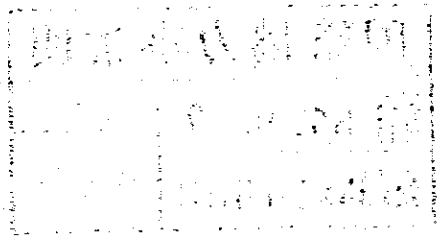
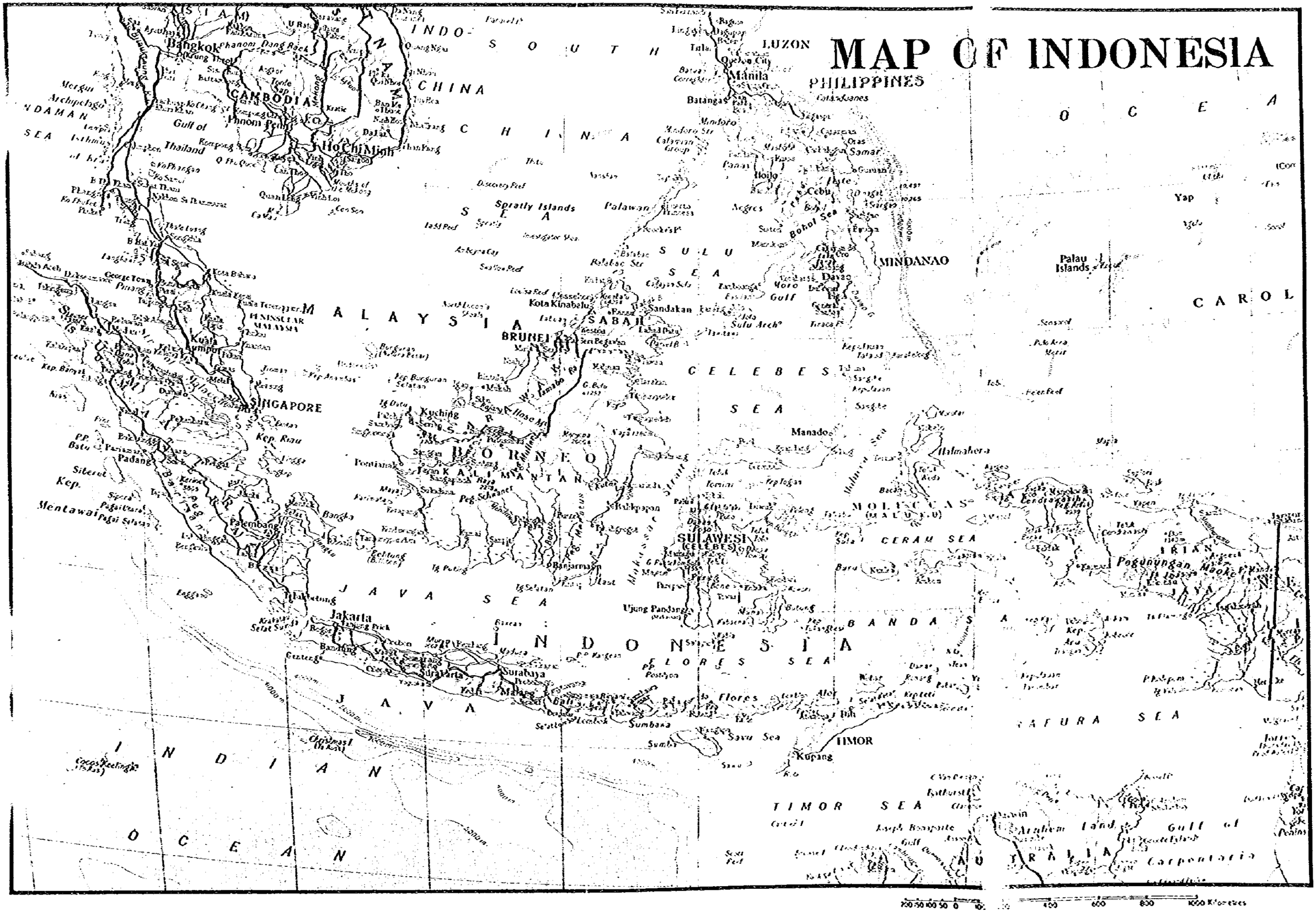
THE REPUBLIC OF INDONESIA
SURVEY REPORT
ON
LONG TERM DEVELOPMENT PLAN
OF
MARITIME COMMUNICATION SYSTEM
(F－TA－193)

MARCH 1982



JAPAN INTERNATIONAL COOPERATION AGENCY

MAP OF INDONESIA



PREFACE

In response to the request of the Government of the Republic of Indonesia, the Government of Japan decided to conduct a survey on the Long Term Development of Maritime Communications System in the Republic of Indonesia, and entrusted the survey to the Japan International Cooperation Agency (JICA).

The JICA sent to the Republic of Indonesia a survey team headed by Mr. Yoichi KOBAYASHI, Deputy Director, Aeronautical and Maritime Division, Radio Communications Department, Radio Regulatory Bureau, Ministry of Posts and Telecommunications, from June 22 to August 20, 1981.

The team had discussions with the officials concerned of the Directorate General of Sea Communications/Government of Indonesia and coducted a field survey.

After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between the two countries.

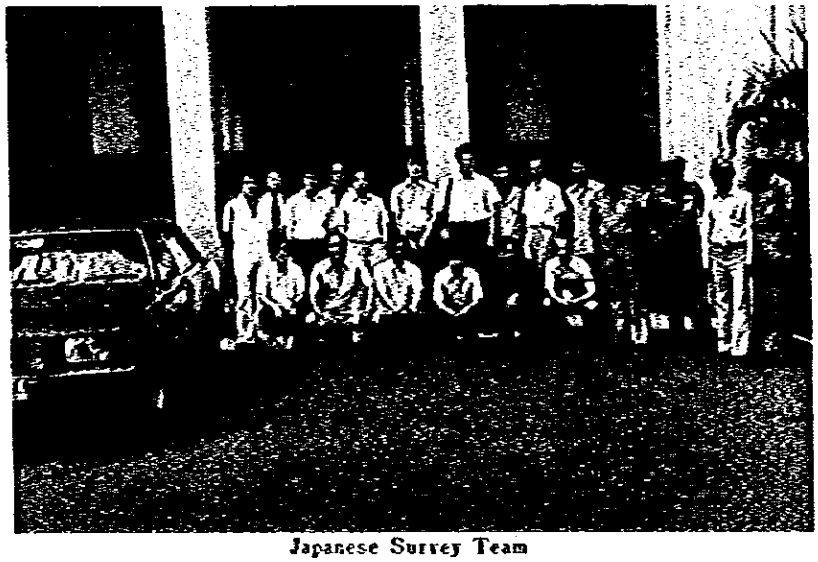
I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

March 1982

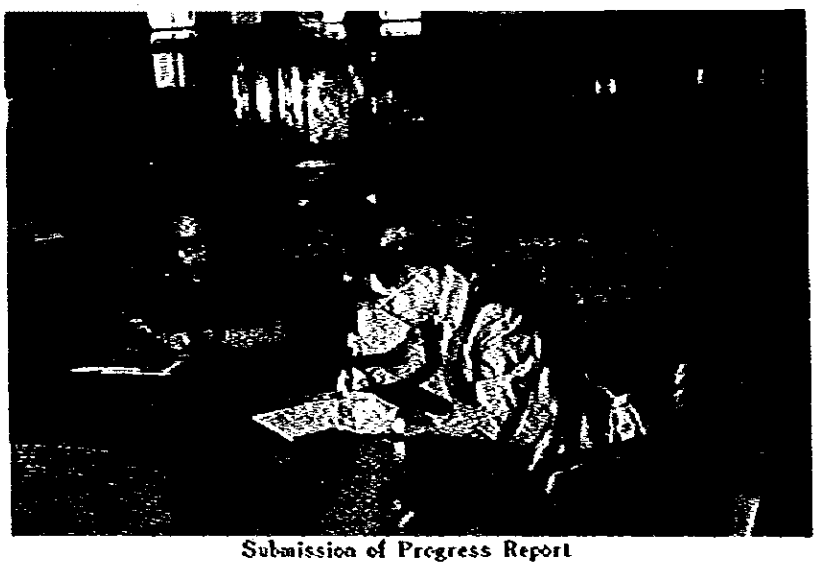
Keisuke Arita

Keisuke ARITA
President
Japan International Cooperation Agency

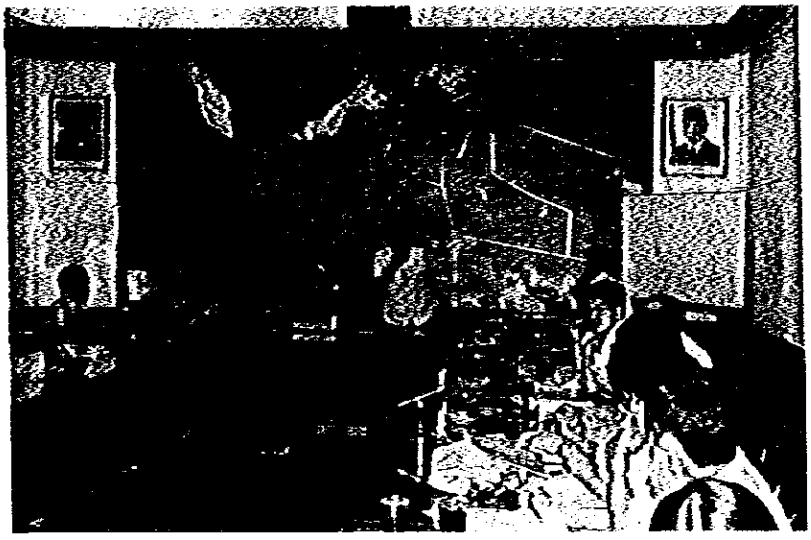
Directorate General of Sea Communications



Japanese Survey Team

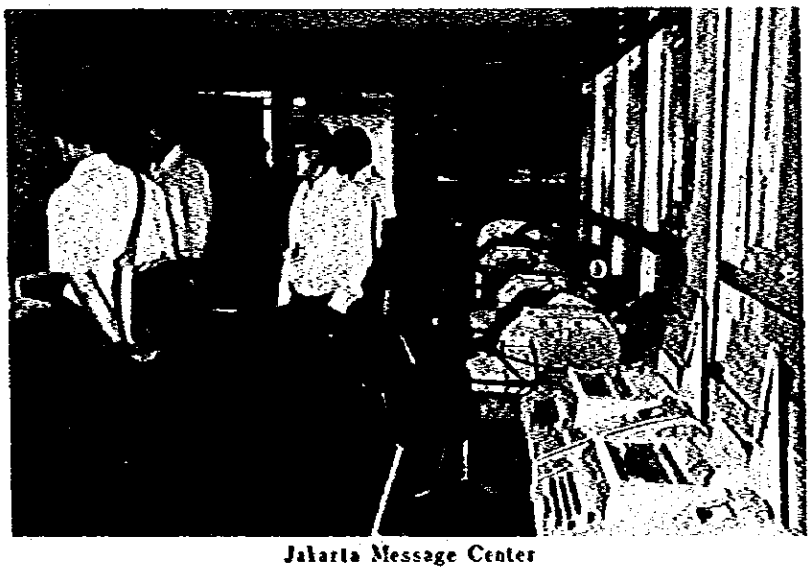


Submission of Progress Report

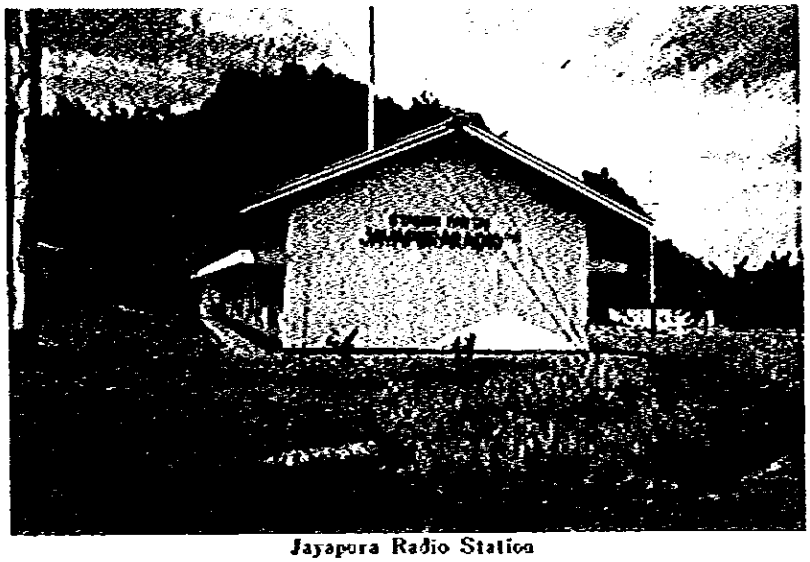


KPLP Headquarters

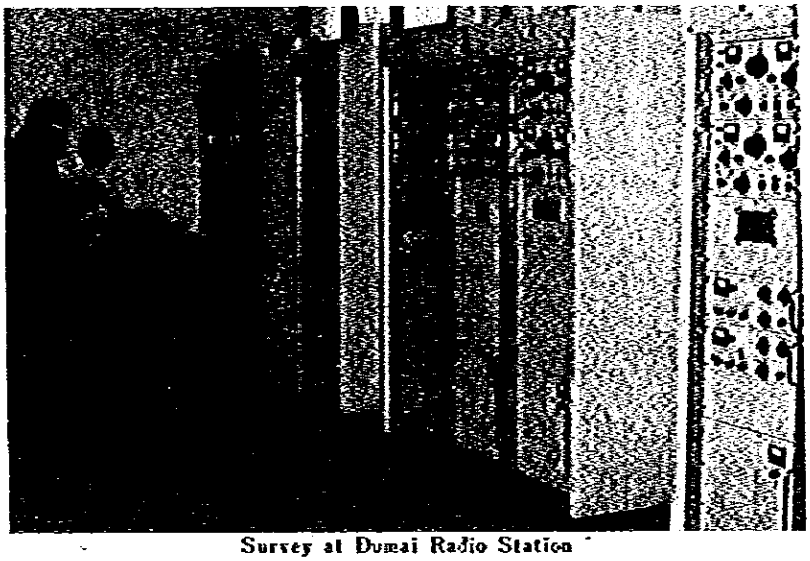
Interview at Dumai Radio Station



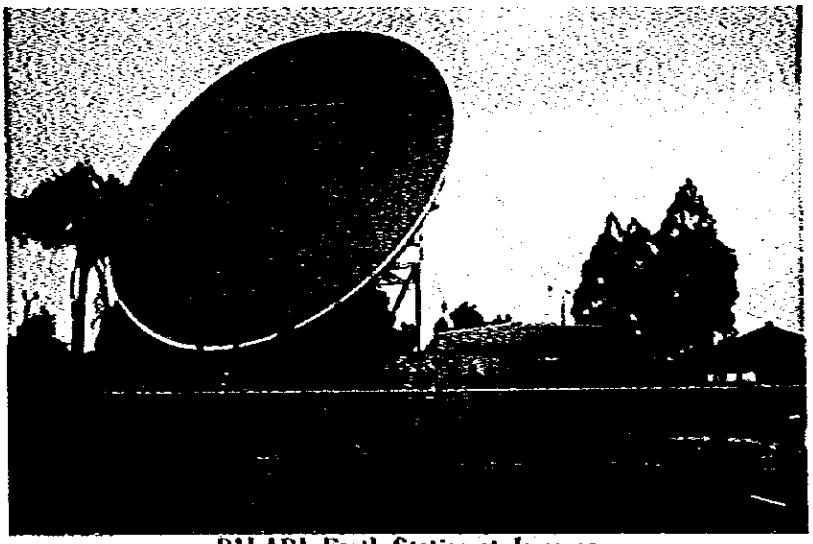
Jakarta Message Center



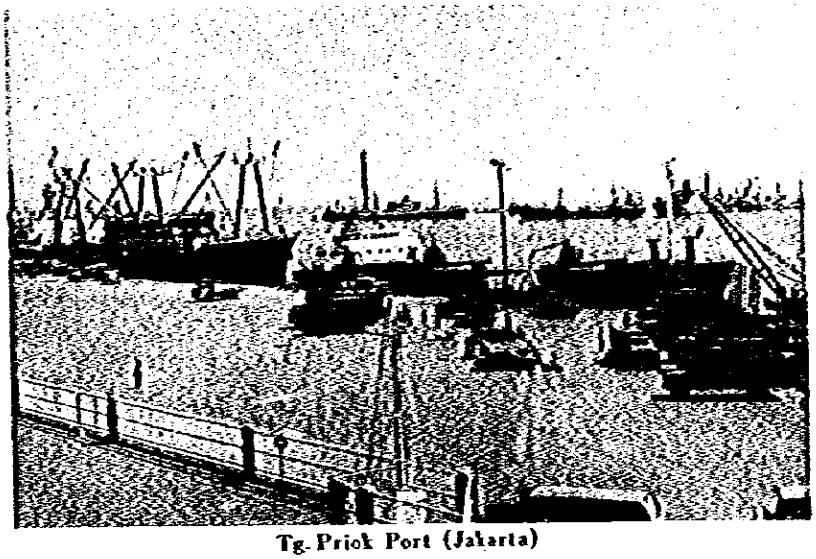
Jayapura Radio Station



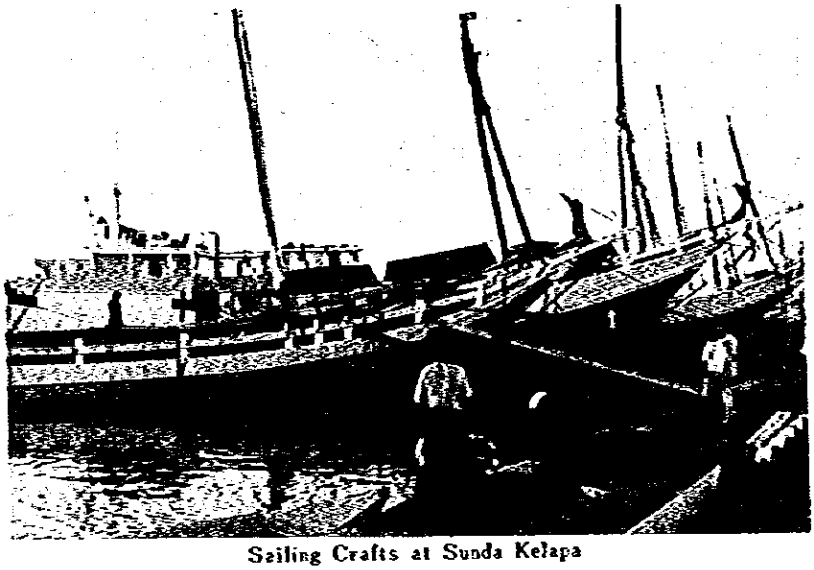
Survey at Dumai Radio Station



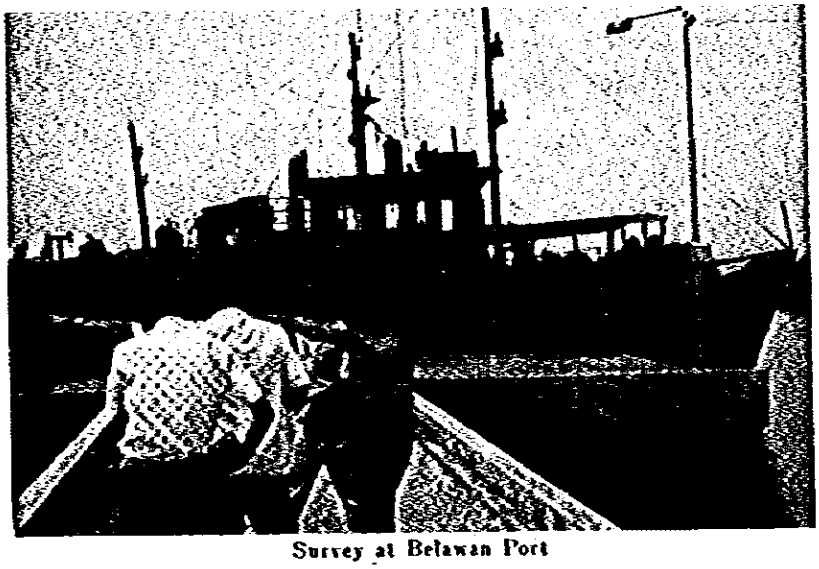
PALAPA Earth Station at Jayapura



Tg. Priok Port (Jakarta)



Sailing Crafts at Sunda Kelapa



Survey at Belawan Port

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ABBREVIATIONS (1/2)

AMVER	Automated Mutual-assistance Vessel Rescue System
BASARI	Board of Indonesian SAR (Badan Search and Rescue Indonesia)
BASARNAS	Board of National SAR (Badan Search and Rescue Nasional)
C.C.Console	Command/Control Console
CCIR	International Radio Consultative Committee
CCITT	International Telegraph and Telephone Consultative Committee
C.I.F.	Cost, Insurance and Freight
DF	Direction-Finding
DSC	Digital Selective Calling
EPIRB	Emergency Position Indicating Radio Beacon
FAX	Facsimile
FGMDSS	Future Global Maritime Distress and Safety System
GDP	Gross Domestic Product
HF	High Frequency
IMCO	Inter-Governmental Maritime Consultative Organization
INMARSAT	International Maritime Satellite Organization
INTELSAT	International Telecommunications Satellite Organization
ISB	Independent Side Band
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
KKR	Rescue Co-ordination Center (Kantor Koodinasi Rescue)
KPLP	Sea and Coast Guard (Kesatuan Pentagaan Laut dan Pantai)
MARISAT	Maritime Satellite Organization
MF	Medium Frequency (HF below 4,000 KHz is included as the case may be)
NAVAREA	World-wide Navigational Warning Service Areas
NBDP	Narrow Band Direct Printing
PABX	Private Automatic Branch Exchange
PALAPA	Domestic Satellite System in Indonesia
PERTAMINA	National Oil Company (Perusahaan Tambangan Minyak dan Gas Bumi Nasional)
PERUMTEL	National Telecommuniation Company (Perusahaan Umum Telekomunikasi)
P-P	Point to Point

ABBREVIATIONS (2/2)

PUSARNAS	National SAR (Pusat SAR Nasional)
REPELITA	National Five-Year Plan (Pencana Pembangunan Lima Tahun)
R.L.S	Regular Liner Service
R.R.	Radio Regulation
Rx	Receiving or Receiver
SAR	Search and Rescue
SAR Console	SAR Radio Operating Console
SAR ROS	SAR Radio Operating Station
SKR	Sub Rescue Co-ordination Center (Sub Koodinasi Rescue)
S/N	Signal/Noise
SOLAS	International Convention on Safety of Life at Sea
S-S	Ship to/from Shore
SSB	Single Side Band
STCW	International Convention on Standards of Training, Certification and Watch Keeping for Seafarers
Tx	Transmitting or Transmitter
UHF	Ultra High Frequency
VHF	Very High Frequency
WARC	World Administrative Radio Conference

SUMMARY, CONCLUSION AND RECOMMENDATION

SUMMARY, CONCLUSION AND RECOMMENDATION

1. Background

The maritime radio communication network improvement project of the Republic of Indonesia got underway in 1958. However, the full scale improvement work by the economic assistance from Japan and Netherland began under the First Five-Year National Development Plan (1969/70 - 1974/75).

The Directorate General of Sea Communications of Indonesia, responding to the revision of the Radio Regulations, the enactment of the International Convention for Safety of Life at Sea 1974, the enactment of the International Convention for Search and Rescue 1979, and so forth, formulated the maritime radio communication network improvement plan from the long term viewpoint, whereby to replenish the existing obsolete facilities. And, for the implementation of this plan, the Directorate General requested the Government of Japan for technical assistance.

In reply to this approach, the Government of Japan dispatched a preliminary investigation team to Indonesia for a period from January 31 to February 9, 1981. As a result, it was agreed that the long term plan of Indonesia was divided into the short term development plan (F-ST-12) and the long term development plan (F-TA-193). The feasibility study for F-ST-12 was carried out for a period from February 10 through February 20, 1981, and the Loan Agreement to F-ST-12 Project by 2,300 million Yen was signed on September 14, 1981.

F-TA-193 to be implemented following the completion of F-ST-12 aims at improvement of the maritime communication system inclusive of SAR. This is a long term project to be completed by the year 2000.

2. Field Survey

The field survey for F-TA-193 was made during June 22 through August 20, 1981, by a survey team composed of 15 members including Mr. Kobayashi, the team leader to investigate the actual situation and to collect the necessary information.

3. Conclusion

As a result of the field survey and the subsequent studies, it is concluded that; the total development of the maritime radio communication and SAR systems including operation and maintenance thereof is to be proceeded step by step until Year 2000 as given below in order to meet the expanding demand for the maritime radio communication, to prevent the marine accident and to facilitate the rapid rescue operation on accident.

4. Recommendation

4.1 Reclassification of Coast Station

The classification of general coast stations was reviewed and changed into four classes: A, B, C and D (provisional). This reclassification was made in consideration of the coverage water area, the frequency band assigned, the distress signal watch hours, amount of communication traffic, relative position in SAR system, etc., of each class.

The number of coast stations by the existing and new classifications is shown below.

By the existing classification:

Station Class	Number of Stations
I	9
II	2
III	12
IVa	14
IVb	56
TOTAL	93

By the new classification:

Station Class	Number of Stations
A	9
B	22
C	8
D	203 *
Total	242

* Note: "203" includes 150 newly scheduled stations.

