

Chapter 4

Present Configuration of
Thai Airways International's Computer system

Thai Airways International Company started using an IBM System/360 model 40 for online application in 1971. The system is named Reservation Operation Yield and Load maximizing system (ROYAL). The major applications are

- 1 Seat reservation, for reservation, general inquiry, flight detail, flight confirmation.
- 2 Space control, for passenger and load maximizing.
- 3 Message switching, for sending and receive data related to flight plan, low and high priority messages.

Royal system use Teleprocessing for both domestic and international communication. The system is linked to SITA* network in order to communicate with remotely attached terminals.

Few years later, the central processing unit was changed to IBM System 370 model 145. Due to the application has a rapidly growth, in 1978 the system is change to System 3031 with 2 Megabyte of storage. In 1981, the main frame is changed to IBM model 4341 group 2 with 4 Megabyte of real storage and run under ACP/TPF** control program

Batch processing run under OS/VS1 operating system. Seven jobs can be executed at the same time because the system was designed to have 7 partitions. In 1979, Data base application was introduced in order to support more functions. Data base and Data Communication run under CICS. There are 3 main applications that run by using CICS online.

1 Flight Kitchen System. This application is used to process flight catering at Bangkok Airport for both Thai Airlines and International Airlines.

2 M&E (Maintenance and Engineering). This application is used to process aircraft maintenance, spare parts stock location and quantity, stock level control, usage record etc.

*SITA Societe International de Telecommunication Aeronautiques.

**ACP/TPF = Airline Control Program / Transaction Processing Facility.

3 TARA (Thai Airways International Revenue Accounting). This application used to process revenue and accounting, account receivable, personnel record etc.

Present Thai Airways internationals 's Computer systems separate by mainframe, system control program and main applications (as of December 1983)

SYSTEM No 1 : Airline Application, run under ACP/TPF, a total online system that has an objective of minimum system downtime and general response time should be less than 3 seconds. More application are being developed to run under this system. However, the current applications are:

1 ROYAL (Passenger Reservation)

- 1.1 Passenger Space Control
- 1.2 Passenger Reservation
- 1.3 Online Schedule Change
- 1.4 Message Switching
- 1.5 DRS: Direct Reference System
- 1.6 FQT: Fare Quotation and Ticketing
- 1.7 ROYAL-SASCO Interface
- 1.8 Miscellaneous
 - 1.8.1 TAREX: Multi-access Travel Agent System
 - 1.8.2 New AIRIMP Format
 - 1.8.3 ROYAL Improvement
 - 1.8.3 TPD: Through Processing Departure

2 DCS (Departure Control System)

- 2.1 Passenger Check in
- 2.2 Weight and Balance
- 2.3 Boarding-Pass Issuance

3 ORCHIDS (Online Revenue Cargo Handling & Information Distributed System)

- 3.1 Cargo Space Control
- 3.2 Cargo Reservation
- 3.3 Online Schedule Change
- 3.4 Import
- 3.5 Export
- 3.6 Warehouse Control
- 3.7 ULD Control

