source of Funds | 11-3 |
| 11.3.2 Loan Repayment Schedule | 11-4 |
| Annex A Air Traffic Forecast | 1 |
| Annex B Wind Rose Analysis (Legaspi, 1987 – 1996) | 1 |
| Annex C Financial Evaluation | 1 |
| Annex D Economic Evaluation | 1 |
| Annex E Plot Points of NavAids Table | 1 |
| Annex F Precision Table | 1 |

| | | |
|----------------|---|----------|
| Annex G | Accuracy Table | 1 |
| Annex H | New Legaspi Airport Development Plan superimposed on New Aerial Photograph | 1 |
| Annex I | New Topographic Map | 1 |

LIST OF TABLES

| | | |
|-------------|--|------|
| Table 1.2-1 | Population Projection (Nationwide and Selected Regions) | 1-4 |
| Table 1.2-2 | Provincial Population Projection | 1-5 |
| Table 1.2-3 | Value of Domestic Production (in billion pesos, 1985 prices) | 1-6 |
| Table 1.2-4 | Region V Travelers | 1-7 |
| Table 1.2-5 | Provincial Distributions of Travelers in Region V (Year 2000) | 1-7 |
| Table 1.3-1 | Comparative Airport Statistics in Region V (2001) | 1-9 |
| Table 1.3-2 | Number of Airports Served by Airline Companies (May 2002) | 1-11 |
| Table 1.3-3 | Present Fleet of Various Airline Companies (May 2002) | 1-12 |
| Table 1.4-1 | Port Facilities | 1-13 |
| Table 1.4-2 | Breakdown of National Roads | 1-13 |
| Table 2.4-1 | Existing Facilities at the Legaspi Airport | 2-8 |
| Table 2.4-2 | Brief Assessment of Selected Airport Components | 2-12 |
| Table 2.5-1 | Comparison between Precision and Non-Instrument Runway | 2-14 |
| Table 3.1-1 | Previous Forecast of Air Traffic Demand | 3-1 |
| Table 3.1-2 | Actual Passenger Volumes | 3-1 |
| Table 3.1-3 | Trip Origin-Destination (Percentage) | 3-2 |
| Table 3.1-4 | Comparison of Forecast Methodologies | 3-2 |
| Table 3.2-1 | Forecast Of Domestic Air Passenger Volumes (NCR and Philippines) | 3-4 |
| Table 3.2-2 | Forecast of Domestic Air Passenger Volumes at Legaspi | 3-5 |
| Table 3.2-3 | Route-Allocated Annual Air Passenger Traffic Forecast | 3-5 |
| Table 3.3-1 | Historical Cargo Traffic (tons) | 3-6 |
| Table 3.3-2 | Forecast Cargo Traffic (tons) | 3-6 |
| Table 3.4-1 | Peak-Hour Air Passenger Traffic Forecat | 3-7 |
| Table 3.5-1 | Aircraft Fleet of PAL | 3-7 |
| Table 3.5-2 | PAL Airport Development Requirements | 3-8 |
| Table 3.5-3 | Air Passenger Volume Per Route | 3-8 |
| Table 3.5-4 | Forecast Aircraft Movement | 3-9 |
| Table 4.1-1 | Planning Criteria and Parameters (Horizontal Components) | 4-1 |
| Table 4.1-2 | Planning Criteria and Parameters (Vertical Components) | 4-2 |
| Table 4.2-1 | Technical Comparisons among Design Aircraft for Legaspi Airport | 4-3 |
| Table 4.2-2 | Aerodrome Reference Code of ICAO Annex 14 | 4-4 |
| Table 4.2-3 | Wind Direction and Speed Distribution (Legaspi City, 1987-1996) | 4-5 |
| Table 4.2-4 | Monthly Weather Data (Rainy Days and Frequency of Wind Directions) | 4-6 |
| Table 4.4-1 | Standard Runway Length Requirements for Domestic Operation in Japan | 4-9 |
| Table 4.9-1 | Minimum Usable Amount of Extinguishing Agents & Fire Fighting Vehicles | 4-14 |