4.2 Development of Maritime Radio Communication System

(1) Only one coast station in each region is qualified as Class-A and this station controls and supervises the other coast stations in the same region.

Several coast stations in each region are qualified as Class-B.

Transmitting power in Class-A and Class-B stations is limited to one(1) kilowatt at maximum except for Jakarta where five(5) kilowatts at maximum is allowed. Hours of service are 24 hours for Class-A and Class-B stations. Communication frequency bands are MF, HF and VHF.

Since the available frequencies are limited in MF and HF bands, the communication traffic overflowed from the MF and HF is absorbed by VHF channels.

Jakarta coast station covers whole area of Indonesia at least while the other Class-A stations and Class-B stations are to cover the nearby water, at least of the coast station.

In Class-A and Class-B stations, the transmitting station and the receiving station are to be geographically separated.

Class-C and Class-D stations operate VHF maritime mobile communication, but Class-C station is to watch MF, HF and VHF distress signals.

Aged facilities which were not replaced in F-ST-12 are replaced step by step in F-TA-193.

To maintain the perfomance of the existing equipment until its replacement by this long term plan, the spares prepared by this plan are to include the spares for the existing equipment.

Although the Sea Comm.'s own HF radio circuits have been for the fixed communication circuit to link the coast stations, this long term plan proposes to use the PERUMTEL's leased lines or public lines for the main circuit for this purpose but to keep the existing HF facilities for protection.

Following is the supplemental explanation to the equipment to be introduced.

1) MF and HF transmitter

Use of fully solid state transmitter with improved reliability is recommended to save an expensive power tube and to facilitate the maintenance.

2) NBDP and DSC

These systems are introduced to all the Class-A stations to provide new services to cope with the modernization by the same devices installed on board.

Use of NBDP will contribute to reduce the number of telegraph operators and to improve character error in the maritime mobile communication to/from the vessel with the same devices, while the use of DSC facilitates the preparatory work as well as call and reply.

4.3 Development of SAR Sytem

The communications sytem for effective SAR operations presently available in Indonesia is considered to be not sufficient and need to be improved. Accordingly, establishment of a communications network for the sole use of SAR is highly recommended in view of the necessity of promptitude and certainty for the flow of various information and the command and control required for SAR purpose. It is also necessary to take into account of the communications with SAR aircrafts for joint operations.

For the purpose of implementing the concept, the following is planned:

(1) SAR Operation Center

SAR operation centers are established having its Central in Jakarta and Regional within each District Headquarters of Sea Communications connecting the trunk lines to all KPLP Detachments for the centralized command/control of communications for SAR operations.

(2) SAR Operating Coast Stations

The main thirty(30) coast stations have the communications equipment for SAR to cover most of Indonesian water.

The Operation Centers are linked with SAR operating coast stations by the trunk lines through the KPLP Detachments. The SAR radio equipment in the coast station is controlled from SAR ROS in KPLP Detachment or SAR Console in the Coast station.

1) SAR Radio Operating Stations (SAR ROS)

SAR ROS's are established in the main sixteen(16) KPLP Detachments covering the important water areas in Indonesia directly controlling the operation of SAR radio equipment installed in the relevant coast stations for direct communications with mobiles including SAR ships.

2) SAR Radio Operating Console (SAR Console)

Fourteen(14) SAR Consoles are installed in the relevant coast stations for SAR communications with mobiles including SAR ships, and HF or VHF lines are available with the nearby KPLP Detachments.

(3) Direction-Finding Facilities/Stations

Twenty-nine (29) direction-finding facilities are incorporated in the SAR operating coast stations and eleven (11) direction-finding stations are additionally established to cover Indonesian waters because of vital importance of having the facilities for watch on important frequencies and furthermore locating ships in distress or in a state of emergency for immediate SAR action by KPLP and other SAR bodies.

Establishment of direction-finding facilities/stations adds importance to motorized-sailing and sailing ships and other small-sized ships, the radio installations of which are being improved.

The direction-finding facilities/stations to be installed in this program are the one which exhibits D.F. performances higher than the Direction-Finder to be provided by F-ST-12.

It is noted that the coverage by the Direction-Finder in F-ST-12 is approximately 150 km while the coverage by the direction-finding facilities by F-TA-193 is approx. 300 km.

4.4 Establishment of Maintenance Center

For the purposes of upgrading the maintenance system for coast station facilities and SAR facilities including direction-finders and of strengthening the training of maintenance personnel, the Central Maintenance Center will be established in Jakarta and the District Maintenance Center at each location of Regional Headquarters of Sea Communications.

These maintenance centers will be provided with all kinds of measuring equipment and instruments which are necessary for periodical tests of coast station facilities and for trouble shooting of those facilities.

At the Central Maintenance Center in Jakarta, a number of typical equipments operating at coast stations will be installed so that they can be used for performance tests of repaired units and panels. Those equipments will also be utilized for the on-job training of maintenance personnel.

Each maintenance center will keep the necessary stock of spare parts and units for the maintenance of facilities installed at coast stations in its jurisdictional area. Inventory management of those spare stores is also the responsibility of each maintenance center.

4.5 Training

Factory training for;

28 persons x 2 months x 1 time for REPELITA III

28 persons x 2 months x 2 times for REPELITA IV

28 persons x 2 months x 2 times for REPELITA V

28 persons x 2 months x 2 times for REPELITA VI

is included in F-TA-193 plan to train the operation and maintenance staff to handle the various equipment to be introduced and those staff who completed the factory training should become the instructors in the courses of training the operation and maintenance persons taking place in Indonesia.

At present all the coast stations of the Sea Communications are operated by approximately 500 operation and maintenance staff, however, necessary number of the operation and maintenance staff for the maritime radio communication and SAR systems may reach approximately 3,100 toward the end of this long term development plan.

Accordingly reinforcement of the existing training program is required for training the necessary number of staff keeping pace with the progress of the long term development plan.

4.6 Utilization of INMARSAT System

For Indonesia, a country geographically located midway between the Pacific Ocean and the Indian Ocean, the study of positive utilization of the INMARSAT system which started the service in February 1982 is of great significance. The need may possibly arise for recommendation that the INMARSAT coast earth stations be established inside Indonesia and ship earth stations aboard ships of Indonesian registry.

4.7 Implementation Schedule

Tables S-1 and S-2 show the implementation schedule of the long term development plan.

As shown in the Table S-1, the plan is divided into, Urgent, Short Term and Long Term Programs.

The Short Term Program is further divided into three (3) sub programs and the Long Term Program, into six (6) sub programs.

4.8 Required Expenses

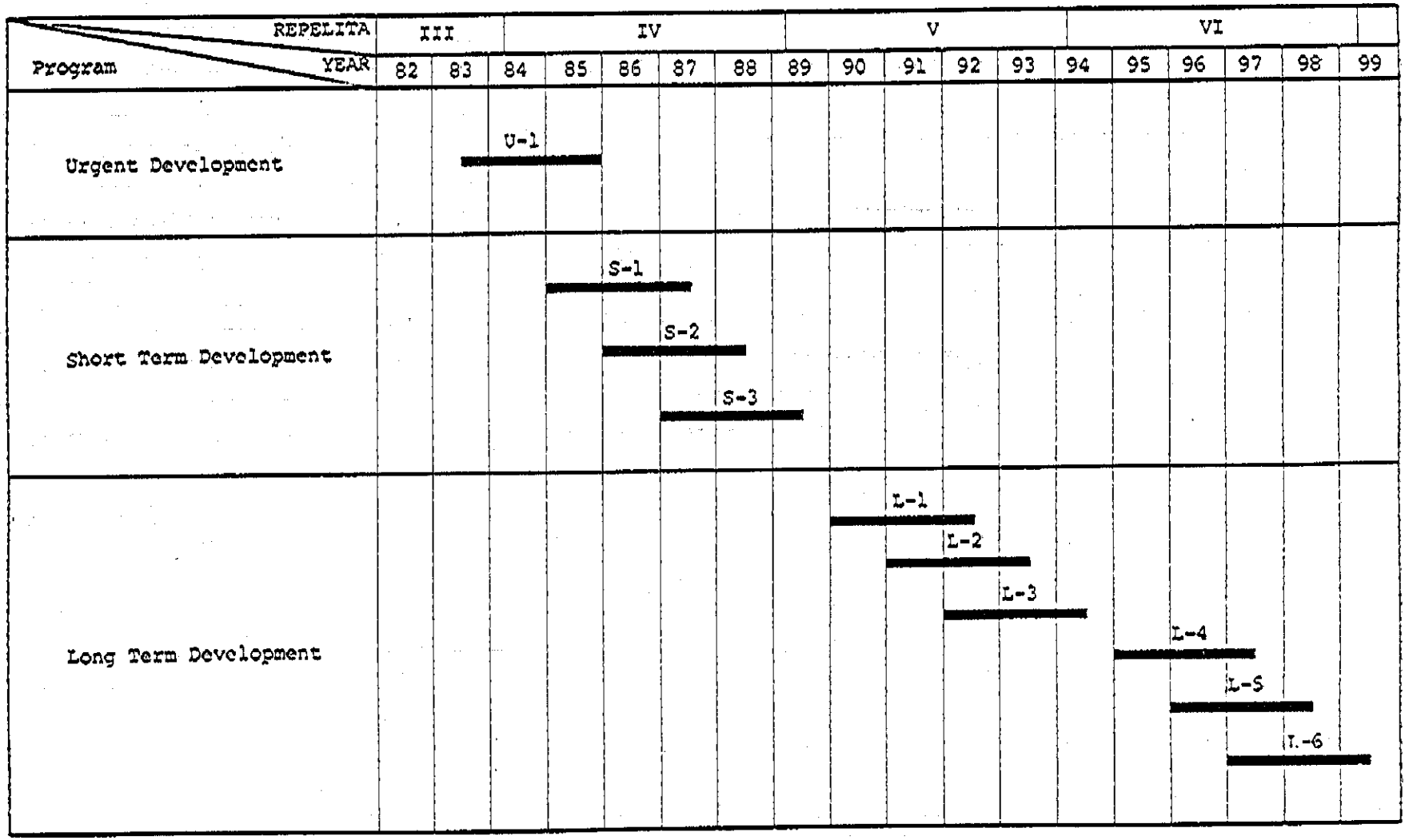
The total expenditures required for implementation of this long term development project are as follows:

REPELITA Series	Foreign Currency Portion			Local Currency Portion	
	Million Japanese Yen	Thousand US$	Million Rupiahs	Million Japanese Yen	Million Rupiahs
III	3,894.9	18,547.7	11,499.2	635.2	1,875.3
IV	8,771.6	41,769.3	25,897.1	1,660.2	4,900.5
V	11,041.0	52,576.2	32,597.2	2,665.7	7,870.1
VI	9,587.7	45,655.8	28,306.5	2,417.1	7,136.4
TOTAL	33,295.2	158,549.0	98,300.0	7,378.2	21,782.3

4.9 Special Remarks

The implementation period of this Project consists of about 17 years up to the year 2000. Since the technical advancement of telecommunications, especially electronics based, equipments and systems, is so rapid, it is difficult to predict precisely such technical advancement during those 17 years. To be taken into account in addition to the above, are the progress of the PERUMTEL's long term development plan, the development of the domestic telecommunication industry, the progress of the port construction plan and the possibility of satellite system utilization. Therefore, the implementation plans formulated by this study will have to be reviewed for each REPELITA series and modified where necessary.

TABLE S-1 IMPLEMENTATION SCHEDULE UP TO YEAR 2000



Note: For details of the subprogram indicated by a sigle bar, refer to TABLE 5 (2).

TABLE S-2 IMPLEMENTATION SCHEDULE OF SUBPROGRAM

Item \ Number of Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1 Preparatory Work	▬																																		
2 Site Survey		▬	▬	▬																															
3 Preparation of Tender Specification			▬	▬	▬	▬	▬																												
4 Tender Announcement							▲																												
5 Tender Evaluation and Contract										▬	▬	▲																							
6 Civil Works & Building					▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬															
7 Equipment Manufacturing													▬	▬	▬	▬	▬	▬	▬	▬	▬	▬													
8 Review of Installation Drawings															▬	▬																			
9 Marine Transportation																		▬	▬	▬	▬	▬													
10 Installation and Tests																		▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬					
11 Payment in Foreign currency (%) (NOTE)	2.2			1.2			1.0			-			2.2			0.6			39.0			44.0			3.5			3.5			2.8			
11 Payment in Local currency (%) (NOTE)	1.2			8.2			6.6			6.0			6.5			6.5			7.0			15.0			15.0			15.0			13.0			

Note: Indicated payment schedule is only for reference.

1. INTRODUCTION

1. INTRODUCTION

1-1 Objective of Survey

The objective of this survey is to make a long term development plan for the maritime communication system of Republic of Indonesia so that the system can meet the future needs, including search and rescue (SAR) for the safety of life at sea up to the year 2000 taking into account the development plan for the public telecommunication system.

1-2 Background of Project

As is well known, Indonesia is an archipelagic country composed of five major islands and a large number of scattered islands in the vast sea area extending 5,000 km from east to west and 2,000 km from north to south and also is the largest maritime country in the world lying between two oceans and two continents.

Maritime traffic in this sea area is increasing conspicuously year after year, reflecting the growth of economic and social activities of the country. Steady uphill demand for maritime communication looms as a foregone conclusion. Thus the measures to meet such demand successfully are urgently required.

The ITU's Radio Regulation was revised in 1979 in accordance with rapid progress in electronics, radio communication technique and software technique, and to cope with the demand for reliability and rapidity of the maritime communications.

The SOLAS Convention of 1974 to ensure the safety of life at sea came into force on May 25, 1980. The SAR convention providing for search and rescue in case of sea distress is also expected to come into force in the near future. Under these circumstances, by a short term project of F-ST-12, the facility improvement is to be carried out at eight Class I coast stations and three Class III coast stations. This short term project practically forms the inception of the presently schemed long term improvement and expansion plan for the maritime communication system.

The other series of maritime communication system upgrading plans, including the SAR system improvement, will be developed under the long term prospects up to the year 2000, coordinated to various national development plans.

1-3 Areas of Study

The study was made for the whole area of the Republic of Indonesia. The locations where field surveys were carried out this time are the undermentioned 26.

Tg. Priok, Dumai, Belawan, Surabaya, Makassar, Bitung, Ambon, Jayapura, Palembang, Sabang, Balikpapan, Teluk Bayur, Panjang, Cirebon, Cilacap, Pontianak, Banjarmasin, Tarakan, Donggala, Sorong, Merauke, Benoa, Lembar (Ampenan), Panarukan, Biak and Tg. Pandan.

Items of survey are as follows:

(1) Collection and analysis of data

1) Trends of export/import trade

2) Shipping activities

3) Present status of communication traffic and future demand estimate

4) Port construction plans

5) Existing and projected satellite communication networks in Indonesia

6) Existing and projected communication networks of other organizations

7) Present status of Indonesian telecommunications industry

8) Maps and diagrams

9) Others

(2) Analytical study of existing maritime radio communication network and coast station facilities and services, as well as operation, maintenance and personnel training

(3) Long term development plan of maritime communication system

1) Coast station classification criteria

2) Telecommunications system relating to maritime transport traffic and associated data, as well as shipping activities

3) Telecommunications system relating to safety of life at sea and of navigation, as well as search and rescue (SAR)

4) Utilization of domestic satellite system (PALAPA) for maritime communication system

5) International Maritime Satellite (INMARSAT) system utilization availability for Indonesia

(4) Formulation of step-by-step implementation schedule in consideration of Five-Year Development Plan (REPELITA) of the Indonesian Government

(5) Collection of information by interviews with responsible personnel of Government departments concerned

(6) Relevant laws and regulations

(7) Cost analysis

1-4 Organization of Survey Team

The field surveys were carried out in two consecutive periods.

The first field survey was made by three groups, i.e., Group A, Group B and Group C, during the period from June 30 through July 8, 1981.

The three groups were respectively composed as follows with the sea communication's counterparts participating:

Group	Members
A	Yoichi Kobayashi
	Hiroshi Fukumuro
	Norimoto Ohtake
	Tatsumi Amano
	Makoto Nikaido
	M.B.E. Sudiarto (Counterpart)
	E. Simandjuntak (Counterpart)
B	Masahiro Hososaka
	Shigehiko Tsuzurahara
	Nobutaka Kamioka
	Haruo Ishizuka
	Masahiro Katayama
	Susumu Takahashi
	M. Darmawan (Counterpart)
	Sulomo (Counterpart)
C	Yoshio Kuroda
	Hirofumi Sugiyama
	Nobuyuki Uehara
	Shoji Aoki
	Kunio Tashima
	Uung (Counterpart)
	Batjan (Counterpart)
	Moch. Anwar (Counterpart)

After the completion of the first field survey, or, more precisely, on July 11, 1981, the undernamed members went back to Japan.

Yoichi Kobayashi	Masahiro Hososaka
Hirofumi Sugiyama	Yoshio Kuroda
Shigehiko Tsuzurahara	Nobuyuki Uehara
Hiroshi Fukumuro	Nobutaka Kamioka
Norimoto Ohtake	

Immediately after the first field survey, the second field survey was conducted by two groups, i.e., Group a and Group b, in two different periods, one from July 9 to July 31, 1981, and the other from July 9 to August 5, 1981.

Members of the two groups, each composed of three Japanese, were:

Group	Members
a	Haruo Ishizuka
	Kunio Tashima
	Makoto Nikaido
b	Shoji Aoki
	Tatsumi Amano
	Masahiro Katayama
	Gde Rai Sukanadi (Counterpart at Kupang only)

On August 11, 1981, the undernamed three including the team leader arrived at Jakarta from Japan again and joined the survey team, and stayed at Jakarta with Group a and Group b members until August 20, 1981.

Yoichi Kobayashi
Nobuyuki Uehara
Norimoto Ohtake

1-5 Itinerary of Survey

Areas which each survey group visited are as follows:

Group	Places Visited
A	Banjarmasin, Balikpapan, Tarakan, Lembar (Ampenan)
B	Dumai, Medan (Belawan), Ulee Lheue
C	Surabaya, Panarukan, Ujung Pandang, Benoa
a	Menado (Bitung), Donggala, Ambon, Sorong, Biak, Jayapura, Merauke
b	Cilacap, Cirebon, Panjang, Pontianak, Sabang, Padang (Teluk Bayur), Palembang, Tg. Pandan

Prior to the field surveys of the above mentioned places, the exchange of views was carried out several times by all survey team members about the present state of maritime communication including the communication means for the SAR system. The exchange of views series took place in the Directorate General of Sea Communications. Then followed the field surveys of coast stations and Port Administration and KPLP for KANWIL III and BASARNAS.

Meanwhile, the previously formulated survey schedules were broadly modified as described below.

Group B — Field Survey of Sabang

The schedule for group B to visit Sabang was cancelled due to the departure delay of ferry service from Ulee Lheue.

Instead, Sabang was visited by Group b on July 25, 1981, and the survey was made by the group.

Group a

Whole Schedule

Since the Ujung Pandang to Jayapura direct flight seats could not be reserved until July 21, 1981, the previously made survey itinerary had to be broadly modified.

The new survey itinerary was formulated, based on the advices from Mr. A. S. Supankat SH of KANWIL VI and Mr. Ardiansyah SH of KANWIL IX.

Survey of Kendari

The survey of Kendari was cancelled because the return flight reservations from Kendari to Jakarta were difficult.

Group b

Visit to Kupang

After waiting for flight for three days at Denpasar Airport, the group was denied the visit to Kupang by reason of no Army permission.

Field survey itinerary details are in APPENDIX 21.

1-6 Methodology of Survey

Methods used in the survey are as follows:

1-6-1 Fact-Finding through Discussions

Prior to the field surveys, the Survey Team carried out the exchange of views with the competent staff of Sea Communications and, through the discussions, obtained necessary knowledge about the existing state of maritime radio communication in Indonesia and the controversial points involved in the system.

Agreement was made that the improvement and expansion of the system be implemented in due order according to the top priority, short term and long term plans. It was also recognized that the system to watch the distress signal be further improved and more effectively organized.

1-6-2 Fact-Finding by Field Surveys

In order to complete the field surveys within the limited period, the target of surveys was restricted to all Class I through Class III stations and several Class IV stations. (The survey of Kupang Station was cancelled because the permission could not be obtained.)

The questionnaire about coast stations and SAR was prepared in advance, and this was to carry out the field surveys efficiently. The questionnaire was either mailed or distributed by the Survey Team to all coast stations. Most of the questionnaire filled with replies have already been recovered.

The field surveys consisted of visits to Regional Sea Communications (KANWIL), coast stations, Port Administration, Harbor Masters, KPLP, KKR (SKR) and so forth. The surveys were also made about the modus operandi of those facilities, as well as the past records of distresses at sea.

Where necessary, the preliminary surveys were also carried out as to the site selection for the direction finding station.

1-6-3 Collection of Data in Shortage and Supplementary Surveys

After the field surveys, efforts were made at Jakarta to obtain data in shortage.

Through the Directorate General of Posts and Telecommunications, information pertaining to PERUMTEL plans up to the year 2000 and PALAPA domestic satellite communication system could be obtained.

Coast station data in shortage could be partly covered with information contained in monthly report and annual report presented by each coast station.

1-6-4 Methodology of Forecast

In the formulation of maritime radio communication network development plan, emphasis is placed on identifying the future developmental direction of maritime communication system, safety at sea and SAR system, and equipment of ship stations. Taken into consideration for this study were the international laws and regulations now in effect and scheduled to come into effect in the near future, port/harbor improvement plans, and PERUMTEL's domestic telecommunications system development plans.

Study was also made as to the relationships between the maritime radio communication network development plan and the growth of domestic telecommunications industry.

For the formulation of long-term development plan up to the year 2000, it is essential to forecast the growth of shipping activities during the period and the concomitant maritime communication traffic.

Data that can be used in the forecast of shipping activities are extremely scant. Fortunately, JICA recently made studies about the improvement plans for four main ports of Indonesia, i.e., Banjarmasin, Bitung, Balikpapan and Sorong. These study reports provided useful information for the shipping activities forecast.

The method used in the forecast of maritime communication traffic is described in detail in Section 4-2-2. It can be summarized as follows:

The past time series data obtained about maritime communication traffic in Indonesia were not sufficient. In addition, it can be easily assumed that, as maritime communication system and national communication system, etc. are upgraded in the future, the behaviors of maritime communication traffic will differ appreciably from its status quo ante.

Therefore, the ordinary method of forecast according to a model expression from time series data, etc., is not considered to be valid this time. Hence, the forecast based on related statistical data of various kinds, was made.

As for the radio frequency to be used by the coast stations and the transmitter output, judgment was made with regard to their appropriateness by means of computer calculation of whether the S/N ratio required of each communication system could be obtained or not under the expected condition of radio propagation.

A summary of computer calculations as per above appears in APPENDIX 22.

2. PRESENT STATUS AND CONTROVERSIAL POINTS

2. PRESENT STATUS AND CONTROVERSIAL POINTS

2-1 Organization and Function

The organization of the Ministry of Communications in charge of implementation of this Project is illustrated in Figure 2-1.

2-1-1 Directorate General of Sea Communications

The Directorate General of Sea Communications manages all the maritime communications and the related affairs of Indonesia, including marine transport, shipbuilding, navigational aid, port administration, safety at sea, and maritime radio communication.

The management and operation of the maritime communication network, including those for the safety of life at sea, safety at navigation and SAR to be upgraded by this Project, come under the direction of the Sub-Directorate for Marine Electronics and Telecommunications.

The whole country is divided into nine KANWILs. Each KANWIL has its headquarters and substructures. The organization charts of the Directorate General of Sea Communications appear in Figure 2-1-1 (1) through Figure 2-1-1 (4).

2-1-2 Directorate General of Air Transport

The Directorate General of Air Communications takes charge of navigational aid to aircraft, air traffic control, airport administration and related affairs. Especially the management and operation of aircraft communication are being carried out by the District Air Communications which is under the control of the Directorate General of Air Communications.

The whole country is divided into five Districts of Jurisdiction. Each District of Jurisdiction has its District Air Communications. The organizational chart of the District Air Communications is in Figure 2-1-2.

2-1-3 Directorate General of Posts and Telecommunications

The Directorate General of Post and Telecommunications is composed of the postal service and saving Division, domestic telecommunications division, international telecommunications division and the communication equipment manufacturing division (P.T. INTI).

Especially the domestic and the international public telecommunication services are provided by PERUMTEL, a public Corporation and by P.T. INDOSAT, respectively for the purpose of high efficiency operation and under the self-supporting accounting system.

The organization chart appears in Figure 2-1-3.

