



# Aircraft Purchasing System for Thai Airlines Company Limited

by

Mr. Voranat Sripong

A Final Report of the Three - Credit Course  
CS 6998 System Development Project

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science  
in Computer Information System  
Assumption University

July, 2000

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Project Title                      Aircraft Purchasing System for Thai Airlines Company Limited

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The Graduate School of Assumption University has approved this final report of three-credit course, CS 6988 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

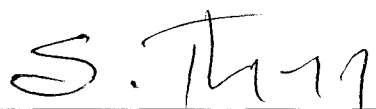
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## ABSTRACT

With the liberization in the air transportation business in Thailand, Thai Airlines is the new airlines that has entered in to the airline business. The two major reasons for developing the system are the mission of the company consisting of the passenger transportation, and providing an aircraft for lease to other airlines. The other reason is the business policy. The company has a short live fleet policy which with the aircraft must be changed every 3 years.

A computerized information system plays an important role in the competitive advantage among competitors, thus some business redesign has been introduced to catch up with the fast changing airline business.

The scope of studying this project is based on the information collected for making a decision on purchasing and performing statistical analysis and feasibility analysis to make a purchase of the new aircraft until the purchase order, and the payment is made. The Management must be able to retrieve the information related to the purchase of the aircraft.

During the study, the existing system can be identified by interviewing the personnel involved in the system, studying the concept of aircraft purchasing, studying the current problem and requirement together, and studying how to adapt the large and complex aircraft purchasing system into a simple system that can be applied to the medium sized airlines companies.

The project covers majors parts of Aircraft purchasing system and is developed in accordance with system analysis and design technique.

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# **I. INTRODUCTION**

## **1.1 Background of the Project**

Nowadays air transportation has become the basic infrastructure for Thai people.

Many Thai people travel by air and the trend of Thai people travelling by air has increased every year until now when the Thai government liberized the airline business competition to eliminate the monopoly and enhance the opportunity for Thai people to have a better quality air Transportation service.

Thai Airlines is the new airline for Thai people. It has a good business opportunity and the business that grows year by year must have a good information system to support the business in the future. The major reasons of the Thai airlines to develop the system are the business mission and business policy. The mission of the business is to transport the passengers and to provide aircrafts for lease to other airlines, and the business policy of this company is a short live fleet policy that the air aircraft must be changed every 3 years. For these reasons the purchase is quite often thus, a decision to purchase is made very often and the decision has to be supported the decision making is also a must.

This project focuses on the information that is used by the Aircraft Purchasing Committee and Management for making a decision to purchase an aircraft. After studying the system, the study results show that the existing system perform inefficiently in supporting the decision made. It is time consuming to prepare the report and retrieve the information. The data is also inconsistent and redundant. Also the manual system is still be implemented in the daily operation. These problems could affect the others in many ways. So the computerized system is required to support the manual system.

To overcome the mentioned problems, the new system must improve data consistency, accuracy, and reliability. The new system must be user-friendly and easy for controlling and maintaining. The new system must enhance the working capabilities, to reduce time consumption, and to assist the distribution of the information across the company, and to support the decision to purchase the aircraft. Therefore, the computerized system is recommended.

## **1.2 Objectives of the Project**

This system is aimed to develop the computerized system to support aircraft purchasing system. This project is suggested as a system that can enhance the business function in terms of capability and control by using a shared information in the database containing necessary information for making decision and supporting daily activities such as invoice checking and receiving, purchase order issuing, and so on.

The Objectives of the project are:

- (1) To improve the decision making support system for aircraft purchasing.
- (2) To provide report to management rapidly and correctly.
- (3) To improve the work flow in the company.
- (4) To reduce redundant data or unnecessary work flow in the system.
- (5) To ensure that the purchase order is issued correctly.
- (6) To minimize company costs and make use of human resources more effectively through the use of the new proposed system.
- (7) To install and test the system on the computers working group.

## **1.3 Scope of the Project**

The areas of study in this project cover The Aircraft Purchasing Committee and Management in making a decisions to purchase a new aircraft up to the receiving and checking of the invoice.



The project will cover the requirements of the new system which are summarized as follows.

- (1) Purchase order must be issued correctly.
- (2) Reduce all redundant data and unnecessary workflow.
- (3) Provide the reports in a timely manner.
- (4) Correct the payment.
- (5) Provide useful and flexible data.

#### **1.4 Deliverables**

The deliverables for the Aircraft Purchasing System are as follows:

- (1) An application that is developed by Microsoft Visual Basic 6.0
- (2) Input Screens
  - (a) Traffic Demand Screen
  - (b) Aircraft on Order Screen
  - (c) Aircraft on Service Screen
  - (d) Aircraft on Leased Screen
  - (e) Aircraft Utilization Screen
  - (f) Long – Term Purchasing Screen
  - (g) Cancelled Purchase Screen
  - (h) Long – Term Account Payable Screen
  - (i) Payment Screen
  - (j) Aircraft Searching Screen
  - (k) Aircraft Specification Searching Screen
  - (l) Feasibility Analysis Screen
- (3) Reports
  - (a) Traffic Demand Report

### 1.5.2 System Analysis

This stage is to study about the existing system and to define the user requirement for the project, then the data flow diagram of the project is prepared.

### 1.5.3 System Design

The study of data flow diagram is continued in detail. All necessary parts such as input screen, report, E – R Diagram, and software design are designed.

### 1.5.4 System Implementation

The application for the project is written by Microsoft Visual Basic 6.0. At this stage, all parts of the application is tested and debugged to get the suitable one. Finally the system and the application is evaluated to find out whether it meets the objective or not, and how the feed back of the user from the new system works.

### 1.5.5 System Maintenance

The application will be installed on to the computer server, and the problem will be found out and solved after installing the application.

## **II. EXISTING SYSTEM**

### **2.1 The Background of the Organization**

Thai Airlines company is a new airlines in Thailand that does a passenger transportation business. The company was established on May 15<sup>th</sup>, 1999. The Company's head office is located on 1-7 Floor Pacific Tower Sukumvit Road.

The Company's mission is to provide air transportation, and to provide aircrafts for leasing to other airlines. The company serves both Domestic and International Route, and Domestic Route consists of Chaing Mai, Mea Hong Son, Chaing Rai, Pitsanulok, Phuket, Hadyai, Krabi, Trang, Samui, Surath Thani, Udon Thani, Khon Kean, Ubon Rattchathani, and Utapao. International destination consist of Kunming, Shaing Hai, Hongkong, Singapore, Kuala Lumpur, Penang, Denpasar, Danang, Phanom Phean, Bombay, Cairns, Darwin, and Sydney. The company utilizes the modern aircrafts such as B737-400, B777-300, A330-300, A300-600R, and ATR-72. The company also has a short live fleet policy with which the company always changes the aircraft every 3 years. In the future the company will expand the network route to Far East Asia, and Europe.

### **2.2 Existing Business Function**

The company has 6 major departments as follows:

(1) Accounting Department:

- (a) General Accounting Division: This division is responsible for the general business transaction such as revenue, tax, account receivable, account payable of the company.
- (b) Disbursement Control Division: This division is responsible for cash in flow and cash out flow of the company.

- (c) Treasurer Division: This division is responsible for the cash in flow and out flow of the company.
- (2) Finance Department:
  - (a) Corporate Finance Division: This division is responsible for the funds management and the source of funds.
  - (b) Budgeting Division: Responsible for both long – term and short – term budgeting.
  - (c) Economic Control Division: Responsible for collecting and analyzing of financial information.
- (3) Marketing Department:
  - (a) Sales Division: This division is responsible for the sales planning strategies, and pricing policy.
  - (b) Customer services Division: This division is responsible for customer satisfaction , and customer feedback.
  - (c) Planing Division: This division is responsible for long – term and short-term marketing plan and strategy.
  - (d) Purchase division: This division is responsible for purchasing activity of the company.
- (4) Personal Department:
  - (a) Human Resources Division: This division is responsible for recruitment, promotion, and termination of employees.
  - (b) Training Division: This division is responsible for the training program for the new and existing employees.
  - (c) Administration Division: This division is responsible for the welfare of employees and employees on leave, and sickness.

- (c) Treasurer Division: This division is responsible for the cash in flow and out flow of the company.
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  - (b) Training Division: This division is responsible for the training program for the new and existing employees.
  - (c) Administration Division: This division is responsible for the welfare of employees and employees on leave, and sickness.



- (5) Flight Operation Department:
- (a) Aviation Safety Division: This division is responsible for controlling of the flight safety.
  - (b) Inflight Service Division: This division is responsible for controlling and regulating the quality of service to conform to the policy and customer satisfaction.
  - (c) Crew Division: This division is responsible for managing and training of cockpit and cabin crew.
- (6) Technical Department:
- (a) Engineering Division: This division is responsible for technical control and working process.
  - (b) General Maintenance Division: This division is responsible for general maintenance.
  - (c) Heavy Maintenance Division: This Division is responsible for heavy maintenance.

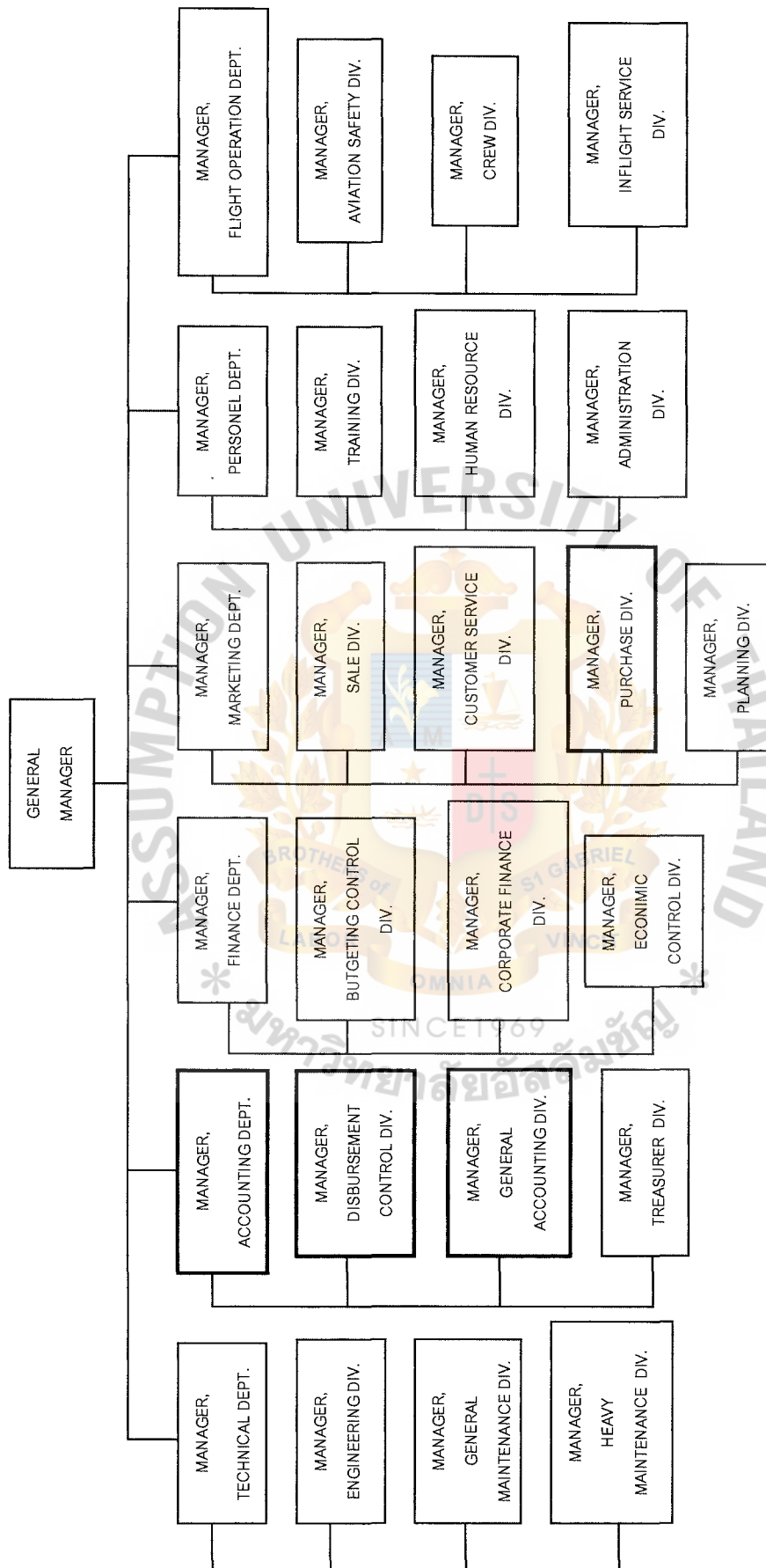


Figure 2.1. Organization Chart.

### **2.3 The Existing System Problems and Areas for Improvement**

The existing system is non-systematic and operated manually thus causes the lower speed in processing, making numerous mistakes, a number of data redundancy, data inconsistency, untimely information , and unreliable. All of these problems will finally lead to the wrong decision made by the aircraft purchasing committee, and management.

The conclusions of the problems are:

- (1) The data redundancy occurred. The data in the Purchasing Plan File and Purchase file are redundant so it is costly for the file maintenance of those data.
- (2) Due to the lack of computerized system, the inaccurate information and data occurred.
- (3) Data are processed manually so it is timely to prepare reports to support decision to be made.
- (4) Inaccurate data and information lead to the wrong decision making for the management.
- (5) List of Aircraft and Details is retrieved manually so it is timely to get the information.
- (6) Many important reports cannot be created due to the lack of better data management system.
- (7) Miscommunication among the functional units in the company occurred.

### **2.4 The Existing Computer System**

In the existing system most tasks are done manually. The computers in the existing system have a minor role in the system. Each computer is not linked to the

network. The computer performs only the simple tasks such as preparing spread sheet, and document printing task. The file is stored on the separate computer.

## **2.5 Recommendation for the Existing System**

For being one of the airline businesses in the advanced information environment, this project is aimed to improve the information system that will enhance the decision making of the management and aircraft purchasing committee. To improve the information system the recommendations are as follows:

- (1) Since the Purchase data and Purchasing plan data are redundant, the data must be stored in the single file storage, so Purchasing plan file must be eliminated and Purchase file must still be maintained.
- (2) In the existing system, all data are recorded by Microsoft Excel application. Sometimes the application cannot perform some complicated tasks, so in the proposed system all data must be captured by the new application written by Visual Basic 6.0 that has user friendly graphical interface and flexibility of use.
- (3) In designing the proposed system, the data must be useful to create information and must be flexible to perform a multi-dimension analysis. So the proposed system is suggested, and the use of SQL Server to enhance this capability is proposed.
- (4) Data must be valid and flexible to create many useful reports.
- (5) For the data consistency, the better database management system is needed.
- (6) For data security, each data can be accessed by authorized users only.
- (7) The proposed system would reduce the time consumed, and errors occurred, while providing better control over the process.
- (8) The proposed system must help one associate with another effectively.

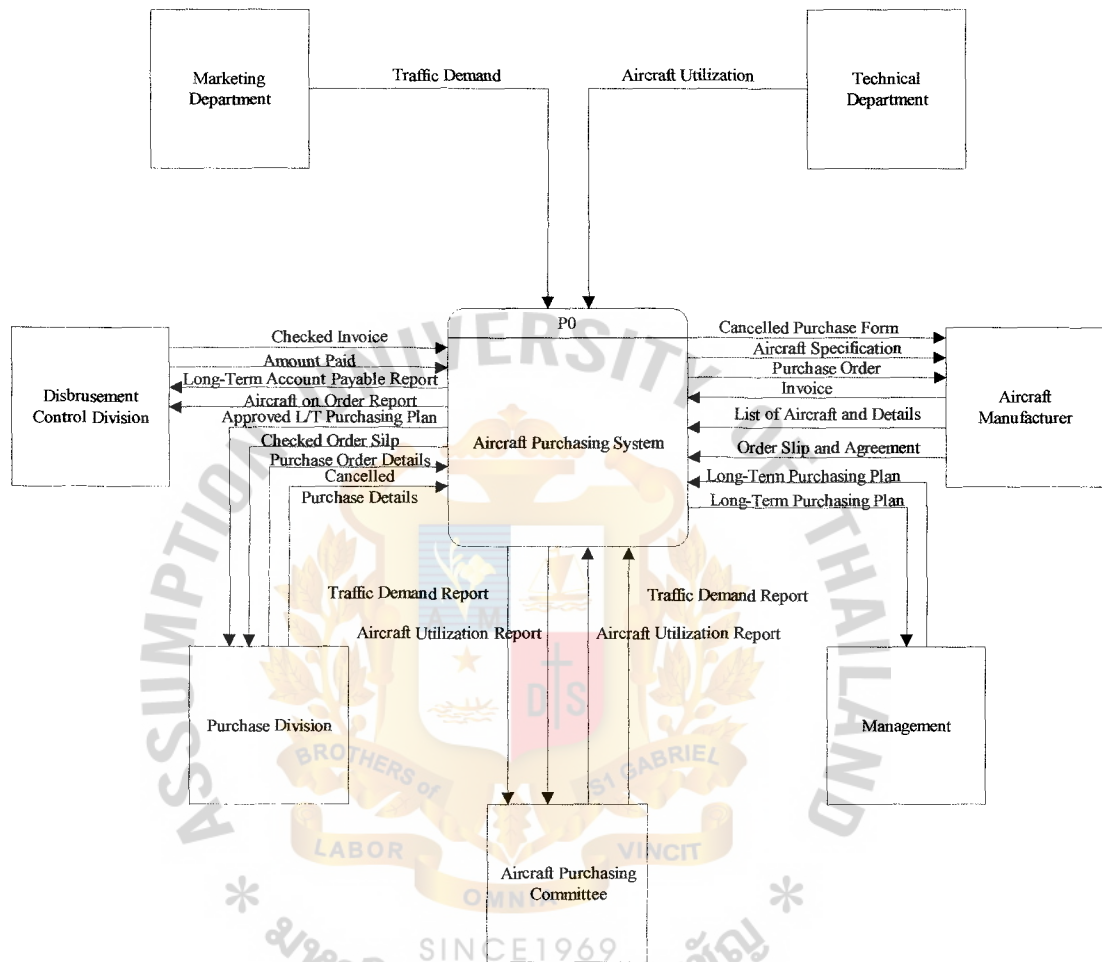


Figure 2.2. Context Level Data Flow Diagram of the Existing System.



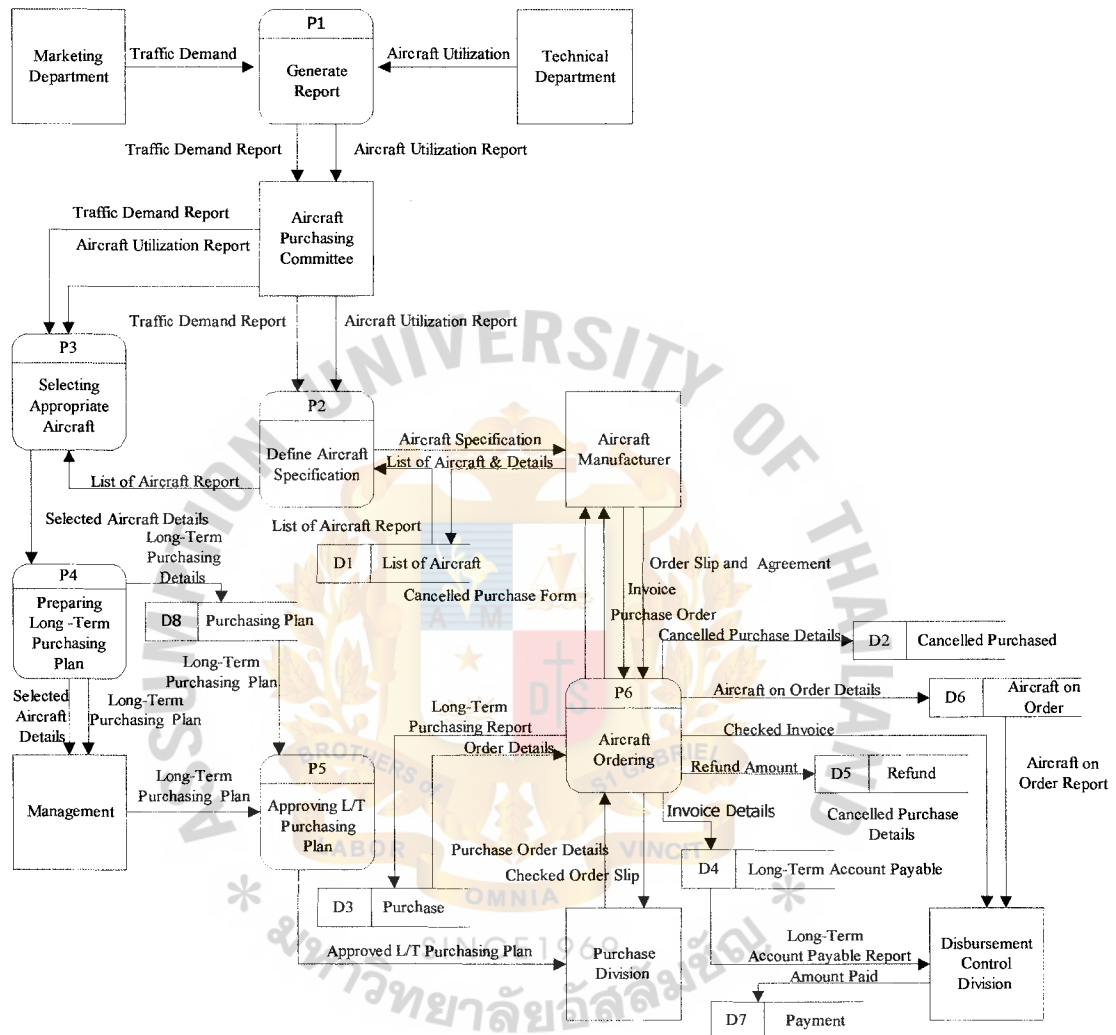


Figure 2.3. Data Flow Diagram Level 0 of the Existing System.

### **III. THE PROPOSED SYSTEM**

#### **3.1 System Specification and User Requirements**

Original list of objective

After analyzing the existing system, user requirements are stated as follows:

- (1) Developing the efficient and powerful computerized system.
- (2) Developing the efficient decision support system for the aircraft purchasing system.
- (3) Minimizing redundancy data.
- (4) Providing useful information for decision making of the system.
- (5) Reducing the process time to generate purchasing process.
- (6) Creating Effective Database Management System.
- (7) Improving the efficient data linkage between the Organization and Aircraft Manufacturer.
- (8) Accelerating the flow of data and information through the organization.
- (9) Preparing for the expert system in the future.

Input requirement:

- (1) Mandatory Requirement
  - (a) Valid Input data
  - (b) Increasing security in accessing data.
  - (c) Protection of reserved data field from unauthorized access and manipulation.
  - (d) Friendly Graphical User Interface (GUI).
- (2) Desirable Requirement
  - (a) Online inquiry of Aircraft list and Details.

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- (b) Shared data between the company and aircraft manufacturer.
- (c) Data can provide more useful information .

### (2) Optional Requirement

- (a) Data can be accessed from remote branches.
- (b) Online purchase agreement with the aircraft manufacturer.
- (c) Data can be provided for multi - dimension analysis.

### Process Requirement:

#### (1) Mandatory Requirement

- (a) Provision of on time report.
- (b) Provision of accurate information.
- (c) Elimination of redundant and unnecessary function.
- (d) Dead Lock Process prevention.
- (e) Automatic Day-end back up

#### (2) Desirable Requirement

- (a) Ordering Process must be finished with in 2 week.
- (b) Report Generating Process must respond to the user promptly as needed.
- (c) Least time operation consumption
- (d) Process Synchronization.

#### (3) Optional Requirement

- (a) On line processing with remote branch.
- (b) The synchronization of the process between the Company and aircraft Manufacturer.

### Output Requirement:

#### (1) Mandatory Requirement

- (a) Analytical Traffic Demand Report
- (b) Analytical Long - Term Purchase Report
- (c) Analytical Long - Term Account Payable Report
- (d) List Of Aircraft Report
- (e) Aircraft on Order Report
- (2) Essential Requirement
  - (a) Equipment Report
  - (b) Flight Personnel Report
- (3) Optional Requirement
  - (a) Online Reports from Remote Process
  - (b) Reports with graphical display
  - (c) Unique Report format with the Aircraft Manufacturer.