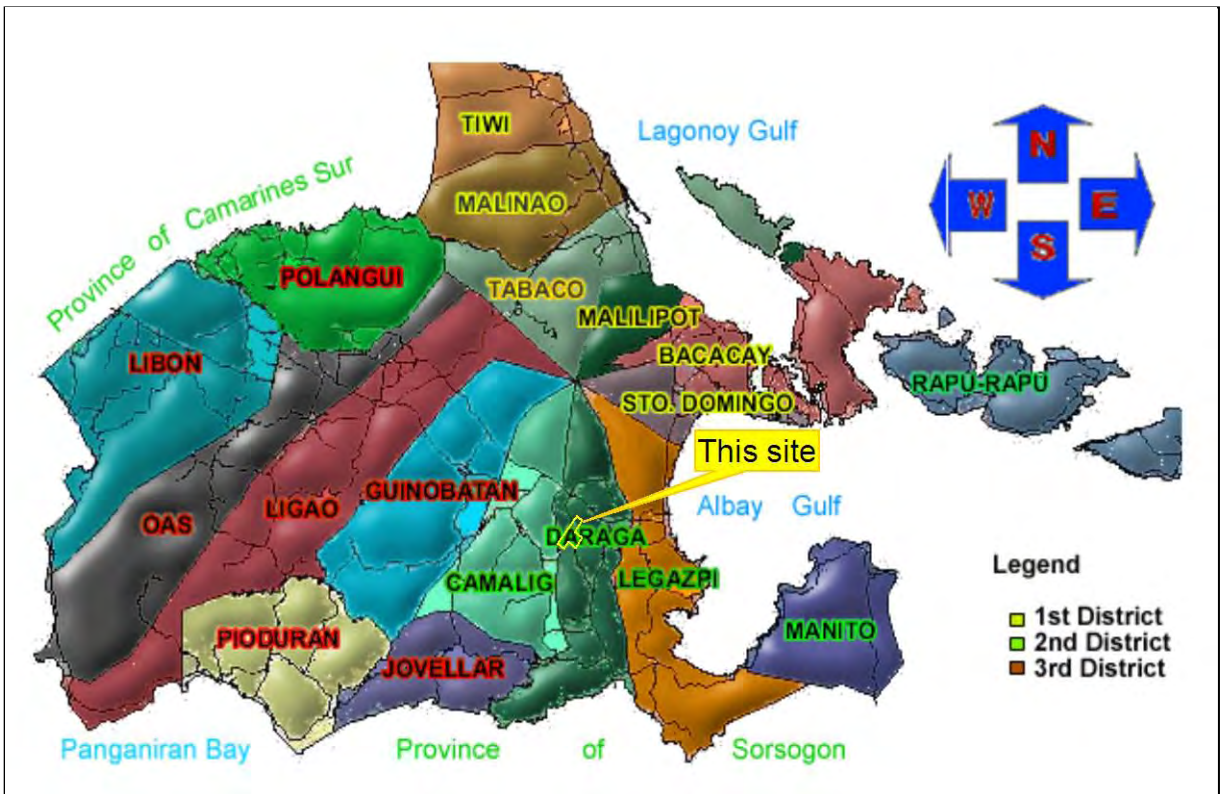
| | | |
|--------------|--|-------|
| Table 4.10-1 | Unit Demand for Utilities for Planning Purposes | 4-14 |
| Table 4.11-1 | Estimated Weekly Fuel Consumption and Required Tank Capacity | 4-15 |
| Table 5.1-1 | Evaluations of Potential Sites for Development Option II | 5-6 |
| Table 5.1-1 | Evaluations of Potential Sites for Development Option II (Cont'd) | 5-7 |
| Table 5.1-2 | Evaluations of Potential Sites for Development Option III | 5-11 |
| Table 5.1-2 | Evaluations of Potential Sites for Development Option III (Cont'd) | 5-12 |
| Table 5.3-1 | Comparison of New Legaspi Airport Sites (Alobo and Bariis) 1 of 3 | 5-20 |
| Table 5.3-1 | Comparison of New Legaspi Airport Sites (Alobo and Bariis) 2 of 3 | 5-21 |
| Table 5.3-1 | Comparison of New Legaspi Airport Sites (Alobo and Bariis) 3 of 3 | 5-22 |
| Table 6.2-1 | Comparison and Evaluation of Alternative Runway Orientation | 6-8 |
| Table 6.4-1 | Details of Work for the Miscellaneous Civil Works | 6-19 |
| Table 6.4-2 | Assumptions for Major Areas and Facilities (Medium-Term Development) | 6-20 |
| Table 7.2-1 | Preliminary Project Cost Estimate | 7-3 |
| Table 7.2-2 | Annual Breakdown of Project Cost | 7-5 |
| Table 8.3-1 | Estimated Revenues at Current Airport Charges (Opening Year) | 8-2 |
| Table 8.4-1 | Weighted Average Cost of Capital Under Various Financing Options | 8-2 |
| Table 8.5-1 | Base Case Financial Indicators (PhP '000) | 8-3 |
| Table 8.5-2 | Various Financial Scenarios | 8-4 |
| Table 8.6-1 | Financial Break-even | 8-4 |
| Table 9.3-1 | Summary of Annual Costs (PhP Million at 2002 prices) | 9-2 |
| Table 9.4-1 | Summary of Economic Benefits | 9-6 |
| Table 9.5-1 | Summary Results of Economic Analysis | 9-7 |
| Table 9.6-1 | Break-Even Economic Scenarios | 9-7 |
| Table 10.1-1 | Climatological Normals | 10-3 |
| Table 10.1-2 | Climatological Extremes | 10-3 |
| Table 10.1-3 | Total Population Distribution of Top Five Municipalities in Albay | 10-6 |
| Table 10.1-4 | Profile of the Affected Municipalities | 10-6 |
| Table 10.1-5 | Profile of the Barangays to be Affected by the Airport Development | 10-6 |
| Table 10.2-1 | Summary of Impacts during Construction Phase | 10-9 |
| Table 10.2-2 | Summary of Impacts during Operation Phase | 10-10 |
| Table 11.3-1 | Overall Project Cost Estimate and Source of Fund | 11-3 |
| Table 11.3-2 | Schedule of Repayment (Yen Million) | 11-4 |
| Table A.1 | Annual Domestic Passenger Records | 1 |
| Table A.2 | Forecast Share of Passenger Traffic (Percentage) | 2 |
| Table A.3 | Correlation Matrix | 3 |
| Table A.4 | Summary of Model Statistics | 3 |
| Table E-1 | Plot Points of NAVAIDS Table | 1 |

| | |
|---------------------------|---|
| Table F-1 Precision Table | 1 |
| Table G-1 Accuracy Table | 1 |