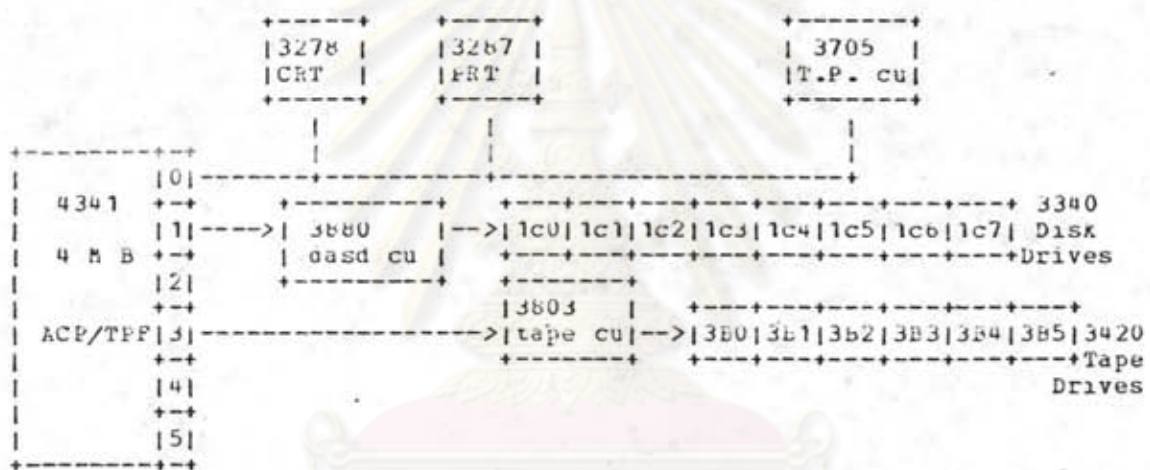
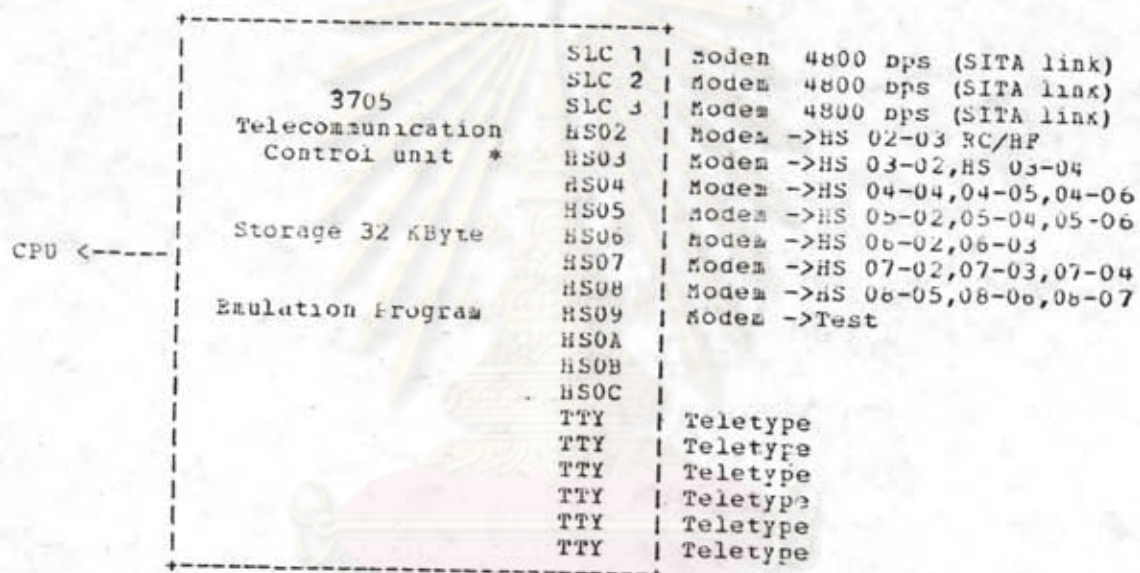