### **3.2 System Design**

In the stage of system design, the techniques that are used in designing the new system are context data flow diagram, data flow diagram (DFD), and structure analysis.

Structure Analysis is a systematic, top down technique that defines goals and objectives that are presented by means of layered model of system requirement. The basic tools used in system design are Context Data Flow Diagram, Data Flow Diagram, System Structure Chart, Process Specification (PSPEC), Entity-Relationship Diagram, and Data Dictionary.

#### **3.2.1 Context Data Flow Diagram**

The Context Diagram represents the highest level of the system model and the scope or boundary of the system.

In Appendix A, Figure A.1 represents the context level data flow diagram of the proposed system. The external entities associates in the system are:

- (1) Marketing Department
- (2) Technical Department
- (3) Disbursement Control Division
- (4) Purchase Division
- (5) Aircraft Purchasing Committee
- (6) Management
- (7) Aircraft Manufacturer.

Input to the system are:

- (1) Traffic Demand
- (2) Aircraft Utilization
- (3) Checked Invoice
- (4) Purchase Order Details
- (5) Invoice
- (6) List Of Aircraft and Details
- (7) Order Slip and Agreement
- (8) Order Details
- (9) Aircraft Utilization Report
- (10) Traffic Demand Report
- (11) Purchase Order Details
- (12) Cancelled Purchase Details
- (13) Amount Paid

Output from the system are:

- (1) Aircraft On Order Report
- (2) Approved Order Details
- (3) Checked Order Slip



- (4) Long-Term Account Payable Report
- (5) Traffic Demand Report
- (7) Aircraft Utilization Report
- (8) Long – Term Purchasing Plan
- (9) Purchase Order
- (10) Aircraft Specification
- (11) Cancelled Purchase Form

### 3.2.2 Data Flow Diagram

Data Flow Diagram Represents the flow of data among the process in the system. The Input of the process represented by the data flow in to the process block and The Output of the process represented by data flow from the process. The data may be flown from the process into data storage, or external entity.

Level 0 is the high level Data Flow Diagram that show all major process and major data flow in the system. Level 0 DFD of the proposed System is shown in Appendix A.2. The proposed system consists of 5 major processes: Generate Report, Define Aircraft Specification, Selecting Appropriate Aircraft, Preparing Long – Term Purchasing Plan, and Aircraft Ordering.

The Proposed System is separated into various processes as follows:

Process 1.0: Generate Report

- (a) To collect and Validate data
- (b) To Organize data into useful format

Process 1.1: Data Capturing

- (a) To retrieve data from source
- (b) To input data into storage

Process 1.2: Data Validation and Updating

- (a) To make a data into a valid form
- (b) To ensure that data are up to date
- (c) To edit or correct the data

#### Process 1.3: Data Organizing

- (a) To make data into useful format and ready for use

#### Process 2.0: Define Aircraft Specification

- (a) To determine the appropriate aircraft specification

#### Process 2.1: Information Analysis

- (a) To calculate the statistical trend
- (b) To make information ready for making a decision

##### Process 2.1.1: Checking Report

- (a) To ensure the validity of the report
- (b) To ensure that the information in the report is updated
- (c) To ensure that the report is in the corrected format

##### Process 2.1.2: Calculate Statistical Trend

- (a) To determine the future trend
- (b) To prepare results for decision making

##### Process 2.1.3: Checking and Correcting Results

- (a) To ensure that the calculated result is corrected
- (b) To identify the mistake during calculation
- (c) To ensure that the result is valid for making decision

#### Process 2.2: Determine Aircraft Specification

- (a) To find out the most suitable aircraft specification

### Process 2.3: Request for the List of Aircraft

- (a) To request the lists of aircraft that conformed with the aircraft specification from the aircraft manufacturer

### Process 2.4: Retrieving the List of Aircraft

- (a) To retrieve the information about an aircraft from the aircraft manufacturer

### Process 3.0: Selecting Appropriate Aircraft

- (a) To identify an appropriate aircraft
- (b) To ensure that the selected aircraft is in conformity with the aircraft specification

### Process 3.1: Information Analysis

- (a) To calculate statistical trend
- (b) To make information ready for making decision

#### Process 3.1.1: Checking Report

- (a) To ensure the validity of the report
- (b) To ensure that the information in the report is updated
- (c) To ensure that the report is in the corrected format

#### Process 3.1.2: Calculate Statistical Trend

- (a) To determine future trend
- (b) To prepare result for decision making

#### Process 3.1.3: Checking and Correcting Result

- (a) To ensure that the calculated result is corrected
- (b) To identify the mistake during calculation
- (c) To ensure that the result is valid for making decision

### Process 3.2: Feasibility Analysis

- (a) To determine financial feasibility
- (b) To determine technical feasibility
- (c) To Determine personal feasibility

#### Process 3.2.1: Selecting Alternative Aircraft

- (a) To select the appropriate aircraft among the list of aircraft that conform to the aircraft specification

#### Process 3.2.2: Determine Cost and Benefits

- (a) To determine the cost incurred from utilizing the selected aircraft
- (b) To determine the benefits derived from utilizing the selected aircraft
- (c) To determine the net benefits from utilizing the selected aircraft

#### Process 3.2.3: Preparing Feasibility Report

- (a) To prepare financial feasibility report
- (b) To determine technical feasibility
- (c) To prepare technical feasibility report
- (d) To determine personal feasibility
- (e) To prepare personal feasibility report

### Process 3.3: Determine Appropriate Aircraft

- (a) To select the most appropriate aircraft among the alternative after the feasibility analysis

### Process 4.0: Preparing Long – Term Purchasing Plan

- (a) To issue the Long – Term Purchasing Plan
- (b) To ensure that the Long - Term Purchasing Plan is issued correctly

#### Process 4.1: Determine The Investment Plan

- (a) To determine the amount of investment

- (b) To identify the return from investment
- (c) To determine the term of investment

#### Process 4.2: Determine Long – Term Purchasing Details

- (a) To determine the purchase amount and price
- (b) To determine the payment period

#### Process 4.3: Issue Long – Term Purchasing Plan

- (a) To issue the Long – Term Purchasing Plan in accordance with the Investment plan

#### Process 5.0: Aircraft Ordering

- (a) To send the purchase order to the Aircraft Manufacturer
- (b) To ensure that invoice details are correct
- (c) To ensure that order slip and purchasing agreement is correct

#### Process 5.1: Approving Order Details

- (a) To ensure that the order details are correct in accordance with the Long – Term Purchasing Plan

#### Process 5.2: Issue Purchase Order

- (a) To issue Purchase Order in accordance with Order Details

#### Process 5.3: Order Slip Receiving and Checking

- (a) To check the correctness of the Order Slip

#### Process 5.3.1: Retrieving Long – Term Purchasing Report

- (a) To get the Long – Term Purchasing Report for checking Order Slip and Details

#### Process 5.3.2: Checking Order Slip and Details

- (a) To check the quantity order in the Order Slip
- (b) To audit the validity of the Order Slip with the Long – Term Purchase Report

#### Process 5.3.3: Updating Aircraft on Order

- (a) To update Aircraft On Order file by adding the new entry

#### Process 5.4: Invoice Receiving and Checking

- (a) To receive and check the correctness of the invoice received

##### Process 5.4.1: Retrieving Long – Term Purchasing Report

- (a) To get the Long – Term Purchase Report in order to check with the Invoice

##### Process 5.4.2: Checking Payable Amount

- (a) To audit the Long – Term Payable
- (b) To correct the Payable amount
- (c) To check the validity of the invoice details

##### Process 5.4.3: Updating Long – Term Account Payable

- (a) To update the outstanding Long – Term Account Payable amount
- (b) To add the new entry into the Long –Term Account Payable file.

#### Process 5.5: Purchase Cancellation

- (a) To cancel the order to purchase the aircraft that has been sent to the Aircraft Manufacturer.
- (b) To determine the refund amount from the Aircraft Manufacturer.



### 3.2.3 System Structure Chart

A system structure chart is a hierarchy diagram that shows the control structure of the system. A system structure chart is derived from the lowest level Data Flow Diagram. The different points between Data Flow Diagram and System Structure Chart are the objectives of their presentation. Data Flow Diagram presents the procedure of the process but the System Structure Chart presents the hierarchical of rank among the processes. A System Structure Chart defines each function into modules and each module can be the boss or operator of the other modules.

In the proposed system , there are 5 major modules : Generate Report, Define Aircraft Specification, Selecting Appropriate Aircraft, Preparing Long - Term Purchasing Plan ,and Aircraft Ordering. Some modules work independently from the others and some work with the others. The System Structure Chart is shown in Appendix B. The Module Specification is shown in Appendix C.

### 3.2.4 Process Specification (PSPEC)

A Process Specification is used to specify the processing details implied by a process block within a Data Flow Diagram. It describes the input into a process and the algorithm that applied to the input and the output that is produced. In addition, Process Specification indicates the restrictions and limitations of the process, performance characteristic of the process, and the design that influences the way in which the process will be implemented. A description of each function presented in the Data Flow Diagram is contained in a Process Specification. The Process Specification of the proposed system is shown in Appendix D.

### 3.2.5 Entity-Relationship Diagram

An Entity – Relationship Diagram is a data model used in a database design. An Entity – Relationship Diagram show the relationship between an entity. A relationship

can be one to one (1:1), one to many (1:m), and many to many (m:m). Each entity contains fields of data and each entity must have a key field to be an identifier of the entity, called Primary Key. Another key is Foreign Key which is the primary key of other entities. A Foreign Key is used as an identifier to other entities and some can be an identifier of its own entity.

In the proposed system, the Entity – Relationship Diagram has 8 entities. They are:

- (1) Invoice
- (2) Aircraft Manufacturer
- (3) List of Aircraft
- (4) Purchase Order
- (5) Cancelled Purchased
- (6) Payment Voucher
- (7) Aircraft
- (8) Aircraft on Order
- (9) Aircraft on Service
- (10) Aircraft on Leased
- (11) Aircraft Utilization
- (12) Flight

The relationship between entities in the proposed system are:

- (1) Many Invoices are issued by One Aircraft Manufacturer.
- (2) Many Purchase Order can be submitted to One Aircraft Manufacturer.
- (3) One Aircraft Manufacturer provides Many Lists Of Aircraft.
- (4) One Aircraft Manufacturer produces Many Aircrafts
- (5) One Aircraft operates Many Flights

- (6) One Purchase Order contains One Aircraft On Order
- (7) One Cancelled Purchase refers to One Purchase Order
- (8) One Payment Voucher refers to One Invoice

The Entity-Relationship Diagram of the proposed system are shown in Appendix F which shows the Context level Entity-Relationship Diagram, Key Based Entity-Relationship Diagram, and Fully Attribute Entity-Relationship Diagram.

### 3.2.6 Data Dictionary

A Data Dictionary is a repository that contains descriptions of all data objects used and produced by the software or the system. It is used to support data flow diagram. It contains all definition of data flows, data store, and process that relate to the system. The Data Dictionary is shown in Appendix F.

### 3.3 The Proposed System User Interface Design

The screen display is used as the user interface in the proposed system. The user can input and update the data through the screen display. The screen display of the proposed system consists of:

- (1) Aircraft Screen
- (2) Aircraft on Order Screen
- (3) Aircraft on Services Screen
- (4) Aircraft on Leased Screen
- (5) Aircraft Manufacturer Screen
- (6) Flight Screen
- (7) Aircraft Utilization Screen
- (8) Aircraft Searching Screen
- (9) Aircraft Specification Searching Screen
- (10) Long – Term Purchase Order Screen

- (11) Long – Term Account Payable Screen
- (12) Cancelled Purchased Screen
- (13) Refund Collection Screen
- (14) Payment Screen

All screen displays of the proposed system are shown in Appendix H.

### **3.4 The Proposed System Report Design**

The proposed system report consists of:

- (1) Traffic Demand Report
- (2) Traffic Demand Monthly Report By Route
- (3) Traffic Demand Annual Report By Route
- (4) Aircraft Utilization Report
- (5) Aircraft Utilization Summary Report
- (6) Fleet Information Report
- (7) Fleet Information Summary Report
- (8) Aircraft on Leased Report
- (9) Long - Term Purchase Report
- (10) Long – Term Purchase Report By Aircraft Manufacturer
- (11) Cancelled Purchase Report
- (12) Refund Receipt Report
- (13) Refund Receipt Summary Report by Aircraft Manufacturer
- (14) Long – Term Account Payable Report
- (15) Long – Term Account Payable Summary Report By Payment Date
- (16) Long – Term Account Payable Summary Report By Creditor(Aircraft Manufacturer)
- (17) Payment Report

- (18) Aircraft List and Details Report
- (19) Aircraft Specification Report
- (20) Aircraft on Order Report
- (21) Aircraft on Order Report By Delivery Date

All reports of the proposed system are shown in Appendix H.

### **3.5 Hardware and Software Requirement**

#### **3.5.1 Hardware Requirement**

As the number of current users is considered, the two-tiered client/server computing is the most appropriate alternative so the hardware requirement for this proposed system must be the server computer, terminal PC, printer, and UPS. The hardware requirement can be summarized as follows:

- (1) Server Computer 1 Unit
  - (a) Pentium III 450 MHz
  - (b) RAM 128 MB
  - (c) Cache 256 KB
  - (d) 6 GB Hard Disk Drive
  - (e) 1.44 Floppy Disk Drive
  - (f) CD ROM 40X Speed
  - (g) 14" SVGA Color Monitor
  - (h) Key Board 104 Keys
  - (i) Mouse PS/2
- (2) Personal Computer 12 Units
  - (a) Pentium III 450 MHz
  - (b) RAM 128 MB
  - (c) Cache 256 MB

### 3.5.2 Software Requirement

The software requirements of the proposed system must support the network computing and support the database system of the proposed system . The software requirement can be summarized as follows:

#### Operating System

- (a) Microsoft Window NT 4.0 Server
- (b) Microsoft Window 2000

#### Software Package

- (a) Microsoft Office 2000
- (b) Microsoft SQL Server





### **3.6 Security and Control**

Security control is provided to protect the system from the unauthorized use, manipulation of data, and viewing of data. Security is separated, and controlled at various levels as follows:

#### **3.6.1 Program Security**

All system programs are stored on secondary storage such as hard disk. To ensure that the program execution is correct and to prevent data loss, all programs and files must be backed up every time when the programs or files are updated.

#### **3.6.2 Database Security**

The proposed system database is protected against unauthorized access, and modification of data. Only authorized users can access and modify data.

#### **3.6.3 User Authentication**

All users can access to the different screen displays concerned by using their user IDs, and passwords. Some information can be displayed, or updated by authorized user.

#### **3.6.4 Periodically the Passwords Must Be Changed**

The users of the system must change their passwords every 90 days. To prevent other users from knowing the password, the users must change them by themselves.

#### **3.6.5 Updating User ID**

The user IDs of the resigned users must be eliminated so the resigned users cannot access the system. The reason of eliminating resigned user is to protect the system from being modified, and destroyed by the persons who want to destroy the system of the company.

- (5) Office Supplies and Miscellaneous Cost increase 3 % per year
- (6) Staff Salary increases 5% per year
- (7) Temporary staff wages increase 3 % per year.
- (8) Office Supplies and Miscellaneous Cost increase 3 % per year



Table 3.1. Manual System Cost.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Fixed Cost</b>					
Personal Computer (2 x 25,900)	51,800.00	10,360.00	10,360.00	10,360.00	10,360.00
Dot Matrix Printer (1 x 6,000)	6,000.00	1,200.00	1,200.00	1,200.00	1,200.00
Laser Printer (1 x 15,000)	15,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Type writer (7 x 8,500 )	59,500.00	11,900.00	11,900.00	11,900.00	11,900.00
Calculator (5 x 2,500)	12,500.00	2,500.00	2,500.00	2,500.00	2,500.00
<b>Total Fixed Cost</b>	<b>144,800.00</b>	<b>28,960.00</b>	<b>28,960.00</b>	<b>28,960.00</b>	<b>28,960.00</b>
<b>Operating Cost</b>					
<b>Salary Cost :</b>					
Division Manager (2 x 20,000 x 12)	480,000.00	494,400.00	519,120.00	545,076.00	572,329.80
Accounting Staff (7 x 10,000 x 12)	840,000.00	882,000.00	926,100.00	972,405.00	1,021,025.25
Purchasing Staff (5 x 12,000 x 12)	720,000.00	756,000.00	793,800.00	833,490.00	875,164.50
Receiving Clerk (5 x 8,000 x 12)	480,000.00	504,000.00	529,200.00	555,660.00	583,443.00
Messenger (2 x 6,000 x 12)	144,000.00	148,320.00	152,769.60	157,352.69	162,073.27
<b>Wages Cost :</b>					
Temporary Staff (3 x 300 x 5 x 4 x 12)	216,000.00	222,480.00	229,154.40	236,029.03	243,109.90
<b>Office Supplies and Miscellaneous Cost :</b>					
Utility Cost	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00
Stationary	20,000.00	20,600.00	21,218.00	21,854.54	22,510.18
Miscellaneous	5,000.00	5,150.00	5,304.50	5,463.64	5,627.54
<b>Total Operating Cost (Baht)</b>	<b>2,941,000.00</b>	<b>3,068,950.00</b>	<b>3,212,666.50</b>	<b>3,363,330.90</b>	<b>3,521,283.44</b>
<b>Total Manual System Cost (Baht)</b>	<b>3,085,800.00</b>	<b>3,097,910.00</b>	<b>3,241,626.50</b>	<b>3,392,290.90</b>	<b>3,550,243.44</b>
<b>Accumulated Manual System Cost (Baht)</b>	<b>3,085,800.00</b>	<b>6,183,710.00</b>	<b>9,425,336.50</b>	<b>12,817,627.40</b>	<b>16,367,870.84</b>

Table 3.2. Computerized System Cost.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Fixed Cost</b>					
<b>Hard Ware Cost:</b>					
Server Computer (1 x 220,000)	220,000.00	44,000.00	44,000.00	44,000.00	44,000.00
Terminal Personal Computer (9 x 25,900)	233,100.00	46,620.00	46,620.00	46,620.00	46,620.00
Laser Printer (2 x 15,000)	30,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Dot Matrix Printer (1 x 6,000)	6,000.00	500.00	500.00	500.00	500.00
UPS (5 x 35,000)	175,000.00	35,000.00	35,000.00	35,000.00	35,000.00
Maintenance Cost :					
Maintenance Cost		15,000.00	15,750.00	16,537.50	17,364.38
<b>Software Cost:</b>					
Microsoft Window NT 4.0 Server	70,000.00				
Microsoft Window 2000	20,000.00				
Microsoft Office 2000	30,000.00				
Microsoft SQL Server	180,000.00				
Total Fixed Cost					
Implementation Cost :					
System Development Cost	115,000.00				
Training Cost	50,000.00				
Office Equipment Cost :					
Calculusator (3 x 2,500)	7,500.00				
<b>Total Fixed Cost (Baht)</b>	<b>1,136,600.00</b>	<b>147,120.00</b>	<b>147,870.00</b>	<b>148,657.50</b>	<b>149,484.38</b>

Table 3.2. Computerized System Cost (Continued).

Cost Items	Year 1	Year2	Year3	Year4	Year5
<u>Operating Cost</u>					
Salary Cost :					
Division Manager (2 x 20,000 x 12)	480,000.00	494,400.00	509,232.00	524,508.96	540,244.23
Accounting Staff (4 x 10,000 x 12)	480,000.00	504,000.00	529,200.00	555,660.00	583,443.00
Purchasing Staff (3 x 12,000 x 12)	432,000.00	453,600.00	476,280.00	500,094.00	525,098.70
Receiving Clerk (3 x 8,000 x 12)	288,000.00	302,400.00	317,520.00	333,396.00	350,065.80
Messenger (2 x 6,000 x 12)	144,000.00	148,320.00	152,769.60	157,352.69	162,073.27
Wages Cost :					
Temporary Staff (2 x 300 x 5 x 4 x 12)	144,000.00	148,320.00	152,769.60	157,352.69	162,073.27
Office Supplies and Miscellaneous Cost :					
Utility Cost	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Stationary	12,000.00	12,360.00	12,730.80	13,112.72	13,506.11
Miscellaneous	4,000.00	4,120.00	4,243.60	4,370.91	4,502.04
Total Operating Cost (Baht)	2,044,000.00	2,127,520.00	2,214,745.60	2,305,847.97	2,401,006.41
Total Computerized System Cost (Baht)	3,180,600.00	2,274,640.00	2,362,615.60	2,454,505.47	2,550,490.79
Accumulated Computerized System Cost (Baht)	3,120,600.00	5,455,240.00	7,817,855.60	10,272,361.07	12,822,851.86

Table 3.3. Cost Comparison between the Manual and the Computerized System.

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	3,085,800.00	3,120,600.00
2	6,183,710.00	5,455,240.00
3	9,425,336.50	7,817,855.60
4	12,817,627.40	10,272,361.78
5	16,367,870.84	12,822,851.30

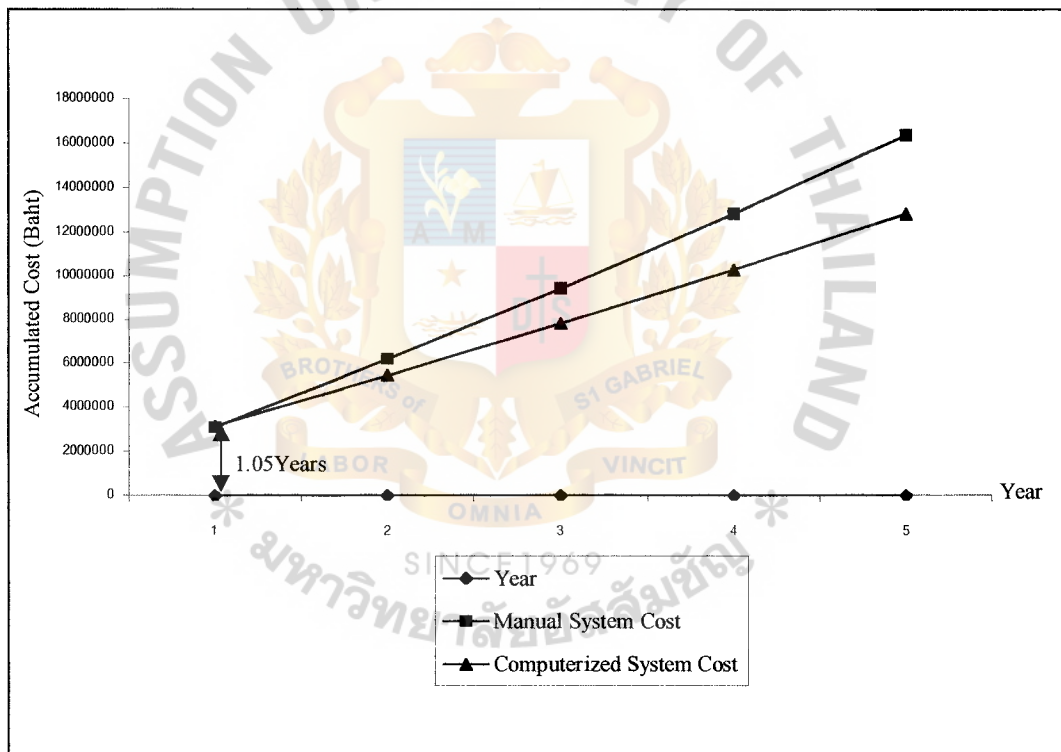


Figure 3.2. Breakeven Graph between the Manual and the Computerized System.



### 3.7.2 System Benefit

The manual work load in the existing system is time consuming. Moreover clerical work needs to be completed without the toll from the system. As the transaction increased rapidly, the users will struggle more to complete all the manual operations. The inflexibility of the existing system will result in unsmooth work flow and the company will end up with a bad performance reputation.