LIST OF FIGURES

| | |
|---|------|
| Fig.1.2-1 Population Projection | 1-4 |
| Fig. 1.2-1 Population Projection in the Bicol Region per Province | 1-5 |
| Fig. 1.3-1 Location and Classification of National Government Airports | 1-8 |
| Fig. 2.2-1 Existing Legaspi Airport and its Environs..... | 2-2 |
| Fig. 2.3-1 Air Passenger Traffic Volumes (Philippines, NCR) | 2-4 |
| Fig. 2.3-2 Air Passenger Traffic Volume in Region V Per Province | 2-5 |
| Fig. 2.3-3 Legaspi's Share of Region V Air Passenger Traffic | 2-5 |
| Fig. 2.3-4 Regional Share of Total Domestic Air Passenger Traffic | 2-6 |
| Fig. 2.3-5 Legaspi's Share Of Total NCR Domestic Air Passenger Traffic..... | 2-6 |
| Fig. 2.3-6 Legaspi's Share of Total Domestic Air Passenger Traffic | 2-6 |
| Fig. 2.3-7 Monthly Flight Cancellation Due to Weather (2000-2001) | 2-7 |
| Fig. 2.4-1 Existing Layout of Legaspi Airport | 2-11 |
| Fig. 2.5-1 Mayon Volcano Pyroclastic Flow Hazard Map (January 2000)..... | 2-16 |
| Fig. 2.5-2 Mayon Volcano Lahar Hazard Map (March 2000) | 2-17 |
| Fig. 2.5-3 Mayon Volcano Lava Flow Hazard Map (January 2000) | 2-18 |
| Fig. 2.5-4 Pre-eruption Topography of the Summit Ravine Bonga Fan sector of Mayon Volcano..... | 2-19 |
| Fig. 2.5-5 Mayon Volcano Ashfall Hazard Map (January 2000)..... | 2-21 |
| Fig. 4-3-1 Obstacle Limitation Surface | 4-8 |
| Fig. 4.7-1 Typical 20-Vehicle Capacity Parking Module Configuration..... | 4-12 |
| Fig. 5.1-1 Alternative Development Option: Existing Airport | 5-3 |
| Fig. 5.1-2 Potential Sites for Alternative Development Option II | 5-5 |
| Fig. 5.1-3 Distribution of Active Faults in Bicol Region | 5-8 |
| Fig. 5.1-4 Potential Sites for Development Option III | 5-10 |
| Fig. 5.3-1 Alobo Site with Aerodrome Surface Limits..... | 5-16 |
| Fig. 5.3-2 Bariis Site with Aerodrome Surface Limits..... | 5-19 |
| Fig. 6.2-1 Annual Wind Rose (Legaspi City)..... | 6-3 |
| Fig. 6.2-2 Alternative Runway Layouts..... | 6-5 |
| Fig. 6.3-1 General Airport Facility Layout Plan | 6-10 |
| Fig. 6.3-2 Terminal Facility Layout Plan | 6-12 |
| Fig. 6.4-1 Horizontal Alignment of Airfield Facilities..... | 6-14 |
| Fig. 6.4-2 Longitudinal Profile of the Runway | 6-15 |
| Fig. 6.4-3 Passenger Terminal Building Layout Plan..... | 6-21 |
| Fig. 6.4-4 Cargo Terminal Building Layout Plan | 6-23 |
| Fig. 6.5-1 Proposed Alignment of Access Road | 6-27 |
| Fig. 6.5-2 Typical Access Road Cross Section..... | 6-28 |

| | |
|--|------|
| Fig. 7.1-1 Preliminary Project Implementation Schedule | 7-2 |
| Fig. 10.1-1 Regional Topographic and Drainage Map | 10-2 |
| Fig. 10.1-2 Climate Map of the Philippines | 10-4 |
| Fig. 10.1-3 Agricultural Map of Albay | 10-5 |
| Fig. 10.1-4 Base Map of Affected Barangays in Daraga..... | 10-7 |
| Fig. 11.1-1 Organizational Chart of DOTC. | 11-2 |
| Fig. 11.1-2 Organizational Chart of ATO | 11-2 |



PROJECT LOCATION MAP

Chapter 1 BACKGROUND OF THE PROJECT

1.1 INTRODUCTION

1.1.1 Background

The 1992 Civil Aviation Master Plan (CAMP), prepared under the auspices of the United Nations Development Program (UNDP) and the International Civil Aviation Organization (ICAO), recommended the preparation of a master plan for all the airports in the country. Upon the request of the Government of the Republic of the Philippines (GRP), the Japan International Cooperation Agency (JICA) conducted the Study on Selected Airports Master Planning Project in 1997 and identified the long-term development requirements of four (4) trunk line airports including Legaspi Airport in the Province of Albay, Bicol Region.