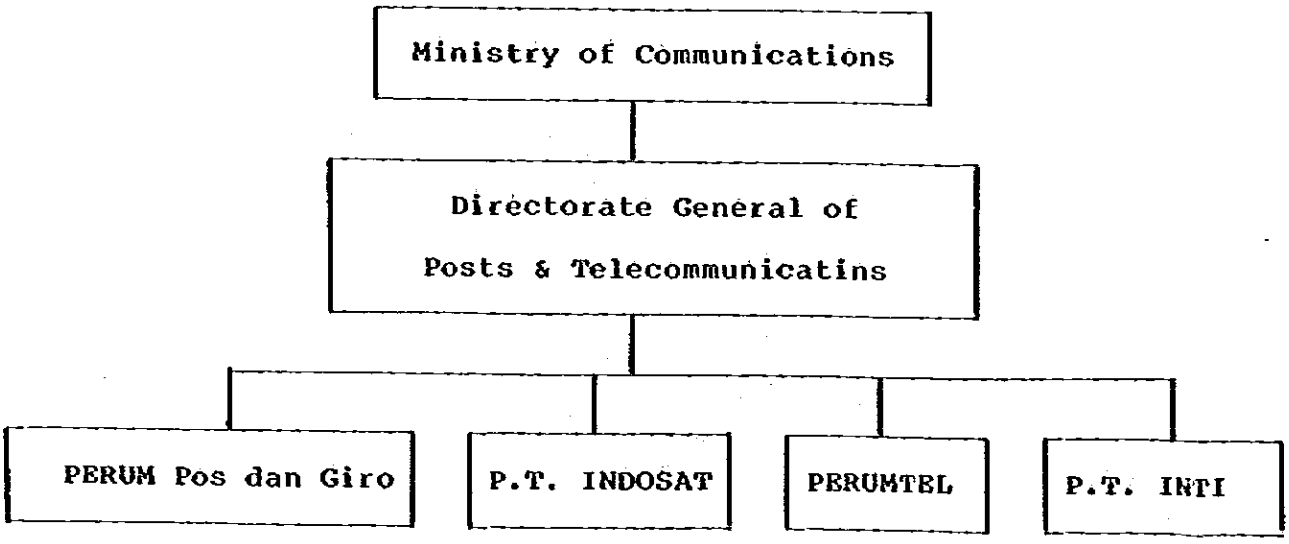


Fig. 2-1-3 Organization of Directorate General of Posts & Telecommunications

Number of staff personnel of P.T INDOSAT as of February, 1982 is;

Technical, planning and facilities division :	77
Operation division :	636
Total	713

The Headquarters of P.T. INDOSAT is in WISMA ANTARA building in Jakarta.

PERUMTEL's Headquartrers is located at Bandung and 12 District Telecommunications Bureaus are established under the headquaters.

Staff personnel statistics of PERUMTEL and P.T. INTI are given in Table 2-1-3 (1) and Table 2-1-3 (2), respectively.

Table 2-1-3 (1) STAFF PERSONNEL STATISTICS OF PERUMTEL

Group	1976	1977	1978	1979	1980
IV	75	83	85	103	97
III	744	766	818	872	938
II	5526	5929	6576	6856	7535
I	18213	18490	18700	18799	18167
Total	24558	25268	26179	26630	26737

Note: Category of group is as follows:

IV... Top management
III... Middle management
II... Supervisory management
I... Operational

Source: POSTEL's ANNUAL REPORT 1980

Table 2-1-3 (2) STAFF PERSONNEL STATISTICS OF P.T. INTI

Group	1976	1977	1978	1979	1980
IV	5	5	4	4	4
III	21	26	25	26	42
II	289	281	251	247	306
I	329	309	238	208	284
Total	644	621	518	483	636

For Note and Source, see Table 2-1-3 (1).

Figure 2-1

ORGANIZATION CHART
MINISTRY OF COMMUNICATIONS

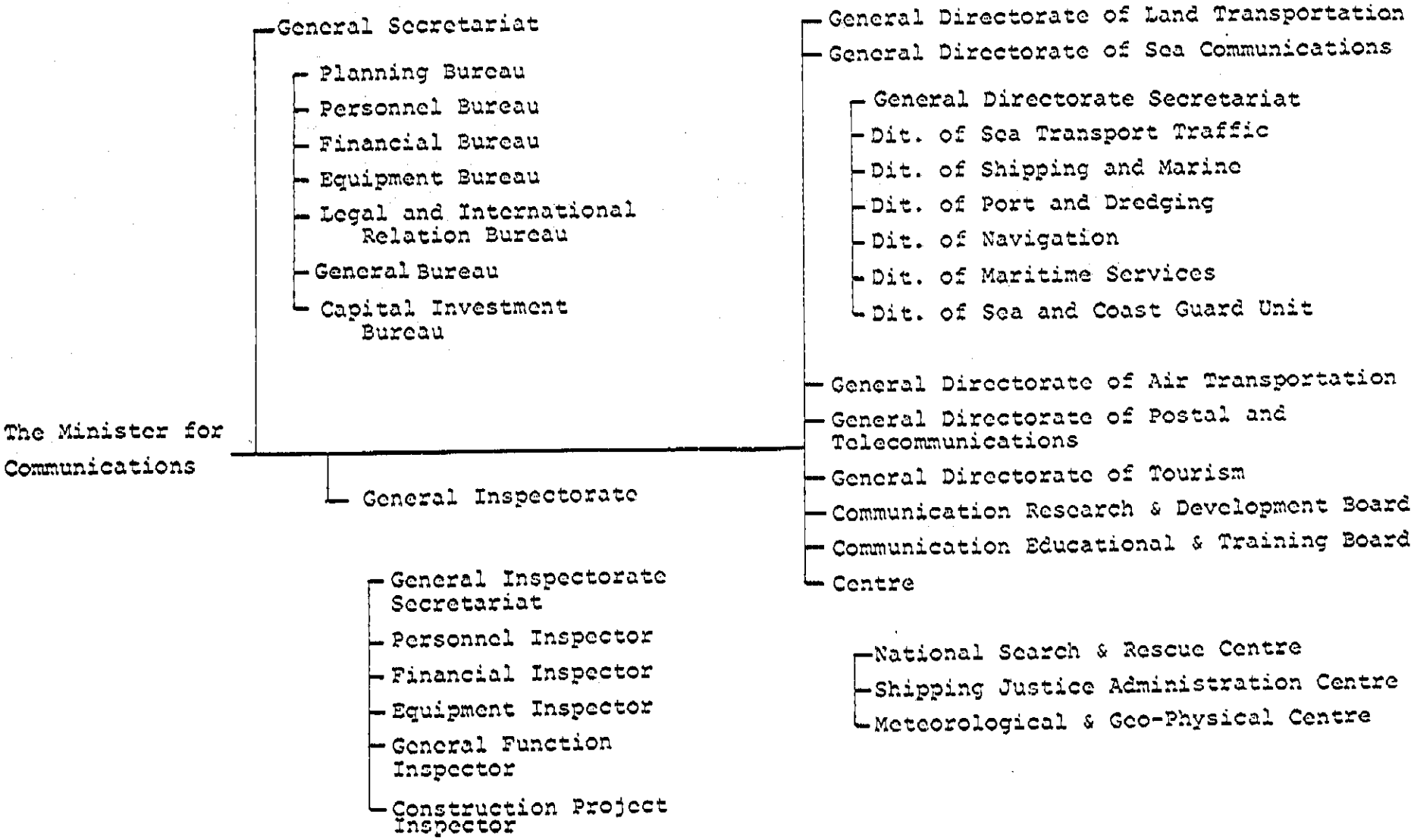


Figure 2-1-1(1)

ORGANIZATION CHART OF SEA COMMUNICATIONS

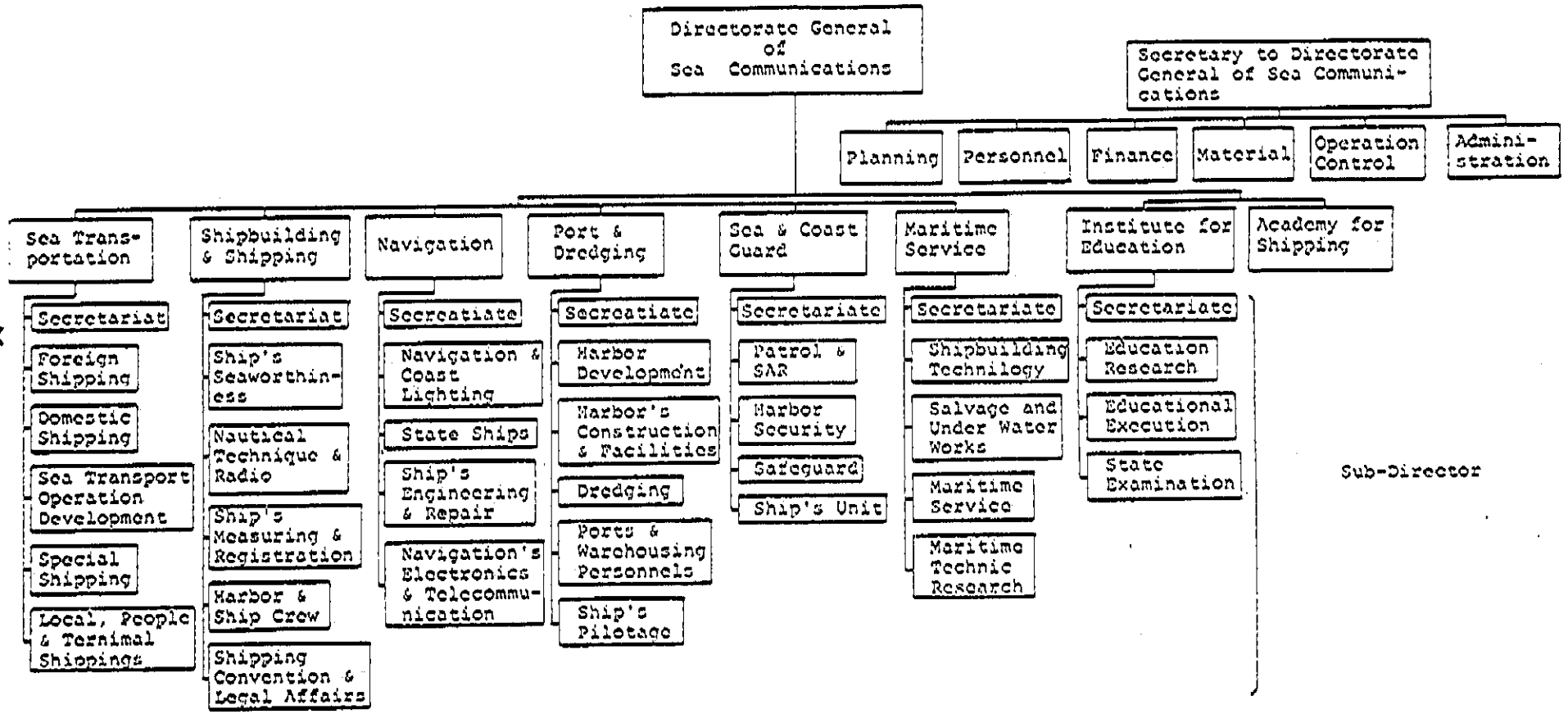
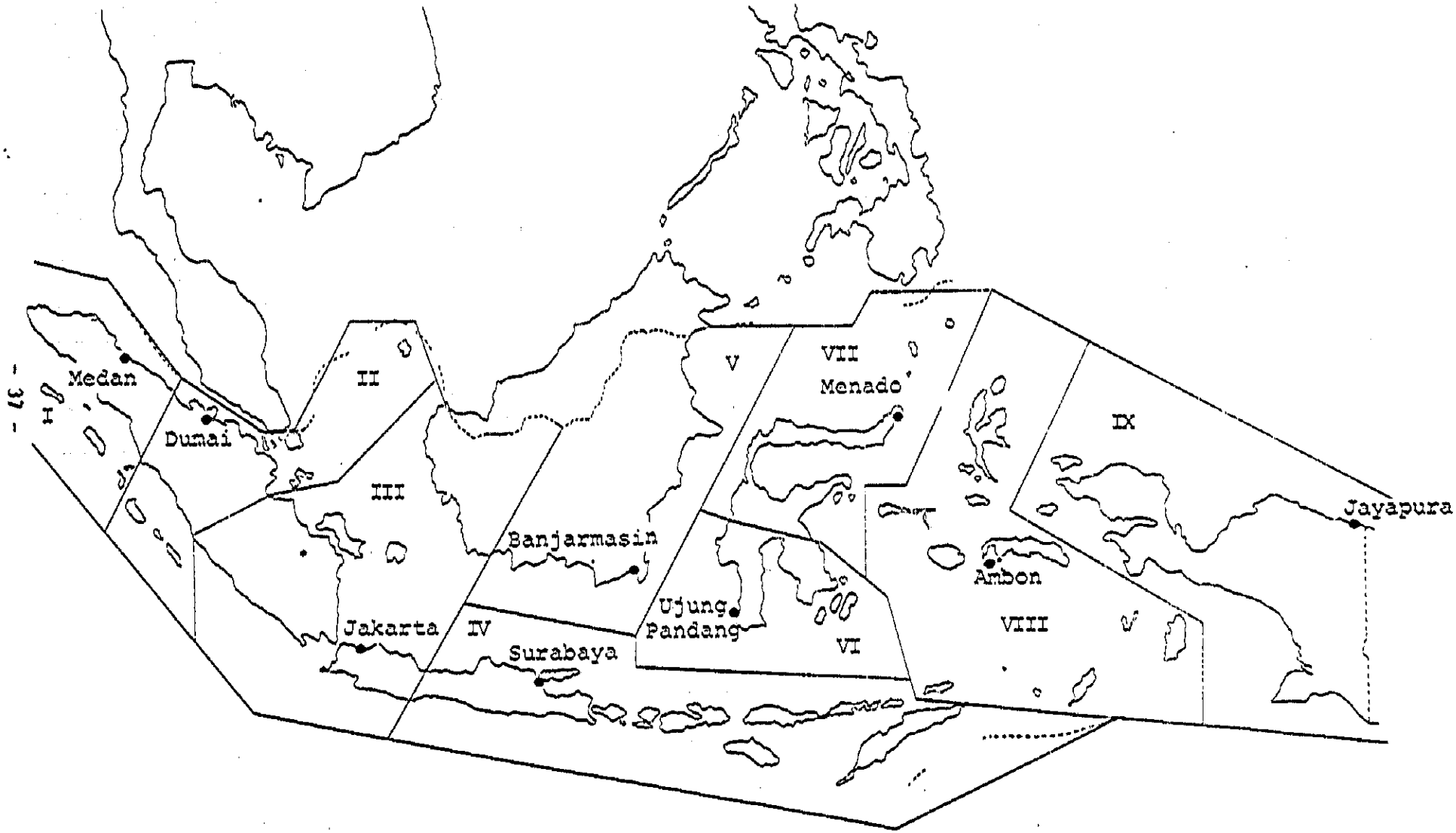


Figure 2-1-1(2) DIVISIONS FOR DISTRICT SEA COMMUNICATIONS



• show the District Headquarters

Figure 2-1-1(3)

ORGANIZATION CHART OF DISTRICT SEA COMMUNICATIONS

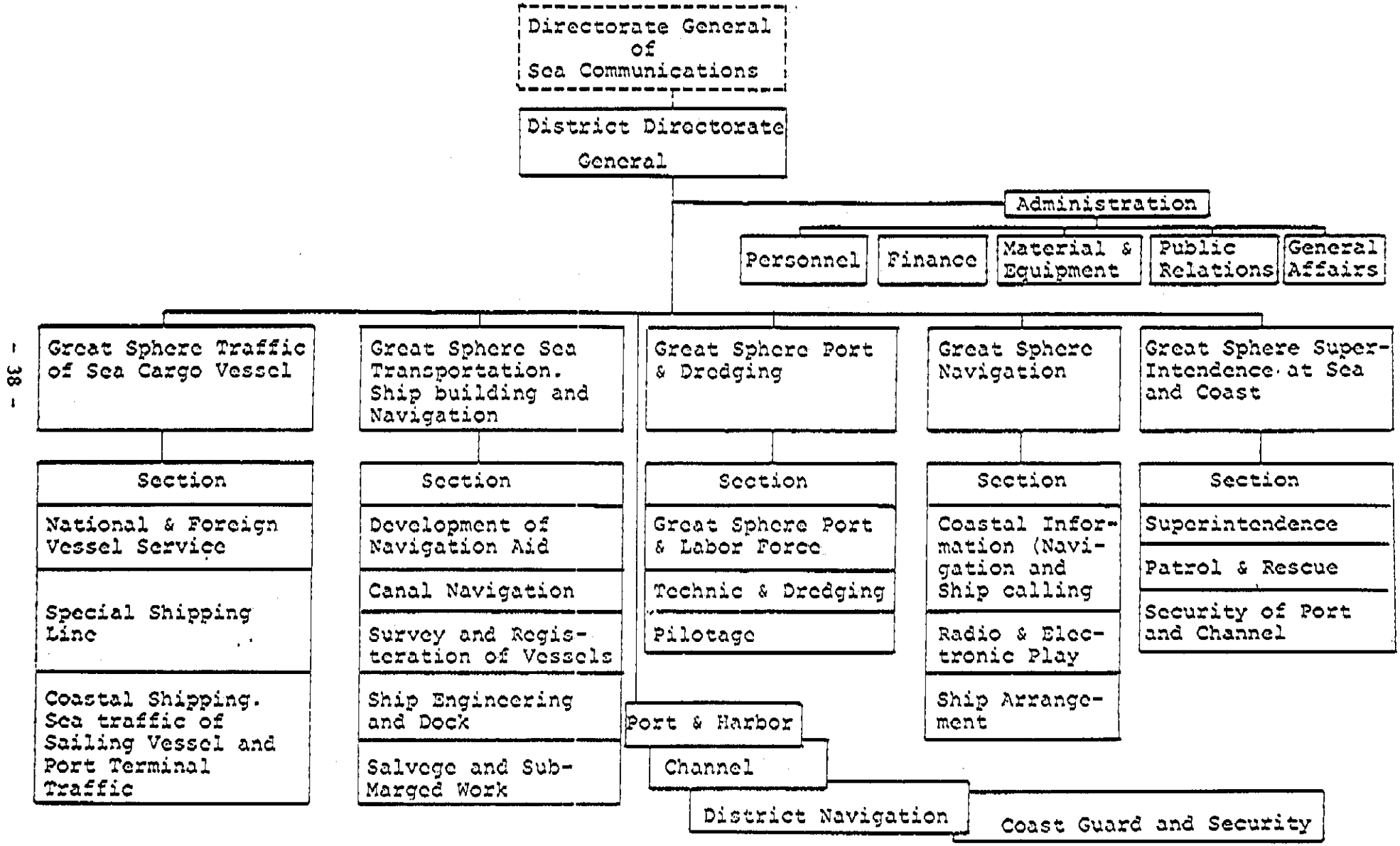
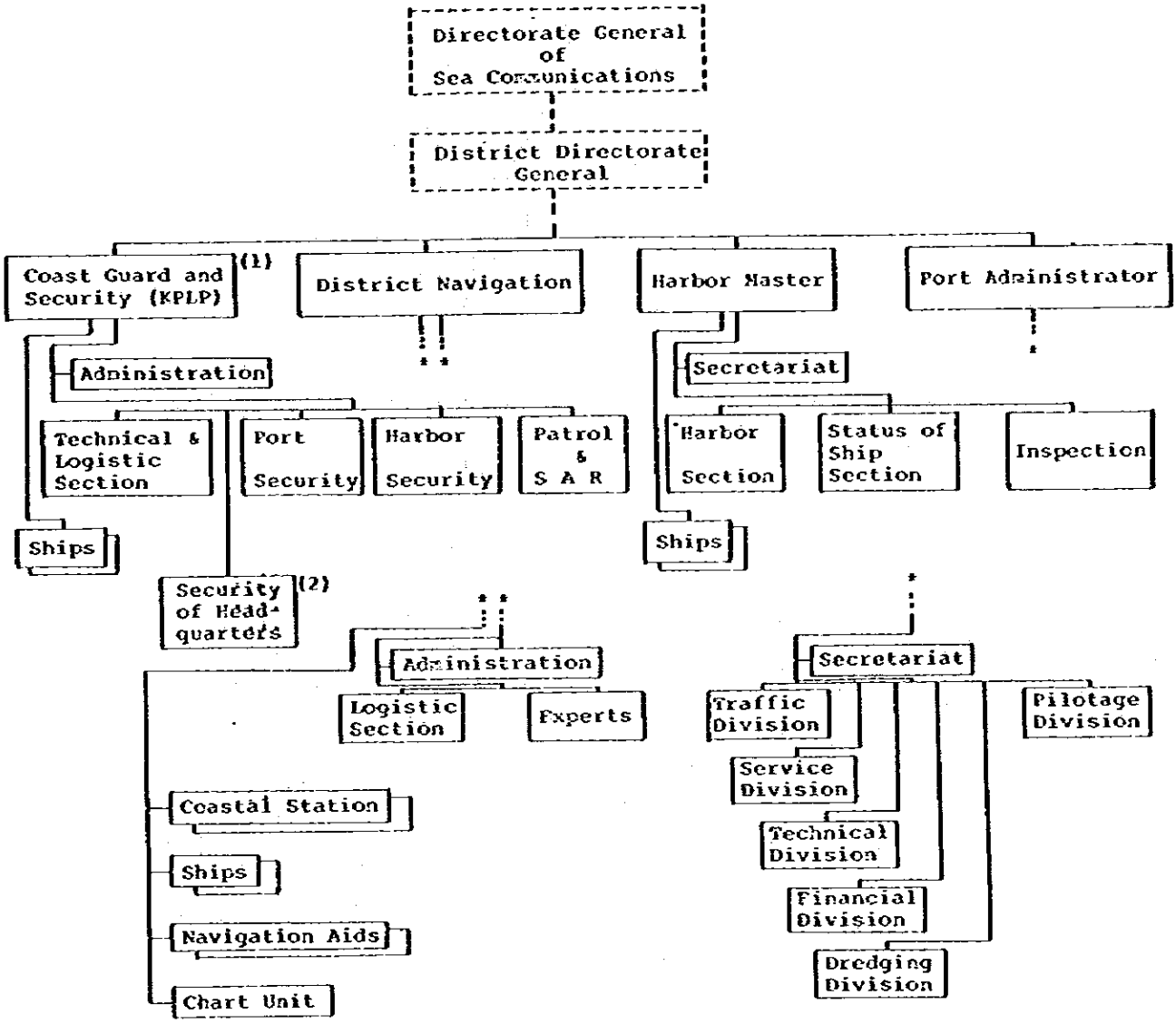


Figure 2-1-1(4)

ORGANIZATION CHART OF LOCAL OFFICES

(DISTRICT SEA COMMUNICATIONS)



Notes (1) Class I and II

(2) TG Priok only

Figure 2-1-2(1)