By using the computerized system instead of the manual system, both the tangible benefits and intangible benefits can be gained in the long-run:

- (1) Tangible Benefits:
  - (a) Reduction of manpower cost
  - (b) Reduction of over time working
  - (c) Reduction of clerical work
  - (d) Reduction of paper work
  - (e) Reduction of copy expense
  - (f) Reduction of miscellaneous expense
  - (g) Reduction of telecommunication expense \*
  - (h) Reduction of mailing expense
  - (i) Reduction of data maintainance cost
  - (j) The efficiency of data management
- (2) Intangible Benefits:
  - (a) User Satisfaction
  - (b) Smoothing of operation flows
  - (c) Improvement of decision making
  - (d) More accurate information
  - (e) On time information as needed

- (f) Improve employee working performance
- (g) Better company image due to, the use of the new technology

The benefits derived from the system is shown in Table 3.4. The assumption of the system benefits in Table 3.4 are as follows:

- (1) Staff and Clerk Salary Reduced by 5 % each year.
- (2) Wages are reduced by 3 % each year.
- (3) Overtime working expenses are reduced by 5% each year.
- (4) Miscellaneous Expenses is reduced by 5% each year.
- (5) Telecommunication Expenses is Reduced by 10% each year.
- (6) Mailing Expenses are reduced by 10% each year.
- (7) Data Maintenance Expenses are reduced by 10% each year
- (8) Accounting Staff is reduced to 3 persons.
- (9) Purchasing Staff is reduced to 2 persons.
- (10) Receiving Clerk is reduced to 2 persons.
- (11) Temporary staff is reduced to 2 persons.

Table 3.3. Computerized System Benefit.

Benefits	Year 0	Year 1	Year 2	Year 3	Year 4
Reduced Salary:					
Accounting Staff (3 x 10,000 x 12)	360,000.00	378,000.00	396,900.00	416,745.00	437,582.25
Purchasing Staff (2 x 12,000 x 12)	288,000.00	302,400.00	317,520.00	333,396.00	350,065.80
Receiving Clerk (2 x 8,000 x 12)	192,000.00	201,600.00	211,680.00	222,264.00	233,377.20
Reduced Wages:					
Temporary Staff (1 x 300 x 5 x 4 x 12)	72,000.00	74,160.00	76,384.80	78,676.34	81,036.63
Reduced Overtime Working (63,000 x 12)	756,000.00	778,680.00	802,040.40	826,101.61	850,884.66
Reduced Clerical Work	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00
Reduced Paper Work	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00
Reduced Copy Expenses	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00
Reduced Miscellaneous Expense	60,000.00	63,000.00	66,150.00	69,457.50	72,930.38
Reduced Telecommunication Expenses	240,000.00	264,000.00	290,400.00	319,440.00	351,384.00
Reduced Mailing Expenses	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
Reduced Data Maintaining	150,000.00	165,000.00	181,500.00	199,650.00	219,615.00
Enhance of Data Management	300,000.00	300,000.00	300,000.00	300,000.00	300,000.00
Total Benefits (Baht)	2,754,000.00	2,867,840.00	2,989,075.20	3,118,280.46	3,256,080.92

### 3.7.2 Financial Analysis

After we knowing net benefit derived from the proposed system (see Table 3.5), the financial basis of the project can be determined. A series of financial model help to determine the financial feasibility of the project that can be determined by payback period, Return on Investment, and Cost – Benefit Ratio.

Table 3.5. Net Benefits of the Project.

Year	1	2	3	4	5
Total Benefits (Baht)	2,754,000	2,867,840	2,989,075	3,118,280	3,256,081
Total Cost (Baht)	3,180,600	2,274,640	2,362,616	2,454,505	2,550,491
Net Benefits (Baht)	(426,600)	593,200	626,459	663,775	705,590

- (1) Payback Period: This method is quite simple. It is measure the time required to payback the initial investment of this project. The payback period of this project is 3.5 Years. The calculation is shown below:

Initial Investment = 1,136,600

Net Cash Flow      Cumulative Net Cash Flow

Year 1      (426,600)      (426,600)

Year 2      593200      166,600

Year 3      626,459      793,059

Year 4      663,775      1,456,834

Year 5      705,590      2,162,784

Payback Period = 3.5 Years

- (2) Accounting Rate of Return on Investment (ROI): This method is to determine the rate of return from investment by adjusting cash inflows produced by the investment for depreciation. Approximating the accounting income earned by the investment, the Accounting Rate of Return on Investment of the proposed system is 31.64 %. The calculation is shown below:

$$\text{ROI} = \frac{\text{Net Benefit}}{\text{Initial Investment}}$$

$$\text{Net Benefits} = \frac{(\text{Total Benefits} - \text{Total Cost}) - \text{Depreciation}}{\text{Useful Life}}$$

$$\text{Net Benefits} = \frac{(14,985,277 - 12,822,852) - 664,100}{5}$$

$$\text{Net Benefits} = 299,665$$

$$\text{ROI} = \frac{299,665}{1,136,600}$$

$$\text{ROI} = 0.2637 \text{ or } 26.37 \%$$

- (3) Cost-Benefit Ratio: This method is to calculate the returns from capital by dividing the total benefits by total costs. The Cost-Benefit Ratio of this project is 1.17 times. The calculation is shown below:

$$\text{Cost-Benefit Ratio} = \frac{\text{Total Benefits}}{\text{Total Cost}}$$

$$= \frac{14,985,277}{12,822,852}$$

$$\text{Cost-Benefit Ratio} = 1.17 \text{ times}$$

- (4) Net Present Value: This method determine the worth of the money value when considering time value of money. The discount rate of this project is 10%. From the calcalation the Net Present Value is 1,464,204 Baht which is the favorable amount to invest.

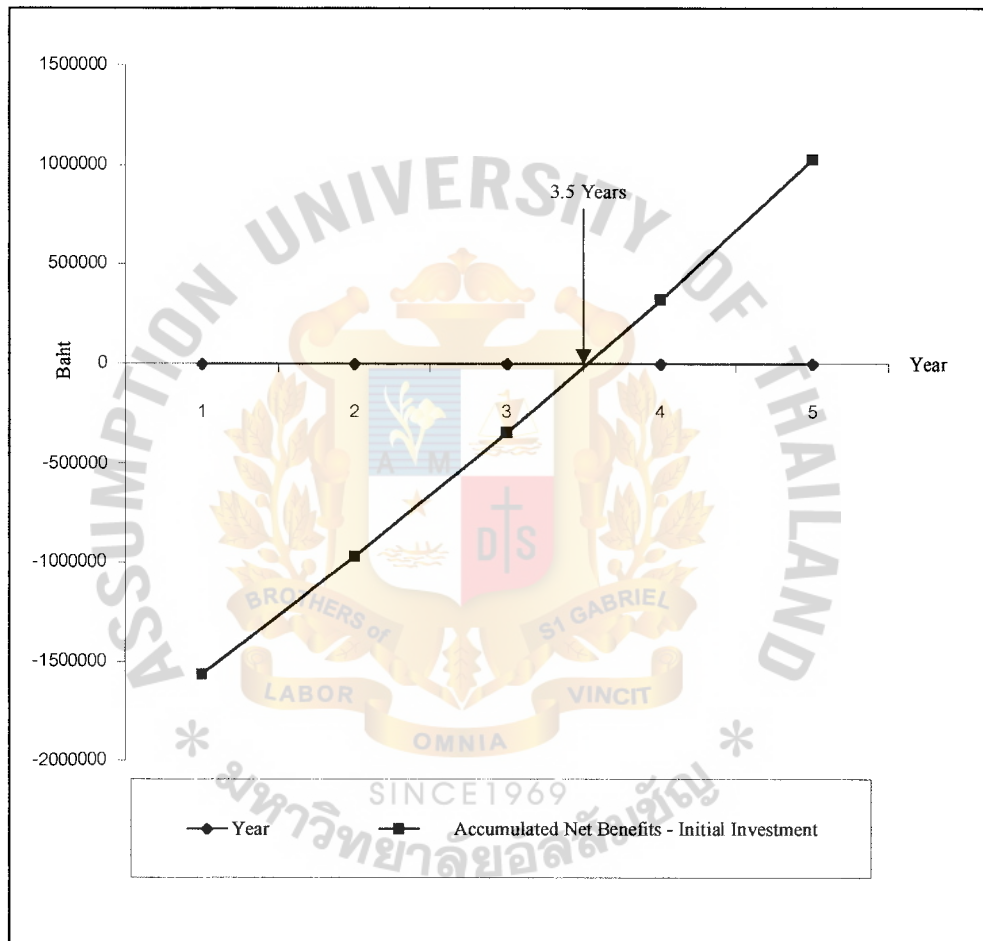


Figure 3.3. Payback Analysis Graph.



## IV. PROJECT IMPLEMENTATION

### 4.1 Program Implementation

Program implementation is the process of creating the program needed to satisfy all the information system processing requirement. The steps of implementation are as follows:

- (1) Review the program documentation that consists of data flow diagrams, process specification, module specification, screen layout, report layout, and data dictionary.
- (2) Design the program by using process specification. This stage involves the analysis and design of the overall system requirement related to input and output that satisfy user's requirement. This stage is responsible for developing operation procedures and standards for the system administrator. The system designer uses tool to manage the ongoing system throughout its life.
- (3) Code program by writing the program based on process specification and module specification.
- (4) Test the program so that the function performs correctly.
- (5) Document the program to help make correction or any changes to any part of the program

### 4.2 Testing

The testing procedure is summarized as shown below:

- (1) Test an individual program to ensure the logic of each program.
- (2) Test data by creating data for testing.
- (3) Test the system by linking all subsystem testing them simultaneously.
- (4) Test back up and restore files.

(5) Issue the documentation

### **4.3 Training**

The education and training course for the users must be prepared. This process begins at the end of the implementation phase.

#### **4.3.1 Hardware Training**

This training is prepared for the technical support personnel who are responsible for solving the system's problem. Knowledge of hardware, connectivity, accessories as well as the maintenance schedule is necessary.

#### **4.3.2 Software Training**

This training is provided for the system administrator and end users. The basic course is provided for inexperienced computer users and advanced course is provided for experienced computer users. However, all system users must learn and know how to use the software.

### **4.4 Conversion**

This stage involves changing the existing (manual system) into the proposed (computerized system). The parallel change over method is chosen for the system conversion. With this method, the computerized system will gradually replace the manual system. Both systems are run in parallel. During the system change over both systems are in full operation for some period of time. The existing (manual) system will be withdrawn when the result of the system satisfies all users.

### **4.5 Documentation**

There are several documents used to explain the operation of the new system such as user manual, system flowchart, file descriptions, and data dictionary.

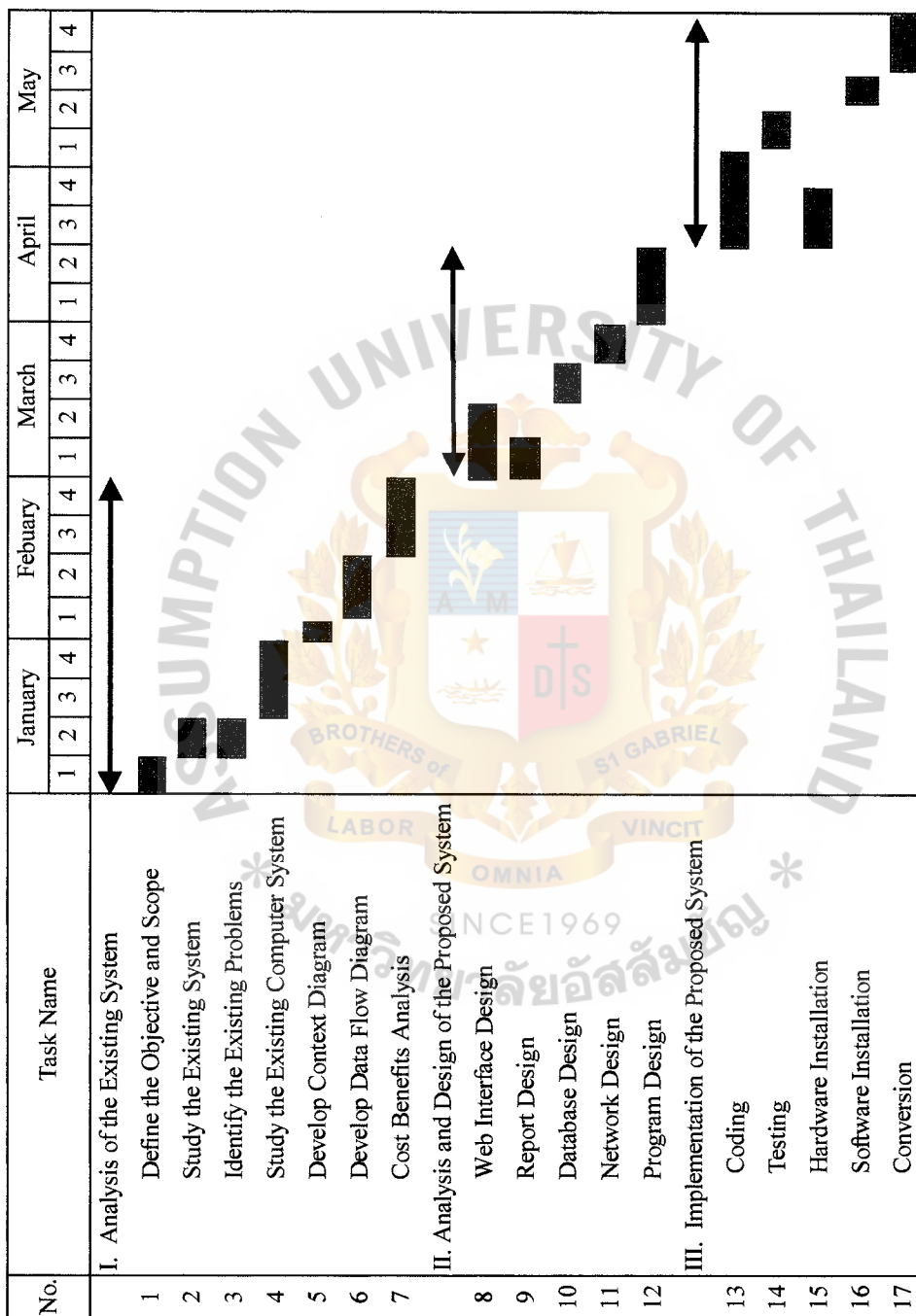


Figure 4.1. Gantt Chart of the Project Plan.

## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

Based on the analysis and study of the existing system, it is suggested that a new computerized system should be used instead of the manual system to improve the decision support system, data storage system, and facilitate the workflow of the system.

From the study and design of the new system, the new system provides the accurate, reliable, and timely information that leads to the correct decision making and redundant data also reduced in the new system. The new system is designed to serve most of the user requirements and the business of the organization. Otherwise, it is created to allow users to share the same database. All screens and reports are generated for user to easily understand.

The need for study is brought by the users who have expressed the need for improving the computerized system to provide timely, reliable, and accurate information to support the decision making system.

Analysis phase is conducted by using structure analysis technique such as context data flow diagram, data flow diagram, data dictionary, E-R Model, and structure chart. The analysis phase covers the entire work procedure at the area under study, the problem areas, area for improvement and user requirement.

The detailed analysis and design phase are handled by walking through with the users. The next step is to develop the proposed system data flow diagram. After the data flow diagram produces the system structure charts. The data dictionary is the data stores and data structures. The final part of the project is cost and benefits analysis. This part is shows whether the proposed system is worth implementing. The results of the analysis is that the project is favorable to invest. The figure shows that the Payback

Period is 3.5 years, Return on Investment is 26.37%, Net Present Value is 1,464,204 Baht, and Cost-Benefits Ratio is 1.17 times.

#### 5.1.1 Degree of Achievement

To monitor the improvement of the efficiency of the process that can produce output in a unit of time, the degree of achievement is needs to monitor the improvement of the proposed system that measure in a time scale. The process is compare before and after implementing a proposed system.

- (1) Generate Report Process: In the existing system takes 45 minutes and the proposed system takes 10 minutes. The difference of this process is 35 minutes that show the proposed system use the machine to gather information and generate information. In others hands, this process is done semi-manually in the existing system. The computer take the minor role in this process.
- (2) Define Aircraft Specification: In this process, the existing system take 8 hours, and the proposed system take 3 hours. The difference is 5 hours because in the existing system the information is analyzed manually so to get the analyzed information to support decision making in defining aircraft specification, but in the proposed system, to define the aircraft specification the information is analyzed automatically by the expert system and the the analyzed result can feed in to the system again and then the expert system can generate the alternative of possible solution and the rest is the human task to select the most suitable aircraft specification, so 20 minutes is for the machine work and the rest is make decision by the human.
- (3) Selecting Appropriate Aircraft: In this process, the existing system takes 10 hours but in the proposed system takes 3 hours. The difference is 7 hours

because in the existing system this task is done manually the list of aircraft are not well organized so the user must organize and retrieve the information by them selves. The information in this process is retrieved by sending the fax to all aircraft manufacturers. In the proposed system, the data warehouse is linked to aircraft manufacturers' database and the data are updated every time. The system must know the changing of the aircraft model. To retrieve the information, the system can retrieve the list of aircraft automatically by inputting the aircraft specification in to the system. This process consumed 30 minutes for the machine hours to list and calculate the expected benefits from utilizing of the aircraft and the rest for the human to select and make decision.

- (4) Preparing Long-Term Purchasing Plan: In this process, the existing system takes 40 minutes and the proposed system takes 15 minutes. The difference is 25 minutes because in the existing system all data are gathered manually to prepare the document but in the proposed system all data are gathered by computer and document is generated by computer.
- (5) Aircraft Ordering: This process consumed a lot of time because this process can decomposed in to many sub process. The existing system takes 40 hours and the proposed system takes 20 hours the difference is because the purchase order, payment voucher are prepared manually and the capturing of the invoice data are done manually and the information that used to generate document are retrieve manually. For the proposed system the all transaction are done by EDI system and the information that related to the transaction are prepared by the computer.



Table 5.1. Degree of Achievement of the Proposed System.

Process	The Existing System	The Proposed System
Generated Report	45 mins	10 mins
Define Aircraft Specification	16 hrs	3 hrs
Selecting Appropriate Aircraft	10 hrs	1 hrs30 mins
Preparing L/T Purchasing Plan	40 mins	15 mins
Aircraft Ordering	40 hrs	20 hrs
Total	72 hrs 20 mins	26 hrs 25 mins

## 5.2 Recommendations

### 5.2.1 The new technology

- (a) Keyless data entry: To avoid the human error in capturing data, the input media should be barcode reader that used for reading the purchase order, invoice, and payment voucher.
- (b) Electronic Data Interchange(EDI): This technology can reduce the paper work and reduce the time of doing the transaction. EDI replace the traditional way of exchanging the business transaction document such as order slip, invoice, and payment voucher.
- (c) Expert System: The artificial intelligence will help the system perform the task like human thinking. For this project the system must be able to analyze the traffic demand statistical trend and the aircraft utilization statistical trend also. The system must find out the aircraft specification automatically after the analysis of the statistical trend, and retrieve the list of aircraft in according to the aircraft specification. To retrieve the list of aircraft the system must know the budget of the company, and company policy. Further

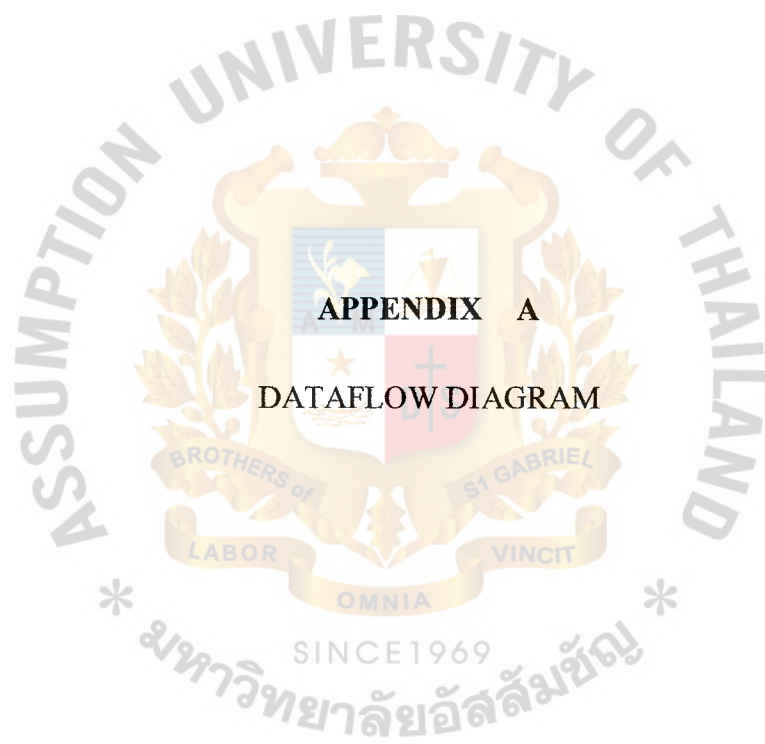
more the system must know the method find out the statistical trend, take the result to find out the aircraft specification, able to calculated the expected benefits derived from the system. By this way the system must know the information about each aircraft models. The system must also know the changing of the aircraft model. The system knowledge must be update every time. The expert system shell of this project is Knowledge Pro (Software produced by Knowledge Garden Inc.).

### 5.2.2 The Methodology Approach

- (a) Joint Application Development: This methodology uses highly organized and intensive workshop to bring together owners, users, analysts, designers, and builder to jointly define and design systems.
- (b) Total Quality Management: This is the comprehensive approach to facilitating quality improvements, and management with in a business. This approach monitors and control the efficiency of the system. For example the efficiency of the process to create output and can measured in the amount of the output per a unit of time.
- (c) Task Scheduling System: This approach control and monitor the task execute in the system to see whether the task performed or not. The example of this methodology are PERT, and CPM.

### 5.2.3 Possibility of utilizing the results to apply to others areas

After developing of this project, the results can also be applied to Aircraft Financing System, Aircraft Payment System which share the input and output from the Aircraft Purchasing System.



## APPENDIX A

### DATAFLOW DIAGRAM

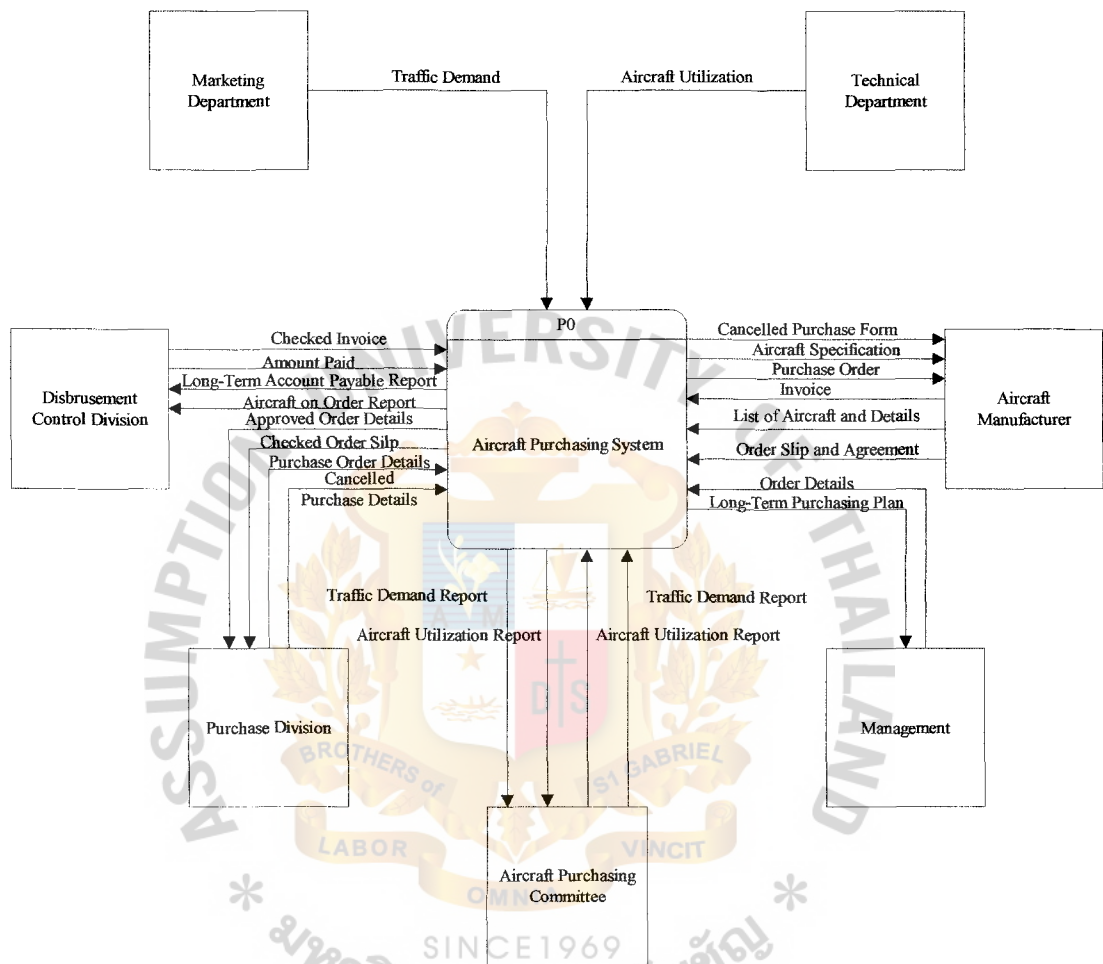


Figure A.1. Context Level Data Flow Diagram: Aircraft Purchasing System.