To supplement the above-mentioned JICA Study, a Pre-Feasibility Study on New Airport Development Project was also conducted in 1997. In the Pre-Feasibility Study, two alternative airport development options in Bicol region (Region V) were devised and evaluated. The options involve the development of a New Legaspi Airport (Alternative A) and the development of a New Southern Philippine Airport, replacing both the existing Naga and Legaspi Airports (Alternative B). The Pre-Feasibility Study concluded that the Alternative Airport Development System A involving the development of a New Legaspi Airport would be a preferable option, especially from the environmental and technical viewpoints.

The Government of the Republic of the Philippines, through the Department of Transportation and Communications (DOTC), now intends to proceed with the implementation of the New Legaspi Airport Development Project, which aims to develop a new airport with international standards. DOTC envisions to commence work by undertaking a pre-feasibility study review and formulating a master plan to guide the subsequent development activities, and hence this report.

1.1.2 Objectives of the Study

Based on the Consultant's understanding of the Terms of Reference (TOR) for the Conduct of the Pre-Feasibility Study and Master Planning for the New Legaspi Airport Development Project, the objectives of the services are summarized as follows:

- (a) Finalize the New Legaspi Airport Master Plan based on the review of previous studies and the latest socio-economic and technical information, including the result of the site investigation to be conducted.
- (b) Evaluate the technical, economic and financial viability of the medium-term development plan formulated from the framework of the overall master plan; and,
- (c) Assess possible financing options to cover the cost of implementation of the Project.

1.1.3 Scope of the Services

The Scope of the Services as defined in the Terms of Reference are summarized as follows:

(a) Review of Previous Feasibility Report

Review, and if necessary, revise the findings and recommendations embodied in the Pre-Feasibility Study on New Airports Development Project (ECFA 1997) and the Study on Selected Airports Development Project (JICA 1997). The review shall cover: 1) Air Traffic Demand Forecast; 2) Evaluation of Existing Airport; 3) Identification of Project Rationale; and 4) Evaluation of the Proposed New Site.

The planning parameters and facility requirements for the medium- and long-term development of the project shall be finalized, based on which the location and orientation of the new runway and overall layout plan shall be determined. The layout plan shall take into account the surrounding conditions with the end-in-view of achieving the most economical solution and minimizing environmental impacts.

(b) Topographic Survey

Conduct a topographic survey of the proposed airport site. The data collected shall be used to carry out the study and may be used in the detailed design and the proposed airport construction.

(c) Project Implementation Schedule and Cost Estimates

Prepare the project implementation schedule including pre-development activities, such as, land acquisition, engineering and tendering. Cost estimates shall likewise be prepared and broken down into local and foreign components. An annual disbursement schedule based on the implementation schedule shall also be formulated.

(d) Review of Economic and Financial Analyses

Review the economic and financial viability of the project.

(e) Initial Environmental Examination (IEE)

Prepare an IEE describing the proposed project, the existing environment, and examining the environmental issues concerning the proposed development of the airport.

1.2 SOCIO-ECONOMIC CONDITIONS

1.2.1 Population

Over the last two decades, the national population growth rate has slowed down from about 2.4% per year to about 2.0% by the turn of the century. It is projected to further slow down to less than 1.5% per year before reaching less than 1% by year 2020. **Table 1.2-1** shows a comparison between the national population projection and those of other regions in the Philippines, including Region V.

Table 1.2-1 Population Projection (Nationwide and Selected Regions)

| Year | Philippines | NCR | Region VII | Bicol Region | Share of Bicol Region |
|----------------------------|-------------|------------|------------|--------------|-----------------------|
| 1980 | 48,316,503 | 5,970,310 | 3,796,049 | 3,489,399 | 7.2% |
| 1985 | 54,668,332 | 6,942,204 | 4,195,015 | 3,921,555 | 7.2% |
| 1990 | 61,480,180 | 7,974,002 | 4,616,038 | 4,388,139 | 7.1% |
| 1995 | 68,424,077 | 8,970,970 | 5,037,050 | 4,872,762 | 7.1% |
| 2000 | 75,223,853 | 9,894,837 | 5,440,597 | 5,354,806 | 7.1% |
| 2005 | 81,590,921 | 10,737,419 | 5,811,025 | 5,809,974 | 7.1% |
| 2010 | 87,206,449 | 11,481,317 | 6,130,836 | 6,211,603 | 7.1% |
| 2015 | 92,429,710 | 12,152,388 | 6,425,005 | 6,597,390 | 7.1% |
| 2020 | 97,681,831 | 12,765,312 | 6,720,316 | 7,014,545 | 7.2% |
| 2025 | 102,686,370 | 13,265,262 | 7,000,339 | 7,447,032 | 7.3% |
| 2030 | 107,123,873 | 13,507,025 | 7,246,341 | 7,869,770 | 7.3% |
| Average Annual Growth Rate | | | | | |
| 1980-1990 | 2.4% | 2.9% | 2.0% | 2.3% | |
| 1990-2000 | 2.0% | 2.2% | 1.7% | 2.0% | |
| 2000-2020 | 1.3% | 1.3% | 1.1% | 1.4% | |
| 2020-2030 | 0.9% | 0.6% | 0.8% | 1.2% | |