ORGANIZATION OF AIR COMMUNICACIONS

STRUKTUR ORGANISASI
DIRECTORAT JENDERAL PERHUBUNGAN UDARA

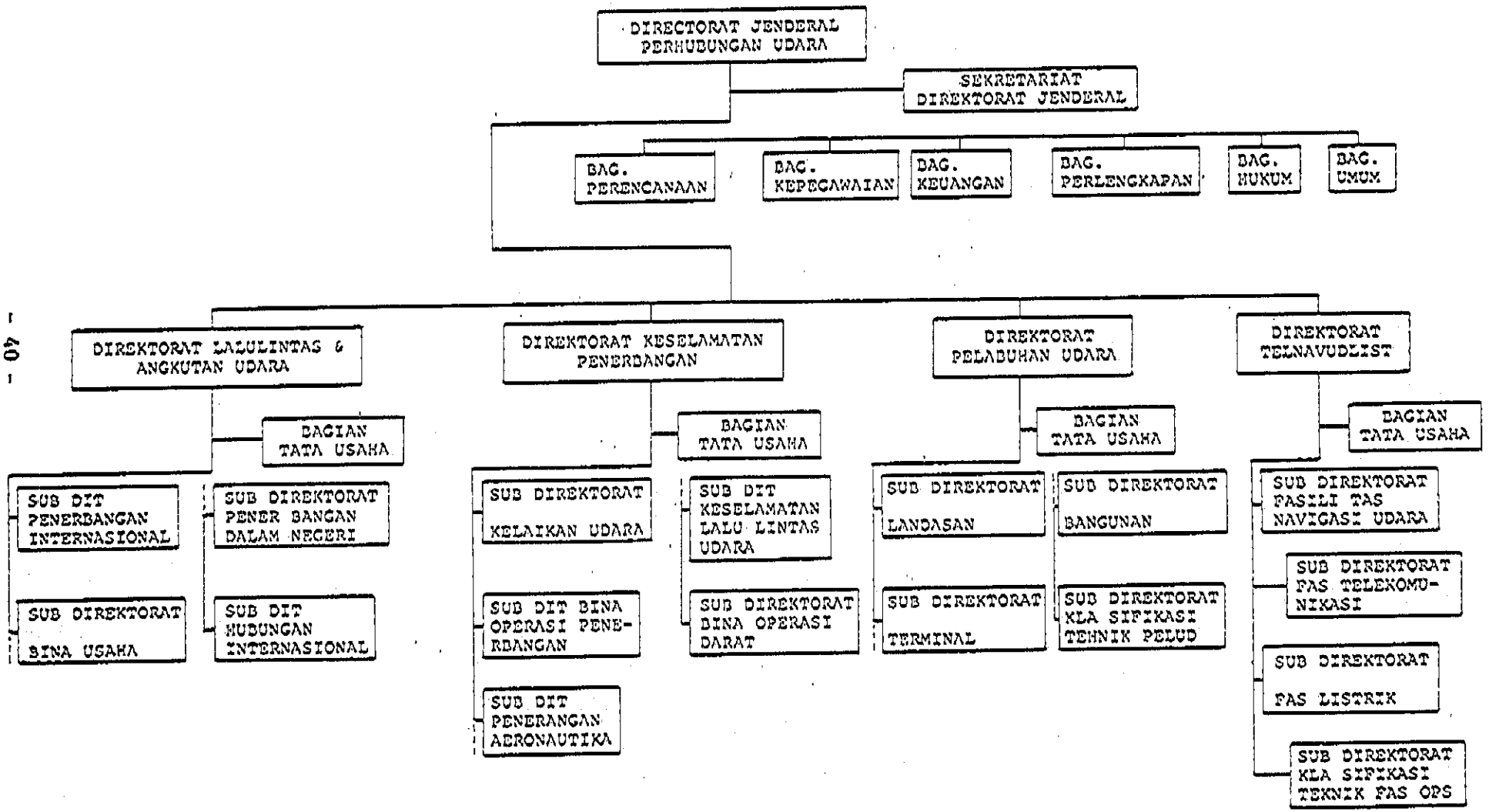
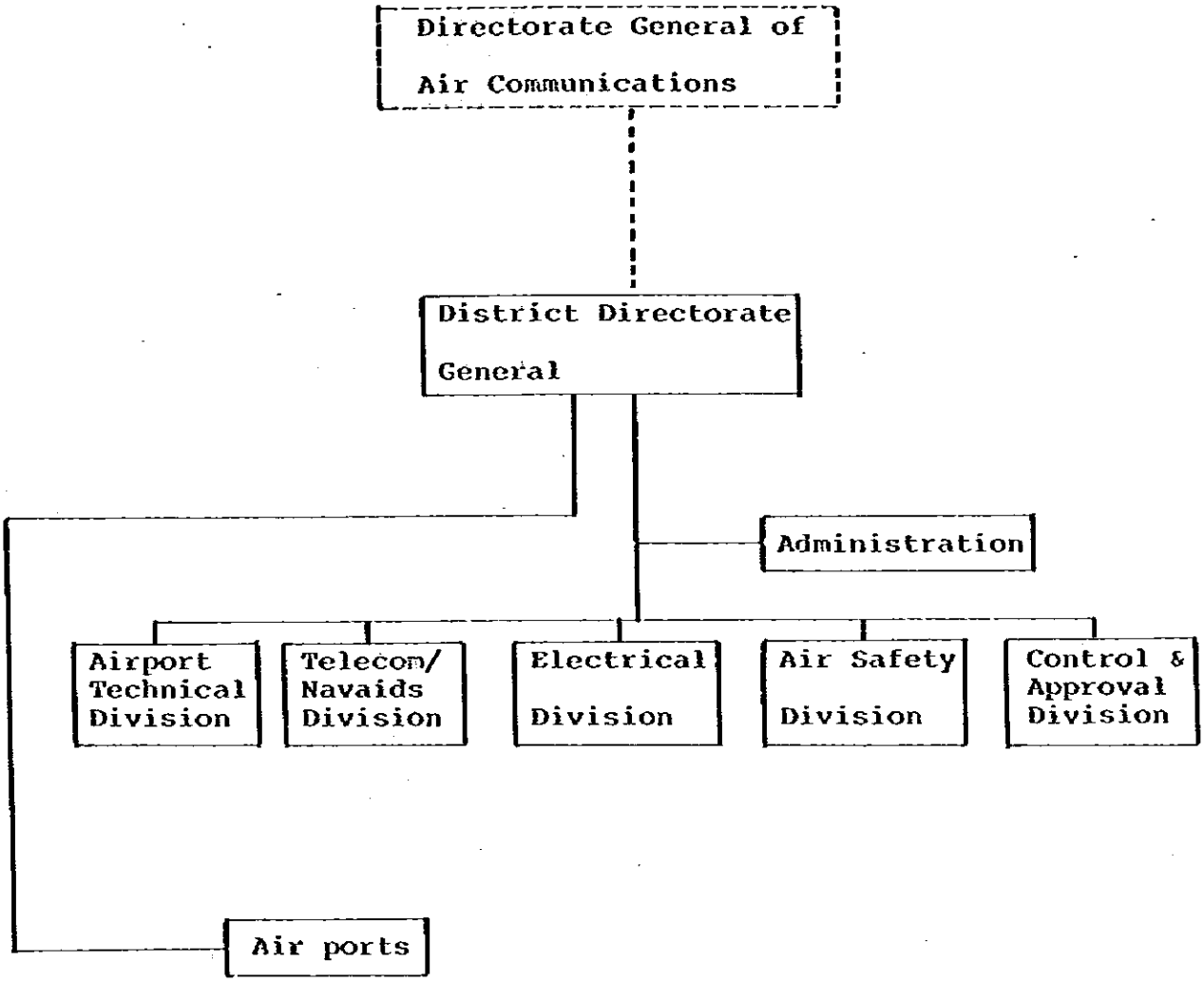


Figure 2-1-2(2)

ORGANIZATION CHART OF DISTRICT AIR COMMUNICATIONS



2-1-4 SAR National

Indonesian SAR National is the central co-ordinating body for all the SAR organizations in Indonesia for the effective conduct of search and rescue operations for marine and air accidents and disasters as well as those occurred on land. SAR National, whose organization charts are shown in Figures 2-1-4(1) and 2-1-4(2), holds no task force within the organization for SAR operations.

The whole nation is divided into four Districts under SAR National, and each District has a Rescue Co-ordination Center (KKR), under which Sub Rescue Co-ordination Centers (SKR) are established as shown in Figure 2-1-4(3).

Figure 2-1-4(1)

ORGANIZATION CHART OF
CENTRAL SAR NATIONAL

DEPARTEMEN PERHUBUNGAN
PUSAT SAR NASIONAL

BAGAN ORGANISASI
PUSAT SERACH AND
RESCUE NASIONAL
DEP.PERHUBUNGAN

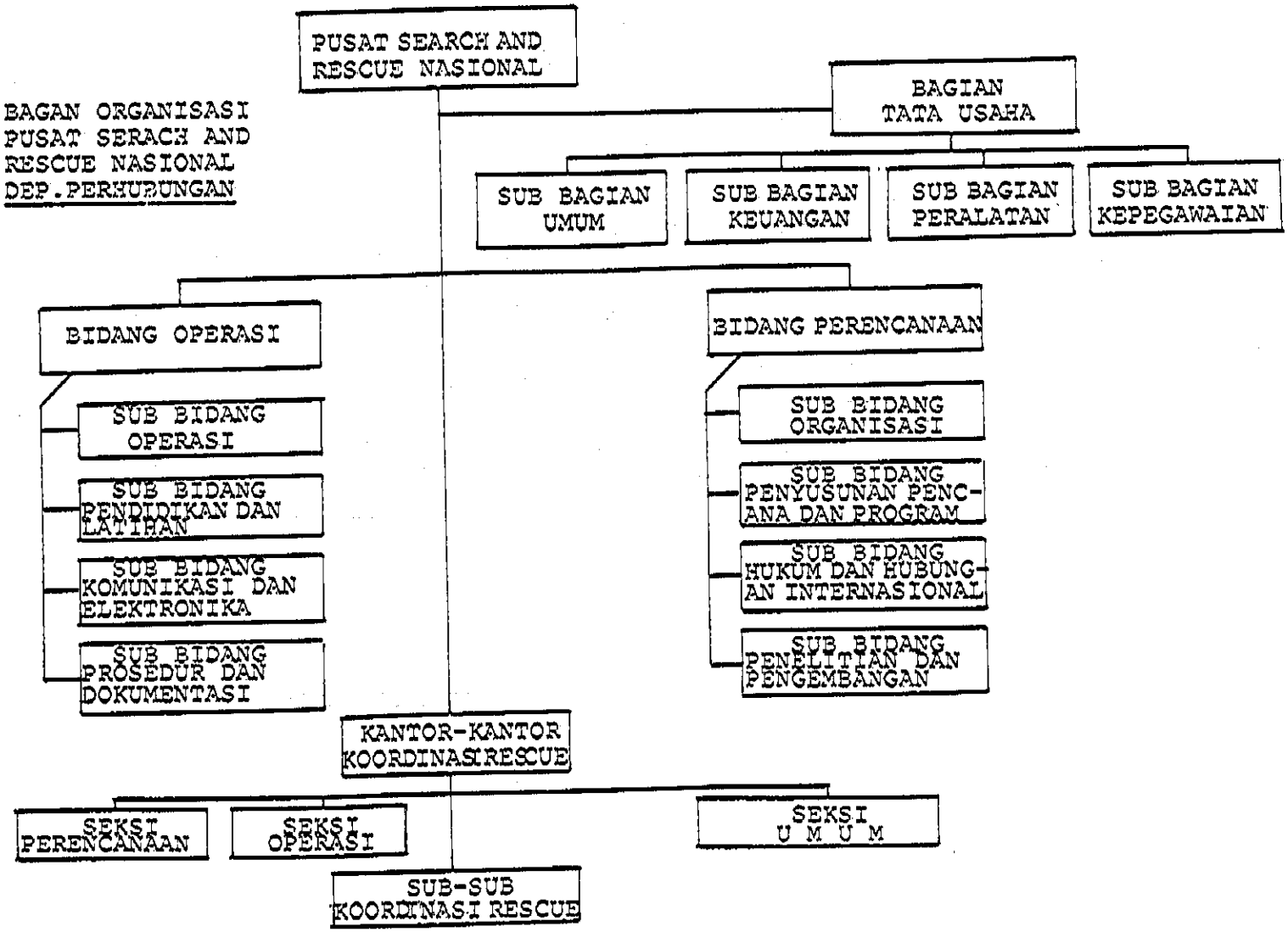


Figure 2-1-4(2)

ORGANIZATION CHART OF
SAR NATIONAL

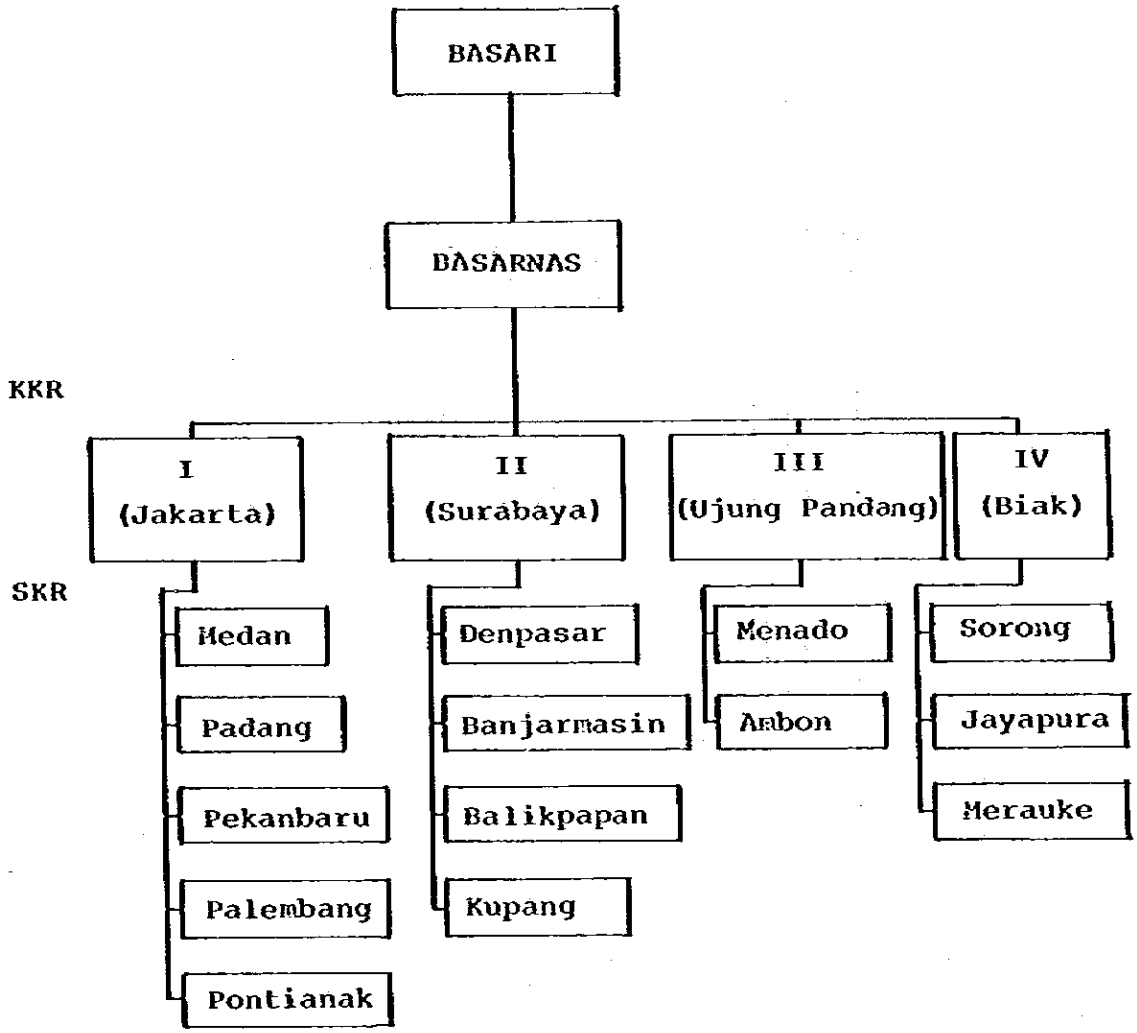
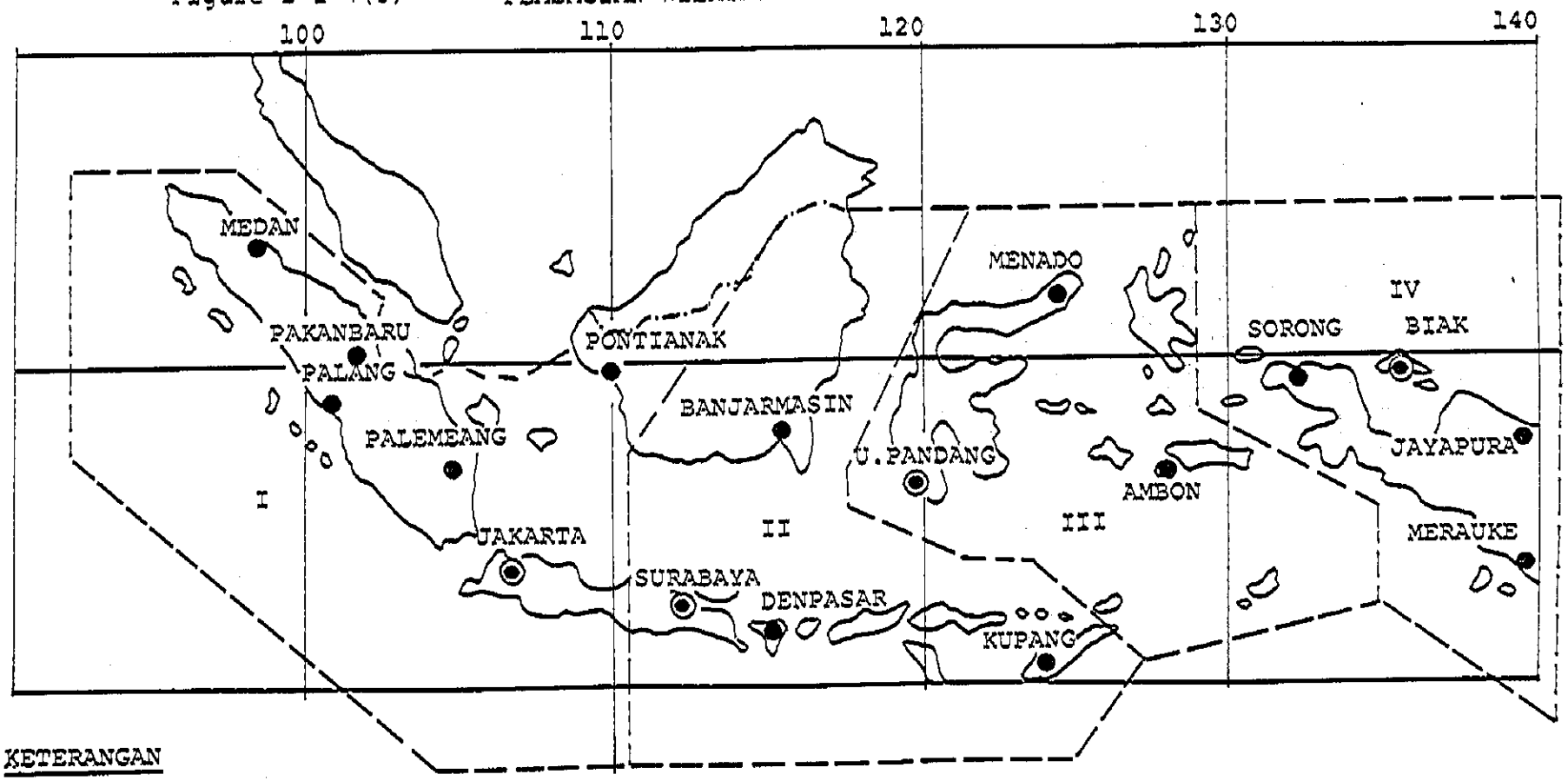


Figure 2-1-4(3) PEMBAGIAN WILAYAH SEARCH AND RESCUE



KETERANGAN

I.WILAYAH KKR JAKARTA
II.WILAYAH KKR SURABAYA
III.WILAYAH KKR UJUNG PANDANG
IV.WILAYAH KKR BIAK
---- BARASWILAYAH SAR

◉ KKR
● SKR

2-1-5 Meteorological and Geophysical Center

The Meteorological and Geophysical Center which belongs to the Ministry of Communications aims at conducting observation, analysis, etc. of the meteorological and geophysical data sent from 126 local offices distributed over the whole Indonesia. The processed information is sent to the local stations to contribute to the various fields of the social activities and also to the safety of vessels and aircrafts. The communication between the head office and the local offices is made through SSB circuit, telex circuit, VHF circuit, etc. Figure 2-1 and Figure 2-1-5 show the organization.

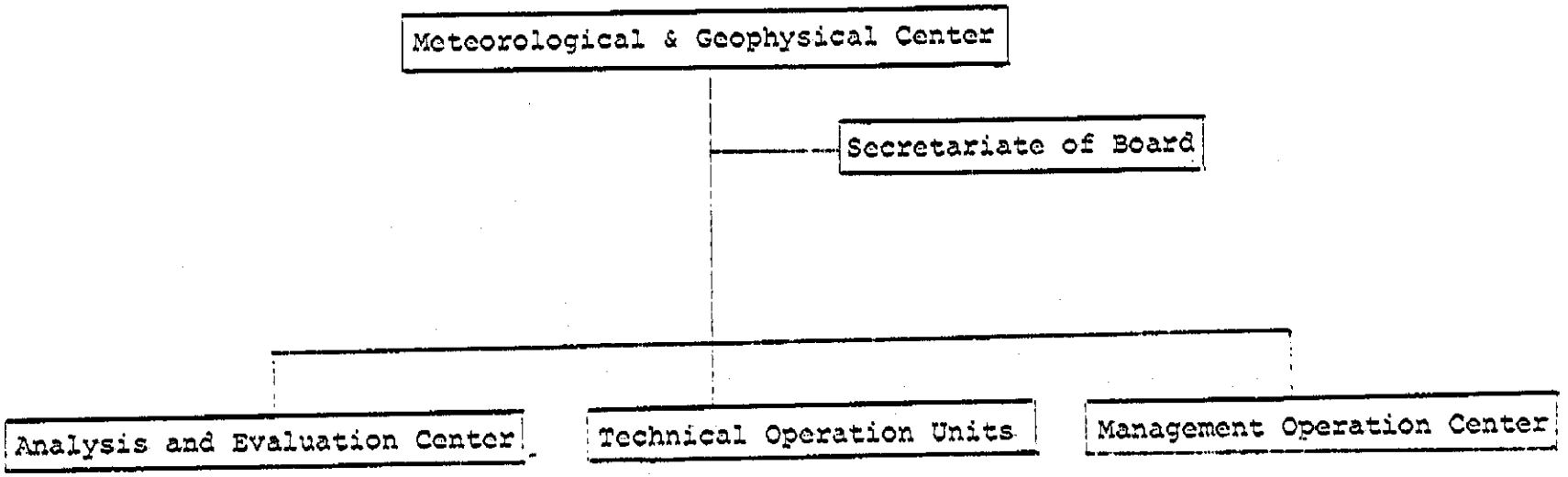


Fig. 2-1-5 Organization Chart of Meteorological & Geophysical Center

2-2 Information and Procedures

The Field Survey was carried out to investigate how quickly messages and information were transmitted and in what way or how the information concerning the vessels without any radio installation on board was obtained and transferred, and other matters.

Since there are various routes, ways and handling procedures to be practised in the flow of information, it can not be mentioned in a uniformed way how it flows. However, normal routes and procedures to follow are available between the offices of various organizations concerned.

2-2-1 Information on Marine Accidents

The general flow of distress message to be emitted from a vessel in distress or in a state of emergency is shown in Figure 2-2-1(1):
SOS message received at a coast station is transferred to the nearby KPLP Detachment for their immediate SAR action as well as to the District Directorate General of Sea Communications, from which the organizations of SAR National are notified of the information for their co-ordination. At the same time, the local Harbor Master, and local Port Administrator receive the information for their necessary SAR assistance.

The information received at PERTAMINA coast stations and fishery coast stations, i.e., other than Sea Communications' is also transferred to the organizations of Sea Communications and then follows the same procedures as above.

In view of the marine disaster of TAMPOMAS II encountered in the past it may be considered that any retardation in the flow of distress message or commanding/controlling message and other information has related to occurrence of a great marine disaster.

Regarding accidents of the ships installed no radio equipment on board, only way to realize their accidents is through the information received from other ships which witnessed the scene, and remarkable delay in the transmission of messages has led to the accidents, for which effective arrangements were not made for the search and rescue.

The handling process of important messages and information at a coast station is given in Figure 2-2-1(2) giving an example at Jakarta Radio.

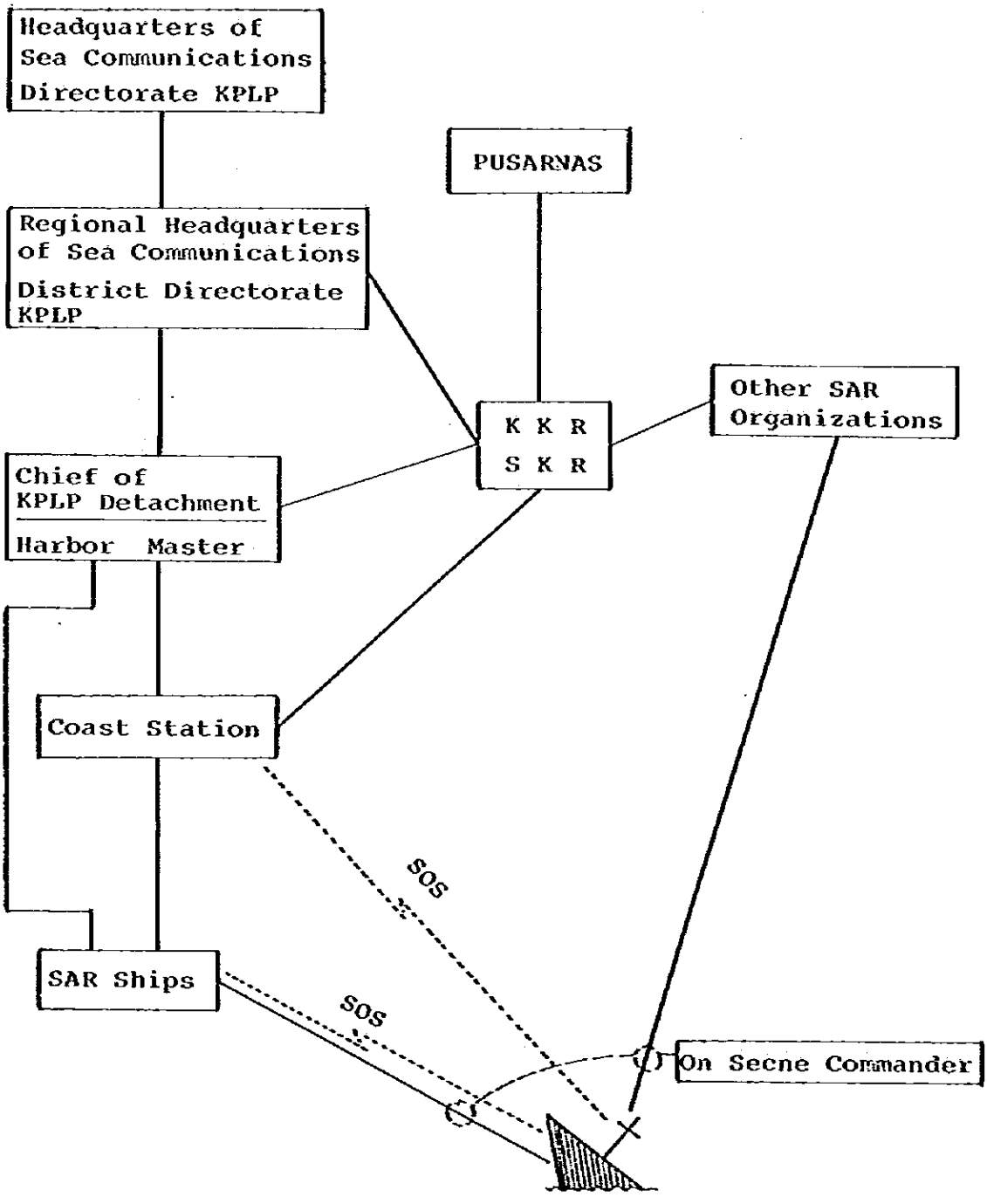
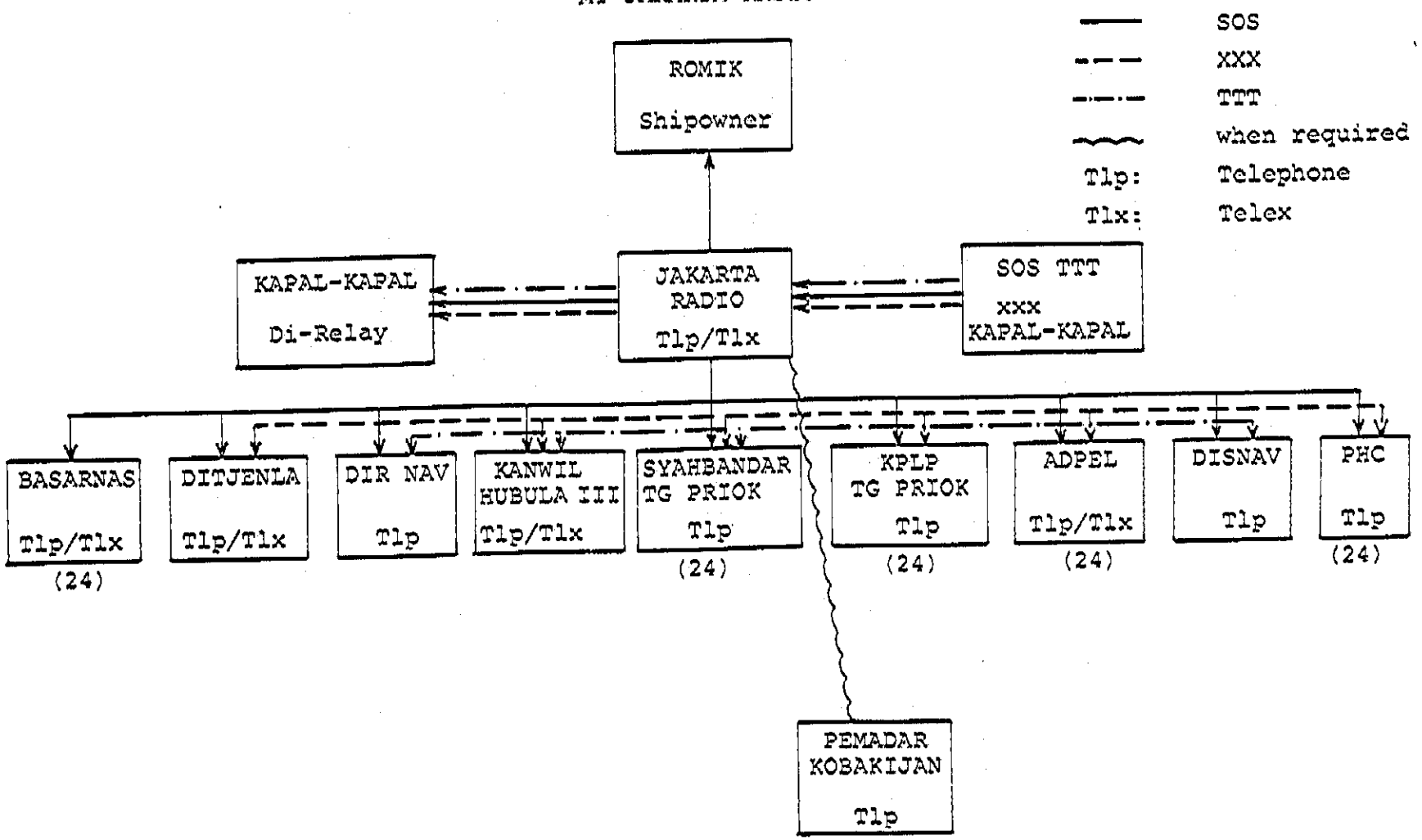


Figure 2-2-1(1) GENERAL FLOW OF SAR INFORMATION
IN CASE OF MARINE ACCIDENTS

Figure 2-2-1(2)

FLOW OF INFORMATION (IMPORTANT MESSAGES)
AT JAKARTA RADIO



2-2-2 Weather and Sea Conditions

The information on weather and sea conditions is so arranged that it will be transferred by public telephones from Meteorological Agency and Naval Oceanography in Indonesia to coast stations for their broadcasting.