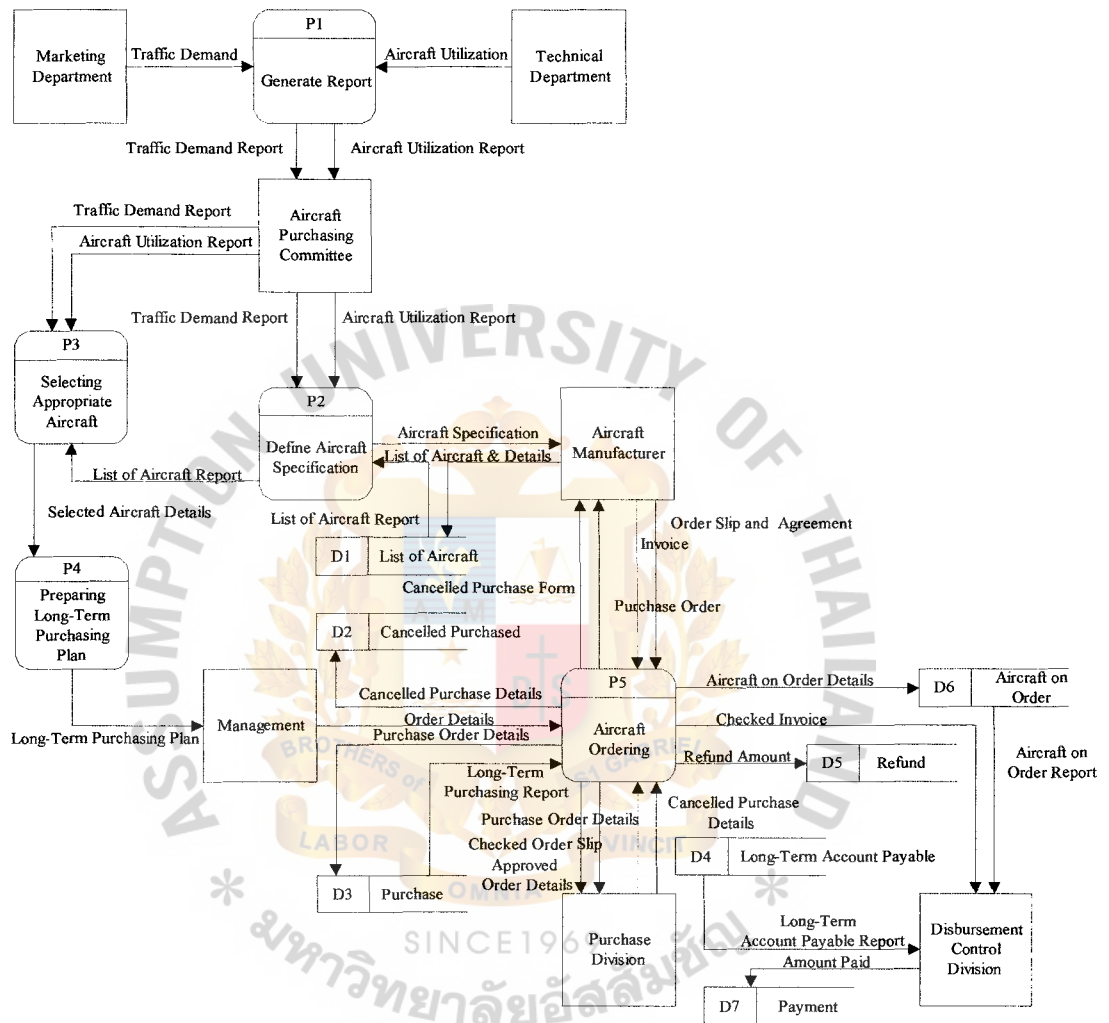


Figure A.2. Data Flow Diagram Level 0: Aircraft Purchasing System.

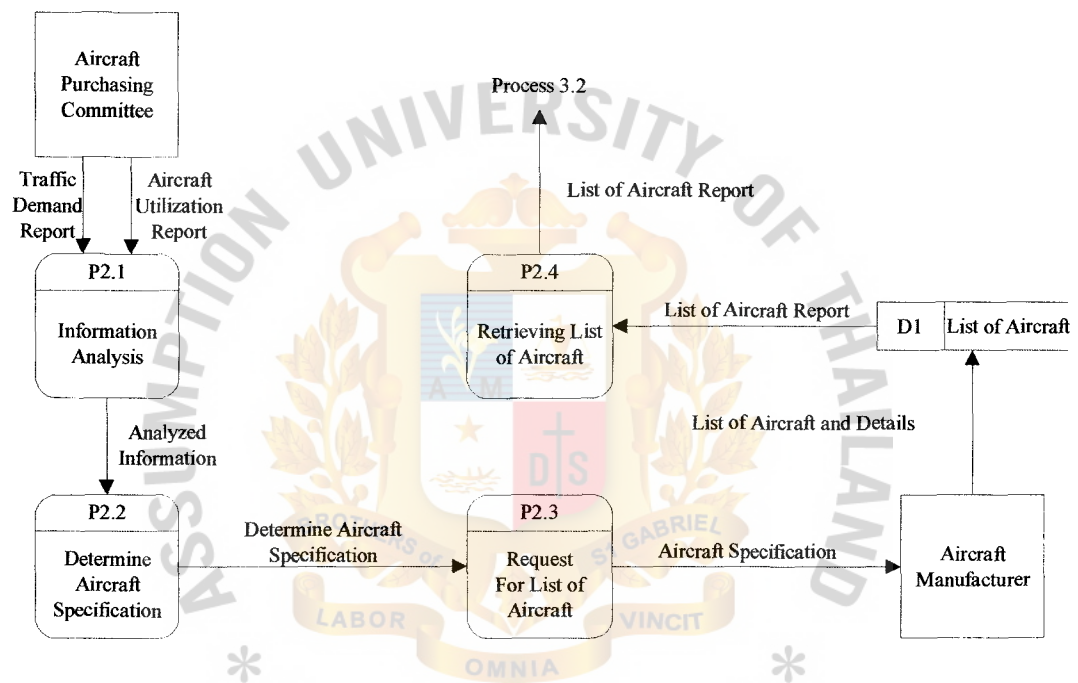


Figure A.4. Data Flow Diagram Level 1: Define Aircraft Specification.



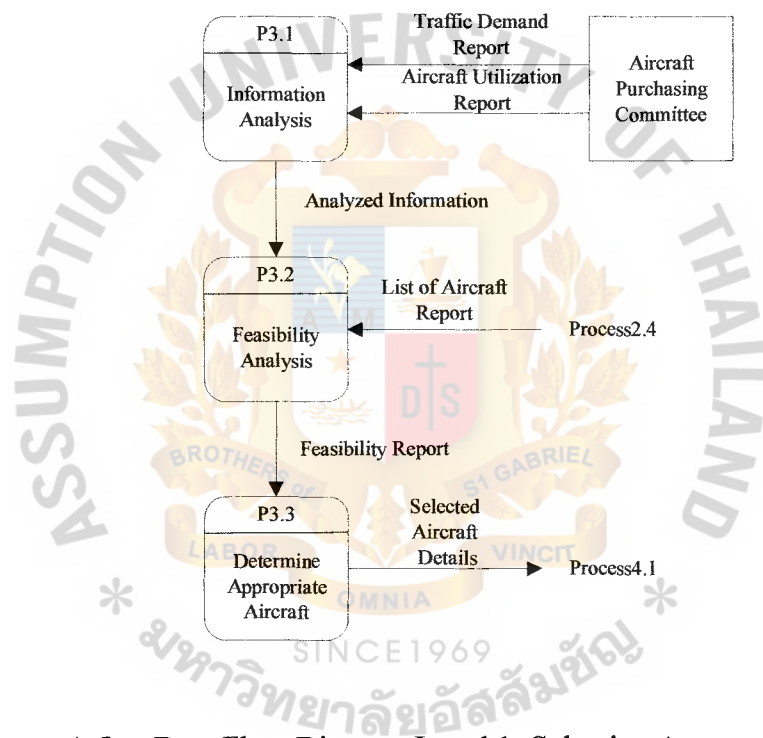


Figure A.5. Data Flow Diagram Level 1: Selecting Appropriate Aircraft.

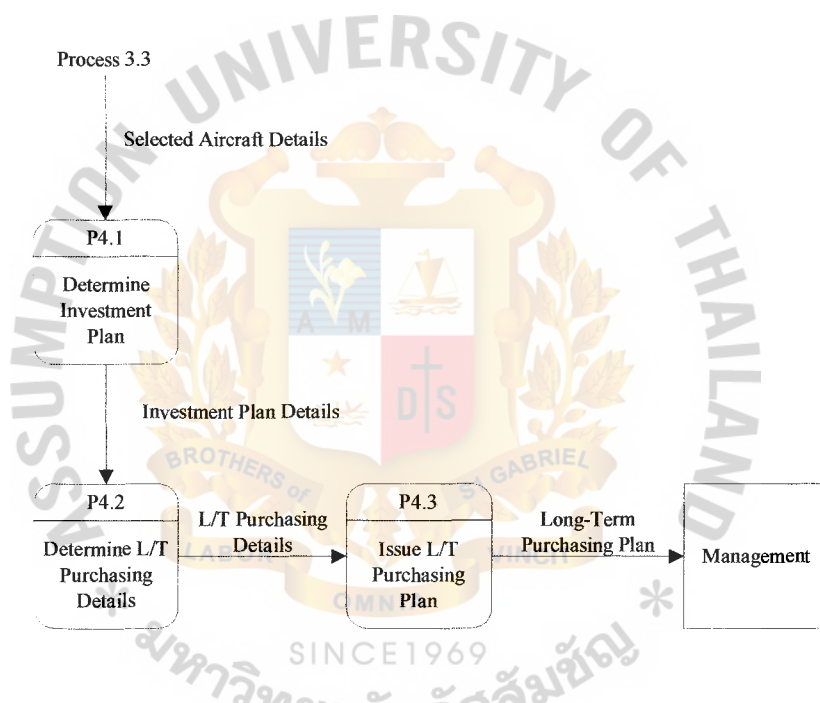


Figure A.6. Data Flow Diagram Level 1: Preparing Long-Term Purchasing Plan.

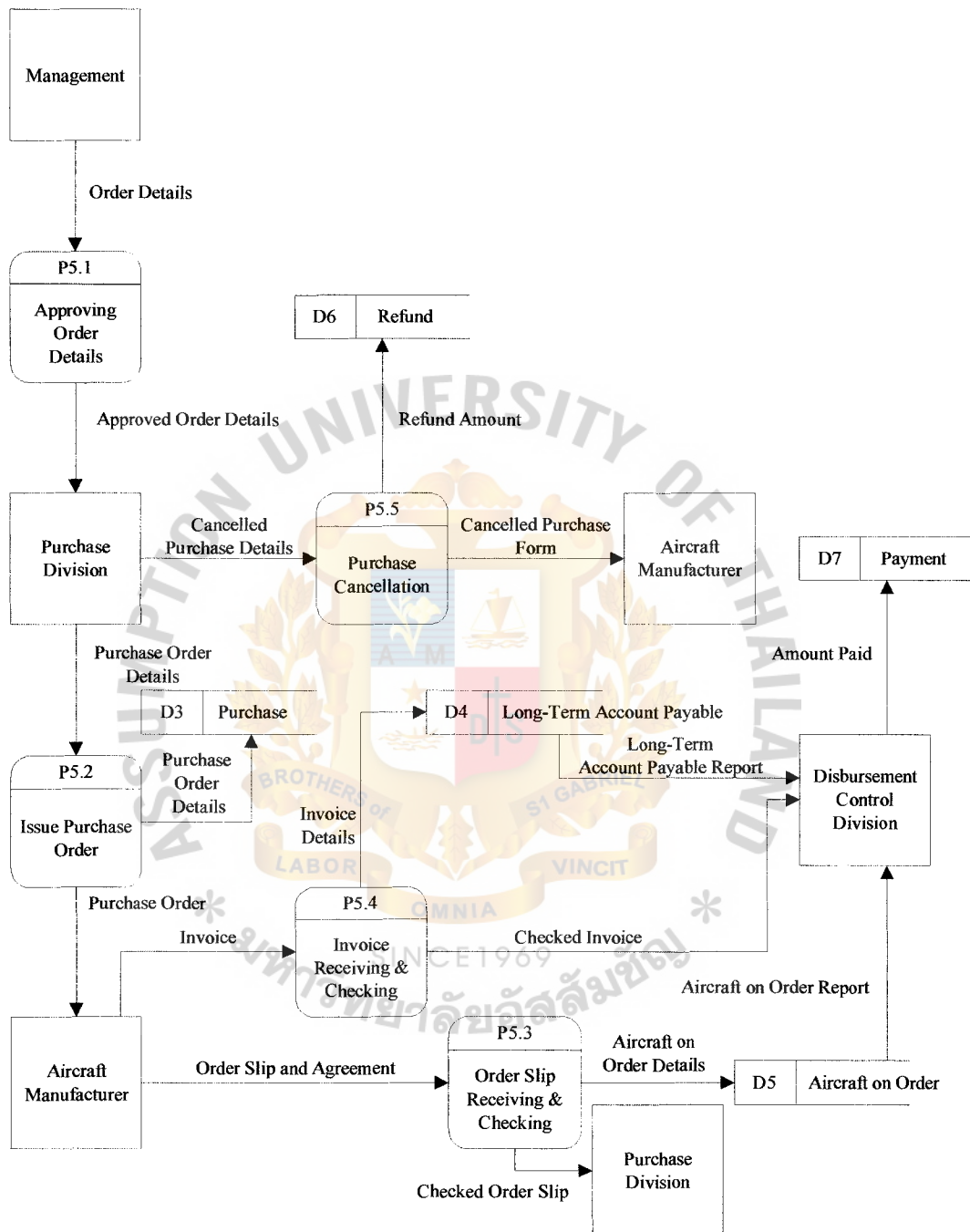


Figure A.7. Data Flow Diagram Level 1: Aircraft Ordering.

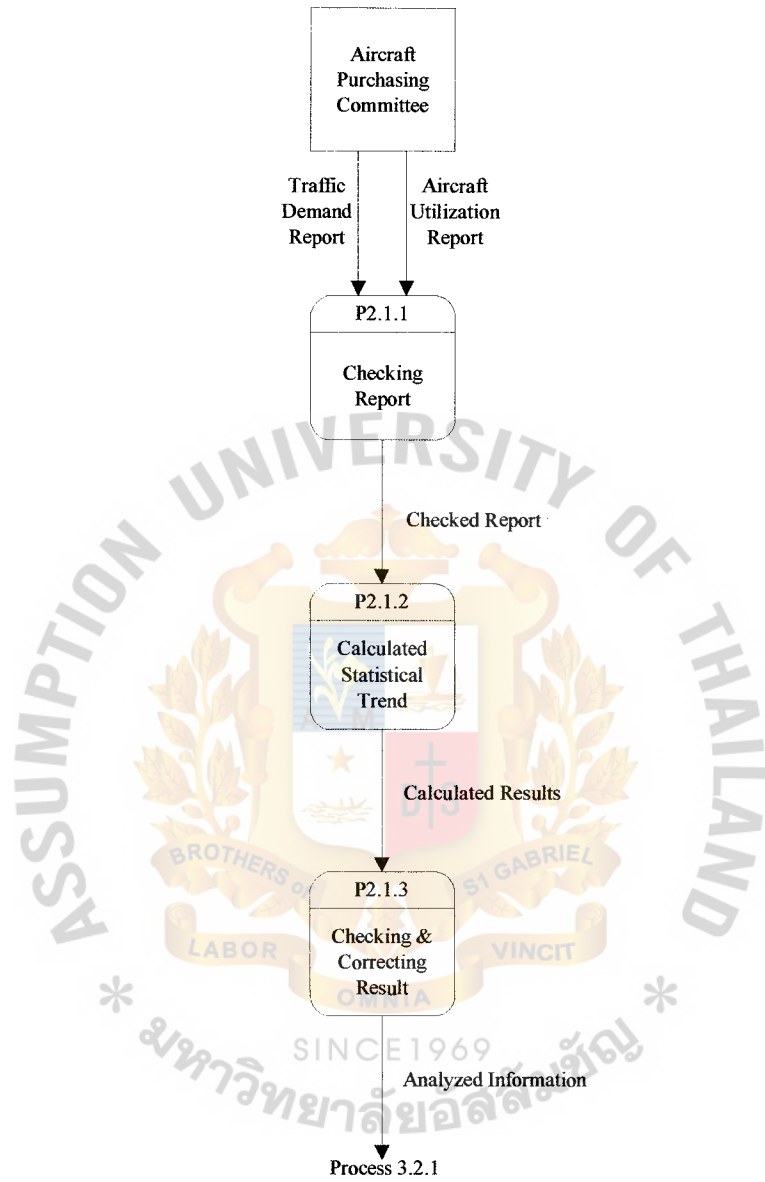


Figure A.8. Data Flow Diagram Level 2: Information Analysis.

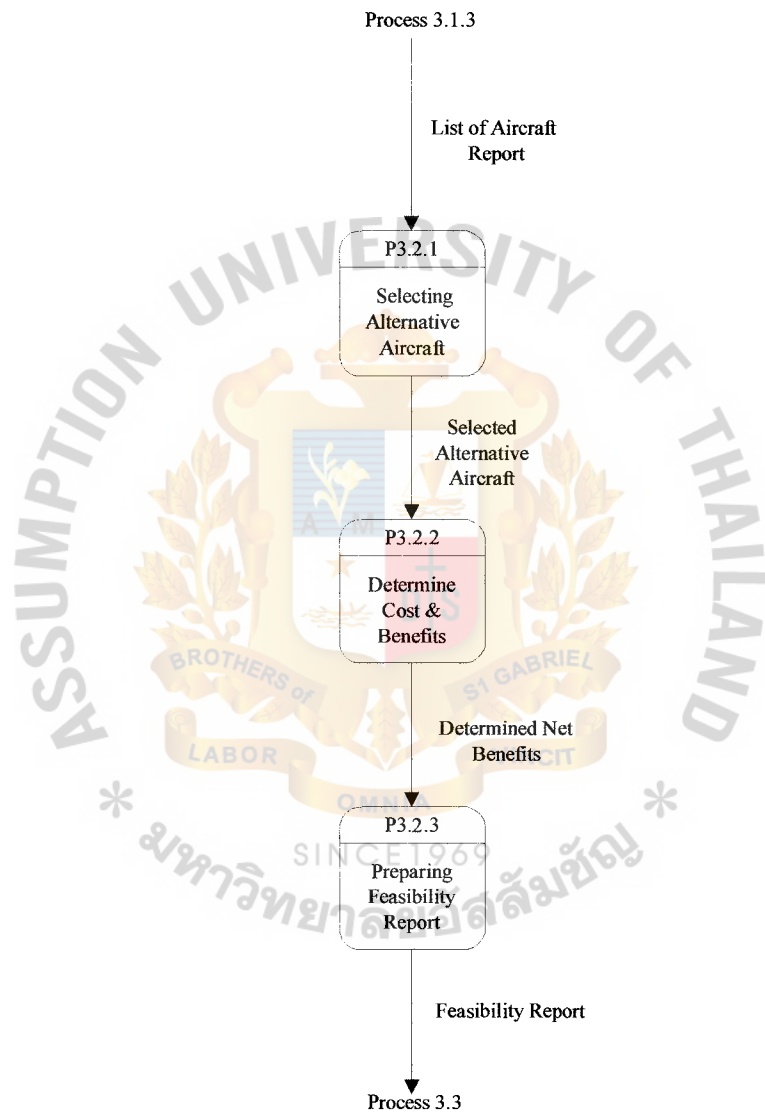


Figure A.10. Data Flow Diagram Level 2: Feasibility Analysis.

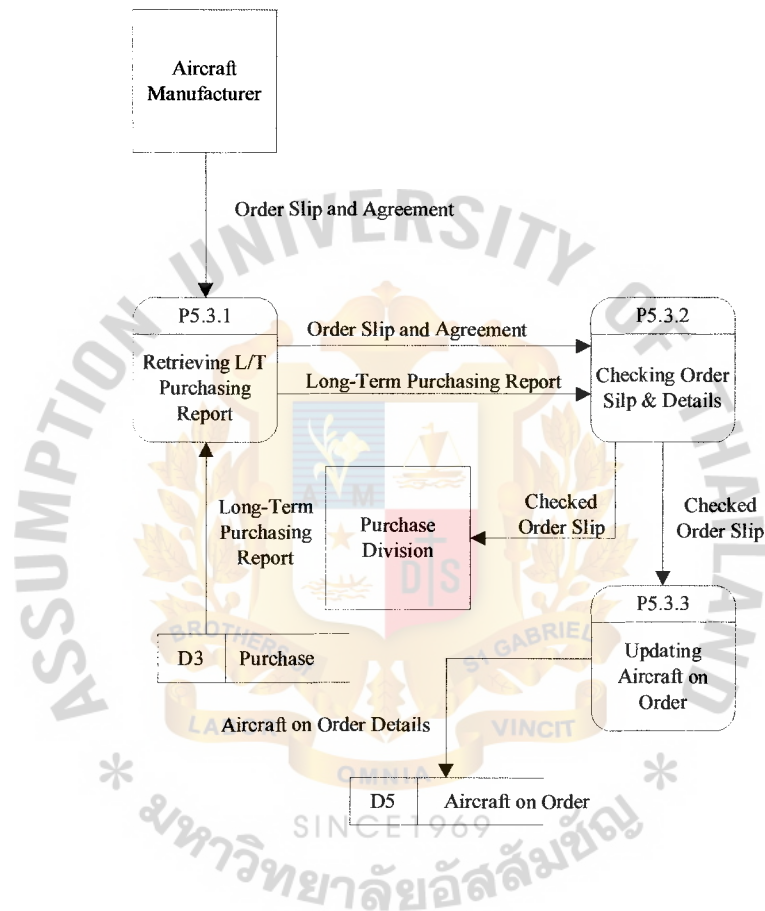


Figure A.11. Data Flow Diagram Level 2: Order Slip Receiving and Checking.