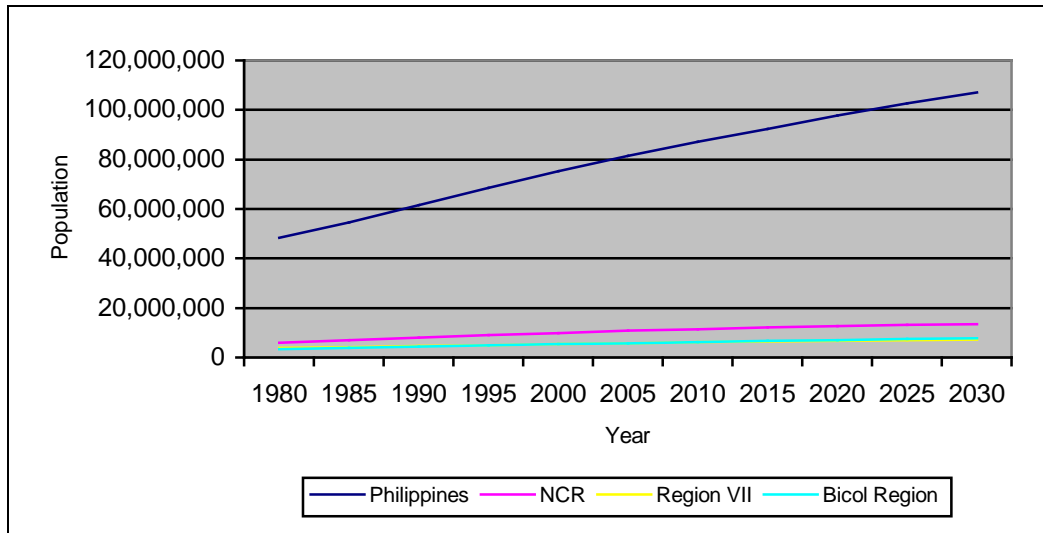


Fig.1.2-1 Population Projection

At the turn of the century, the population of the entire Bicol Region constituted about seven percent of the total national population. In terms of percentage growth, the Bicol Region follows the decreasing growth rate at the national level. By 2020, it is expected to grow annually at just over one (1) percent.

Among the provinces in the Bicol Region, Camarines Sur registers the largest population at the turn of the century, followed by Albay (**Table 1.2-2**).

It is projected that Camarines Sur and Albay will continue to house about 55 percent of the total population of the Bicol Region. Considering only the contiguous provinces in Bicol Region, the proportion of the combined population in Albay and Camarines Sur is about 69 percent.

Table 1.2-2 Provincial Population Projection

| Year | Albay | Cam. Sur | Cam. Norte | Catanduanes | Masbate | Sorsogon |
|------|-----------|-----------|------------|-------------|-----------|-----------|
| 1980 | 812,285 | 1,102,723 | 309,208 | 174,984 | 587,551 | 502,648 |
| 1985 | 906,215 | 1,247,063 | 352,054 | 192,833 | 656,623 | 566,767 |
| 1990 | 1,004,570 | 1,405,422 | 398,899 | 211,992 | 729,915 | 637,341 |
| 1995 | 1,103,216 | 1,571,946 | 447,793 | 232,284 | 805,424 | 712,099 |
| 2000 | 1,198,934 | 1,739,635 | 496,237 | 252,405 | 880,172 | 787,423 |
| 2005 | 1,287,725 | 1,899,577 | 542,386 | 271,132 | 949,868 | 859,286 |
| 2010 | 1,364,343 | 2,042,155 | 584,223 | 287,334 | 1,010,217 | 923,331 |
| 2015 | 1,436,547 | 2,178,788 | 625,703 | 302,984 | 1,068,165 | 985,203 |
| 2020 | 1,514,006 | 2,323,916 | 671,716 | 320,607 | 1,132,278 | 1,052,022 |
| 2025 | 1,592,712 | 2,472,972 | 720,382 | 339,638 | 1,200,191 | 1,121,137 |
| 2030 | 1,666,904 | 2,618,860 | 768,939 | 358,896 | 1,268,035 | 1,188,136 |