It was, however, found that the examples of this pracitce were uncommon and accordingly so were the broadcast by coast stations.

2-2-3 Navigation Safety

The information on navigation safety is divided broadly into the two categories of navigation aids and obstacles to navigation;

Information on navigation aids such as failure of lighthouses is reported by District Navigasi and/or Harbor Master to Headquarters of Sea Communications through their senior offices, and then the Sea Communicaitons, whenever necessary, provide instruction to coast stations for their broadcasting of safety messages. It was found through the Field Survey that there were no coast stations broadcasting safety messages under the own judgement and decision by District Navigasi or Harbor Master.

The reports on obstacles to navigation from vessels at sea are extremely uncommon to have been received, and accordingly the examples of broadcasting safety messages were infrequently found.

2-2-4 Harbor Service

The information on the report and control for in-coming and out-going vessels is transmitted mainly through coast stations including PERTAMINA owned ones as well as small installations of the VHF transceivers belonging to Port Administrators.

It is required in Indonesia that ships should report to local Harbor Masters and Port Administrators on the estimated time of their arrival twenty-four hours before their entry. However, they say that in most cases ships report to the authorities by telexes and other means of communications originating from the ports of departure through the ship agents due to the possibility that they might miss an opportunity to report, if it were sent by radiotelegrams, because of the limited watch hours. especially of local coast stations.

2-2-5 Inter-Communications within Sea Communications

The communications within the organizations of Sea Communications for both routine services and SAR are presently made through dedicated HF and/or public telecommunications circuit.

HF SSB's are available for P-P communications of coast stations during the limited hours of operation, and therefore there may be some delays in information transmission.

It is necessary to establish a communications network for the sole use of SAR in view of the necessity of promptitude and certainty for the flow of information and the control and command required particularly for SAR purpose.

2-3 Maritime Radio Communication Network

2-3-1 Directorate General of Sea Communications

(1) Maritime Communication System

1) Maritime Mobile Communication service

At present, the coast stations that belong to the Directorate General of Sea Communications total 93. Out of them, 52 are the coast stations that take care of maritime mobile service including port operation and ship movement communication services. The remaining 41 engage in Point-to-Point (P-P) communication only.

Of all ships of Indonesian nationality, 881 are the ship stations fitted with radio communication equipment.

Maritime mobile communication service are in practice to/from those 881 ship stations of Indonesian nationality and other ships of foreign nationalities.

The classification of coast stations in charge of maritime mobile communication service is follows:

Class of Station	Number of Station	Frequency	Service
I	9	MF, HF & VHF	Public correspondence Port operation Ship movement
II	2	MF, HF & VHF	"
III	12	MF, HF & VHF	"
IV a	14	MF, HF & VHF	Public correspondence Port operation Ship movement
IV b	15	*2 *2 MF, HF & VHF	Port operation Ship movement
Total	52		

Note: *1 Applicable to Sibolga, Tg. Pinang, Tg. Balai Kariman, Jambi, Benoa, Ampenan, Dili, Samarinda, Ternate, Manokwari and Biak (11 stations in total)

*2 Applicable to Pangkalan Balan, Tegal, Meneng, Gorontalo and Luwuk (5 stations in total)

The service area is of a radius of about 200-500 km of the coast station in MF and HF bands and of a radius of about 50 km in VHF band.

Operating hours are as follows:

- Class I stations: 24 hours except Belawan (17 hours), Palembang (16 hours), Dumai (14 hours) and Jayapura (12 hours)
- Class II stations: 12 hours except Sabang (10 hours)
- Class III stations: 8 - 15 hours
- Class IVa stations: about 8 hours
- Class IVb stations: within 8 hours

Traffic behaviors are shown in Table 2-3-1 (1) and Table 2-3-1 (2). Telegraph traffic shows no significant change in the past three years, but telephone traffic marks a nearly three times increase in the past three years. This fact indicates that the maritime mobile communication is shifting steadily toward telephonic communication.

The coast stations that engage in maritime mobile communication without belonging to the Directorate General of Sea Communications, i.e., the PERTAMINA's coast stations dedicated to maritime mobile communication, are now established near the main ports and a half of them are operating on practically around-the-clock basis especially for Channel 16 of VHF band. Therefore, for urgent communication as in the case of distress at sea or other emergency, there is much to depend upon the PERTAMINA's coast stations.

With regard to port operation and ship movement service communication, all the 52 coast stations of the Directorate General of Sea Communications maintain the VHF band.

Of those 52 coast stations, most of Class III and higher rankings handle public correspondence service, as well as the port operation and ship movement services. In the case of Class IV coast stations providing maritime mobile service, handle the port operation and ship movement services only. The sole exception is Dili, one of Class IVa coast stations, that handles public correspondence also.

As the harbor facilities are further improved in the future, a greater number of ships are required to hold a means of communication so as to ensure greater safety of maritime traffic. There will be the increased need for more and more coast stations to provide the port operation and ship movement communication services.

2) P-P Communication

P-P communication among the coast stations is being operated by the exclusive HF network as illustrated in Figure 2-3-1 (1). However, in line with the development of public communication network of PERUMTEL, the means of P-P communication is gradually shifting from the exclusive network to the public communication network.

At present, almost all coast stations periodically contact the other coast stations and establish the P-P radio circuit for conveying various information on maritime services and for administration.

Communication between the coast station and the message center is via telephone and telex line in almost all cases by use of the public communication network of PERUMTEL.

As seen in Figure 2-3-1 (1), P-P communication is conducted in many cases between the coast stations in the same KANWIL. Communication with the message center at Jakarta is Via Class I or Class II station though there are a few exceptions. The exceptions are Sorong (Class

III), Cilacap (Class III) and Dili (Class IVa) stations that carry out P-P communication directly with the message center.

P-P communication among the coast stations in the same KANWIL is by HF-band telephone in most cases. There even is the coast station that communicates with as many as 10 other coast stations by the same frequency by staggered time schedules.

(2) Facilities and Personnel

1) Coast Station

The coast stations that belong to the Directorate General of Sea Communications total 93 at present. The breakdown by classes follows:

Class of station	Number of station
I	9
II	2
III	12
IVa	14
IVb	56
Total	93

APPENDIX-1 presents a list of the existing coast stations. Shown in the list are the call signs and frequencies that they use and their transmitter outputs and operating hours, as well as their geographical latitudes and longitudes, compiled according to the KANWILs which they respectively control and their station classes.

Table 2-3-1 (3) shows the sites and building areas of the existing main coast stations.

Figure 2-3-1 (2) and Figure 2-3-1 (3) give the typical examples of the site plan (including the antenna location) and the equipment arrangement, respectively.

Of all those coast stations, Class I and Class II stations have the transmitting and receiving stations separately located.

At present, many Class I coast stations have their receiving stations located in the urban area. Because of the progress of urbanization works and the resultant increase of city noise, the reception of those receiving stations is significantly deteriorated. Not a few coast stations desire to transfer their receiving stations to other sites.

For the coast stations as a whole, it must be pointed out that they are located too near the harbor in most cases. Therefore, when the harbor communication further increases quantitatively, e.g., when a large number of ship stations transmit radio signals at the same time, it will become difficult to prevent interference disturbance due to intermodulation in transmitting and receiving equipments.

Sabang, a Class II coast station, is an exception. This station has the transmitting and receiving facilities installed at the same site and building since a few years ago. At the time it was first established, it had the transmitting and receiving station separated; however, to avoide difficulty due to frequent

troubles with the entrance cable between both stations, the transmitting and receiving facilities were collocated at the previously transmitting station.

Class III and lower ranking coast stations have the transmitting and receiving facilities installed at the same building. And, with such concentrated facilities, those stations are carrying out both maritime mobile communication by MF, HF and VHF and P-P communication by HF.

Since the volume of communication is relatively small at present, no serious problem arises. However, as the communication traffic increases from now on, the simultaneous parallel operation of transmitters and receivers at the same site becomes necessary. Especially in the MF and HF bands, mutual interference in the same station may pose a new problem in addition to the existing noise and radio interference. This situation makes it difficult to improve the service quality to a higher level than at present and may even necessitate the separation of transmitting and receiving station.

2) Facilities

The coast station facilities comprise three main categories: antenna facilities, radio facilities and power supply facilities.

a) Antenna Facilities

For the transmitting antenna, the following types are used:

For MF:	T type
For MF and HF:	Fan type, T type, inverted L type, conical monopole type, FD type
For VHF:	Braun type, sleeve type

For the receiving antenna, the main types used are T type, inverted L type and dipole type. For VHF, the types of receiving antenna are the same as those used for transmitting antenna. Many coast stations use the same antenna for both transmission and reception.

Generally, the station site is small. Therefore, almost all stations do not have sufficient space for antenna installation to meet the expected service expansion in the future.

The antenna system maintenance also is not satisfactory at some stations.

b) Power Supply Facilities

Almost all coast stations receive the commercial AC power supply. In many cases, Class I and Class II stations are equipped with the 30-100 kVA standby engine generator and other stations with the 3-5 kVA standby engine generator at their transmitting stations.

At no station is adopted the non-break power supply to be used at the time of power supply failure. The engine generator adopted is mostly the type to be manually driven in the engine room.

For power supply to the receiving equipment also, many coast stations use the AC supply while a few stations use DC supply.

Most of coast stations are equipped with two engine generator units so that those stations can sustain the power supply during commercial power failure. However, at some stations, the maintenance of such engine generator units is not satisfactory.

The major problem with the power supply facilities is that, when the commercial power supply fails, the coast station service may most possibly be interrupted for more than 10 minutes. It is necessary to have a non-break power supply at the receiving station at least.

c) Radio Facilities

APPENDIX-2 shows the status of radio facilities installed and operating at the existing coast stations. This table is compiled on the basis of information obtained from the monthly report of each coast station and by this study. The table explains the kind and type of equipment, year of manufacture, frequency used, transmitting output, and state of operation.

Table 2-3-1 (4) is the summary of APPENDIX-2.

Many of radio facilities used at the existing coast stations are considerably aged. The equipments manufactured before 1969, especially MF/HF transmitters and receivers, are defective in many respects, so that they have to be replaced with new units in the near future.

3) Personnel

A breakdown of coast station personnel is given in Table 2-3-1 (5). This table is based on the data as of March 1981 obtained from coast station monthly reports and by the field survey carried out this time. Replies to the questionnaire addressed to the Directorate General of Sea Communications are also used in the formulation of this table. Although the data obtained do not cover the whole of the existing coast stations, the trend of personnel allocation among coast stations according to their classes can be known from this table.

Present status of the station personnel is summarized as follows:

Class of station	Number of personnel
I	17 - 99
II	6 - 8
III	2 - 13
IVa	1 - 7
IVb	1 - 4

(3) Operation/Maintenance System

Every station surveyed suffers from the shortage of spares; accordingly, many equipment of various kinds are kept unrepaired. In some stations, the failed equipment was repaired with a circuit component removed from the stand-by equipment.

The number of technicians capable of repairing the failed equipment is apparently not sufficient. Since the shortage of normally operating equipment imposes restriction upon the operation of coast stations, some kinds of remedies, such as introduction of Maintenance Center, increased supply of spares and effective assignment of manpower, may become necessary.

Table 2-3-1(1) Statistics of Mobile Telegraph Service Calls

YEAR \ NAME OF STATION	JAKARTA	SURABAYA	BELAWAN	DUMAI	UJUNG PANDANG	BITUNG	AMBON	JAYAPURA	SORONG	MERAUKE	SEMARANG	TOTAL
	8,780	441	887	40	270	34	185	-	27	62	14	
1979	47,975	6,745	4,163	854	2,304	1,085	2,761	240	1,004	315	364	
	56,755	7,186	5,050	894	2,574	1,119	2,946	240	1,031	377	378	68,991
	8,525	483	1,299	25	371	87	218	32	32	5	5	
1978	37,846	8,859	4,428	851	2,750	2,669	2,515	133	1,343	75	439	
	46,371	9,342	5,727	876	3,121	2,756	2,733	165	1,375	79	444	72,989
	10,755	685	1,158	96	574	51	274	45	39	8	10	
1977	45,321	8,062	4,646	1,612	5,645	1,614	2,744	188	1,050	67	401	
	56,076	8,747	5,804	1,708	6,219	1,665	3,018	233	1,089	75	411	85,045

Note: Upper row - Number of calls transmitted
Middle row - Number of calls received
Lower row - Total

Source: Sea Comm.

Table 2-3-1(2) Statistics of Mobile Telephone Service Calls

NAME OF STATION / YEAR	JAKARTA	SURABAYA	BELAWAN	DUMAI	UJUNG PANDANG	BITUNG	AMBON	JAYAPURA	SORONG	MERAUKE	SEMARANG	TOTAL
1979	1,672	632	279	162	224	675	168	78	163	x	97	4,150
1978	1,094	494	136	136	198	x	151	55	131	x	61	2,456
1977	728	273	112	x	159	x	x	47	119	x	x	1,438

Note: x = Not in operation

Source: Sea Comm.

Table 2-3-1 (3) THE EXISTING LANDSPACE AND BUILDING

RADIO STATIONS	LANDSPACE TX	LANDSPACE RX	BUILDING TX	BUILDING RX	BUILDING FOR GENERATING SET TX	BUILDING FOR GENERATING SET RX
JAKARTA	2.0 Ha *2	1.5 Ha	*1 1800 M^2	700 M^2	70 M^2	35 M^2
BELAWAN	1.5 Ha *3	2.5 Ha	304 M^2	224 M^2	70 M^2	28 M^2
PALENBANG	2 Ha	1.5 Ha	480 M^2	300 M^2	70 M^2	35 M^2
DUHAI	4 Ha	2 Ha	280 M^2	180 M^2	42 M^2	40 M^2
SURABAYA	0.455Ha	0.65 Ha	249 M^2	472 M^2	55 M^2	72 M^2
UJUNG PANDANG	2 Ha	1.16 Ha	240 M^2	180 M^2	40 M^2	35 M^2
BITUNG	1.62 Ha	1.21 Ha	100 M^2	180 M^2	40 M^2	35 M^2
AMBON	2.8 Ha	0.3 Ha	216 M^2	*4 448 M^2	48 M^2	24 M^2
JAYAPURA	2.4 Ha	1.08 Ha	240 M^2	180 M^2	70 M^2	35 M^2
SEMARANG	1 Ha	1 Ha	294 M^2	210 M^2	40 M^2	35 M^2
SORONG	1000 M^2	-	*5 76 M^2	-	-	-
MERAUKE	600 M^2	-	*5 76 M^2	-	-	-
CILACAP	2500 M^2	-	*5 76 M^2	-	-	-

REMARKS:

1) TX Building consist of two floor 900 M^2 each.
2) Will be removed to new location, land space at new location 2 Ha.
3) Planned to remove to new location.
4) Consist of two floor.
5) TX and RX building in one place.

Table 2-3-1 (4)

Condition of Radio Equipment in Coast Stations

(Excluding (F-ST-12) Project Plan Station)

Class	Manufac-tured Year	MF Tx G	MF Tx NG	HF Tx G	HF Tx NG	MF/HF, Rx G	MF/HF, Rx NG	MF/HF,TRx G	MF/HF,TRx NG	VHF,TRx G	VHF,TRx NG	Total
II	Before 1969	1	2	3	0	7	0	0	1	1	0	15
	Before 1974	3	0	3	0	4	0	1	0	3	0	14
	After 1975	0	0	0	0	0	0	0	0	0	0	0
III	Before 1969	4	2	2	1	10	0	5	0	4	0	28
	Before 1974	11	0	2	0	12	0	6	1	8	0	40
	After 1975	1	0	0	0	2	0	2	0	4	0	9
IV(A)	Before 1969	0	2	11	0	3	2	0	0	0	0	18
	Before 1974	0	0	0	0	1	0	6	1	4	0	12
	After 1975	0	0	0	0	0	0	4	1	1	0	6
IV(B)	Before 1969	2	1	1	4	3	6	2	2	2	0	23
	Before 1974	1	0	2	0	2	0	26	2	10	1	44
	After 1975	0	0	0	0	0	0	4	0	1	0	5
Yearly Total	After 1969	7	7	17	5	23	8	7	3	7	0	84
	Before 1974	15	0	7	0	19	0	39	4	25	1	110
	After 1975	1	0	0	0	2	0	10	1	6	0	20
Ground Total		23	7	24	5	44	8	56	8	38	1	214

Legend:

G: Good
NG: No Good

Note: Number of Coast Station's Classification

Class II	2
Class III	9
Class IV(A) ...	7
Class IV(B) ...	23
Total	41

Table 2-3-1(5) Personnel by Coast Stations (as of March 1981) (1/2)

Coast Station	Class	Region	KAS	MAR	OPE	TEC	MOT	OTR	Total
Blawan	I	I	1	-	16	8	-	-	25
Dumai	I	II	(1)	11	2	4	-	-	17
Palembang	I	III	1	8	4	5	-	5	23
Jakarta	I	III	(1)	44	23	20	3	9	99
Surabaya	I	IV	1	65	3	12	4	13	98
Ujung Pandang	I	VI	1	24	-	10	1	6	42
Bitung	I	VII	1	-	11	5	-	-	17
Ambon	I	VIII	1	-	10	7	-	-	18
Jayapura	I	IX	1	-	14	8	-	-	23
Sabang	II	I	1	-	7	(7)	-	-	8
Balikpapan	II	V	1	2	2	-	1	-	6
Teluk Bayur	III	II	1	3	-	-	1	3	8
Panjang	III	III	(1)	2	2	1	-	2	7
Cirebon	III	III	1	2	1	-	-	2	6
Semarang	III	IV	-	-	8	5	-	-	13
Cilacap	III	IV	1	-	-	5	-	2	8
Kupang	III	IV	(1)	4		3	-	2	9
Pontianak	III	III	1	-	4	-			5
Banjarmasin	III	V	1	3	4	-			8
Tarakan	III	V	-	-	2	-			2
Donggala	III	VII	-	-	3	1	-	-	4
Sorong	III	IX	1	-	3	(1)	-	2	6
Merauke	III	IX	1	-	5		(1)	-	6
Tg. Uban	IVa	II	1	2	-	-	1	1	5
Jambi	IVa	III	1	-	1	-	-	3	5
Benoa	IVa	IV	(1)	5	-	-	1	1	7
Panarukan	IVa	IV	(1)	1	-	-	-	-	1

Table 2-3-1(5) Personnel by Coast Stations (as of March 1981) (2/2)

Coast Station	Class	Region	KAS	MAR	OPE	TEC	MOT	OTR	Total
Sampit	IVa	V	-	2	-	-	-	1	3
Ternate	IVa	VIII	1	-	2	1	-	-	4
Biak	IVa	IX	1	-	2	-	-	-	3
Ulee-Lheue	IVb	I	(1)	1	2	-	-	-	3
Gunung Sitoli	IVb	I	(1)	1	-	-	-	-	1
Beng Kalis	IVb	II	-	1	-	-	-	-	1
Muara Sabak	IVb	III	-	1	-	-	-	-	1
Bengkulu	IVb	III	-	-	1	-	-	-	1
Tegal	IVb	IV	1	-	2	-	-	1	4
Buleleng	IVb	IV	1	-	1	-	-	-	2
Bima	IVb	IV	1	-	-	-	-	-	1
Probolingo	IVb	IV	1	-	-	-	-	-	1
Meneng	IVb	IV	1	-	-	-	-	1	2
Pulau Pisani	IVb	V	-	-	1	-	(1)	-	1
Kendari	IVb	VI	-	1	-	-	1	-	2
Gorontalo	IVb	VII	1	-	1	-	1	-	3
Poso	IVb	VII	1	1	-	-	(1)	-	2
Parigi	IVb	VII	1	-	1	-	1	-	3
Tahuna	IVb	VII	1	-	-	-	-	-	1
Kolonedale	IVb	VII	1	-	1	-	-	-	2
Siau	IVb	VII	1	-	-	-	-	-	1
Kaimana	IVb	IX	(1)	-	2	-	-	-	2
Fak-Fak	IVb	IX	1	-	2	-	-	-	3

Note: KAS: Kasrop
MAR: Marconis
OPE: Operator
TEC: Technician
MOT: Motoris
OTR: Others