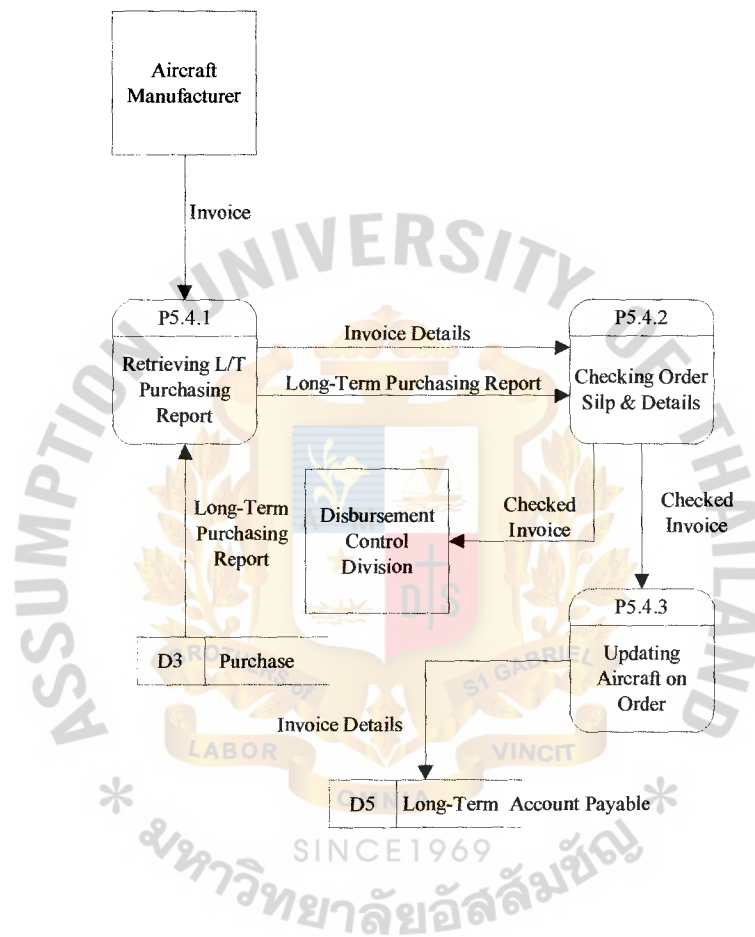
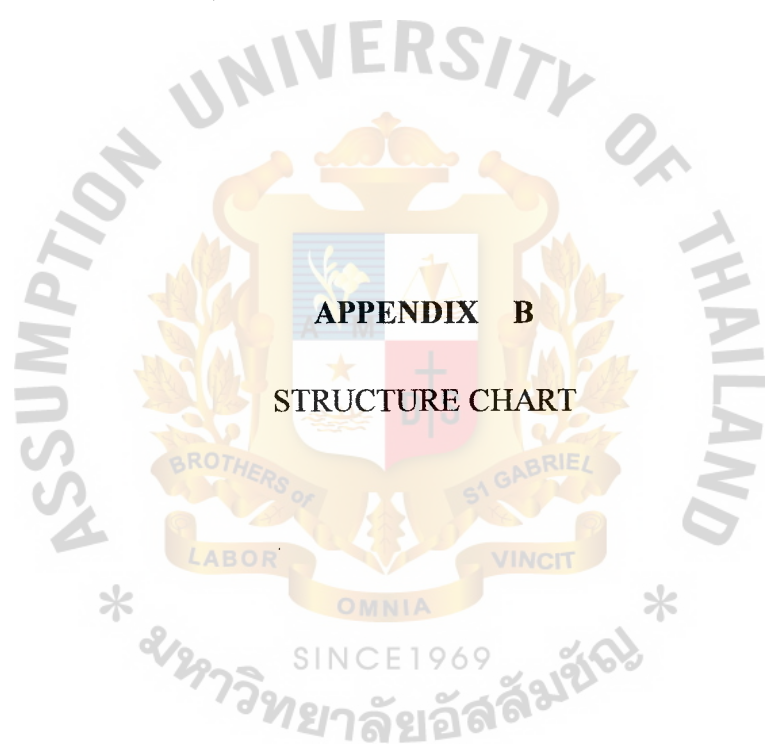


Figure A.12. Data Flow Diagram Level 2: Invoice Receiving and Checking.



## APPENDIX B

### STRUCTURE CHART

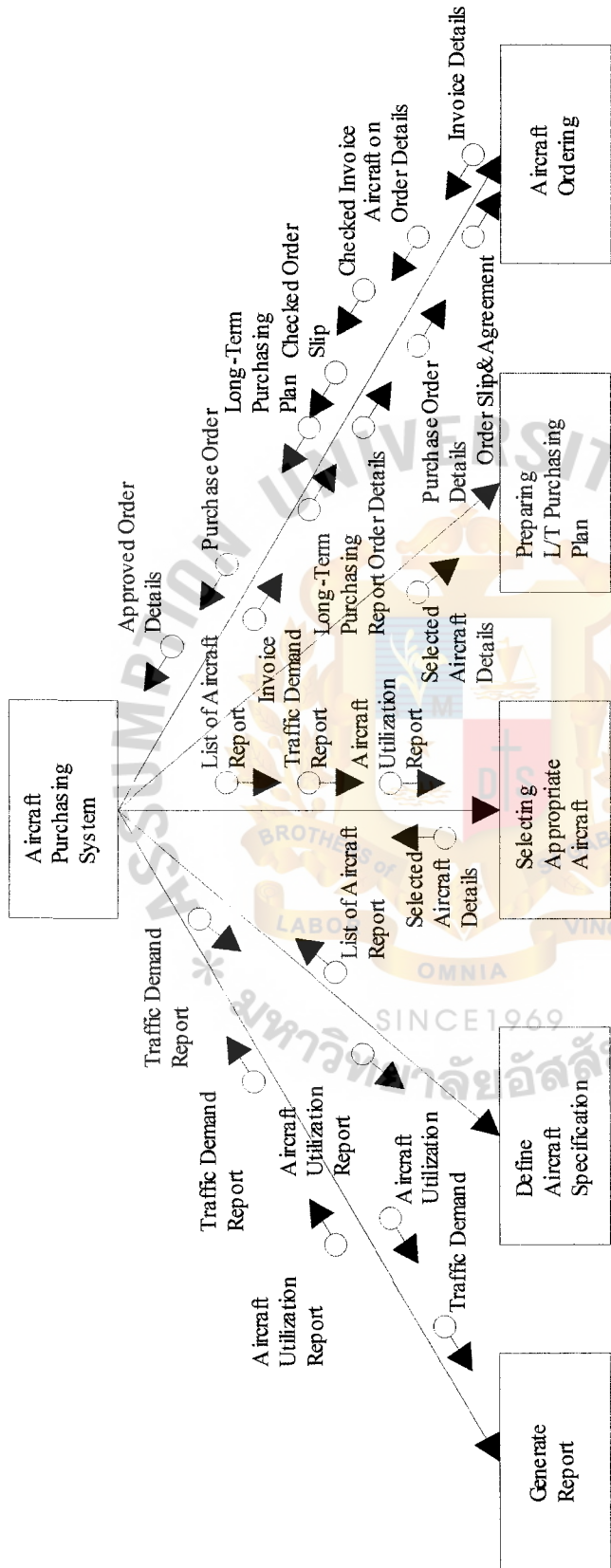


Figure B.1: Structure Chart: Aircraft Purchasing System.

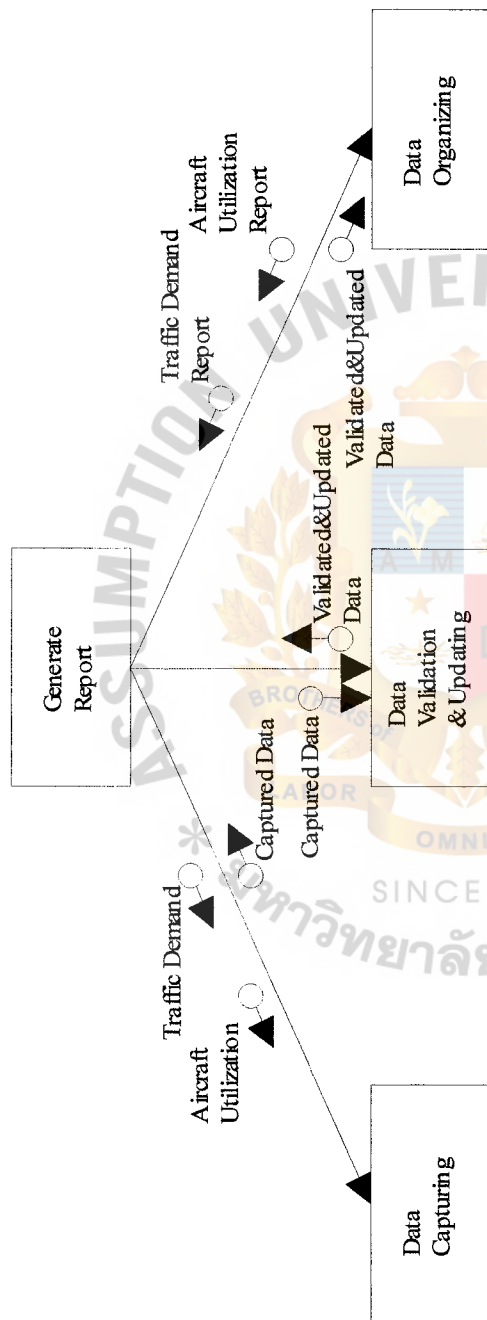


Figure B.2. Structure Chart: Generate Report.

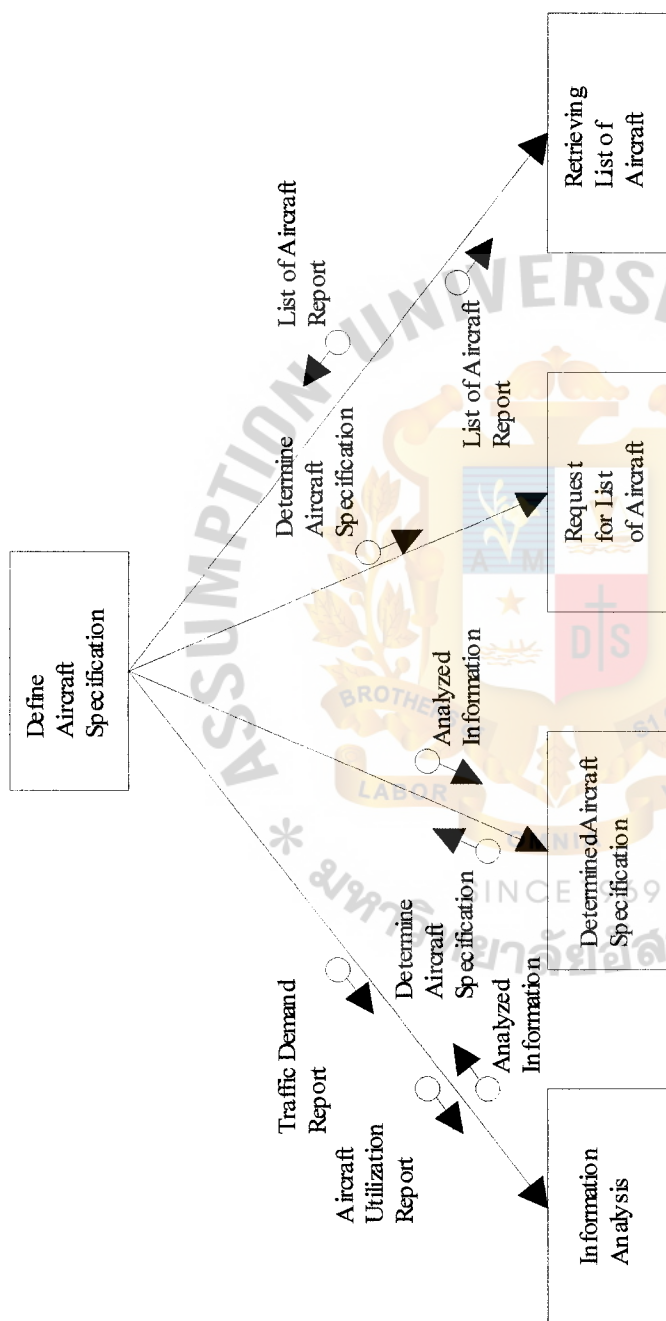


Figure B.3. Structure Chart: Define Aircraft Specification.

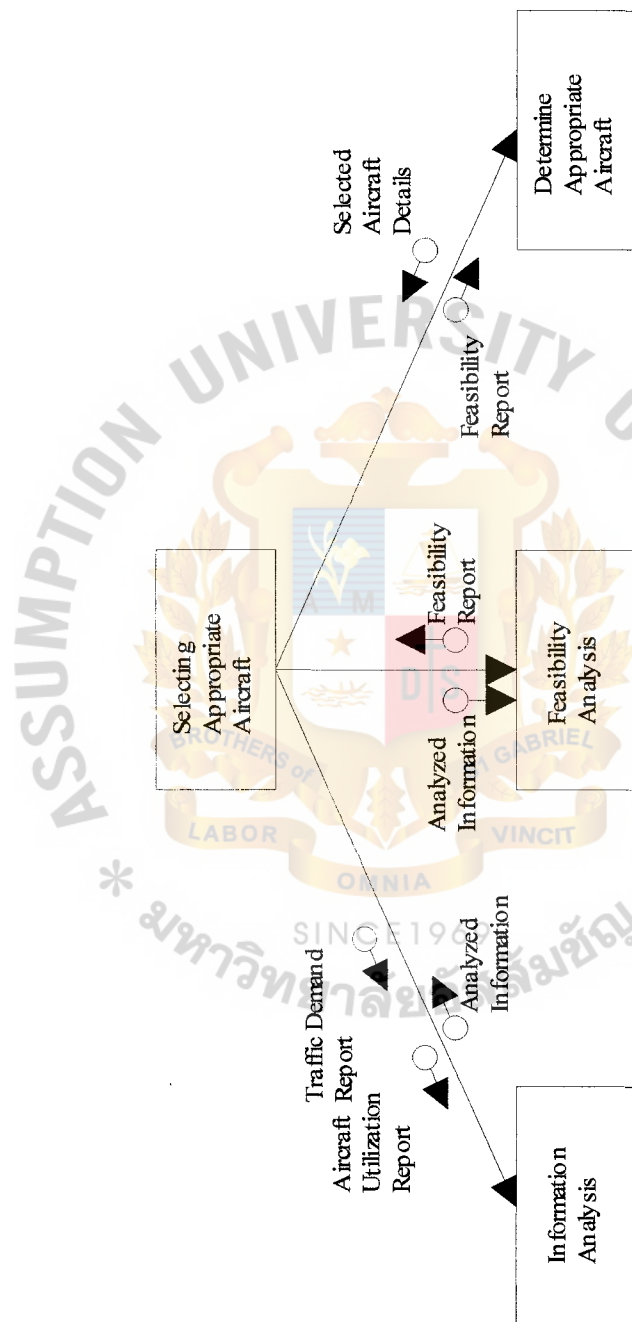


Figure B.4. Structure Chart: Selecting Appropriate Aircraft.

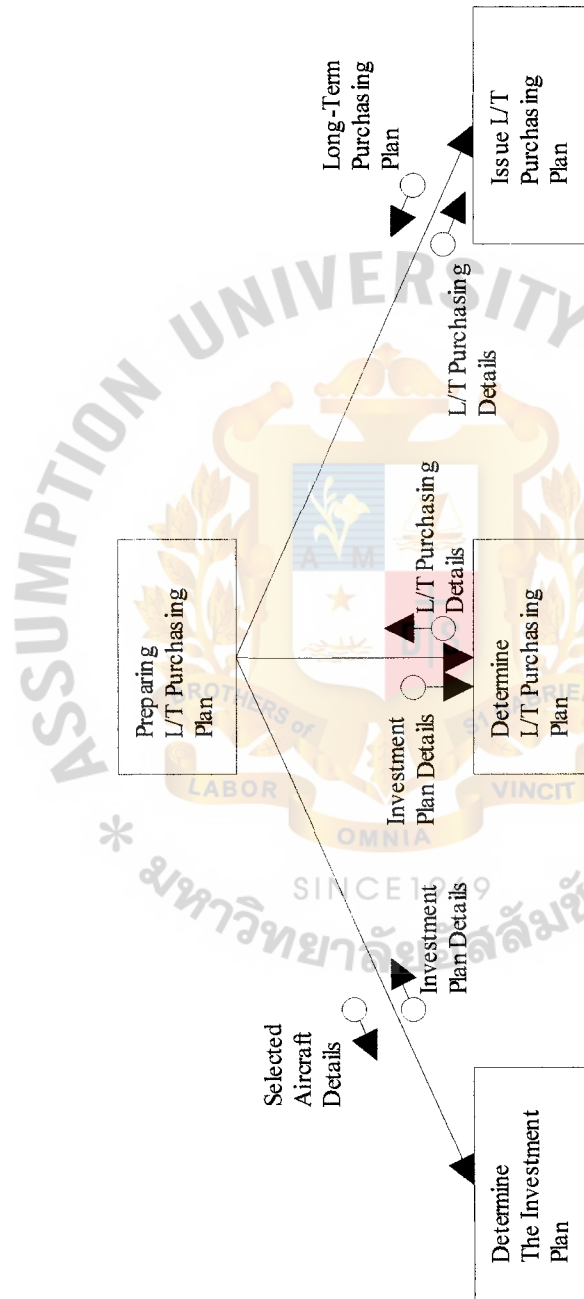


Figure B.5. Structure Chart: Prepare Long-Term Purchasing Plan.



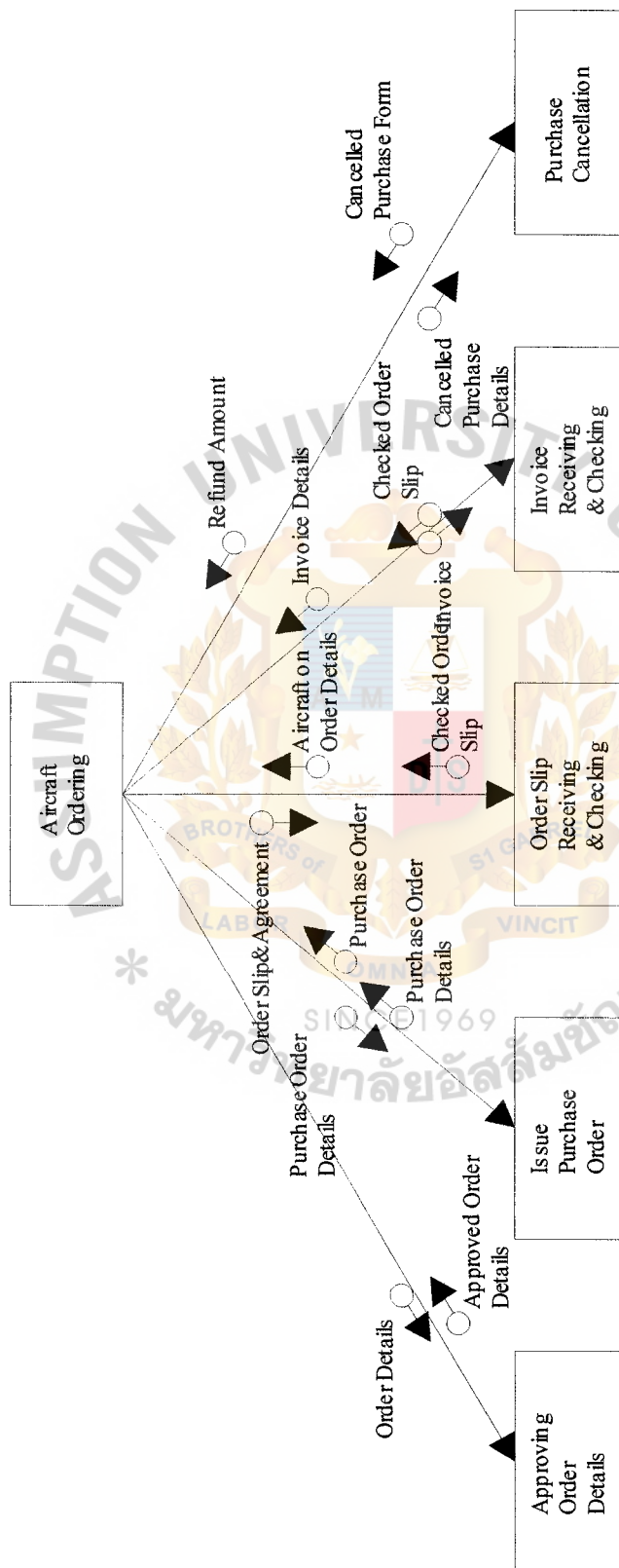


Figure B.6. Structure Chart: Aircraft Ordering.



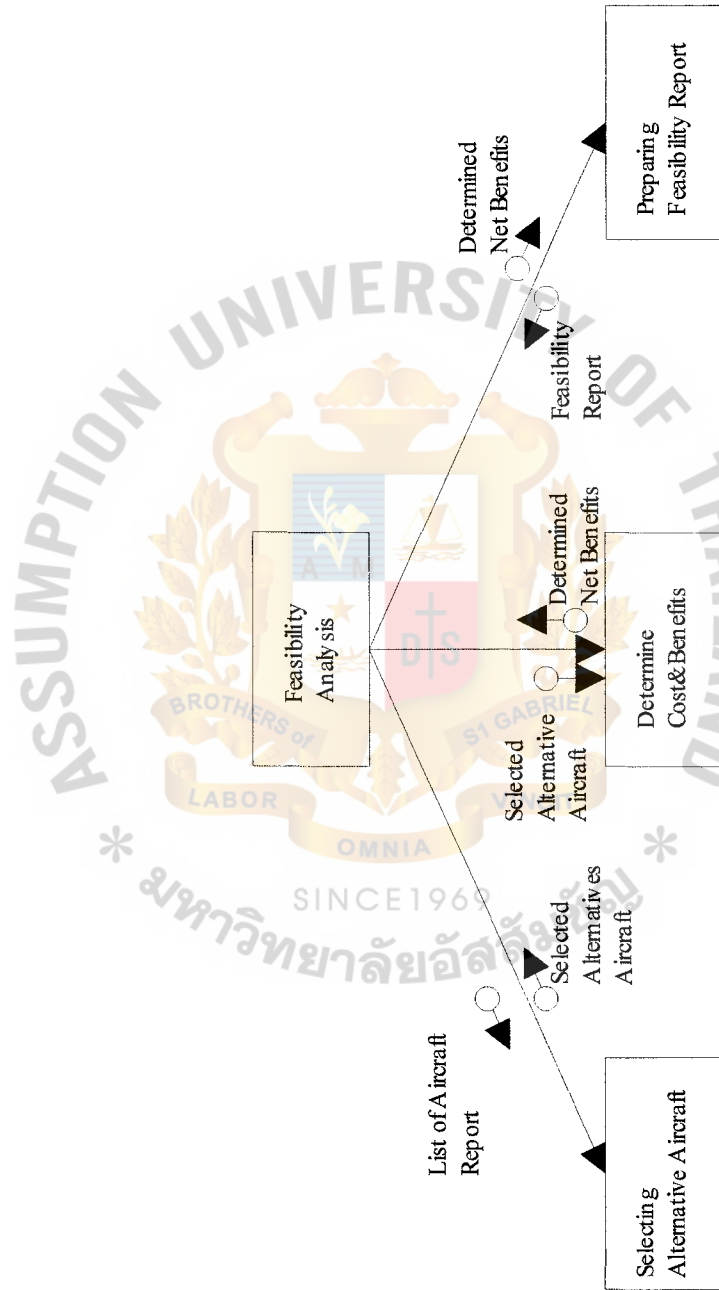


Figure B.8. Structure Chart: Feasibility Analysis.