Source: NSO

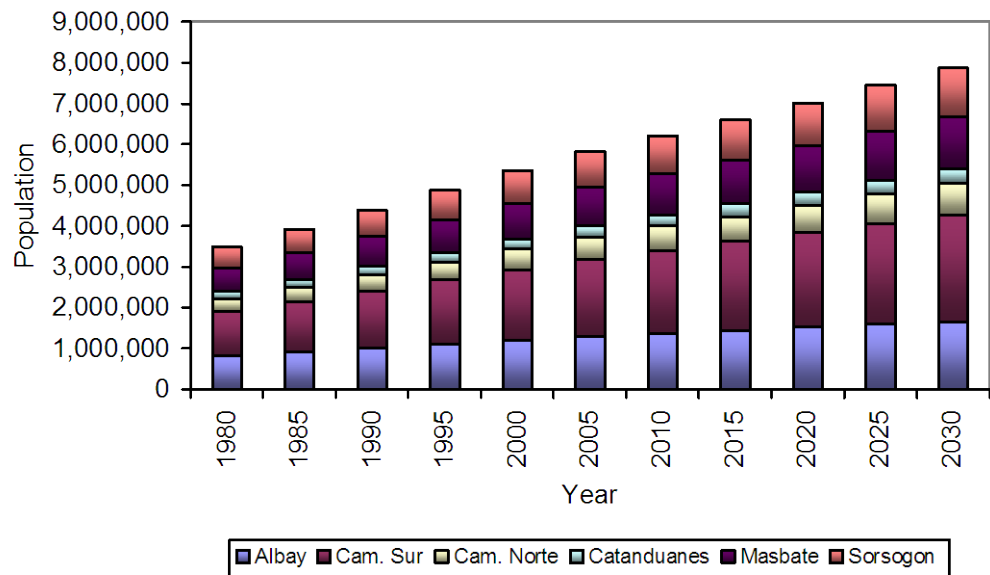


Fig. 1.2-1 Population Projection in the Bicol Region per Province

1.2.2 Economic Growth and Industrial Structure

Region V accounts for about 2.83 percent of the total peso value of domestic production in 1999 (**Table 1.2-3**). Compared with Manila, domestic production in Region V is valued historically at about one-tenth of the gross domestic product in NCR.

The bulk of the production in Region V has been accounted for by agriculture until 1990, after which year the service sector started to predominate. Over the last ten years, the service sector has accounted for about 42 percent of the total domestic production in Region V, followed by agriculture, which accounts for about 37 percent. Industrial output has traditionally lagged behind in value.

Table 1.2-3 Value of Domestic Production (in billion pesos, 1985 prices)

| Year | GDP: (PHI) | GRDP (NCR) | Region V | | | | |
|------|---------------|---------------|----------|-------------------------------|---------------------|------------------|------------------|
| | | | GRDP | Per Capita GRDP (P'000) | GVA- Agriculture | GVA- Industry | GVA- Services |
| 1980 | 609.77 | 183.44 | 18.24 | 5.23 | 8.25 | 3.24 | 6.75 |
| 1982 | 653.47 | 196.60 | 19.60 | 5.36 | 8.56 | 3.74 | 7.30 |
| 1984 | 616.96 | 186.14 | 20.50 | 5.35 | 8.30 | 4.99 | 7.21 |
| 1986 | 591.42 | 169.36 | 19.53 | 4.87 | 8.25 | 3.99 | 7.29 |
| 1988 | 658.58 | 197.27 | 20.10 | 4.79 | 8.46 | 3.67 | 7.98 |
| 1990 | 720.69 | 221.75 | 21.69 | 4.94 | 8.57 | 4.42 | 8.70 |
| 1992 | 718.94 | 215.47 | 21.90 | 4.78 | 8.56 | 4.57 | 8.78 |
| 1994 | 766.37 | 227.35 | 23.09 | 5.26 | 8.85 | 4.72 | 9.52 |
| 1996 | 849.12 | 256.00 | 24.63 | 5.37 | 9.04 | 5.31 | 10.29 |
| 1998 | 887.91 | 272.30 | 25.63 | 4.96 | 8.61 | 5.71 | 11.32 |
| 1999 | 917.38 | 279.05 | 25.93 | 4.93 | 8.84 | 5.54 | 11.55 |

Source: NSO

1.2.3 Tourism Demand

Over the last four years, the total number of tourists who visited Region V steadily increased despite the decrease in the number of foreign visitors in year 2000 (**Table 1.2-4**). During that year, visitors in Region V constituted about four (4) percent of the total number of tourist arrivals in the entire Philippines. About two (2) percent of the total foreign visitors in the country went to Region V in the same year.

Table 1.2-4 Region V Travelers

| Year | Foreign Travelers | Overseas Filipinos | Total Domestic Travelers | Total |
|------|-------------------|--------------------|--------------------------|---------|
| 1997 | 10,814 | 5,140 | 234,331 | 250,285 |
| 1998 | 14,324 | 5,027 | 279,449 | 298,800 |
| 1999 | 20,965 | 6,341 | 313,437 | 340,743 |
| 2000 | 18,913 | 3,558 | 334,253 | 356,724 |

Source : DOT

In terms of provincial distribution, the combined foreign and overseas Filipino visitors in Albay and Camarines Sur made up about half of the total number of foreign and overseas Filipino visitors in the Region. Albay accounts for about one-third of the total domestic travelers in Region V. The contributions of the other provinces in terms of tourist arrivals are shown in decreasing significance in **Table 1.2-5** below.