Figure 4-1 Present system configuration for ACP/TPF System

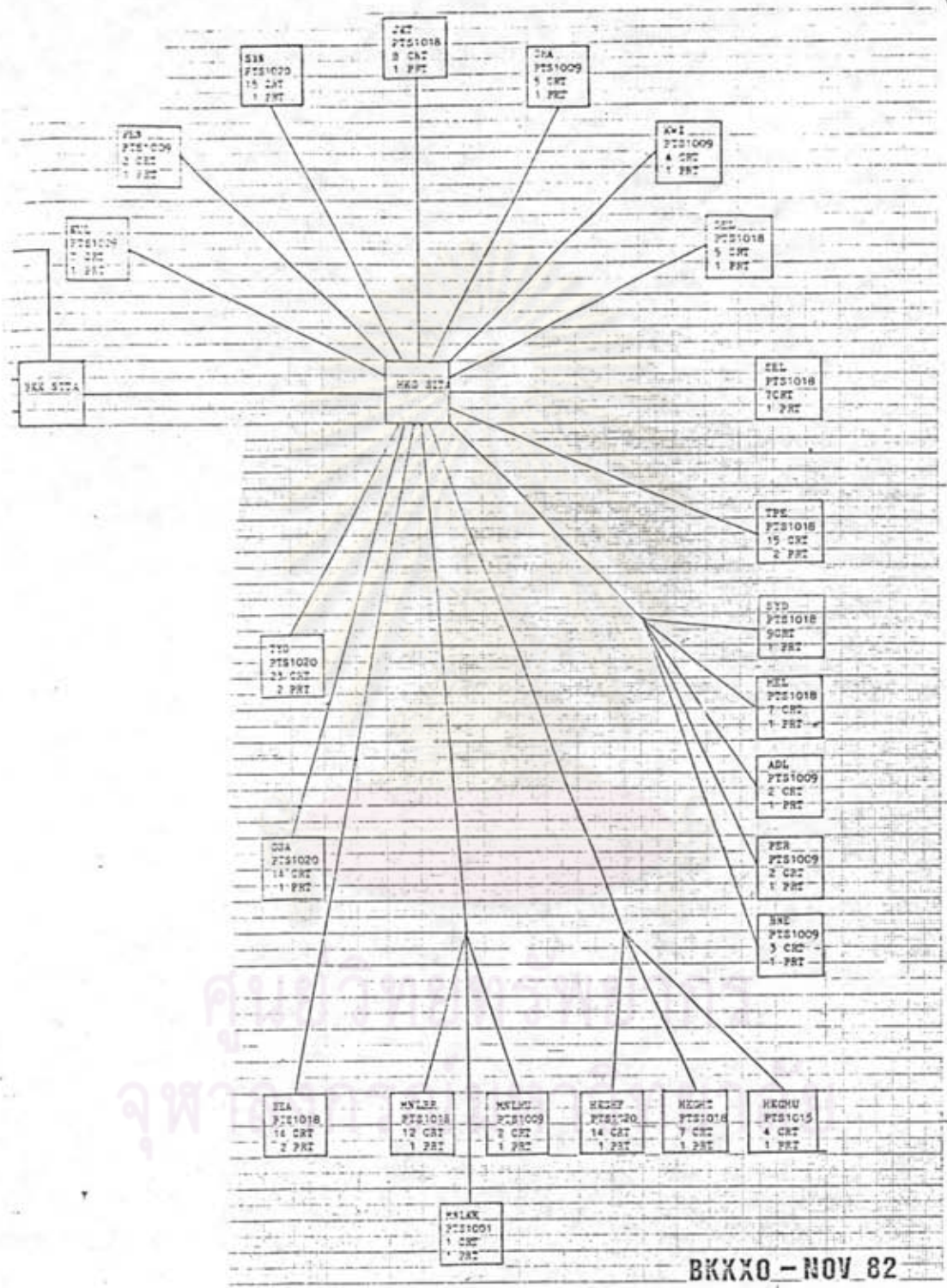
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Figure 4-2 Diagram of communication lines for ACP/TPF System

* See Detail in Appendix A



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Figure 4-3 Diagram of SITA networks

SYSTEM No 2 : Data base application, which is an interactive online application for inquiry, update, data entry, batch processing handled by CICS/VS* which run under OS/VS1. Main frame is CPU model 3031 with 4 Megabytes of real storage. There are 4 applications in this system.

1 FLIGHT KITCHEN SYSTEM

- 1.1 Menu Costing
- 1.2 Inventory Accounting
 - 1.2.1 Raw Material
 - 1.2.2 Sales and Services
- 1.3 Flight Data Base
- 1.4 Menu-Pricing

2 MAINTENANCE AND ENGINEERING

- 2.1 Material System for
 - 2.1.1 Aircraft Spare Parts
 - 2.2.2 Ground Support Equipment
 - 2.2.2 Inventory Planning and Forecasting
- 2.2 Reliability System (SAS RELS)
- 2.3 Rotables Control (SAS ROCO)
- 2.4 Modification Control (SAS MOCO)
- 2.5 Bill of Work for A/C (SAS BOWAC)
- 2.6 Information Storage and Retrieval (SAS ISR)