Source: Monthly Reports submitted by Coast Stations

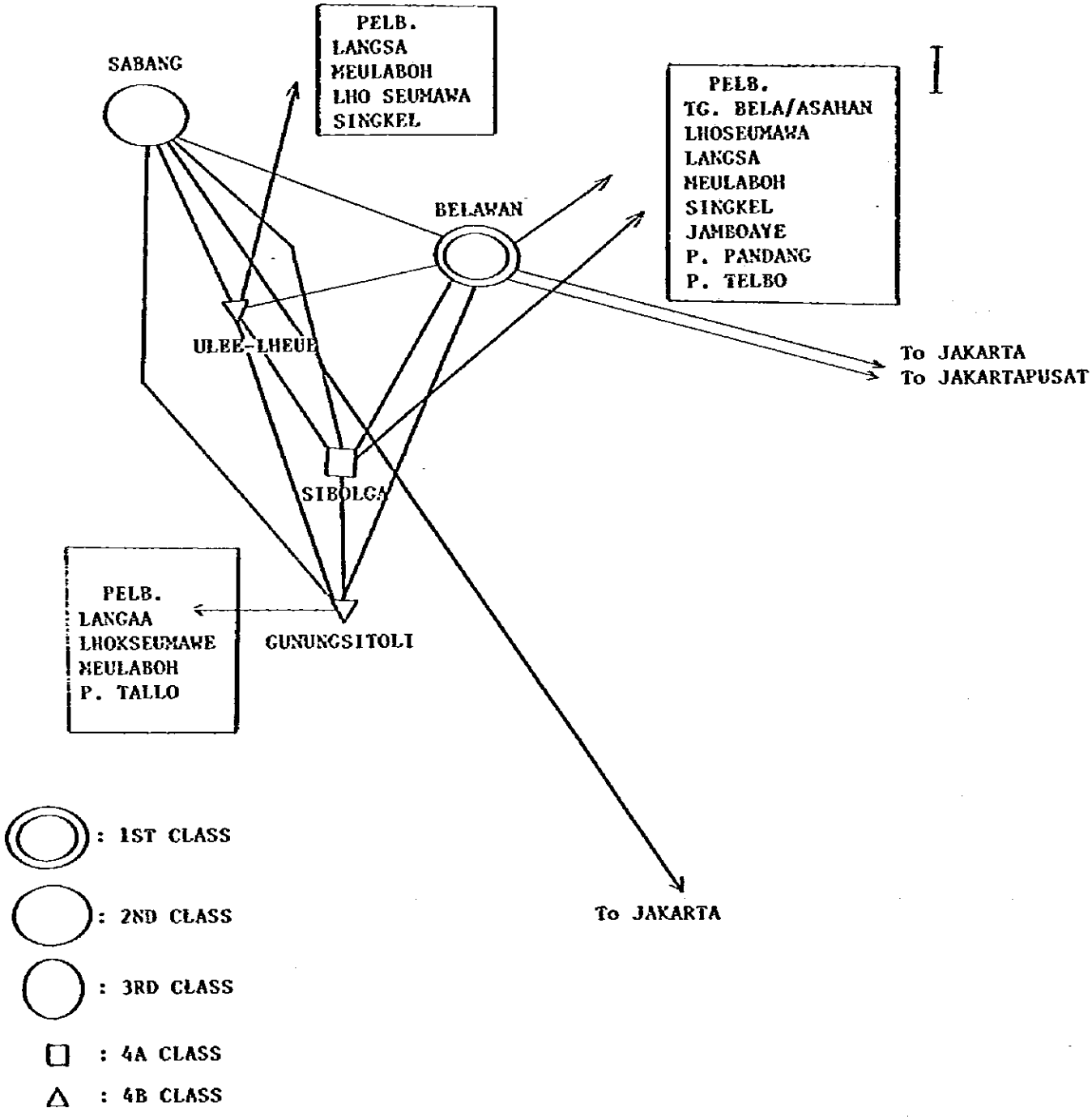


Fig. 2-3-1(1) Point-to-Point Network (1/7)

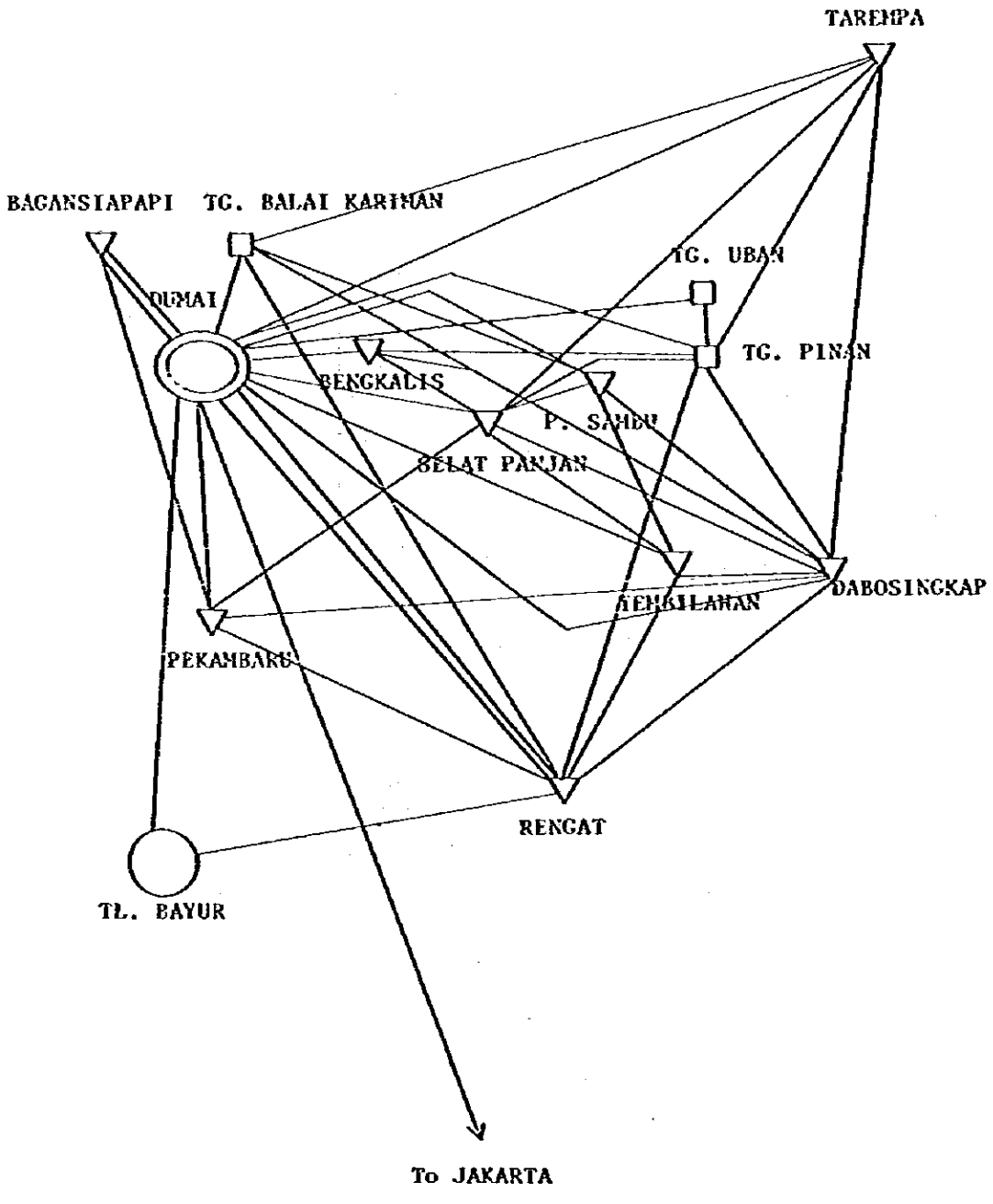


Fig. 2-3-1(1) Point-to-Point Network (2/7)

III

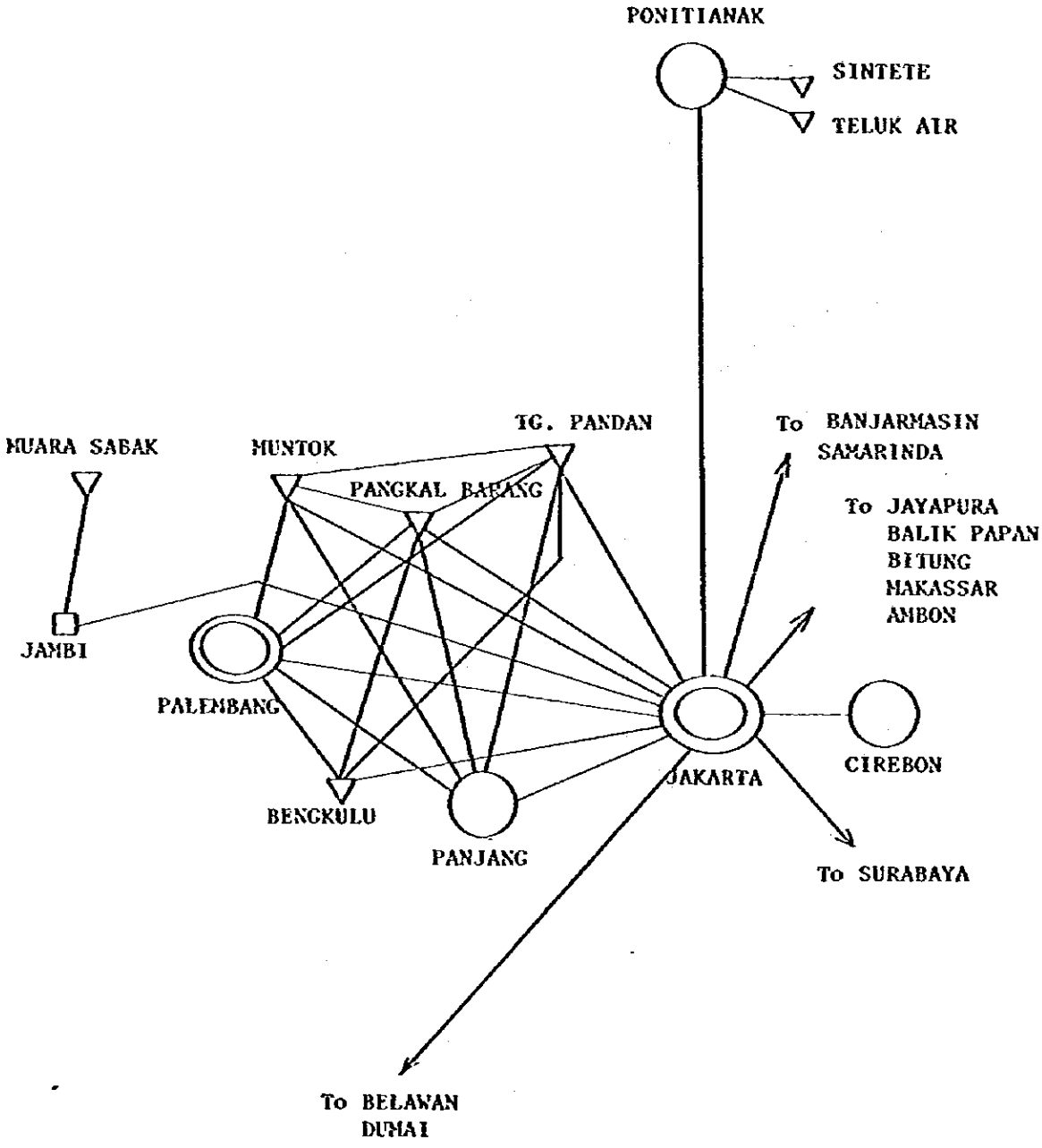


Fig. 2-3-1(1) Point-to-Point Network (3/7)

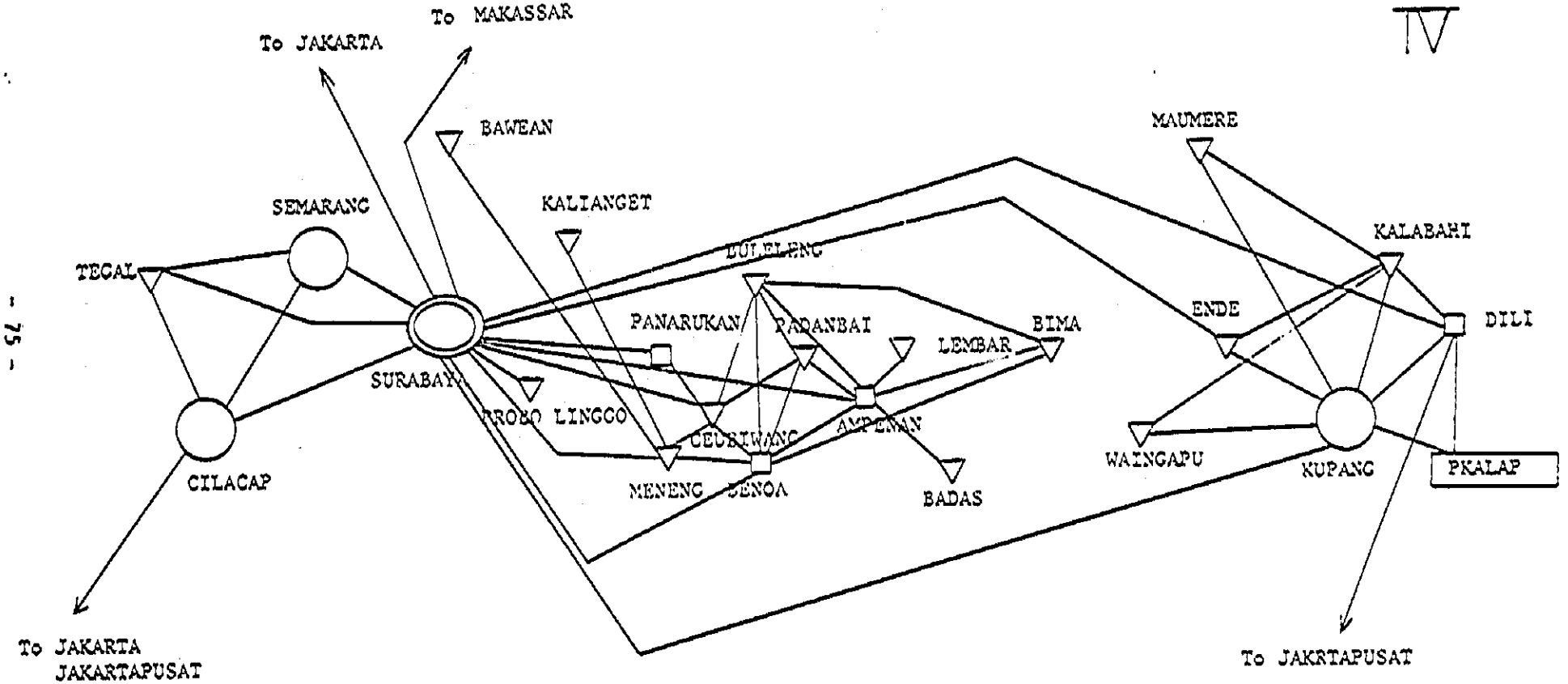


Fig. 2-3-1(1) Point-to-Point Network (4/7)

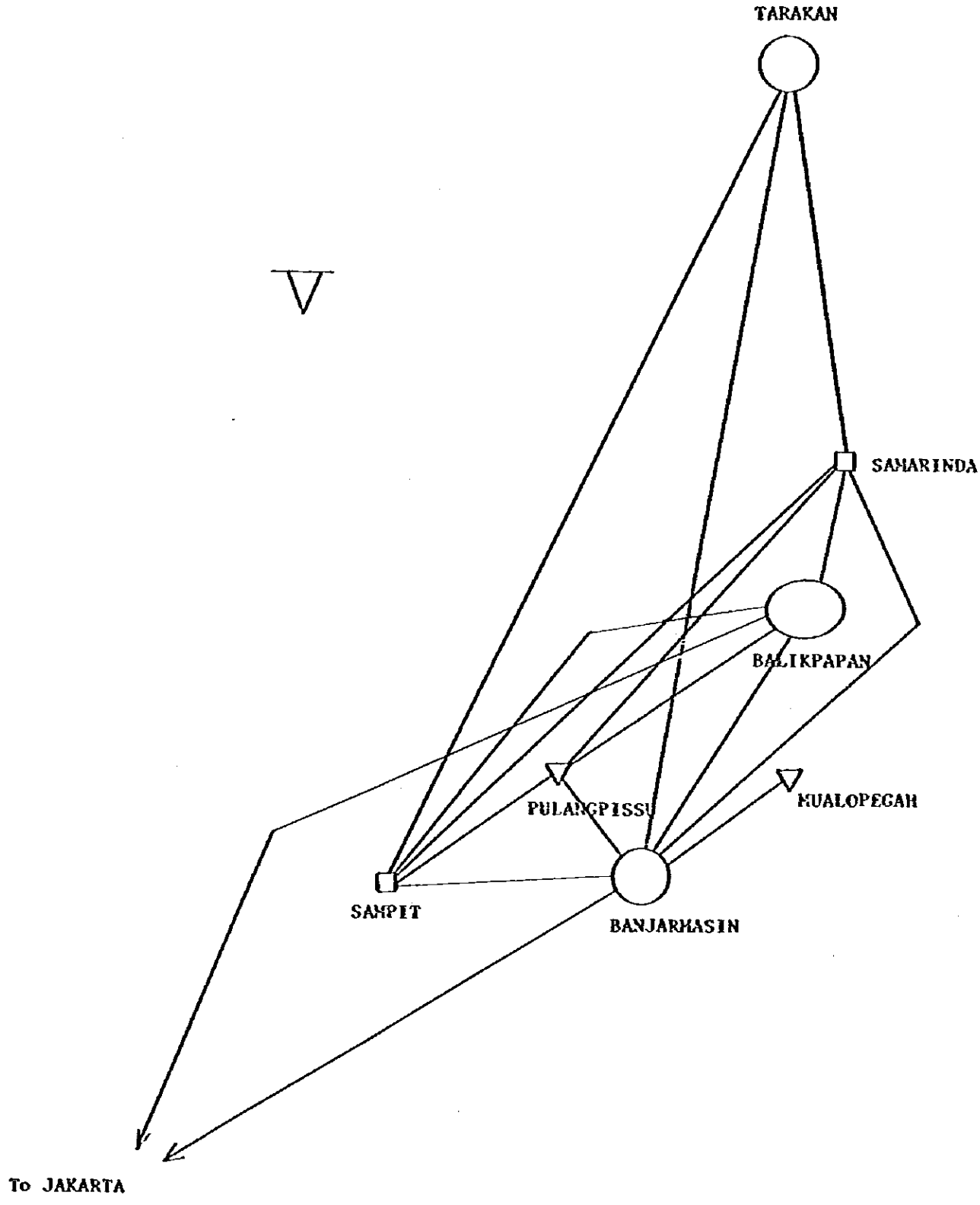


Fig. 2-3-1(1) Point-to-Point Network (5/7)

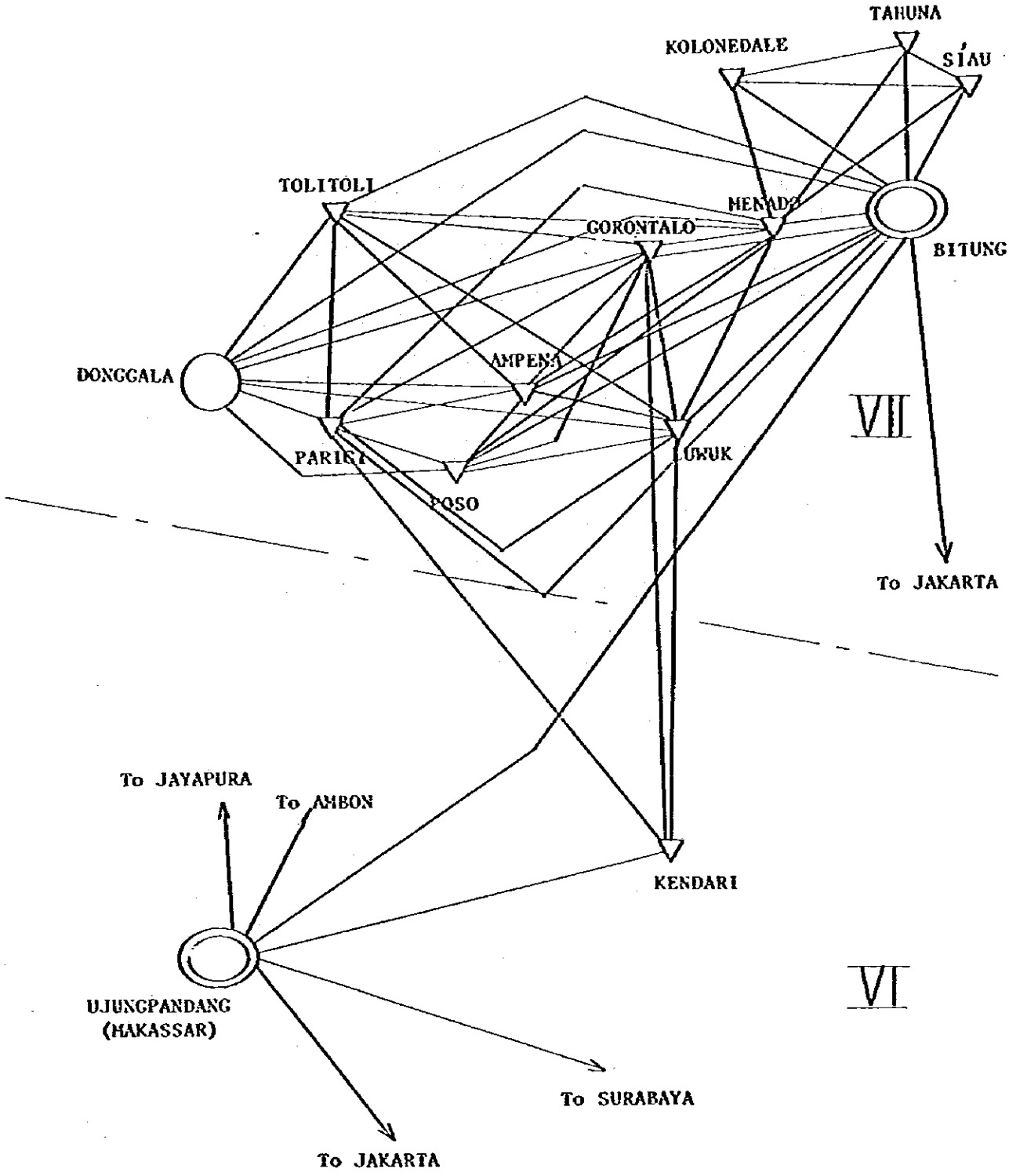


Fig. 2-3-1(1) Point-to-Point Network (6/7)

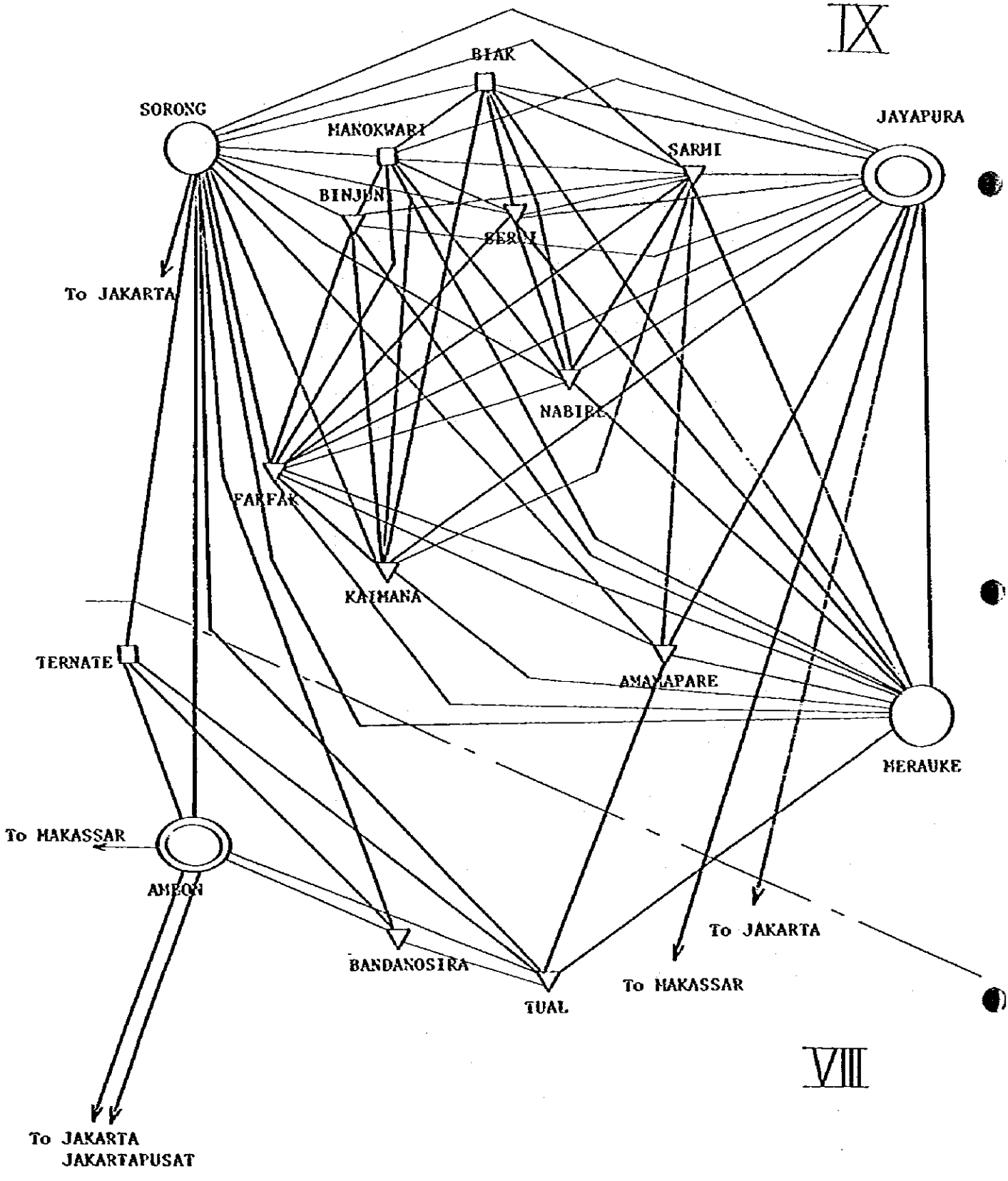
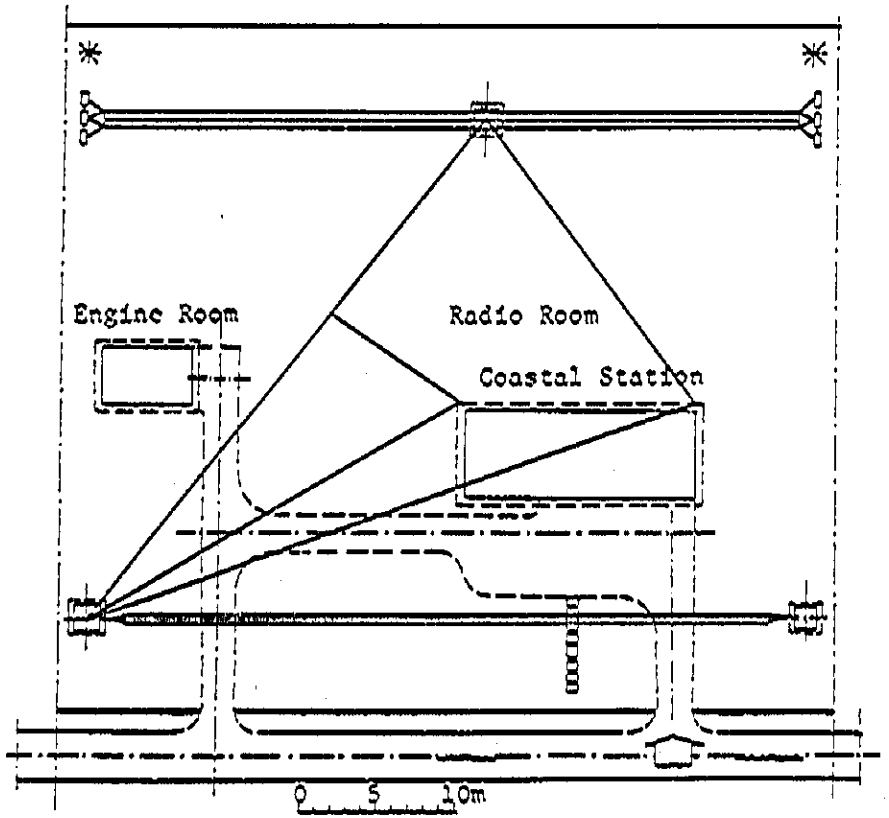
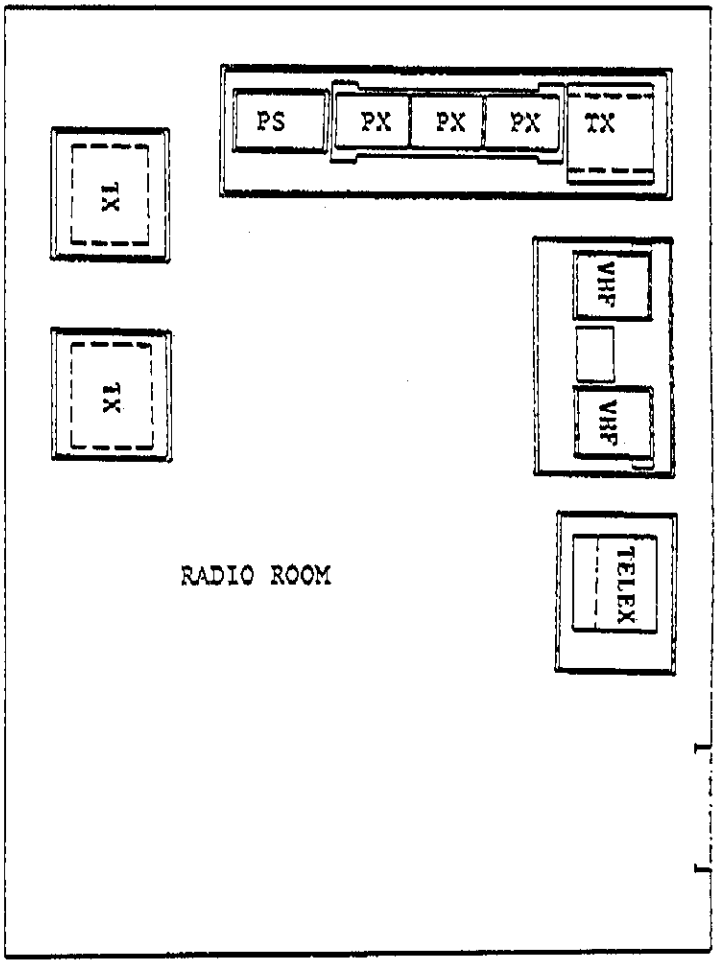