Table 1.2-5 Provincial Distributions of Travelers in Region V (Year 2000)

| Year | Foreign Travelers | Overseas Filipinos | Total Domestic Travelers | Total |
|--------------------------|-------------------|--------------------|--------------------------|---------|
| Abay/ Legaspi City | 6,744 | 426 | 110,010 | 117,180 |
| Camarines Sur/ Naga City | 4,071 | 1,322 | 96,586 | 101,979 |
| Camarines Norte/ Daet | 2,241 | 771 | 49,615 | 52,627 |
| Sorsogon | 2,091 | 718 | 45,654 | 48,463 |
| Masbate | 3,587 | 201 | 24,641 | 28,429 |
| Catanduanes | 179 | 120 | 7,747 | 8,046 |
| Grand Total | 18,913 | 3,558 | 334,253 | 356,724 |

Source : DOT

1.3 THE AIR TRANSPORT SECTOR

1.3.1 The Airport System

The Philippine Government, through the Air Transportation Office (ATO), administers a total of 87 airports (**Figure 1.3-1**) and are classified as follows:

- a) 8 International/Alternate International Airports
- b) 12 Trunk line Airports
- c) 36 Secondary Airports
- d) 31 Feeder Airports

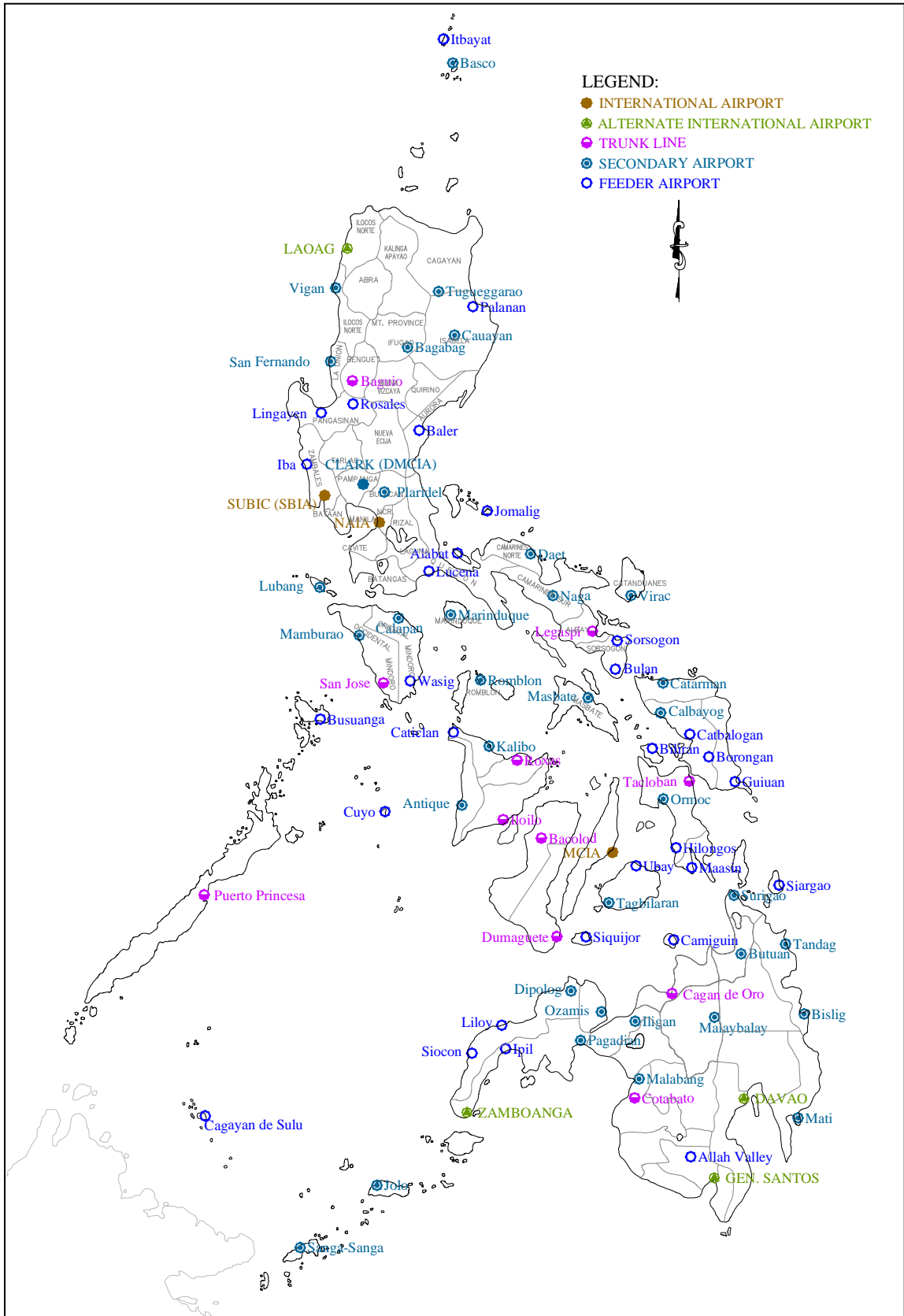


Fig. 1.3-1 Location and Classification of National Government Airports

In Region V, there are five (5) airports operating with commercial services, namely:

- a) Legaspi Airport in Albay (Trunkline)
- b) Naga Airport in Camarines Sur (Secondary)
- c) Daet Airport in Camarines Norte (Secondary)
- d) Masbate Airport in Masbate Province (Secondary)
- e) Virac Airport in Catanduanes Province (Secondary)

In addition, the following two (2) feeder airports without regular commercial services are also located in Sorsogon Province:

- a) Sorsogon (Bacon) Airport in Sorsogon Province (Feeder), and
- b) Bulan Airport in Sorsogon Province (Feeder).