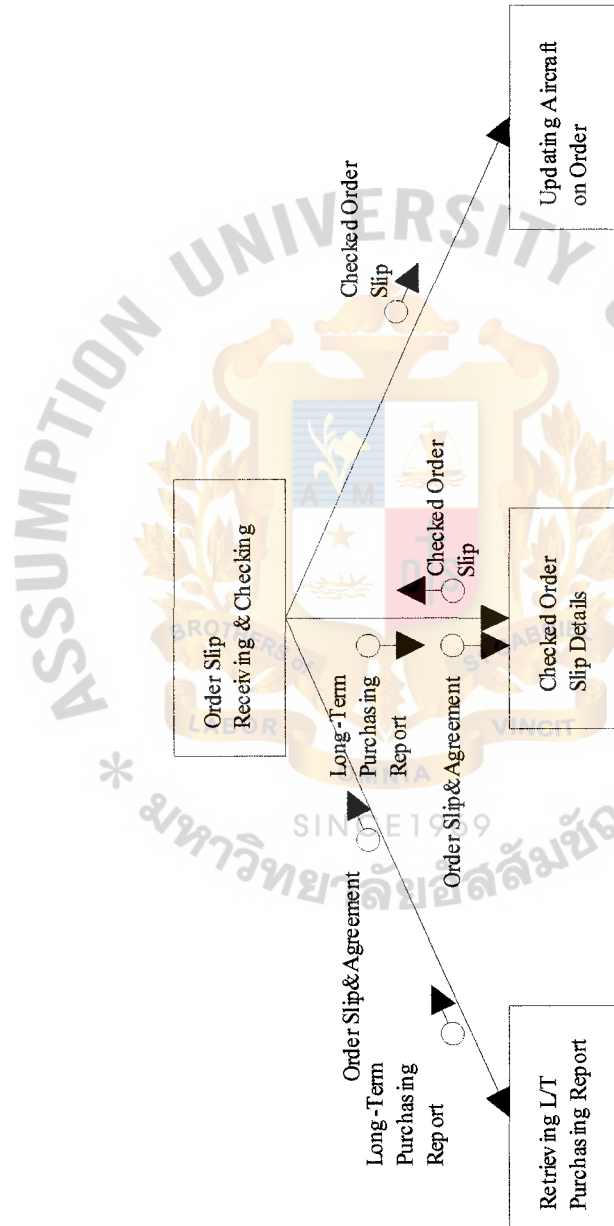


Figure B.9. Structure Chart: Order Slip Receiving and Checking.

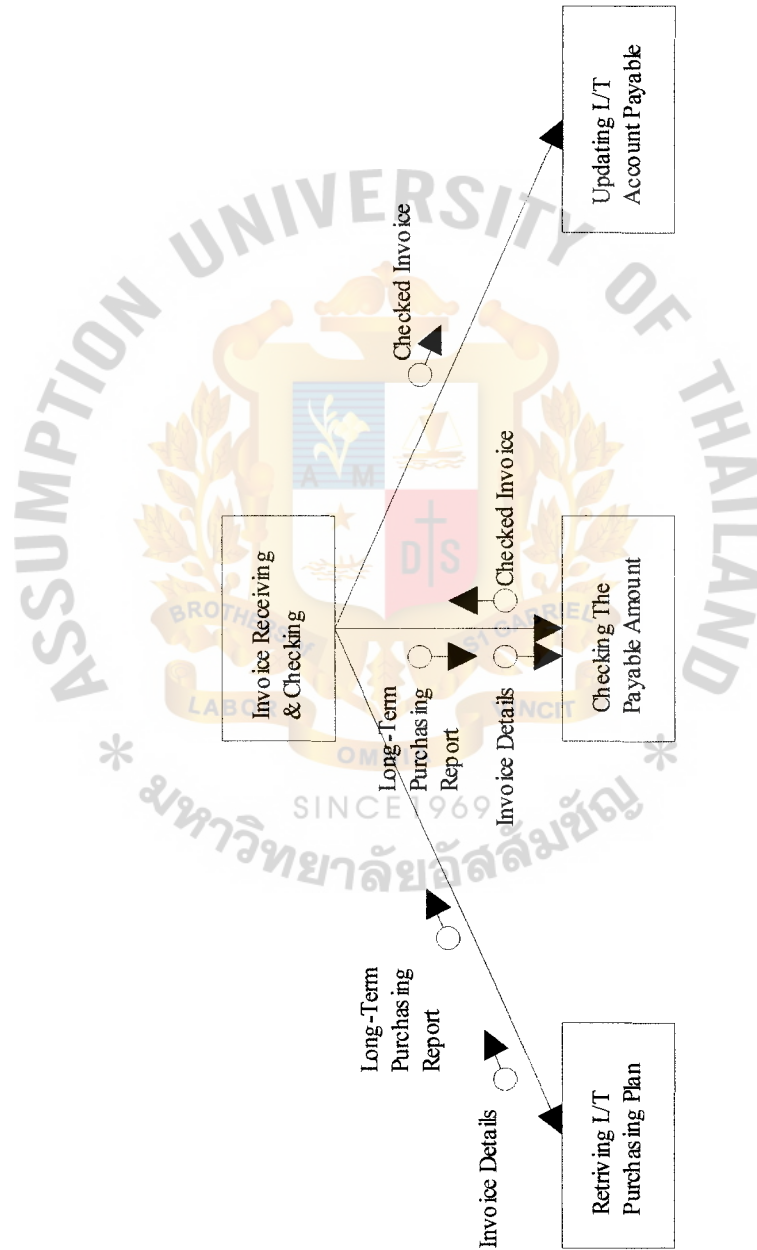
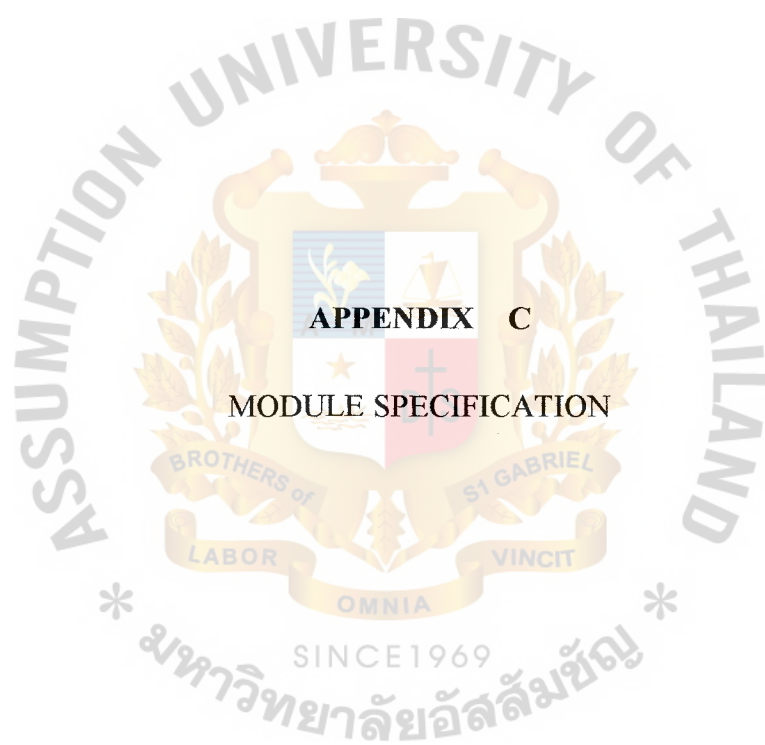


Figure B.10. Structure Chart: Invoice Receiving and Checking.

## MODULE SPECIFICATION

Module Name	Aircraft Purchasing System
Purpose Objective	To facilitate the decision making for purchasing, to arrange the efficient order process, and checking and receive invoice effectively.
Input	Traffic Demand, Aircraft Utilization, Invoice, List Of Aircraft and Details, Order Slip and Agreement, Order Details, Traffic Demand Report, Aircraft Utilization Report, Cancelled Purchase Details, Purchase Order Details, Checked Invoice, Amount Paid
Output	Traffic Demand Report, Flight Personal Available Report, Aircraft Specification, Purchase Order, Cancelled Purchase Form, Long-term Purchasing Plan, Aircraft On Order Report, Approved Order Details, Checked Order Slip, Long-Term Account Payable Report
Invoker	M2-M6
Callee	M7-M39
Module Number	M2
Module Name	Generate Report
Purpose Objective	To create a report from source data
Input	Traffic Demand, Aircraft Utilization
Output	Traffic Demand Report, Aircraft Utilization Report.
Invoker	M7-M9
Callee	M24-M26



## APPENDIX C

### MODULE SPECIFICATION



Module Number	M3
Module Name	Define Aircraft Specification
Purpose Objective	To control and define the aircraft specification effectively
Input	Traffic Demand Report, Aircraft Utilization Report, List of Aircraft Report
Output	Aircraft Specification, List of Aircraft Report.
Invoker	M10-M13
Callee	M25-M27

Module Number	M4
Module Name	Selecting Appropriate Aircraft
Purpose Objective	To select an appropriate aircraft in accordance with the aircraft specification.
Input	Traffic Demand Report, Aircraft Utilization Report, List of Aircraft Report
Output	Selected Aircraft Details.
Invoker	M14-M16
Callee	M28-M33

Module Number	M5
Module Name	Prepare L/T Purchasing Plan
Purpose Objective	To Issue a correct L/T purchasing plan that will use to issue purchase order
Input	Selected Aircraft Details
Output	L/T purchasing plan

Invoker M17-M19

Callee -

Module Number M6

Module Name Aircraft Ordering

Purpose Objective To manage the order of an aircraft

Input Order Slip & Agreement, Invoice, Purchase Order Details,  
Cancelled Purchase Details, Order Detail, L/T purchasing report.

Output Purchase Order, Aircraft on Order Details, Checked Invoice,  
Invoice Details, PurchaseOrder Details, Approved Order  
Details, Checked Order Slip, Cancelled Purchase Details,  
Cancelled Purchase Form, Refund Amount

Invoker M20-M24

Callee M33-M39

Module Number \* M7

Module Name Data Capturing

Purpose Objective To capture the source data

Input Traffic Demand, Aircraft Utilization.

Output Captured Data

Invoker -

Callee -

Module Number	M8
Module Name	Data Validation & Updating
Purpose Objective	To correct and update data
Input	Captured Data
Output	Validated and Updated Data
Invoker	-
Callee	-

Module Number	M9
Module Name	Data Organizing
Purpose Objective	To organize data into a useful format.
Input	Validated & Updated Data
Output	Aircraft Utilization Report, Traffic Demand Report
Invoker	-
Callee	-

Module Number	M10
Module Name	Information Analysis
Purpose Objective	To analyze information
Input	Traffic Demand Report, Aircraft Utilization Report.
Output	Analyzed Information
Invoker	M25-M27
Callee	-

Module Number	M11
Module Name	Determine aircraft Specification
Purpose Objective	To determine the aircraft specification
Input	Analyzed Information
Output	Determined Aircraft Specification
Invoker	-
Callee	-

Module Number	M12
Module Name	Request for List of Aircraft
Purpose Objective	To request the List of Aircraft in accordance with the Aircraft Specification
Input	Determine Aircraft Specification
Output	Aircraft Specification
Invoker	-
Callee	-

Module Number	M13
Module Name	Retrieve List of Aircraft
Purpose Objective	To retrieve and check the list of aircraft that has to be conformed with request
Input	List of Aircraft Report
Output	List of Aircraft Report
Invoker	-
Callee	-

Module Number	M14
Module Name	Information Analysis
Purpose Objective	To analyze information
Input	Traffic Demand report, Aircraft Utilization
Output	Analyzed Information
Invoker	M28-M30
Callee	-

Module Number	M15
Module Name	Feasibility Analysis
Purpose Objective	To find out the technical, operational, and financial feasibility for each type of aircraft
Input	List of Aircraft Report, Analyzed Information
Output	Feasibility Report
Invoker	M31-M33
Callee	-

Module Number	M16
Module Name	Determine Appropriate Aircraft
Purpose Objective	To find the appropriate aircraft in accordance with the aircraft specification
Input	Feasibility report
Output	Selected Aircraft Details
Invoker	-
Callee	-

Module Number	M17
Module Name	Determine the Investment Plan
Purpose Objective	To determine the amount of investment
Input	Selected Aircraft Details
Output	Investment Plan Details
Invoker	-
Callee	-

Module Number	M18
Module Name	Determine Long-Term Purchasing Plans
Purpose Objective	To determine the detail of long-term purchasing plan
Input	Investment Plan Details
Output	Long-Term Purchasing Details
Invoker	-
Callee	-

Module Number	M19
Module Name	Issue Long-Term Purchasing Plan
Purpose Objective	To issue the long-term purchasing plan
Input	Long-Term Purchasing Details
Output	Long-Term Purchasing Plan
Invoker	-
Callee	-

Module Number	M20
Module Name	Approving order Details
Purpose Objective	To approve details in the order that include aircraft type, quality, and date of order.
Input	Order Details
Output	Approved Order Details
Invoker	-
Callee	-

Module Number	M21
Module Name	Issue Purchase Order
Purpose Objective	To issue purchase order
Input	Purchase Order Details
Output	Purchase Order, Purchase Order Details
Invoker	-
Callee	-

Module Number	M22
Module Name	Order Slip Receiving & Checking
Purpose Objective	To check whether the order slip conforms with the Purchase Order or not
Input	Order Slip and Agreement
Output	Aircraft on Order Details, Checked Order Slip
Invoker	M34-M36
Callee	-



Module Number	M23
Module Name	Invoice Receiving and Checking
Purpose Objective	To check the validity of the invoice
Input	Invoice
Output	Invoice Details, Checked Invoice
Invoker	M37-M39
Callee	-

Module Number	M24
Module Name	Purchase Cancellation
Purpose Objective	To cancel the purchase order that has been sent to the Aircraft Manufacturer.
Input	Cancelled Purchase Details
Output	Refund Amount , Cancelled Purchase Form
Invoker	-
Callee	-

Module Number	M25
Module Name	Checking Report
Purpose Objective	To check the validity of the report
Input	Traffic Demand Report, Aircraft Utilization Report.
Output	Checked Report
Invoker	-
Callee	-

Module Number	M26
Module Name	Calculated Statistical Trend
Purpose Objective	To calculate the trend of the information
Input	Checked Report
Output	Calculated Result
Invoker	-
Callee	-

Module Number	M27
Module Name	Checking & Correcting Result
Purpose Objective	To check the validity of report
Input	Traffic Demand Report, Aircraft Utilization Report
Output	Checked Report
Invoker	-
Callee	-

Module Number	M28
Module Name	Checking Report
Purpose Objective	To check the validity of the report
Input	Traffic Demand Report, Aircraft Utilization Report.
Output	Checked Report
Invoker	-
Callee	-

Module Number	M29
Module Name	Calculate Statistical Trend
Purpose Objective	To calculate trend of information
Input	Checked Report
Output	Calculated Result
Invoker	-
Callee	-

Module Number	M30
Module Name	Checking & Correcting Result
Purpose Objective	To check the correctness of calculated result
Input	Calculated Result
Output	Analyzed Information
Invoker	-
Callee	-

Module Number	M31
Module Name	Selecting Alternative Aircraft
Purpose Objective	To select all possible alternative aircraft
Input	List of Aircraft Report
Output	Selected Alternative Aircraft
Invoker	-
Callee	-

Module Number	M32
Module Name	Determine Cost & Benefits
Purpose Objective	To determine the cost and benefit from utilizing each aircraft
Input	Selected Alternative Aircraft, Analyzed Information
Output	Determined Net Benefits
Invoker	-
Callee	-

Module Number	M33
Module Name	Preparing Feasibility Report
Purpose Objective	To prepare feasibility report
Input	Determined Net Benefits
Output	Feasibility Report
Invoker	-
Callee	-

Module Number	M34
Module Name	Retrieving Long-Term Purchase Report
Purpose Objective	To retrieve and read the Long-Term Purchase Report
Input	Order Slip and Agreement
Output	Order Slip and Agreement, Long-Term Purchase Report
Invoker	-
Callee	-

Module Number	M35
Module Name	Checking Order Slip Details
Purpose Objective	To check the correctness of order slip.
Input	Order Slip and Agreement, Long-Term Purchasing Report
Output	Checked Order Slip
Invoker	-
Callee	-

Module Number	M36
Module Name	Updating Aircraft On Order
Purpose Objective	To update the aircraft on order file.
Input	Checked Order Slip
Output	Aircraft on Order Details
Invoker	-
Callee	-

Module Number	M37
Module Name	Retrieving Long-Term Purchase Report
Purpose Objective	To get the Long-Term Purchase Information.
Input	Invoice, Long-Term Purchase Report
Output	Long-Term Purchase Report, Invoice Details
Invoker	-
Callee	-

Module Number	M38
Module Name	Checking the Payable Amount
Purpose Objective	To check the correctness of the payable.
Input	Invoice Details, Long-Term Purchase Report
Output	Checked Invoice
Invoker	-
Callee	-

Module Number	M39
Module Name	Updating Long-Term Account Payable
Purpose Objective	To check the correctness of the account payable.
Input	Checked Invoice
Output	Invoice Details
Invoker	-
Callee	-



## APPENDIX D

### PROCESS SPECIFICATION



## PROCESS SPECIFICATION

Process 1.1: Data Capturing

Precondition: All data are collected on the paper or document.

Post Condition: All data are stored into the file storage.

BEGIN

GET data from source document

END

Process 1.2: Data Validation & Updating

Precondition: All data are stored in the storage

Postcondition: All data are updated

BEGIN

GET Data from a file storage.

IF data is corrected or updated.

PROCEED to another process

ELSE

EXIT the program

ENDIF

END

Process 1.3: Data Organizing

Precondition: Data are updated, validated, and stored in the file storage.

Postcondition: All data are generated into a report.

BEGIN

GET data

CLASSIFY data into group  
ORGANIZE data into useful format  
GENARATE information  
PRINT report  
END

Process 2.1: Information Analysis.

Precondition: Report is prepared

Postcondition: Analysis result

BEGIN

GET information

CALCULATE statistical trend

DISPLAY result

PRINT result report

END

Process 2.2: Determine Aircraft Specification.

Precondition : Analysis results is ready for case.

Postcondition : Aircraft Specification is determined.

BEGIN

GET analysis result

SUMMARIZE analysis result

FIND aircraft specification

PRINT aircraft specification

END

Process 2.3: Request for List of Aircraft

Precondition: Aircraft Specification is determined.

Postcondition: List of Aircraft is sent.

BEGIN

GET the aircraft specification.

END

Process 2.4: Retrieving List of Aircraft.

Precondition: List of aircraft is prepared.

Postcondition: List of aircraft report is generated.

BEGIN

RETRIEVE list of aircraft.

CHECK list of aircraft.

COMPARE aircraft type

IF match with the aircraft specification.

ADD to the record.

PRINT the aircraft type

ELSE

EXIT the program

ENDIF

END

Process 2.1.1:   Checking Report

Precondition:    Report is prepared

Postcondition:   Report is checked and corrected

BEGIN

    GET   report

    CHECK report

    FIND   error

        IF   error occur

            UPDATE   information

        ELSE

            PRINT   Report

        ENDIF

END

Process 2.1.2:   Calculate Statistical Travel

Precondition:    Information is ready to be calculated.

Postcondition:   Statistical trend result coming out

BEGIN

    GET   information

    CALCULATE   trend analysis

    CALCULATE   average amount

    CALCULATE   standard deviation

    SUMMARIZE   calculation result

    DISPLAY   result

END

Process 2.1.3:   Checking & Correcting Result

Precondition:    Statistical trend result is calculated.

Postcondition:   Statistical trend result is corrected.

BEGIN

    GET   calculated results

    PERFORM   second calculation

    GET   results of second calculation

    COMPARE   the first results with second result

        IF   the result are different

            FIND   the point of error

            CORRECT   the point of error

            DISPLAY   corrected result

        ELSE

            EXIT   the program

        ENDIF

    PRINT   statistical result

END

Process3.1:    Information Analysis

Precondition:    Report is prepared

Postcondition:   Analysis result

BEGIN

    GET   information

    CALCULATE   statistical trends

DISPLAY result  
PRINT result  
END

Process 3.2: Feasibility Analysis

Precondition : List of aircraft report is provided.

Postcondition : Feasibility result of each aircraft type is coming out.

BEGIN

GET list of aircraft report  
SELECT the type of aircraft for analysis  
PERFORM feasibility analysis  
DISPLAY result  
PRINT result

END

Process 3.3: Determine Appropriate Aircraft

Precondition : Feasibility analysis result of each aircraft type comes out.

Postcondition : The most appropriate aircraft is determined.

BEGIN

GET the feasibility analysis result  
COMPARE the analysis result of each aircraft type.  
FIND the best analysis result  
SELECT the most appropriate aircraft

END

Process 3.2.1: Selecting Alternative Aircraft

Precondition: List of Aircraft Report is prepared.

Postcondition: The list of appropriate aircraft is selected.

BEGIN

GET the list of aircraft report

COMPARE the list of aircraft with aircraft specification

SELECT the list of alternative appropriate aircraft

PRINT the list of alternative aircraft

END

Process 3.2.2: Determine Cost & Benefit

Precondition: The list of alternative aircraft is selected.

Postcondition: The net benefits of each alternative are determined.

BEGIN

GET the list of alternative aircraft

CALCULATE cost

CALCULATE benefit

CALCULATE net benefit

PRINT net benefit

END

Process 3.2.3: Preparing Feasibility Report

Precondition: Net benefit for each alternative is provided.

Postcondition: Feasibility report is prepared.



BEGIN

GET the net benefit of each alternative aircraft

COMPARE the net benefit of each alternative aircraft

FIND the most feasibility alternative

PRINT the feasibility report

END

Process 4.1: Determine the Investment Plan

Precondition: The appropriate aircraft is selected.

Postcondition: The investment plan is determined.

BEGIN

GET the amount of investment

CALCULATE the return on investment

CALCULATE the net benefit

PRINT investment plan details

END

Process 4.2: Determine L/T Purchasing Details

Precondition: Investment plan is prepared

Postcondition: Long - Term purchasing is defined

BEGIN

GET investment plan details

CHECK Long-Term purchasing detail

DISPLAY Long-Term purchasing plan

PRINT Long-Term purchasing details

END

Process 4.3: Issue Long - Term Purchasing Plan

Precondition: Long - Term purchasing details are provided.

Postcondition: Long-term purchasing file is updated.

BEGIN

GET Long – Term purchasing details

CHECK Long - Term purchasing details

IF Long – Term purchasing details are valid

UPDATE Long-term purchasing plan file

ELSE

CHECK Long – Term purchasing with investment plans

UPDATE long-term purchasing plan

UPDATE long-term purchasing plan file

ENDIF

END

Process 5.1: Approving Order Details

Precondition: Order details are prepared

Postcondition: Order details are approved

BEGIN

GET order detail

CHECK order details with long-term purchasing plan.

IF order details are valid

APPROVE the order

```

ELSE
    CORRECT the order details
ENDIF

```

```

END

```

Process5.2: Issue Purchase Order

Precondition: Order details are approved.

Postcondition: Purchase Order is issued.

```

BEGIN

```

```

    GET Purchase order detail
    CHECK Purchase order detail with order detail
        IF Purchase order is valid
            UPDATE long-term purchasing file
        ELSE
            CORRECT the purchase order detail
            UPDATE long-term purchasing file
        ENDIF
    GENERATE Purchase order

```

```

END

```

Process 5.3: Order Slip Receiving & Checking

Precondition: Order Slip & Agreement is received.

Postcondition: Order Slip is checked and Aircraft on data file is updated.

```

BEGIN

```

```

    GET order slip

```

```
CHECK  order slip with purchase order  
    IF  order slip is valid  
        UPDATE  aircraft on order file  
    ELSE  
        REQUEST  the new order slip  
    ENDIF
```

END

Process 5.4: Invoice Receiving & Checking

Precondition: Invoice is received

Postcondition: Long -Term Account Payable file is updated.

BEGIN

GET invoice

CHECK invoice

IF invoice is valid

UPDATE long - term account-payable file

ELSE

REQUEST the new invoice

ENDIF

END

Process 5.5: Purchase cancellation

Precondition: Purchase is cancelled

Postcondition: Cancelled Purchase Form is submitted and the Refund is received.

BEGIN

GET Cancelled Purchase Details

CHECK Cancelled Purchase Details

IF Cancelled Purchase Details is valid

PRINT Cancelled Purchase Form

ELSE

REQUEST the valid cancelled purchased details

ENDIF

END

Process 5.3.1: Retrieving L/T Purchasing Report

Precondition : Order Slip and agreement is received

Postcondition : Long - Term purchasing report is generated. \*

BEGIN

GET order Slip

CHECK order slip with long-term purchasing data

IF order slip is valid

GENERATE Long - Term purchasing report

ELSE

REQUEST the new order slip

ENDIF

END

Process 5.3.2:    Checking Order Slip & Details

Precondition :    Long - Term Purchasing report and order slip and details are prepared.

Postcondition:    Order Slip is checked

BEGIN

    GET   order slip

    CHECK   order slip with L/T purchasing report

        IF   order slip is valid

            UPDATE   aircraft on order file

        ELSE

            REQUEST   the new order slip

        ENDIF

END

Process 5.3.3:    Updating Aircraft on Order

Precondition :    Order Slip is checked

Postcondition :    Aircraft on order file is updated

BEGIN

    GET   checked order slip

    UPDATE   aircraft on order file

END

Process 5.4.1:    Retrieving Long - Term Purchase Report

Precondition :    Invoice is received.