Fig. 2-3-1(1) Point-to-Point Network (7/7)

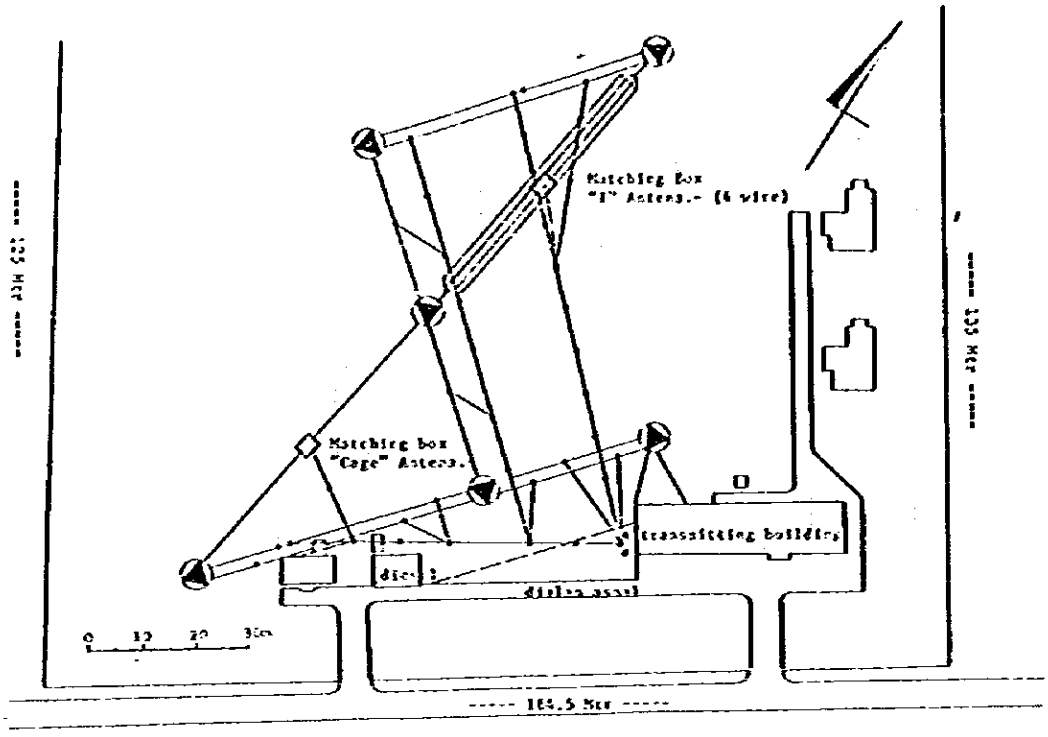


Site Layout



Floor Layout

Fig. 2-3-1(2) Site and Floor Layout (Cilacap)



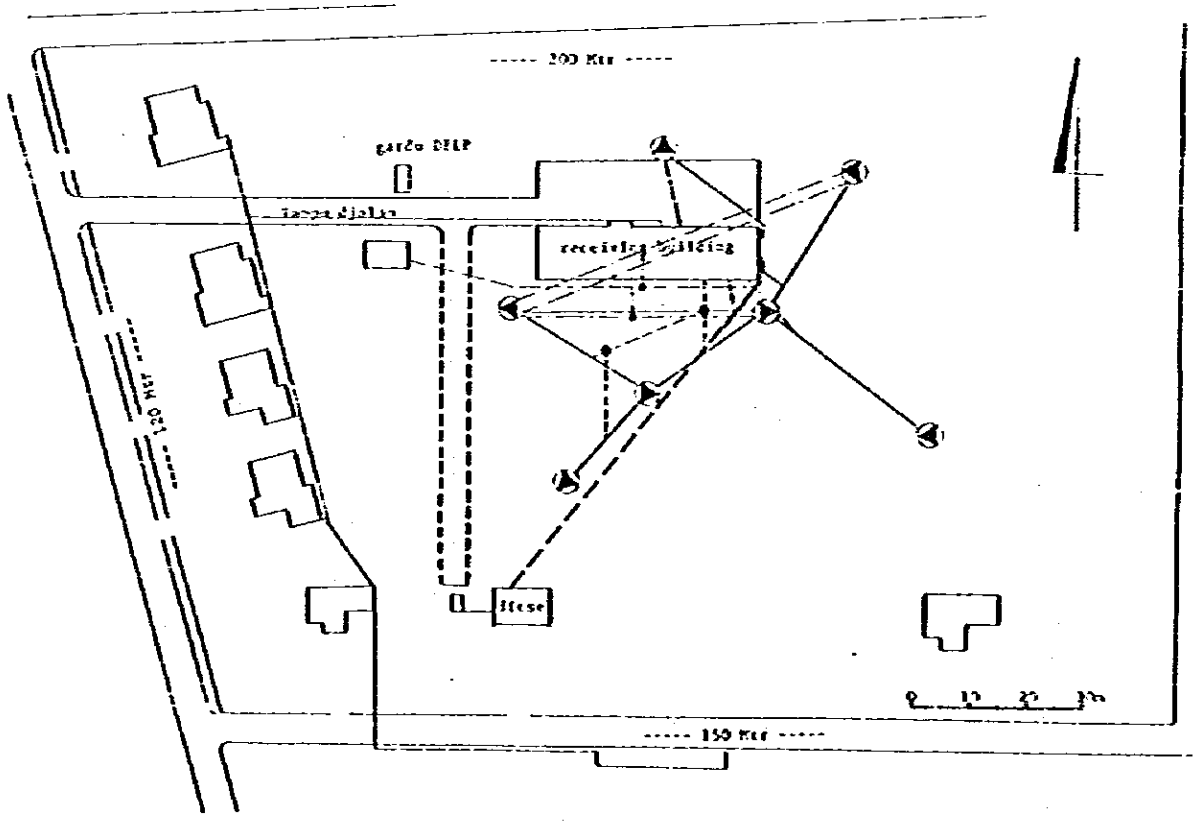


Fig. 2-3-1(3) Site Layout (BELAWAN)

2-3-2 Others

(1) PERUMTEL

The status quo illustrations of the existing microwave systems and PALAPA earth stations, which are operated by PERUMTEL, are given in Paragraph 3-5.

Frequency bands used in the backbone systems and their transmission capacities are as follows:

1. Jawa-Bali Microwave System (Jakarta - Denpasar)

   4 GHz, 2 systems

   (Telephone: 960 or 1,260 ch/system)

2. Trans-Sumatra Microwave System (Jakarta - Medan)

   4 GHz and 2 GHz, 2 systems each

   (Telephone: 1,260 ch/4 GHz system or
   300 ch/2 GHz system)

3. Surabaya-Banjarmasin OH System

   2 GHz (OH section) and 4 GHz (line-of-sight microwave section), 2 systems each

   (Telephone: 120 ch/OH system and
   300 ch/line-of-sight microwave system)

4. Eastern Microwave System (Denpasar - Ujung Pandang)

   (Telephone: 960 ch/4 GHz, 6 GHz upper system;
   24 ch/400 MHz system)

PALAPA System is operating with two PALAPA A satellites.

Their geostationary orbital positions are 77° E (PALAPA A-1) and 88° E (PALAPA A-2) above the Equator.

The service life of PALAPA A satellites is scheduled to terminate by 1983. Therefore, the launching of PALAPA B satellite at the beginning of 1983 is planned.

The most part of PALAPA A satellites is operated by PERUMTEL. The PALAPA A System comprise 26 large sized stations established at provincial capitals including Jakarta, 16 medium sized stations established at local centers, and about 75 small sized stations now under construction.

Large and medium sized earth stations with the 10 mø parabolic antenna are able to terminate Up/Down Link for one TV channel at Jakarta and Surabaya, and only Down Link for one TV channel for the rest of the earth station and 10-40 telephone/telegraph channels.

As medium sized earth stations, 10 additional stations will be established.

Small sized earth stations which use the 4.5 mø parabolic antenna are to handle small volume communication and will accommodate Down Link for one TV channel and 2 to 5 telephone channels.

With the completion of construction of all these earth stations, the nationwide communication network via PALAPA Satellite will be realized.

The 960 km long submarine cable system between Indonesia and Singapore is scheduled to be completed by the end of 1981. This submarine cable system holds transmission capacity for 480 telephone channels.

(2) Fishery Radio

At present, in Indonesia, 14 radio stations relating to fishery are in operation as shown in Figure 2-3-2 (1). These 14 include the radio stations owned by the Directorate General of Fishery and the Pearl Company.

These radio stations are respectively assigned with either of the frequencies, i.e., 4143.6 kHz, 6218.6 kHz, 6221.6 kHz and 6518.8 kHz. The class of emission is R3E or J3E.

Operating hours are restricted, ranging from 15 minutes to 5 hours per day.

Antenna input power is 10 watts to 100 watts.

(3) PERTAMINA

The radio stations owned and operated by PERTAMINA total 32 as shown in Figure 2-3-2 (2).

Some of those radio stations operate by MF, HF and VHF, some by HF and VHF, and the rest by VHF only. The breakdown follows:

- MF, HF and VHF stations:

  Five stations including Jakarta

- HF and VHF stations:

  Three stations including Balikpapan

- VHF stations:

    24 stations including Bolongan

The class of emission is A1A, R3E, J3E or G3E. Antenna input power at MF or HF stations is 0.4 to 1 kW and at VHF stations 15 to 75 watts.

Most of VHF stations use three channels 9, 16 and 19 or two channels 9 and 16, or 16 and 19.

As for the operating hours:

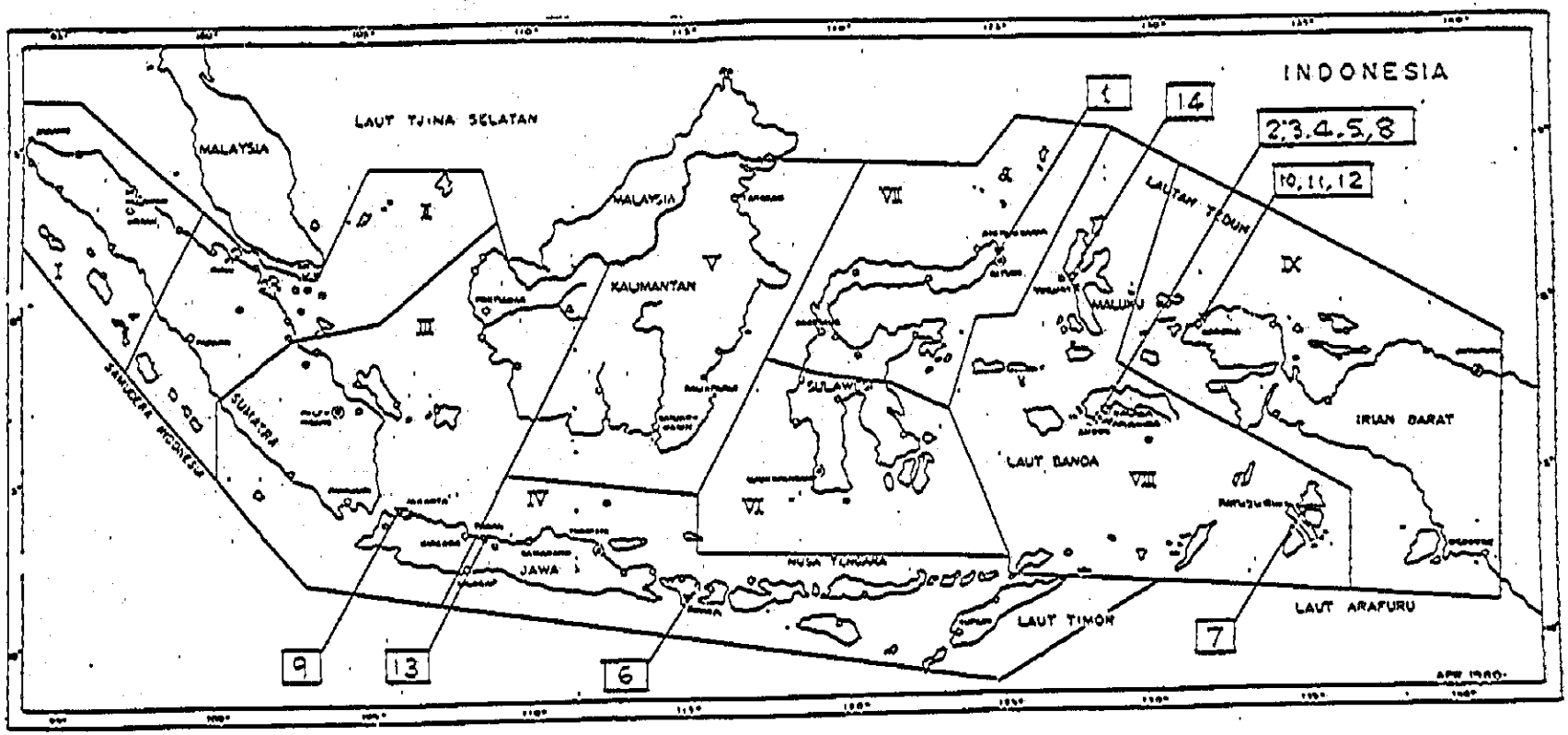
- Stations operating for 24 hours/day by MF:

    Four stations including Jakarta

- Stations operating for 24 hours/day by VHF:

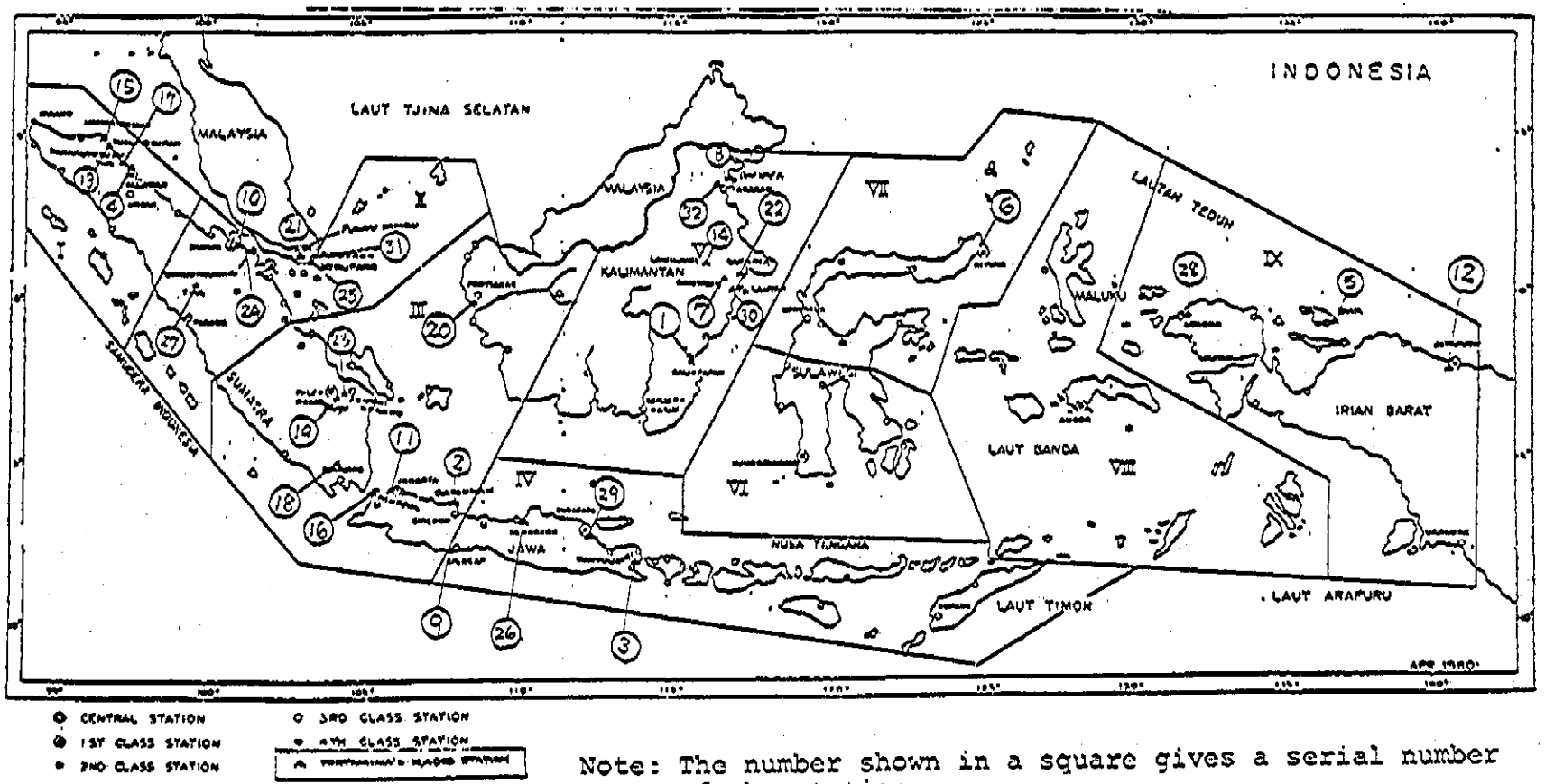
    16 stations including Jakarta

Fig. 2-3-2 (1) RADIO STATION RELATING TO FISHERY



Note: The number shown in a square gives a serial number of the station.

Fig. 2-3-2 (2) PERTAMINA'S RADIO STATIONS



Note: The number shown in a square gives a serial number of the station.

2-4 Co-ordination between SAR Organizations

2-4-1 Domestic SAR Organizations

All the SAR concerned organizations in Indonesia, having its Chairman of Central SAR National (BASARI) as the nucleus for SAR co-ordination, constitute the necessary SAR communications network.

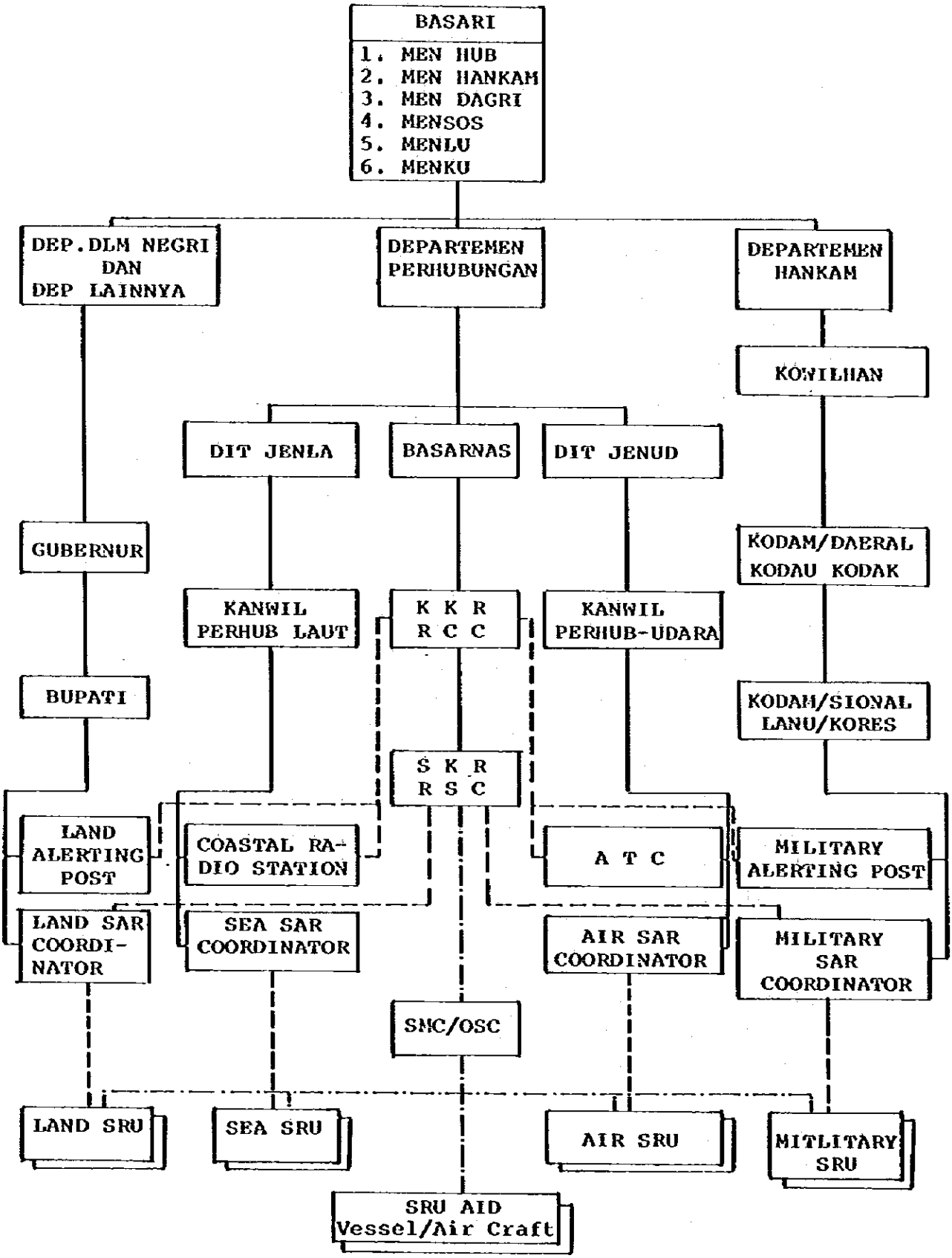
As shown in Figure 2-4-1(1), Central SAR National (BASARNAS), Rescue Co-ordination Center (KKR) and Sub Rescue Co-ordination Center (SKR) coordinate the Headquarters and District Headquarters of Sea Communications, KPLO Detachments, Harbor Masters, Airport Masters and other SAR bodies as well.

More in detail, a coast station, having received distress message from a ship in distress or in a state of emergency, or a ship navigating nearby, transfer the message to the nearest KPLP Detachment, Harbor Master, and KKR and SKR, and then the information flows through for the necessary actions of command/control and the co-ordination within the respective organizations of Sea Communications and SAR National. On the other hand, KPLP Detachment upon receipt of marine accidents information despatch SAR task units to the scene, where the units are placed under the command of an on-scene commander together with other SAR field units to be sent out by other SAR organizations under the co-ordination of KKR and SKR.