3 TARA (REVENUE ACCOUNTING)

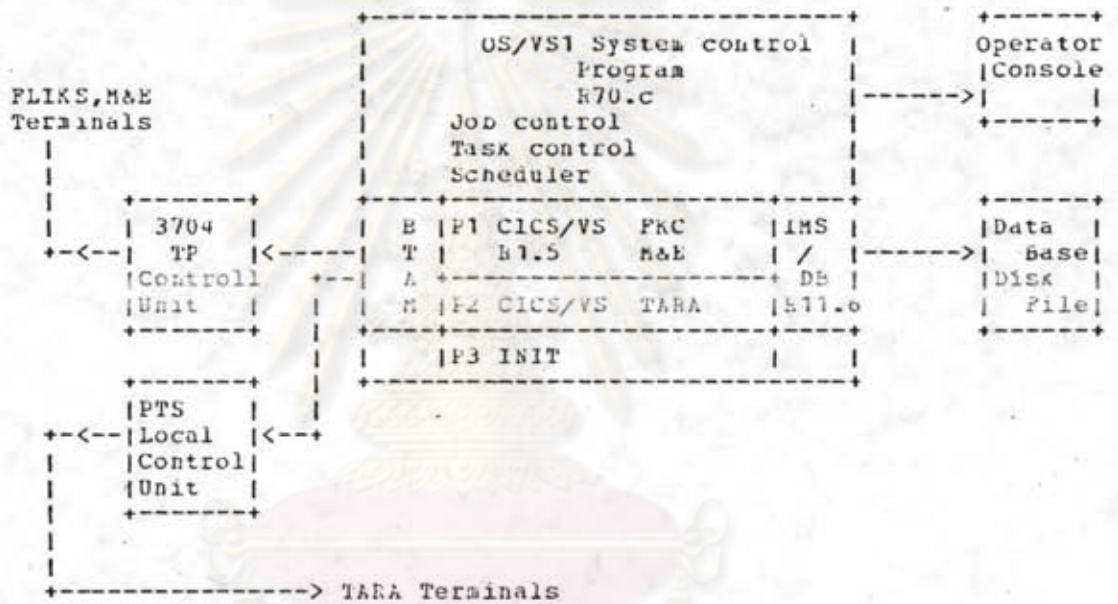
- 3.1 Sales Sub-system A/C (SAS BOWAC)
- 3.2 CCR-CC Fee Sub-system
- 3.3 Flown (&Proration) -Milage Poration
- 3.4 Incoming Sub-system
- 3.5 Balancing Sub-system

4 ISR (INFORMATION STORAGE AND RETRIEVAL)

SYSTEM SOFTWARE STRUCTURE

Operating system is OS/VS1²², which have 3 partitions. Flight kitchen and Maintenance and Engineering applications run in the same partition. Revenue and accounting application run in separate partition because the nature of the job is different and all terminals are attached locally.