Postcondition :    L/T Purchasing report is generated

BEGIN

GET invoice

CHECK invoice with L/T purchasing report

IF invoice is valid

GENERATE long - term purchasing report

ELSE

REQUEST the new invoice

ENDIF

END

Process 5.4.2: Check the payable amount

Precondition : L/T Purchasing report is generated.

Postcondition : The invoice is checked.

BEGIN

GET long - term purchasing report

CHECK long - term purchasing report with invoice

IF long – term purchase report is valid

UPDATE long - term Account payable file

ELSE

REQUEST the new invoice

ENDIF

END

Process 5.4.3: Updating L/T Account Payable



Precondition : Invoice is checked.

Postcondition : Long - Term Account payable file is updated.

BEGIN

GET checked invoice details.

UPDATE long-term Account payable file

END





**APPENDIX E**  
**DATABASE DESIGN**

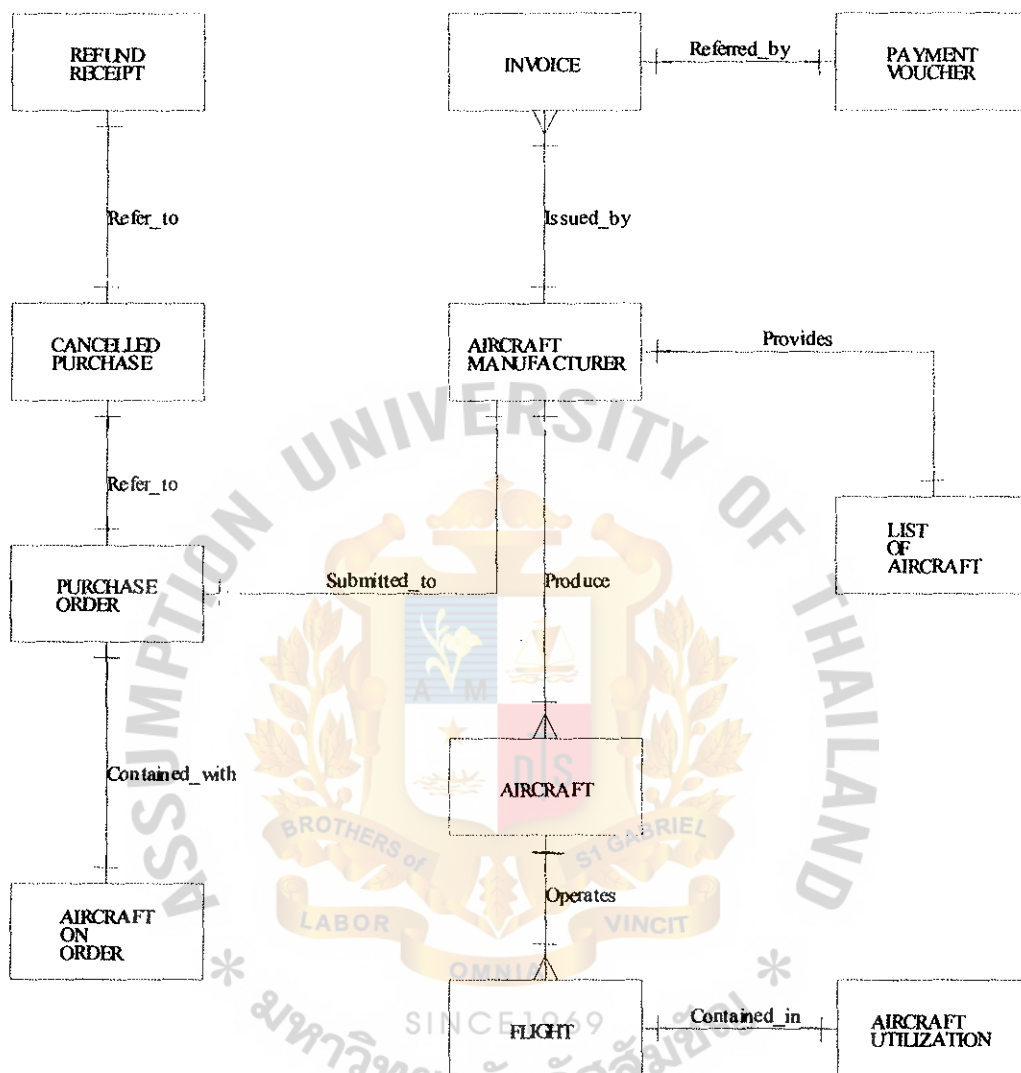


Figure E.1. Context Entity-Relationship Diagram.

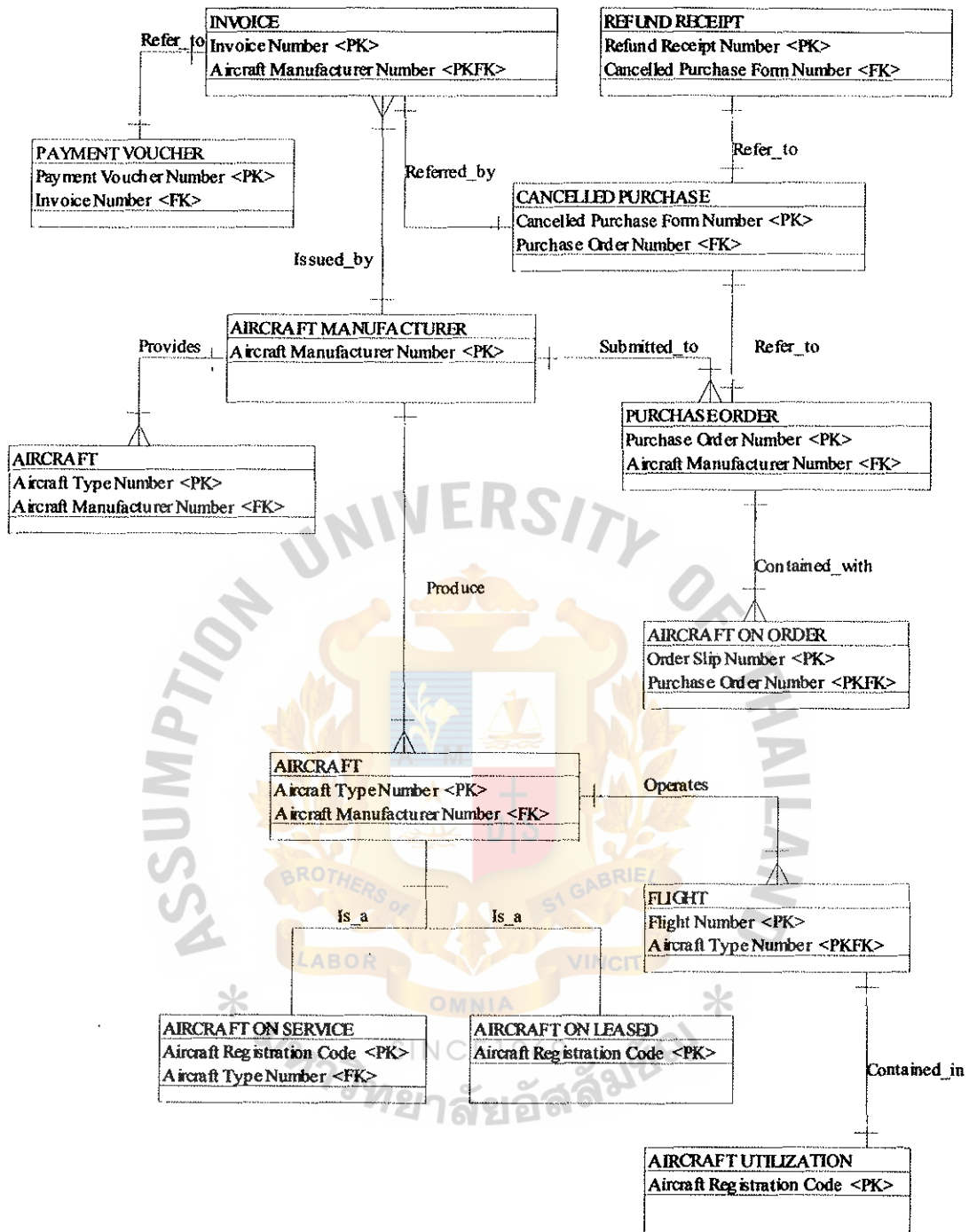


Figure E.2. Key Based Entity-Relationship Diagram.

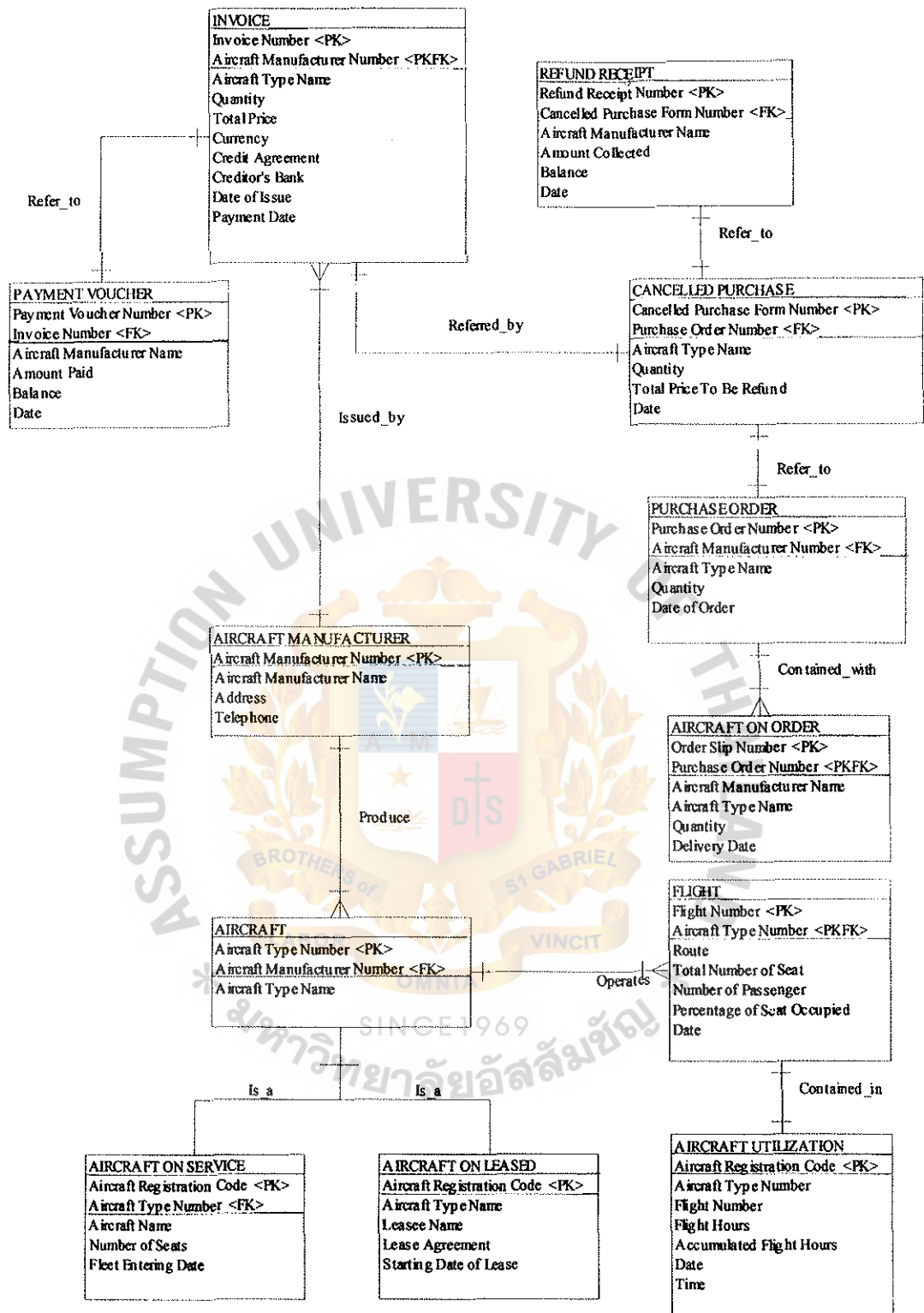


Figure E.3. Fully Attribute Entity-Relationship Diagram.

Table E.1. Normalization Table.

Invoice

PK

PKFK

Invoice No.	Aircraft Manufacturer No.	Aircraft Type Name	Quantity	Total Price
Currency	Credit Agreement	Creditor's Bank	Date of Issue	Payment Date

Payment Voucher

PK

FK

Payment Voucher No.	Invoice No.	Amount Paid	Balance	Date
---------------------	-------------	-------------	---------	------

Aircraft Manufacturer

PK

Aircraft Manufacturer No.	Aircraft Manufacturer Name	Address	Telephone
---------------------------	----------------------------	---------	-----------

List of Aircraft

PK

FK

Aircraft Type No.	Aircraft Manufacturer No.	Aircraft Type Name
-------------------	---------------------------	--------------------

Seat Loading Capacity	Range Capacity	Length of Aircraft	Other Details
-----------------------	----------------	--------------------	---------------

Aircraft

PK

FK

Aircraft Type No.	Aircraft Manufacturer No.	Aircraft Type Name
-------------------	---------------------------	--------------------

Aircraft On Service

PK

FK

Aircraft Registration Code	Aircraft Type Number	Aircraft Name	No.of Seats
Fleet Entering Date			

Table E.1. Normalization Table (Continued).

Aircraft On Leased				
PK				
Aircraft Registration Code	Aircraft Type Name	Leasee Name	Lease Agreement	
Starting Date Of Lease				
Flight				
PK		FK		
Flight No.	Aircraft Type No.	Route	Total Number of Seat	No. of Passenger
Percentage of Seat Occupied	Date			
Aircraft Utilization				
PKFK				
Aircraft Registration Code	Aircraft Type No.	Flight No.	Flight Hours	
Date	Time			
Purchase Order				
PK		FK		
Purchase Order No.	Aircraft Manufacturer No.	Aircraft Type Name	Amount	Date
Cancelled Purchase				
PK		FK		
Cancelled Purchase Form No.	Purchase Order No.	Aircraft Type Name	Quantity	
Total Price To Be Refund	Date			



Table E.1. Normalization Table (Continued).

Refund Receipt		
PK	FK	
Refund Receipt No.	Cancelled Purchased Form No.	Aircraft Manufacturer Name
Amount Collected	Balance	Date
Aircraft On Order		
PK	PKFK	
Order Slip No.	Purchase Order No.	Aircraft Manufacturer Name
Aircraft Type Name	Amount	Delivery Date



**APPENDIX F**  
**DATA DICTIONARY**

## DATA DICTIONARY

### External Entity

Aircraft Purchasing Committee	= * The Representative from each Department comes to meet for the planning of purchasing a new aircraft. *
Aircraft Manufacturer	= * An aircraft company that sells and, manufacture the aircraft such as Boeing, and Airbus.*
Disbursement Control Division	= * Division that controls the cash out flow of the company.
Marketing Department	= * The department that plans the strategy of the company and manages the sale of the company. *
Technical Department	= * The department that handles the aircraft maintenance and record the aircraft usage *
Management	= * The company's management *
Purchase Division	= * The division that is responsible for the purchase duty *

## Data Store

Aircraft on Order	= * The file that stores data about an aircraft on order. *
Cancelled Purchase	= * The file that stores the cancelled purchase of an aircraft.*
List of Aircraft	= * The file that stores data about a list of aircraft. *
Long - Term Account Payable	= * The file that stores data about long – term Account Payable.*
Payment	= * The file that stores the amount paid.*
Purchase	= * The file stores data about purchase.*

## Data Process

Aircraft Ordering	= * The process of ordering an aircraft.*
Approving Long - Term Purchasing Plan	= * The process of approving long-term purchasing plan. *
Approving Order Details	= * The process of approving aircraft order details. *
Calculate Statistical Trend	= * The calculation of trend of traffic demands and aircraft utilization. *
Checking & Correcting Result	= * The checking and correcting the statistical trend of the calculation results. *

Checking Order Slip & Details	= * The process of checking the validity of the order slip sent from the aircraft manufacturer. *
Checking Report	= * Checking the correctness of the generated report. *
Checking the Payable Amount	= * Checking the correctness of the payable amount. *
Data Capturing	= * Collect the traffic demand data, and aircraft utilization from source. *
Data Organizing	= * Organized the captured data into useful format. *
Data Validating and Updating	= * The process of updating and validating data. *
Define Aircraft Specification	= * Define the proposed detail of the Aircraft. *
Determine Appropriate Aircraft	= * Find the appropriate aircraft from the list provided. *
Determine Cost & Benefits	= * To calculate and find the cost and benefits derived from the aircraft. *
Determine Long –Term Purchasing Details	= * Determine the long – term purchasing details such as type of aircraft purchased, and amount. *

Determine the Investment Plan	= * To determine the amount to be invested and the payment. *
Feasibility Analysis	= * To analyze the feasibility from utilizing each type of aircraft. *
Generate Report	= * To run a report from the sources data. *
Information Analysis	= * To analyze the information from the reports.
Invoice Receiving and Checking	= * To check the correctness of the invoice received. *
Issue Long – Term Purchasing Plan	= * To issue the long – term purchasing Plan. *
Issue Purchase Order	= * To issue purchase order.
Order Slip Receiving and Checking	= * To check the correctness of order slip received. *
Preparing Feasibility Report	= * To prepare the feasibility report after the feasibility analysis. *
Preparing Long – Term Purchasing Plan	= * To prepare long-term purchasing for the ordering processs. *
Purchase Cancellation	= * To cancel the purchase order sent to the aircraft Manufacturer.*
Request for List of Aircraft	= * To request the list of aircraft from the aircraft manufacturer for the selection process. *

Retrieving Long – Term Purchasing Report	= * To retrieve the long-term purchasing report for the ordering process. *
Retrieving List of Aircraft	= * To retrieve the list of aircraft for the selection process. *
Selecting Alternative Aircraft	= * To select the list aircraft from the list of aircraft file. *
Selecting Appropriate Aircraft	= * To select the most suitable aircraft according to the specification. *
Updating Aircraft on Order	= * To update aircraft on order file. *
Updating Long – Term Account Payable	= * To update long-term account payable file. *
<b>Data Flow</b>	
Aircraft on Order Details	= * The description of aircraft on order such as seat load capacity, and range capacity. *
Aircraft on Order Report	= * The Report of aircraft on order that contains the aircraft type, quantity, and delivery date.
Aircraft Specification	= * The proposed details of aircraft in seat loading capacity, and range capacity. *
Aircraft Utilization	= * The data about the utilization of the aircraft's quantified hours in flight. *



Aircraft Utilization Report	= * The Report that contains the accumulated flight hours of each aircraft. *
Amount Paid	= * The amount paid to the aircraft manufacturer. *
Analyzed Information	= * The information from the report that is analyzed. *
Approved Long – Term Purchasing Plan	= * The long-term purchasing plan of the aircraft that has already been checked and approved. *
Approved Order Details	= * The details in the order such as aircraft type, and quantity of order that has already been approved. *
Calculated Result	= * The result from statistical trend calculation. *
Cancelled Purchase Details	= * The description of the cancelled purchase such as aircraft type quantity, and purchase order number. *
Cancelled Purchase Form	= * The document that contains the details of the cancelled purchase. *
Captured Data	= * The traffic demand data, and aircraft utilization data that are captured. *

Checked Invoice	= * The invoice that has been checked for the correctness in amount and payment date. *
Checked Order Slip	= * The order slip that has been checked for the correctness in accordance with the order details. *
Checked Report	= * The generated report that has been checked for the correctness. *
Determined Net Benefits	= * Net benefits that derived from the utilization of each aircraft. Calculate Benefits – Cost . *
Determined Aircraft Specification	= * The proposed details of the aircraft such as seat loading capacity, and range capacity are determined. *
Feasibility Report	= * The report that shows the feasibility analysis result of each aircraft type. *
Investment Plan Details	= * The details that show the investment amount and the payment. *
Invoice	= * The document that the company received to make a payment to the aircraft manufacturer. *
Invoice Details	= * The details contained in the invoice such as amount to be paid, details of purchase, and payment due date. *

Long – Term Purchasing Details	= * The details of long-term purchasing that containing the aircraft type, and quantity. *
List of Aircraft Report	= * Report containing the details of each type of aircraft. *
List of Aircraft and Details	= * The list containing the details of each aircraft such as loading capacity, and range capacity. *
Long – Term Purchasing Details	= * The details of aircraft purchasing that are aircraft type, and quantity. *
Long – Term Account Payable Report	= * The report of long-term account payable to be paid to the aircraft manufacturer showing the payment date with amount and creditor name. *
Long – Term Purchasing Plan	= * The details of aircraft purchasing in the plan. *
Long – Term Purchasing Report	= * The report that shows the details of the aircraft purchasing in the future. *
Order Details	= * The details of the aircraft ordering, aircraft type, manufacturer name, and quantity. *

Order Slip and Agreement	= * The document that received from the aircraft manufacturer stating that the order is taken and confirming the sale in accordance with the purchase order. *
Purchase Order	= * The document that contains a details of aircraft purchase such as aircraft type, and quantity. *
Purchase Order Details	= * The details in purchase order. *
Refund Amount	= * The amount that must be refunded after the purchase cancellation. *
Selected Aircraft Details	= * The details of selected aircraft such as loading capacity, and range capacity. *
Selected Alternative Aircraft	= * The list of aircrafts that are selected to perform the feasibility analysis. *
Traffic Demand	= * The data about the passenger quantity on each flight. *
Traffic Demand Report	= * The report that shows the quantity of passenger on each route and flight. *
Validated and Updated Data	= * The traffic demand data, flight personnel data, aircraft utilization data , and equipment data that has been updated, and validated. *



## APPENDIX G

### USER INTERFACE DESIGN

User Log In

THAI AIRLINES COMPANY LIMITED

User ID: N-197115606

Password: xxxxxxx

ENTER

Figure G.1. User Log in Screen.



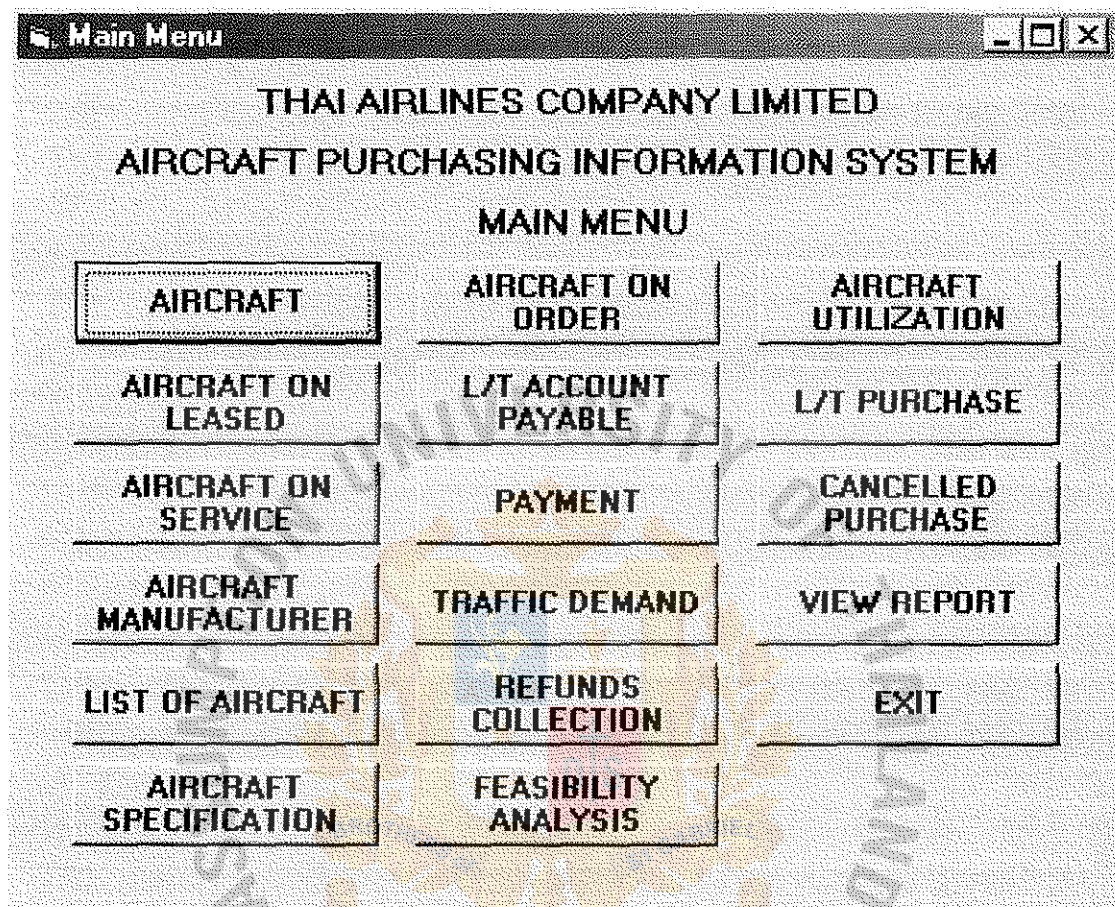


Figure G.2. Main Menu Screen.