Among those airports, Legaspi and Naga Airports have been handling most of the passenger movements in the region. Both of these airports, however, have been suffering from serious restrictions due to the existence of obstacles to aircraft operations. Comparative statistics from these airports are shown in **Table 1.3-1** below.

Table 1.3-1 Comparative Airport Statistics in Region V (2001)

| Data | Legaspi | Naga | Virac | Masbate | Daet | Sorsogon | Bulan |
|--|--------------|----------------|---------------|---------|------------|-----------------|-----------------|
| Location | Legaspi City | Pili, Cam. Sur | Virac, Catan. | Masbate | Cam. Norte | Bacon, Sorsogon | Bulan, Sorsogon |
| Area Covered (has) | 75 | 36 | 25 | 24 | 39 | 19 | 33 |
| Aircraft Served | 854 | 796 | 375 | 676 | 9 | 6 | 0 |
| Volume of Passengers | 88,324 | 74,212 | 27,580 | 28,328 | 0 | 0 | 0 |
| Vol. Of Cargo (kgs) | 409,419 | 368,135 | 154,387 | 228,038 | 0 | 0 | 0 |
| Messages Handled | 169,992 | 11,289 | 2,070 | 1,493 | 0 | 0 | 0 |
| Commercial Flight Delays (Incidents) | 55 | 45 | 20 | 28 | 0 | 0 | 0 |
| Commercial Flight Cancellation (Incidents) | 53 | 32 | 30 | 19 | 0 | 0 | 0 |

Source: ATO, Legaspi City

1.3.2 Administration of Civil Aviation

Administration of civil aviation in the Philippines is vested under the ATO, an attached agency of the Department of Transportation and Communications (DOTC), as mandated by the RA No. 776, otherwise known as the Civil Aeronautics Act. ATO/DOTC formulates policies for the air transport sector; oversee the planning of public air transportation facilities and services, and implements airports and airways facility development projects.

Except for Ninoy Aquino (Manila), Mactan (Cebu), Subic Bay and Diosdado Macapagal International Airports, the nationwide system of airports, are operated and managed by the ATO. These four (4) airports are administered by the Manila International Airport Authority (MIAA), Mactan Cebu International Airport Authority (MCIAA), Subic Bay Metropolitan Authority (SBMA) and Clark Development Corporation (CDC), respectively.

ATO is tasked for implementing policies regarding civil aviation, to ensure safe, dependable, economical, reliable and efficient air transportation system. It is also tasked to develop efficient and compatible static/dynamic elements of the air transportation system.

1.3.3 Air Traffic Services

Except for aviation meteorology, which is under the responsibility of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Air Traffic Services (ATS) in the Philippines are provided by ATO. Civil aviation security is controlled by the Aviation Security Group (ASG) of the Philippine National Police.

The Philippine Airspace is covered under the Manila Flight Information Region (FIR). The Manila FIR is divided into four sectors, North Sector, West Sector, East Sector, and Mactan Sector (up to Flight Level 280). The Manila Area Control Center (ACC) is responsible for the North, West, and East Sectors, and Mactan Sub-ACC is responsible for the Mactan Sector. Terminal Control Areas (TCAs) are established at Bacolod (covering also Iloilo), Davao, Laoag, Mactan, Manila, Tacloban and Zamboanga. Aerodrome control is provided at 18 airports, which include Bacolod,

Baguio, Basa, Cagayan, Cotabato, Davao, Fernando, Iloilo, Laoag, Legaspi, Mactan, Manila, Plaridel, Puerto, Sangley, Subic, Tacloban and Zamboanga Towers. There are 42 airways, 7 restricted, 16 danger areas and 11 flight training areas in the Manila FIR.

1.3.4 Development in the Air Transportation Sector

Following the liberalization of the airline industry, new routes and domestic airlines emerged starting in 1995. The number of airports served by airline companies and their current fleet as of May 2002 are shown in **Table 1.3-2**

Table 1.3-2 Number of Airports Served by Airline Companies (May 2002)

| Airline Company | Number of Airports Served | Aircraft used for Domestic Services |
|----------------------------------|---------------------------|--|
| Philippine Airlines | 17 | A330 / A320 / B737 |
| Air Philippines | 19 | B737 |
| Cebu Pacific | 9 | DC- 9 |
| Grand International Airways | 0 | B737 (operation suspended) |
| Asian Spirit | 18 | DHC 7/YS11 / LET 410 / LET410UVT / CN235 |
| Southeast Asian Airlines (Seair) | 18 | LET410UVP-E |
| Laoag International Airlines | 1 | F27 |
| Corporate Air | 2 | Twin Otter/Cessna Caravan |

Source: Various Airlines

The fleet compositions of these airlines are summarized in **Table 1.3-3**, which highlighted the continued predominance of PAL in terms of operational capability.