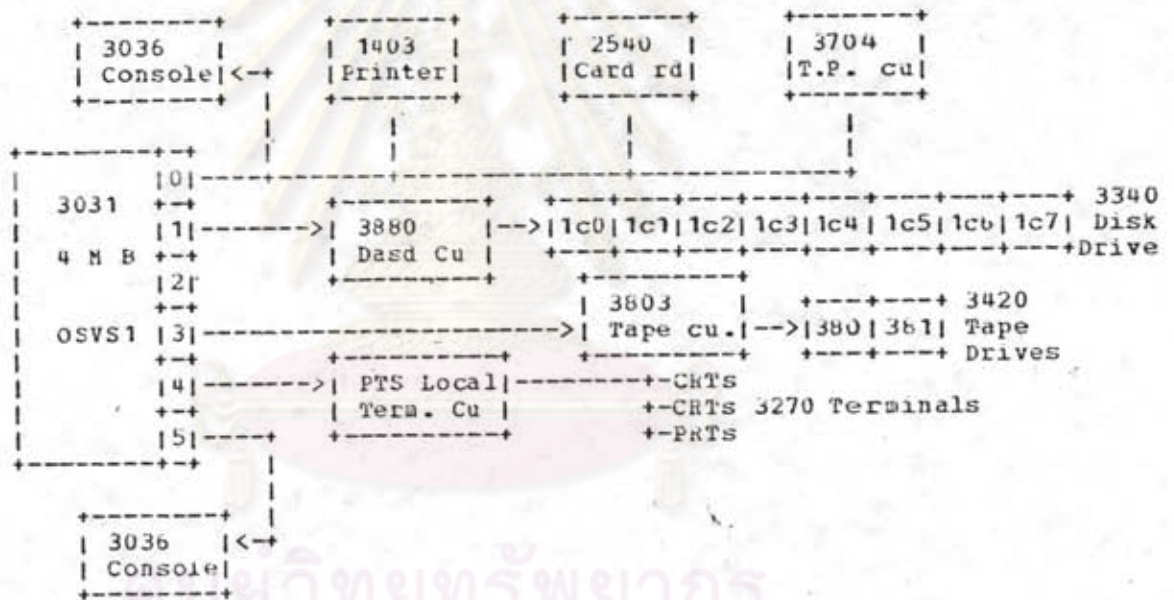
* See Appendix D



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Figure 4-4 Present Software Configuration for CICS/VS System

Hardware component



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Figure 4-5 Present system configuration for CICS/VS System

SYSTEM No 3 : Test and development system and batch processing

This system serve as a general purpose computer. System Control Program is VM/370²² (Virtual Machine/370), which has the possibility to operate more than one operating system at the same time. There are 3 major operating system run under VM/370:

1. OS/VS1 with 16 Megabytes of virtual storage, which serve all batch job , long run job, test job, and program compilation.

2. ACP/TPF²², which is the same application as the real ACP/TPF system but run in program development mode.

3. CP/CMS, for miscellaneous user, provide any user to have EDIT facility Every user can create, update or change their file, which contain application program or other text. Each user can use any other operating system by request operator to attach appropriate I/O device, or send his job to execute in OS/VS1 via spooling capability.

Hardware consideration for VM/370

There are 3 main types of hardware resource used in VM/370.

1. Real device such as real printer, real card reader, tape unit, disk drive, diskette reader, real card punch, real storage, display terminal, and other real input/output unit.

2. Virtual device such as virtual printer, virtual card reader, and virtual card punch. These devices are reader, printer and punch spooling system in VM/370. Virtual storage, which can be defined up to 16 Megabytes, are one source of virtual hardware.

3. Shared device, is the direct access storage device that can be shared by several user. It can be shared by access to the same disk or simulate one disk drive to many partitions , which is called minidisk, and attach dedicate to each user as a private disk.