**Aircraft**

**AIRCRAFT**

**Aircraft Type Number:**

**Aircraft Manufacturer Number:**

**Aircraft Type Name:**

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.3. Aircraft Information Screen.

**Aircraft on Service**

**AIRCRAFT ON SERVICES**

**Aircraft Registration Code:** HS-TAA

**Aircraft Type Number:** 773

**Aircraft Name:** Pran Buri

**Number of Seat:** 390

**Fleet Entering Date:** 1/9/1999

BACK FORWARD

ADD DELETE

EXIT

Figure G.4. Aircraft on Service Screen.



**Aircraft on Leased**

### AIRCRAFT ON LEASED

**Aircraft Registration Code:**

**Aircraft Type Name:**

**Leasee Name:**

**Lease Agreement ( Year):**

**Date of Starting Leased:**

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.5. Aircraft on Leased Screen.

**Traffic Demand**

### TRAFFIC DEMAND

**Flight Number:** TX100

**Aircraft Type Number:** 734

**Route:** BKK/CNX

**Total Number of Seat:** 120

**Number of Passenger:** 100

**Percentage of Seat Occupied:** 83

**Date:** 1/1/00

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.6. Traffic Demand Screen.



**Aircraft Utilization**

### AIRCRAFT UTILIZATION

**Aircraft Registration Code:**

**Aircraft Type Name:**

**Flight Number:**

**Flight Hours:**

**Accumulated Flight Hours:**

**Date:**

**Time:**

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.7. Aircraft Utilization Screen.

**Long-Term Purchase Order**

### LONG-TERM PURCHASE ORDER

**Purchase Order Number:**

**Aircraft Manufacturer Number:**

**Aircraft Type Name:**

**Quantity:**

**Date of Order:**

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.8. Long-Term Purchase Screen.



**Aircraft on Order**

### AIRCRAFT ON ORDER

Order Slip Number:

Purchase Order Number:

Aircraft Manufacturer Name:

Aircraft Type Name:

Quantity:

Deliverly Date:

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.9. Aircraft on Order Screen.



**Cancelled Purchase**

**CANCELLED PURCHASE**

**Cancelled Purchase Form Number:** 240001

**Purchase Order Number:** 100004

**Aircraft Type Name:** ATR-72

**Quantity:** 1

**Amount To Be Refund (\$):** 27,000,000

**Date:** 10/4/00

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.10. Cancelled Purchase Screen.

**Refunds Collection**

**REFUNDS COLLECTION**

**Refund Receipt Number:** 100022

**Cancelled Purchase Form Number:** 240001

**Aircraft Manufacturer Name:** Aero Liner

**Amount Collected (\$):** 7,000,000

**Balance (\$):** 20,000,000

**Date:** 15/5/00

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.11. Refunds Collection Screen.



**Long-Term Account Payable**

### LONG-TERM ACCOUNT PAYABLE

Invoice Number:	24001
Aircraft Manufacturer Number:	11
Aircraft Type Name:	B777-300
Quantity:	1
Total Price:	162,950,555.00
Currency:	US DOLLAR
Credit Agreement (Years):	2YRS
Creditor's Bank:	Bank of America
Date of Issue:	10/3/00
Payment Date:	10/3/02

BACK	FORWARD
ADD	DELETE
EXIT	

Figure G.12. Long-Term Account Payable Screen.

**Payment**

**PAYMENT**

**Payment Voucher Number:** 255688

**Invoice Number:** 25001

**Aircraft Manufacturer Name:** Airbus

**Amount Paid (\$):** 45,500,000.00

**Balance (\$):** 45,500,000.00

**Date:** 10/4/00

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.13. Payment Screen.



Aircraft Searching

X

AIRCRAFT SEARCHING

☒

Seat Load Capacity:

360

to

400

☒

Maximum Range Capacity (kms):

9,000

☒

Maximum Price(Dollars):

200,000,000

Aircraft Manufacturer

☒ Boeing

☒ Airbus

☐ AeroLiner

☐ Others

SEARCH

STOP

Figure G.14. Aircraft Searching Screen.

**Aircraft Manufacturer**

**AIRCRAFT MANUFACTURER**

**Aircraft Manufacturer Number:** 11

**Aircraft Manufacturer Name:** Boeing

**Address:** 1248 Boeing Company , Highw

**Telephone Number:** 100-225-655-5888

**BACK** **FORWARD**

**ADD** **DELETE**

**EXIT**

Figure G.15. Aircraft Manufacturer Information Screen.



**Aircraft Specification Searching**

### AIRCRAFT SPECIFICATION SEARCHING

**Report**

☒ Monthly  to

☐ Yearly  to

Route:

**SEARCH**

**STOP**

Figure G.16. Aircraft Specification Searching Screen.



**Feasibility Analysis**

## FEASIBILITY ANALYSIS

**Aircraft Type:**

**Aircraft Manufacturer:**

**ENTER**

**VIEW REPORT**

Figure G.17. Feasibility Analysis Screen.



## APPENDIX H

### OUTPUT REPORT DESIGN

Traffic Demand Report							
Date	Flight No.	Route	Aircraft Type	Number	Total No. of Seat	No. of Passenger	Percentage of Seat Occupied (%)
1/1/00	TX402	BKK/SIN	333		358	300	84
1/1/00	TX100	BKK/CNX	734		150	100	83
1/1/00	TX412	BKK/JKT	734		150	90	60
1/1/00	TX602	BKK/HKG	333		358	350	97
1/1/00	TX652	BKK/KMG	360		265	265	100
1/1/00	TX200	BKK/HKT	333		358	358	100
1/1/00	TX668	BKK/PNH	734		150	105	70
1/1/00	TX992	BKK/SYD	773		390	350	90
1/1/00	TX120	BKK/CEI	360		265	260	98
1/1/00	TX302	BKK/RGN	734		150	123	82
1/1/00	TX102	BKK/CNX	734		150	150	100
1/1/00	TX202	BKK/HKT	773		390	390	100
1/1/00	TX250	BKK/HYD	734		150	150	100
1/1/00	TX690	BKK/TPE	333		358	350	98
1/1/00	TX101	CNX/BKK	734		150	140	94
1/1/00	TX404	BKK/SIN	773		390	390	100
1/1/00	TX669	PNH/BKK	734		150	145	97
1/1/00	TX252	BKK/HYD	360		265	265	100
1/1/00	TX201	HKT/BKK	333		358	358	100

Figure H.1. Traffic Demand Report.

# Traffic Demand Monthly Report by Route

As of January, 2000

Flight No.	Route	Aircraft Type No.	Total No. of Seat	No. of Passenger	Percentage of Seat Occupied (%)
TX100	BKK/CNX	734	4,500	3,500	78
TX102	BKK/CNX	734	4,500	3,350	74
TX104	BKK/CNX	734	4,500	3,000	67
TX106	BKK/CNX	333	10,740	8,000	75
			24,240	17,850	74
TX120	BKK/CEI	360	7,950	6,850	87
TX122	BKK/CEI	734	4,500	4,300	95
TX124	BKK/CEI	360	7,950	7,000	89
			20,400	18,150	89

Figure H.2. Traffic Demand Monthly Report by Route.

## Traffic Demand Annual Report by Route

As The End of Year 2000

Flight No.	Route	Aircraft Type	No. of Seat	No. of Passenger	Percentage of Seat Occupied (%)
TX100	BKK/CNX	734	54,000	50,000	93
TX102	BKK/CNX	734	54,000	52,500	97
TX104	BKK/CNX	734	27,000	21,050	78
TX106	BKK/CNX	333	64,440	59,855	93
TX108	BKK/CNX	333	128,880	100,000	78
			328,320	283,405	86
TX120	BKK/CEI	360	95,400	92,000	96
TX122	BKK/CEI	734	54,000	52,500	97
TX124	BKK/CEI	360	95,400	91,555	95
			244,800	236,058	96
TX200	BKK/HKT	333	128,880	120,000	93
TX202	BKK/HKT	773	131,040	129,500	97
TX204	BKK/HKT	773	131,040	129,995	99
			390,960	379,495	97

Figure H.3. Traffic Demand Annual Report by Route.

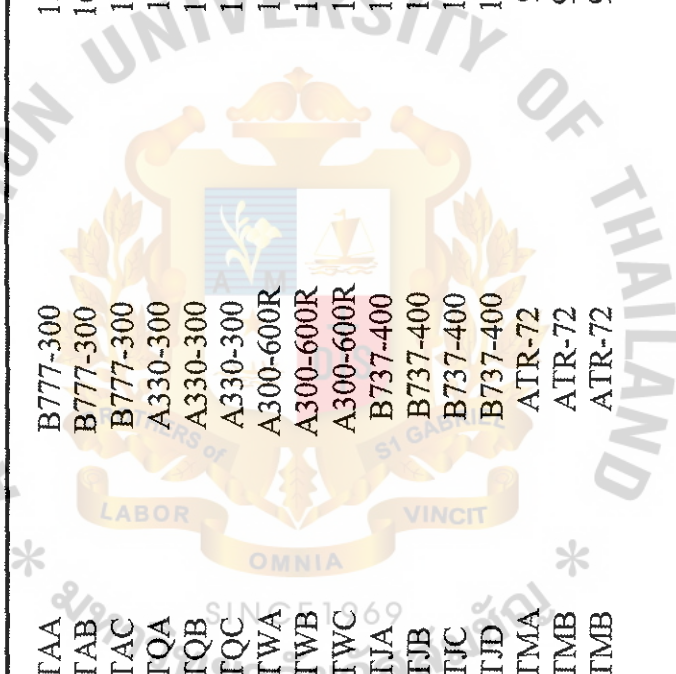
Aircraft Utilization Report						
Aircraft Registration Code	Aircraft Type Name	Flight No.	Flight Hours	Accumulated Flight Hours	Date	Time
HS-TJA	B737-400	TX100	1:10	5,690	15/3/00	0845
HS-TWB	A300-600R	TX652	1:50	7,050	15/3/00	0900
HS-TJA	B737-400	TX101	1:10	7,051	15/3/00	1045
HS-TJC	B737-400	TX412	3:30	6,951	15/3/00	1100
HS-TJB	B737-400	TX668	1:15	7,053	15/3/00	1115
HS-TQC	A330-300	TX602	2:45	9,063	15/3/00	1130
HS-TQA	A330-300	TX200	1:20	10,635	15/3/00	1145
HS-TAA	B737-400	TX992	9:30	12,256	15/3/00	1200
HS-TWA	A300-600R	TX120	1:20	9,650	15/3/00	1200
HS-TJD	B737-400	TX302	1:15	7,095	15/3/00	1215
HS-TWB	A300-600R	TX653	1:45	7,052	15/3/00	1215

Figure H.4. Aircraft Utilization Report.



### Aircraft Utilization Summary Report

Aircraft Registration Code	Aircraft Type Name	Accumulated Flight Hours
HS-TAA	B777-300	15,050
HS-TAB	B777-300	16,550
HS-TAC	B777-300	17,500
HS-TQA	A330-300	13,200
HS-TQB	A330-300	12,500
HS-TQC	A330-300	11,210
HS-TWA	A300-600R	12,500
HS-TWB	A300-600R	11,952
HS-TWC	A300-600R	11,658
HS-TJA	B737-400	11,565
HS-TJB	B737-400	12,580
HS-TJC	B737-400	10,560
HS-TJD	B737-400	12,556
HS-TMA	ATR-72	9,980
HS-TMB	ATR-72	9,980
HS-TMB	ATR-72	9,520



Aircraft Registration Code	Aircraft Type Name	Accumulated Flight Hours
HS-TAA	B777-300	15,050
HS-TAB	B777-300	16,550
HS-TAC	B777-300	17,500
HS-TQA	A330-300	13,200
HS-TQB	A330-300	12,500
HS-TQC	A330-300	11,210
HS-TWA	A300-600R	12,500
HS-TWB	A300-600R	11,952
HS-TWC	A300-600R	11,658
HS-TJA	B737-400	11,565
HS-TJB	B737-400	12,580
HS-TJC	B737-400	10,560
HS-TJD	B737-400	12,556
HS-TMA	ATR-72	9,980
HS-TMB	ATR-72	9,980
HS-TMB	ATR-72	9,520

Figure H.5. Aircraft Utilization Summary Report.



Seat Load Capacity = 360-400 Max. Range Capacity (kms) = 9,000 Max. Price (\$) = 200,000,000					
Aircraft List and Details Report					
Aircraft Manufacturer Name	Aircraft Type Name	Seat Load Capacity	Range Capacity(kms)	Price (\$)	
Airbus	A340-300	405	8,250	170,000,000	
Airbus	A340-400	405	9,000	180,000,000	
Airbus	A3XX	520	10,000	200,000,000	
Boeing	B777-400	415	10,000	198,000,000	
Boeing	B747-400	405	9,588	180,000,000	

Figure H.6. Aircraft List and Details Report.

Aircraft Specification Report			
Route = BKK/CNX			
Monthly = Jun, 99-Jun, 00			
Seat Load Capacity	Maximum Range Capacity(kms)	Budget Limited (\$)	
75-120	4,000	150,000,000	
150-265	6,000	155,000,000	
300-400	8,000	200,000,000	
265-360	7,000	180,000,000	

Figure H.7. Aircraft Specification Report.

Long - Term Purchase Report					
Purchase Order No.	Aircraft Manufacturer No.	Aircraft Manufacturer Name	Aircraft Type Name	Quantity	Date of Order
100001	11	Boeing	B777-300	1	10/10/99
100002	12	Airbus	A330-300	2	10/10/99
100003	11	Boeing	B747-400	1	1/12/99
100004	13	Aero Liner	ATR-72	1	1/12/99
100005	13	Aero Liner	ATR-72	1	10/3/00
100006	12	Airbus	A300-600	1	15/3/00

Figure H.8. Long-Term Purchase Report.

Long – Term Purchase Report by Aircraft Manufacturer					
Purchase Order No.	Aircraft Manufacturer No.	Aircraft Manufacturer Name	Aircraft Type Name	Quantity	Date of Order
100001	11	Boeing	B777-300	1	10/10/99
100003	11	Boeing	B747-400	1	1/12/99
				2	
100002	12	Airbus	A330-300	2	10/10/99
100006	12	Airbus	A300-600R	1	15/3/00
				3	
100004	13	Aero Liner	ATR-72	1	1/12/99
100005	13	Aero Liner	ATR-72	1	10/3/00
				2	

Figure H.9. Long-Term Purchase Report by Aircraft Manufacturer.

Cancelled Purchase Report					
Cancelled Purchase Form No.	Purchase Order No.	Aircraft Type Name	Quantity	Total Price To Be Refund (\$)	Date
240001	100004	ATR-72	1	27,000,000	10/4/00
240002	100020	BAE146	2	60,000,000	20/5/00
240003	100021	B737-400	1	200,000,000	30/5/00
240004	100030	ATR-72	1	27,000,000	30/5/00

Figure H.10. Cancelled Purchase Report.

Refund Collection Report					
Refund Receipt No.	Cancelled Purchase Form No.	Aircraft Manufacturer Name	Amount Collected (\$)	Balance (\$)	Date
100021	240001	Aero Liner	7,000,000	20,000,000	15/5/00
100022	240002	British Aero Space	30,000,000	30,000,000	15/6/00
100023	240003	Boeing	-	200,000,000	15/6/00
100024	240004	Aero Liner	-	27,000,000	15/6/00

Figure H.11. Refund Collection Report.

Refund Collection Summary Report by Aircraft Manufacturer					
Refund Receipt No.	Cancelled Purchase Form No.	Aircraft Manufacturer Name	Amount Collected (\$)	Balance (\$)	Date
100021	240001	Aero Liner	7,000,000	20,000,000	15/5/00
100024	240004	Aero Liner	-	27,000,000	15/6/00
				<u>47,000,000</u>	
100022	240002	British Aero Space	30,000,000	30,000,000	15/6/00
				<u>30,000,000</u>	
100023	240003	Boeing	-	200,000,000	15/6/00
				<u>200,000,000</u>	
				<u>277,000,000</u>	

Figure H.12. Refund Collection Summary Report by Aircraft Manufacturer.



Aircraft on Order Report					
Order Slip No.	Purchase Order No.	Aircraft Manufacturer Name	Aircraft Type Name	Quantity	Delivery Date
110001	100001	Boeing	B777-300	1	15/1/01
110002	100003	Boeing	B747-400	1	1/3/01
120003	100002	Airbus	A330-300	2	15/1/01
120004	100006	Airbus	A300-600R	1	1/3/01
110005	100007	Boeing	B777-400	2	10/2/03
130006	100004	Aero Liner	ATR-72	1	1/3/01

Figure H.13. Aircraft on Order Report.

Aircraft on Order Report by Delivery Date				
Order Slip No.	Purchase Order No.	Aircraft Manufacturer Name.	Aircraft Type Name	Quantity Delivery Date
110001	100001	Boeing	B777-300	1 15/1/01
120003	100002	Airbus	A330-300	2 15/1/01
				<u>3</u>
110002	100003	Boeing	B747-400	1 1/3/01
130006	100004	AeroLiner	ATR-72	1 1/3/01
120004	100006	Airbus	A300-600R	1 1/3/01
				<u>3</u>
110005	100007	Boeing	B777-400	2 10/2/03
				<u>2</u>

Figure H.14. Aircraft on Order Report by Delivery Date.

Long – Term Account Payable Report					
Invoice No.	Aircraft Manufacturer Name	Credit Amount (\$)	Credit Term (Year)	Date of Issue	Payment Date
24001	Boeing	162,000,000	2	10/3/00	10/3/02
25001	Airbus	216,950,000	3	10/3/00	10/3/03
25002	Airbus	81,000,000	2	15/6/00	15/6/03
24002	Boeing	182,000,000	3	30/6/00	30/6/03
24003	Boeing	195,000,000	3	30/6/00	30/6/02
26001	Aero Liner	27,950,000	1	30/3/00	30/3/01
		<u>865,851,115</u>			

Figure H.15. Long-Term Account Payable Report.

Long – Term Account Payable Summary Report by Creditor’s Name					
Invoice No.	Aircraft Manufacturer Name	Credit Amount (\$)	Credit Term (Year)	Date of Issue	Payment Date
24001	Boeing	162,000,000	2	10/3/00	10/3/02
24002	Boeing	182,000,000	3	30/6/00	30/6/03
24003	Boeing	195,000,000	3	30/6/00	30/6/03
		<u>639,951,115</u>			
25001	Airbus	216,950,000	3	10/3/00	10/3/03
25002	Airbus	81,000,000	2	15/6/00	15/6/02
		<u>297,950,000</u>			
26001	Aero Liner	27,950,000	1	30/3/00	30/3/01
		<u>27,950,000</u>			
		<u>865,851,115</u>			

Figure H.16. Long-Term Account Payable Summary Report by Aircraft Manufacturer.

Long -- Term Account Payable Summary Report by Payment Date					
Invoice No.	Aircraft Manufacturer Name	Credit Amount (\$)	Credit Term (Year)	Date of Issue	Payment Date
24002	Boeing	182,000,000	3	30/6/00	30/6/03
24003	Boeing	195,000,000	3	30/6/00	30/6/03
		<u>377,000,000</u>			
24001	Boeing	162,950,000	2	10/3/00	10/3/02
		<u>162,950,000</u>			
25001	Airbus	216,950,000	3	10/3/00	10/3/03
		<u>216,950,000</u>			
25002	Airbus	81,000,000	2	15/6/00	15/6/02
		<u>81,000,000</u>			
26001	Aero Liner	27,000,000	1	30/3/00	30/3/01
		<u>27,000,000</u>			
		<u>865,851,115</u>			

Figure H.17. Long-Term Account Payable Summary Report by Payment Date.

Payment Report						
Payment Voucher No.	Invoice No.	Aircraft	Manufacturer Name	Amount Paid(\$)	Balance(\$)	Date
255685	24001		Boeing	62,950,000	100,000,000	6/6/00
255686	25001		Airbus	16,950,000	100,000,000	30/6/00
255687	26001		Aero Liner	10,000,000	17,000,000	30/6/00
255688	25002		Airbus	45,000,000	45,000,000	30/7/00
255689	24002		Boeing	82,000,000	100,000,000	9/10/00

Figure H.18. Payment Report.



### Aircraft on Service Report

Aircraft Registration Code	Aircraft Type Name	Aircraft Name	No. of Seat	Fleet Entering Date
HS-TAA	B777-300	Pranburi	390	1/9/1999
HS-TAB	B777-300	Petchburi	390	1/9/1999
HS-TAC	B777-300	Nakorn Sawan	390	1/9/1999
HS-TQA	A330-300	Ang Thong	358	15/9/1999
HS-TQB	A330-300	Lop Buri	358	30/10/1999
HS-TQC	A330-300	Sara Buri	358	30/10/1999
HS-TQD	A330-300	Surat Thani	358	30/10/1999
HS-TWA	A300-600	Narathiwat	265	1/9/1999
HS-TWB	A300-600	Chaing Khan	265	1/9/1999
HS-TWC	A300-600	Chaing Sean	265	1/9/1999
HS-TJA	B737-400	Si Trang	150	15/9/1999
HS-TJB	B737-400	Si Saket	150	15/9/1999
HS-TJC	B737-400	Ranong	150	20/10/1999
HS-TJD	B737-400	Chumphorn	150	20/10/1999
HS-TMA	ATR-72	Samut Prakarn	80	1/9/1999
HS-TMB	ATR-72	Samut Sakorn	80	9/9/1999
HS-TMC	ATR-72	Samut Songkram	80	30/9/1999

Figure H.19. Aircraft on Service Report.

Aircraft on Service Summary Report		
Aircraft Type No.	Aircraft Type Name	Amount
773	B777-300	3
333	A330-300	4
360	A300-600R	3
734	B737-400	4
720	ATR-72	3
		<u>17</u>

Figure H.20. Aircraft on Service Summary Report.

### Aircraft on Leased Report

Aircraft Registration Code	Aircraft Type Name	Leasee Name	Lease Agreement (Year)	Lease Starting Date
HS-THA	Dash-8	Myanmar Airlines	10	10/12/99
HS-THB	Dash-8	Myanmar Airlines	10	10/12/99
HS-THC	Dash-8	Lao Aviation	10	15/1/00
HS-THD	Dash-8	Lao Aviation	10	15/1/00
HS-TKA	BAE-146	Myanmar Airlines	10	20/1/00
HS-TKB	BAE-146	Myanmar Airlines	10	20/1/00
HS-TMD	ATR-72	Air Cambodia	10	25/5/00
HS-TME	ATR-72	Air China	10	30/6/00
HS-TJD	B737-400	Angle Airlines	15	30/6/00

Figure H.21. Aircraft on Leased Report.

Feasibility Analysis Report				
Aircraft Type	Expected Maintenance Cost Per Year (\$)	Benefit Derived Per Year (\$)	Net Benefit Per Year (\$)	
A330-300	XXXXXX	XXXXXXXXXX	XXXXXX	
B777-200	XXXXXXXX	XXXXXXXXXX	XXXXXX	
B777-300	XXXXXXXX	XXXXXXXXXX	XXXXXX	

Figure H.22. Feasibility Analysis Report.

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