Figure 4-7 Present system configuration for VM/370 System

THAI AIRWAYS INTERNATIONAL'S COMPUTER SYSTEM
CONFIGURATION AS OF 8/1/63

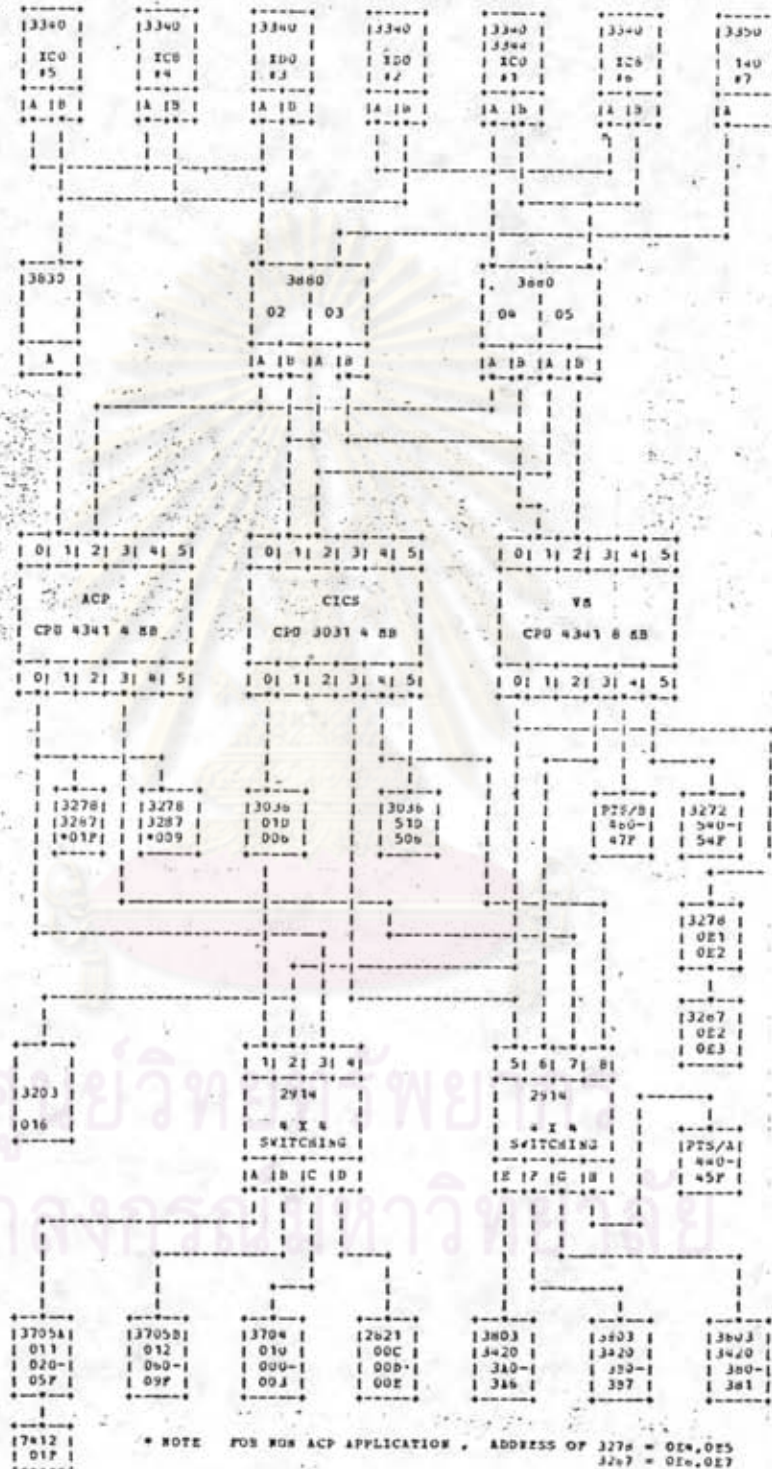


Figure 4-8 Overall system configuration for TG System

Overall hardware configuration

The overall hardware system configuration was designed to meet the following requirement:

1. Versatility to switch any devices to connect to appropriate CPU for back up purpose.
2. Ability to share printer, card reader and card punch for 3 CPUs by switching unit.
3. Easily to change CPU in case of CPU hardware failure was detected.
4. Easily to change other I/O such as tape drive, disk drive, telecommunication controller when hardware problem occurred.
5. Application priorities are given to ACP/TPF, OS/VS1-CICS/VS, and VM/370 respectively.

The hardware system have power back up by using uninterrupted power supply (UPS) for non stop operation in case of power problem. General environment

1. ACP/TPF operates 24 hours a day and 7 days a week, I/O requirement are:

- at least 4 tape drives.
- at least 14 disk drives
- at least 1 TP controller
- printer and card reader are not necessary.

2. OS/VS1-CICS/VS operates 24 hours for M&E and FKC, but TARA application run only office hours. I/O requirement are:

- at least 1 tape drive
- at least 1 string of disk drives
- at least 1 TP controller
- one local terminal control unit
- several CRT terminal and terminal printer
- line printer and card reader are seldom used

3. VM/370 run 24 hours, because OS/VS1 batch job have a lot of routine job to run daily. The VM users can logon VM/370 at any time the terminals are enabled. Request for tape or disk drive to be attached to them are possible.

FUTURE GROWTH

Thai Airways international's computer application has a rapid growth. More and more application plan to use computer for the fast and reliable job. Numbers of

application, number of programmers, number of systems and terminal are increasing very fast. All program development are running by individual technical group. They can simulate real environment by running under VM/370 ,that is the way to make full utilization of present hardware and software.

ACP/TPF system have a lot of application to be added ,such as:

- CARGO system .
- Hotel reservation system.
- Ticket printing system.

Data base application using CICS/VS, IMS/VS/DB, running under OS/VS1 has the following project:

- TOPAS (Passenger revenue accounting system)
- CREW Management
- OS/VS2 (or MVS) migration

VM/370 are being updated to VM/SP and the following possibilities are being studied :

- Possibility to share data between test system and production system
- Possibility to send job from VM to execute in another System

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