As above, the co-ordination is implemented through SAR National in order to effectively and speedily conduct the rescue operations by KPLP, which is the task force for maritime SAR operations, jointly with other SAR bodies.

Figrue 2-4-1(1)

OPERATIONAL INDONESIA SAR



2-4-2 International SAR Operations

It is BASARNAS' responsibility for the international co-ordination of SAR in Indonesia, while at present there is no particular co-ordination system established especially for international SAR. In connection with NAVAREA, Indonesian waters are in the area of XI, and the contacts by international public telegram are available between Indonesian Hydro-Oceanography and the Hydrographic Department of Maritime Safety Agency, a Japanese Government Department, the co-ordinator for Area XI.

2-5 Personnel Training System

The maritime communication personnel training comprises three training courses. They are the top and middle management course for staff management personnel, radio officer and marine radio engineer course, and radio operator and radio technician course.

The training period and intervals and the number of trainees for each training course are as follows:

Course	Period (month)	Interval (year)	Number of Trainees
(1) General Certificate Radio Officer	10	3	15
(2) Second Class Certificate Radio Officer	9	2	20
(3) Second Class Marine Radio Engineer	11	7 or more	15
(4) Third Class Marine Radio Engineer	9	2-3	20

For the management course, the pertinent records are not available.

The training courses for marine radio technicians and electro technicians are scheduled to be held for 1982/1983 and 1983/1984.

Details of the training courses are given in Table 2-5-1, Table 2-5-2 and Table 2-5-3.

As seen in those tabulations, the training is limited to one course at one period for the most part. This fact shows that for the improvement of maritime communication services, the strengthening of the training system is indispensable.

Special SAR courses are occasionally being held by Sea Communications.

Table 2-5-1 TRAINING PROGRAMME FOR RADIO OFFICERS

NO.	KIND OF TRAINING	TRAINING PERIOD	TRAINEES AND REQUIREMENTS	NUMBER OF TRAINEES	PURPOSE OF TRAINING
1.	General Certificate Radio Officer	10 Months	Second class certificate Radio Officer, at least 3 years	15 each for training implementation	To upgrade and enable Radio Officers to be employed as: - Chief of second class coastal Radio Station. - Staff members at first class coastal Radio Station. - Junior staff at Sub-Directorate of Marine Electronics and Telecommunications.
2.	Second Class Certificate Radio Officer	9 Months	Third class certificate Radio Operator having at least 3 years on-board experience and at coastal Radio Station, or High School graduate	20 each for training implementation	To upgrade and enable Radio Officers to be employed: - Onboard the first class ships of Directorate General of Sea Communications. - As Radio Officer at first or second class coastal Radio Station. - As staff members at second class coastal Radio Station. - As Chief of third class coastal Radio Station.

NOTE: There are four kinds of Radio Telegraph Operator certificates and two kinds of Radio Telephone Operator certificates to be issued by the Government of the Republic of Indonesia i.e.:

1. General Radio Telegraph Operator Certificate
2. First class Radio Telegraph Operator Certificate
3. Second class Radio Telegraph Operator Certificate
4. Third class Radio Telegraph Operator Certificate
5. General Radio Telephone Operator Certificate
6. Restricted Radio Telephone Operator Certificate

Table 2-5-2 TRAINING PROGRAMME FOR MARINE RADIO ENGINEERS

NO.	KIND OF TRAINING	TRAINING PERIOD	TRAINEES AND REQUIREMENTS	NUMBER OF TRAINEES	PURPOSE OF TRAINING
1.	Second class Marine Radio Engineer	11 Months	Academy degree holder in the field of Electronics and Radio Engineering or third class Marine Radio Engineer with at least 3 years experience at coastal Radio Station	15 each for training implementation	To upgrade and enable skilled Radio Engineers to be employed as: - Junior Marine Radio engineer at first coastal Radio Station. - Chief Marine Radio Engineer at second class coastal Radio Station. - Junior staff at Sub-Directorate of Marine Electronics and Telecommunications.
2.	Third Class Marine Radio Engineer	9 Months	Marine Radio Technician with at least 3 years experience at coastal Radio Station, or Technical High School graduate in the field of Electronics and Radio Engineering		To upgrade and enable skilled Radio Engineers to be employed as: - Chief Marine Radio Engineer at third class coastal Radio Station. - Junior Marine Radio Engineer at second class coastal Radio Station.

NOTE: There are four kinds of certificates in the field of Marine Radio engineering to be issued by the Directorate-General of Sea Communications, i.e.:

1. First class Marine Radio Engineer Certificate
2. Second class Marine Radio Engineer Certificate
3. Third class Marine Radio Engineer Certificate
4. Marine Radio Technician Certificate.

Table 2-5-3 TRAINING SCHEDULE

TRAINING PROGRAMME		SECOND FIVE-YEAR DEVELOPMENT PROGRAMME					THIRD FIVE-YEAR DEVELOPMENT PROGRAMME				
NO.	TRAINING OBJECTIVE	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
1.	Training of General Certificate Radio Officer					15 persons			15 under proposal		
2.	Training of Second class Radio Officer	15 persons	15 persons	45 persons				20 persons		20 persons under proposal	
3.	Second class Marine Radio Engineer				15 persons						
4.	Third class Marine Radio Engineer						20 persons		20 persons under proposal		
5.	Marine Radio Technician	Trainings for the Marine Radio technician and Electro technician are proposed to be held at Palembang for west region, Ujung Pandang for east region and Surabaya for south region during 1982/1983 and 1983/84.									
6.	Electro Technician										

2-6 Domestic Telecommunications Industry

Today, in Indonesia, there are several companies engaging themselves in the domestic production of telecommunications equipments. They are state managed P.T. INTI and others under private management.

The Indonesian Government is trying hard to develop the country's communication equipment manufacturing industry through the domestic production of telecommunications equipments required in the implementation of the national telecommunications system development plan.

Following is a summary description of P.T. INTI.

(1) Corporate History

P.T. INTI is a state management corporation founded in 1974 by the Presidential order in the Government Ordinance No. 34. The purpose is to expedite the upgrowth of the communication equipment industry of Indonesia.

The official name is

P.T. INDUSTRI TELEKOMUNIKASI INDONESIA (PERSERO).

P.T. INTI is an abbreviation.

The parental body of P.T. INTI is the Communications Industry Research and Development Institute, the Directorate General of Posts, the Ministry of Communications. The Institute is called L.P.P.I. for short. The department in L.P.P.I. in charge of fostering "INDUSTRI" became independent as P.T. INTI.

(2) Capital

Authorized capital	3,200,000,000 Rupiahs
Issued capital	1,600,000,000 Rupiahs
Paid-up capital	900,000,000 Rupiahs

(3) Shareholder

All capital shares are owned by the Minister of Finance.

(4) Location

Bandung

(5) Representative

M. JUNUS, president

(6) Main Customers

PERUMTEL

Meteorological and Geophysical Center

Ministry of Home Affairs

Police

Provincial Governments

(7) Line of Business

P.T. INTI is being operated with the cooperation of the undermentioned foreign communication equipment manufacturers:

Siemens A.G. (West Germany)

Bell Telephone Manufacturing Ltd./ITT (Belgium)

Japan Radio Co. (Japan)

Nippon Electric Co. (Japan)

VIZ Manufacturing Ltd. - Philadelphia (U.S.A.)

Ericsson (Sweden)

Equipments that are assembled/manufactured by P.T. INTI are telephone switching system, as well as radio and transmission equipment, as detailed below.

1) Telephone Switching System
   - Telephone instrument and telephone console
   - Siemens automatic telephone system
   - EMD automatic switching system
   - BTM automatic switching system
   - Cross-bar automatic switching system
   - Key telephone equipment
   - PABX

2) Radio and Transmission
   - SSB HF transceiver
   - SSB/ISB transmitter and receiver
   - VHF (1 ch) transceiver
   - Radio telephone terminal equipment
   - Vehicle mobile telephone equipment
   - Rural telephone equipment
   - Multichannel radio equipment
   - Multiplex terminal equipment
   - Maritime radio equipment
   - Meteorological and geophysical instruments
   - Small earth station

- Other communication equipment

  Antenna

  Special radio measuring equipment

  Spare parts

3) Service Fields

- Consulting
- Survey
- Installation work
- Maintenance
- System design

(8) Production Records

According to Postel's Annual Report 1980, the production records of P.T. INTI during the past one year comprise the following equipment categories:

1) Telephone Equipment

Production by Siemens' technical cooperation:

	Item	Quantity
a.	Racks	179
b.	Switch board	-
c.	Wahler rachmen	206
d.	Telephone instrument H 70	6,615
e.	Repairs, telephone instrument H63H	3,894
f.	Telephone masteract for INTI	38,188

Production by BTM's technical cooperation:

Item	Quantity
a. Subset 2912 AFAT	31,219
b. Biphone	6,962
SSB 2910 AJBI	6
Filter ATO	251
PCB	6,698
c. Repeater unit PENTOMAT	7

Production by Ericsson's technical cooperation:

Item	Quantity
a. Telephone exchange CB	-
b. Telephone instrument INTI 110 (CB)	2,400

2) Radio Equipment

Production by JRC's technical cooperation:

Item	Quantity
a. Transceiver JSB 50	86
b. Transceiver JHV 224	100
c. Mobile station/STKB	98

Production by VIZ's technical cooperation:

Item	Quantity
a. Radio sonde transmitter	5,597
b. Wind sonde transmitter	3,200

Production by NEC's technical cooperation:

Item	Quantity
a. Mutiplex carrier terminal equipment	22

3) Central workshop Equipment

Item	Quantity
a. Component parts	179
b. Ditto for modification	179
c. Product of plastics	266,948
d. Metal product	403

(9) Number of Employees

The number of employees as of 1980 is as follows:

Job Grade	Number of Employees
I	284
II	306
III	42
IV	4
Total	636

(10) Revenue and Expenditure

Revenue in 1980 totals 3,067,000,000 Rupiahs. The breakdown follows:

Public telephone	23.94%
Public radio	61.61%
Central workshop service	10.99%
Installation work	3.23%
Others	0.23%

The total amount of expenditure in 1980 is approximately 2,929,000,000 Rupiahs.

2-7 Controversial Points

2-7-1 Technical Implications

Technical implications in the existing system and remedial plans for such implications are as follows:

(1) Most of the Class I coast stations have their receiving offices located in the urban sector so that their reception is being seriously affected by the increased city noise and is deteriorating significantly. (The city noise continues to be aggravated due to the increase of civil works that use electric machines, such as cranes.) Accordingly, a number of stations desire to relocate the receiving station to an appropriate location.

(2) At Jayapura Station, the radio message by 500 kHz cannot be received until two hours before the ship enters the port, though it is not clarified whether the situation is due to radiowave attenuation by hearby mountain or any other reason. Investigation to identify the cause is urgently required.

(3) The coverage area of SAR communication is not sufficient. Improvement in this respect is necessary.

(4) The existing facilities aboard the SAR ship also leave room for improvement.

(5) Radio Equipment

Generally, the radio equipment is considerably aged. In not a few cases, equipment units in trouble remain unrepaired mainly due to the shortage of maintenance/repair parts.

Many are the vacuum tube type equipment units and they lack the required performance stability. Remedy in this respect is to change such equipment units to the stable solid state units systematically.

(6) At present, the SAR system is devoid of the Direction-Finding equipment. Meanwhile, by the F-ST-12 Project, the direction finder is to be installed at nine coast stations. This arrangement will improve the SAR system to no small extent.

(7) Power Plant

Almost all existing coast stations adopt the AC power supply system that operates by receiving the commercial power supply.

When the commercial power supply fails, the necessary power supply is from the stand-by engine generator. However, the stand-by engine generator is the type to be manually driven. Furthermore, most coast stations cannot be remote-controlled so that, at the time of commercial power failure, for instance, the personnel-in-charge of those stations must hasten to the engine room and start the engine generator manually. For this reason, the commercial power failure at the AC supply system stations causes the service interruption to continue for more than 10 minutes.

The countermeasures are, besides the earlier mentioned introduction of solid state radio equipment, to increase the DC power supply system and, at the same time, to adopt the automatic start system for the stand-by engine generator.

(8) Antenna System

The antenna system is not exactly in the satisfactory condition mainly due to the small land space at the station site. At present, however, the antenna system is operating apparently without trouble. Nevertheless, when the needs for service expansion in the future are considered, the antenna system improvement in one way or another is necessary.

2-7-2 Operational Implications

Operational implications in the existing system and remedial plans for such implications are as follows:

(1) Maritime Communications

1) Even among Class I coast stations, those operating on full 24 hours basis number only several.
To initiate the service improvement and expansion in the future, a considerable number of coast stations must be enabled to operate on around-the-clock basis. This fact has vitally to do with the hours to watch for the distress signal. Hence the need for reconsidering the existing operating hours of coast stations, with special emphasis on improving the SAR system.

2) At the present stage, each coast station is carrying out its operation and maintenance independently with the limited assigned personnel.

Such being the circumstances, small coast stations where the assigned personnel are few have many operation and maintenance related problems. At those stations, while the equipments themselves are aged, the equipment units in trouble remain unrepaired.

Furthermore, those stations cannot operate by the prearranged time schedule because the number of equipments that can be put into operation is not enough. Some of those stations are compelled to operate by the makeshift schedule.

(2) Traffic Control

The correct knowledge of traffic behaviors in both quantitative and qualitative aspects assumes utmost importance in the efficient and economical operation of the maritime radio communication network.

However, at the present stage, the categories, format, etc., of traffic classification differ from one coast station to another. Coast stations that submit traffic data to the Headquarters of Sea Communications are not more than 60% or so of all, whereas the data submitted apparently are not always processed properly by the statistical method, nor utilized effectively.

It will be important to establish the traffic measurement and control system and keep it organized. Data thus collected should be statistically processed so that they can be effectively used for the proper management of the communication network

(3) SAR

1) SAR Operating Coast Stations

Because of the necessity for the radio operators dealing with SAR communications to have knowledge on SAR operations, ships, meteorology, etc. as well as for establishing responsibility arrangements for SAR communications, stationing of some SAR radio operators solely dealing with SAR communications is required at the SAR operating coast stations.

2) On Board SAR Ships

The number of personnel presently on board SAR ships is the minimum required for SHIP's movement only. It is necessary that the number of personnel enough to cope with SAR should be retained for the SAR ships to carry out the operations at anytime.

Regarding the number of radio operators on board the minimum number of four(4) is required for the ships oprating at open sea and ocean with the necessity of establishing continuous watch set-up while at sea.

2-7-3 Personnel Implications

(1) Personnel implications in the existing system and remedial plans for those implications are correlated to the statements in the preceding Sections 2-3-1 and 2-7-2.

Almost all coast stations except a few Class I stations are apparently understaffed. Even among Class I stations, not a few are not in a position to operate on 24 hours per day basis.

(2) The shortage of capable engineers and technicians will impede the service upgrading. Planning for re-education of engineers and technicians and for effective distribution of well-trained technical staff to key assignments must be hastened.

(3) To cope with such situation and to realize service improvement and expansion in the future, the system for organized personnel training and education must be established as soon as possible. No less important is the operation and maintenance system remodelling in order that the effective personnel alignment will become possible.

3. FUTURE TRENDS

3. FUTURE TRENDS

3-1 International Trends

3-1-1 IMCO

The Inter-Governmental Maritime Consultative Organization (IMCO) is a specialized agency of UN, having been established in 1958 for the purpose of promoting international cooperation concerning all matters related to maritime transport. IMCO is making extensive activities, such as ensuring safety of life and property at sea and controlling sea pollution by ships, as well as the related legal affairs.

Many international conventions concerning radio communication have been adopted by IMCO. Chief among them are:

(1) International Convention for the safety of life at sea, 1974 (SOLAS, 74)

This convention is a wholesale amendment to SOLAS of 1960 and is in force since May 1980. This convention provides for the required hull construction and marine facilities, especially safety equipment, applicable to all ships to engage in international voyage (except fishing vessels, non-power driven ships and cargo ships below 500 gross tons).

At the Expanded Maritime Safety Committee meeting of November 1981, the convention amendment was discussed, resulting in the adoption of the revised provision obligating the radio stations also to be equipped with the 2182 kHz radio telephone system.

(2) Convention for the International Maritime Satellite Organization (INMARSAT)

This convention is in force since July 1979. For details of the provisions, refer to Paragraph 3-6.

(3) Torremolinos International Convention for the Safety of Fishing Vessels, 1977 (Torremolinos, 77)

This convention applies to fishing vessels of 24 m in length and over. Provisions are practically the same as those of SOLAS, 74. As of the present, six states, i.e., United Kingdom, Norway, Spain, France, Yemen and D. R. Germany, have deposited their acceptances of the convention with IMCO. IMCO, for its part, is encouraging these states to ratify the convention, so that the time coming into force of the convention will be earlier than initially expected.

(4) International Convention on Standards of Training, Certification and Watch Keeping for Seafarers, 1978

The drafting of this convention was motivated by the Tree Canyon accident of March 1967. (Tree Canyon was shipwrecked in the Dover Strait and about 100,000 tons of crude oil flowed out into the sea and polluted the sea water.) In the belief that the sea accident of that kind is attributable to the immature navigational skill of the ship crew and the lack of their duty-consciousness to observe maritime laws and regulations strictly, IMCO intends to create the international standards of ship crew training, certification and duty performance. IMCO is confident that, by so doing, the safety assurance for life and property at sea and the protection of ocean environment can be promoted.

The requirements for the coming into force of the convention have not yet been filled. However, in view of the fast increasing interest among the countries concerned, the convention is expected to come into force at an early date.

(5) SAR 1979 (International Convention on Marine Search and Rescue, 1979)

The Internaitonal Convention on Marine Search and Rescue, 1979 was adopted during the interantional conference held by IMCO for that purpose in Hamburg Federal Republic of Germany in April, 1979.

The gist of the Convention is as follows:

a) Parties shall ensure that neceaasy arrangements are made for the provision of adequate search and rescue services for persons in distress at sea round their coasts, and each search and rescue region shall be established by agreement among Parties concerned. It also provides that Parties shall establish rescue co-ordination centers for their search and rescue services as a national machinery for the overall co-ordination.

b) Parties shall co-ordinate their search and rescue organizations and should, whenever necessary, co-ordinate search and rescue operations with those of neighbouring States (Recommendation).

c) Each rescue co-ordination center and its sub-bodies shall have available up-to-date information relevant to search and rescue operations, and prepare detailed plans or instructions for the conduct of search and rescue operations.

d) Rescue co-ordination centers and its sub-bodies shall conduct search and rescue operations according to the state of emergency encountered.

e) Parties should establish a ship reporting system for application within any search and rescue region for which they are responsible (Recommendation).

The entry-into-force of this convention is 12 months after the date on which 15 States have become Parties to it, and as of March, 1981, there are 3 States which have become Parties.

For the purpose of practicing effectively the search and rescue operations as provided for in this SAR Convention, IMCO (COM) is now working hard to develop "the global system of communication to meet with the distress at sea and to ensure the safety of life and property at sea."

FGMDSS is a system to practice the undermentioned seven work items by use of automatic equipment, as well as DSC and NBDP systems, not to mention utilizing the satellite system.

- To issue distress alarm signal.
- To discriminate the above alarm signal.
- To identify the distress location.
- To make communication for coordination of search and rescue operations.
- To communicate with the distress spot.
- To discover the distress location.
- To take necessary preventive actions.

FGMDSS is scheduled to transfer to a new system by 1990. Such amendments of SOLAS, 74 follow the revision of R.R. by WARC-Mobile as stated in the following paragraph.

3-1-2 International Telecommunication Union (ITU)

Discussions on matters relating to maritime telecommunications are made by the member organizations of the International Telecommunication Union (ITU), the World Administrative Radio Conference (WARC), the International Radio Consultative Committee (CCIR) and the International Telegraph and Telephone Consultative Committee (CCITT).

The main duty of WARC is to take care of keeping "Radio Regulations", the basic international arrangements with respect to telecommunications, and integrating the provision, so that the regulations can meet the current situation. WARC is composed of the administrations that represent the competence as the member states of ITU.

CCIR and CCITT are the organizations to discuss technical and operational matters. Both are composed of the administrations of the member states of ITU, communication carrier enterprises and international organizations of communication equipment manufacturers' or communication system users'.

The following description summarizes the discussions by WARC, CCIR and CCITT:

(1) WARC-79

This conference was held at Geneva, Switzerland, for approximately 10 weeks from September 1979. Representatives of the administrations of ITU's 142 member states participated in the conference.

The conference to make all-round amendment to the Radio Regulations, was the first in the past 20 years, and proceeded to coordinate divergent interests among various work divisions of WARC as the result of the amendment.

The revised Radio Regulations based on the decisions at WARC-79 are to enter into force from January 1, 1982. The main points of amendment in the field of maritime radio communications are as follows:

To reduce the guard band for the frequency 500 kHz in distress or calling by radio telegraph from ±10 kHz so far used to ±5 kHz. To reduce the guard band for the frequency 2182 kHz in distress or calling by radio telephone from ±12 kHz so far used to ±8.5 kHz.

The date of entry into force of the above guard band reductions is to be decided at the next WARC-Mobile.

To rearrange part of HF band so far allocated to the fixed communication services to maritime mobile service for exclusive or shared use. To maintain intact the frequency band so far allocated to the maritime mobile service.

By this rearrangement the frequency band width so far available for maritime mobile service, 3850 kHz, has been increased to 4808 kHz.

The way of use for the increased frequency band width as per above is to be decided at the next WARC-Mobile.

(2) WARC-Mobile

WARC-Mobile to discuss the mobile operations of maritime, aeronautical, and land mobile services is scheduled to be held in 1983. The agenda concerned to maritime mobile services will be:

The way of use for the frequency band newly allocated for shared use at WARC-79.

Reconsideration of regulations concerning distress and safety communications.

Study of the way for introducing new technology, such as digital selective calling (DSC) system and satellite communications, in the Future Global Maritime Distress and Safety System (FGMDSS).

Re-study of HF band channelling for telephony in maritime mobile services.

Study about Ship Station Identification.

(3) CCIR Activities

CCIR makes discussions about radio communiction technology in all its aspects on the international level. Results of discussions approved upon are compiled as Recommendations or Reports, and such Recommendations and Reports are edited into booklets (Green Books). Discussions are made by several study groups in each field. Maritime along with aeronautical and land mobile communications, comes under the category of Mobile Services and is taken care of by Study Group 8 (SG-8).

Following are the main results of discussions on maritime mobile services at the latest meeting of SG-8 (August 1981):

1) Completion of operational procedures for Digital Selective Calling by MF/HF/VHF band (distress calls and public correspondences).

2) Study about communications on FGMDSS including the decision of distress communication frequencies.

3) Arrangement to introduce DSC system into VHF/UHF automatic marine telephone system.

4) Decision of the format of meteorological report by NBDP.

Since recently, the satellite communication technology is making rapid strides, and maritime mobile services by the MARISAT System was already put into commercial services in 1976. Operating of "Emergency Position Indicating Radio Beacon (EPIRB)" system for distress communications via maritime satellites is being studied by CCIR. Field trial by use of the INMARSAT System be carried out about the middle of 1982.

(4) CCITT Activities

CCITT, jointly with CCIR, has been making study for establishing the internationally standardized system for ship station identification numbers which are important for calling in maritime communications. As the result, the ship station number format has been decided in CCITT Recommendation E210/F120/Q;

"Ship Station Identification for VHF/UHF and Satellite Maritime Mobile Service."

This format consists of decimal system with nine digits, i.e., "N_1, I_2, D_3, X_4, X_5, X_6, X_7, X_8 and X_9." The first three digits, "N_1, I_2 and D_3," are the ship nationality identification digits.

The concrete allocation, "NID", to the member states of CCITT will be made at WARC-Mobile, 1983.

3-2 Port Construction and Improvement Plan

In Indonesia, being a large maritime nation, most of the main cities have developed along the coasts. The nation is divided into the nine Districts for the control of all ports, and each district has its District Sea Communications, under which there are a number of the ports with Harbor Masters and Port Administrators based. Table 3-2 gives the number of ports per each District, and the division of each District together with the location of the main ports are shown in Figure 3-2(1), according to which large and small ports are scattered widely around the whole country. The development of sea transportation has old history in Indonesia as an archipelago nation, and accordingly its position is immovable as compared to the transportations via land and air.

With the advance of domestic distribution of goods and foreign trades, the inner and outer traffic routes have gradually been developed for the recent years, and in addition the promotion in the development of local areas and the expansion in overseas trades collectively increase the further importance of maritime sector. In order to meet the argumentation of the future demands, the implementation of the Port Development Project as shown in Figure 3-2(2) has been in progress for the main ports according to the long term development plans established for the construction of foreign trade and public wharfs.

Table 3-2

NUMBER OF PORTS BY CLASS AND DISTRICT

District	1st Class	2nd Class	3rd Class	4th Class	5th Class	Total
I	1	0	4	6	18	29
II	1	2	3	8	31	45
III	2	1	6	12	33	54
IV	1	1	4	8	26	40
V	0	3	3	5	14	25
VI	1	0	1	4	11	17
VII	0	1	1	5	21	28
VIII	0	1	0	2	22	25
IX	0	1	2	5	6	14
Total	6	10	24	55	182	277

Source: DAFTER KESYAHBANDARAN DISTRIBUSI BUKU-BUKU P.U./Tahun 1979

DITKAPPEL SUB DIT K & AK-SEKSI P.U. Jakarta, 15 Juli 1980

Figure 3-2(1) DISTRICT SEA-COM AND MAIN PORTS

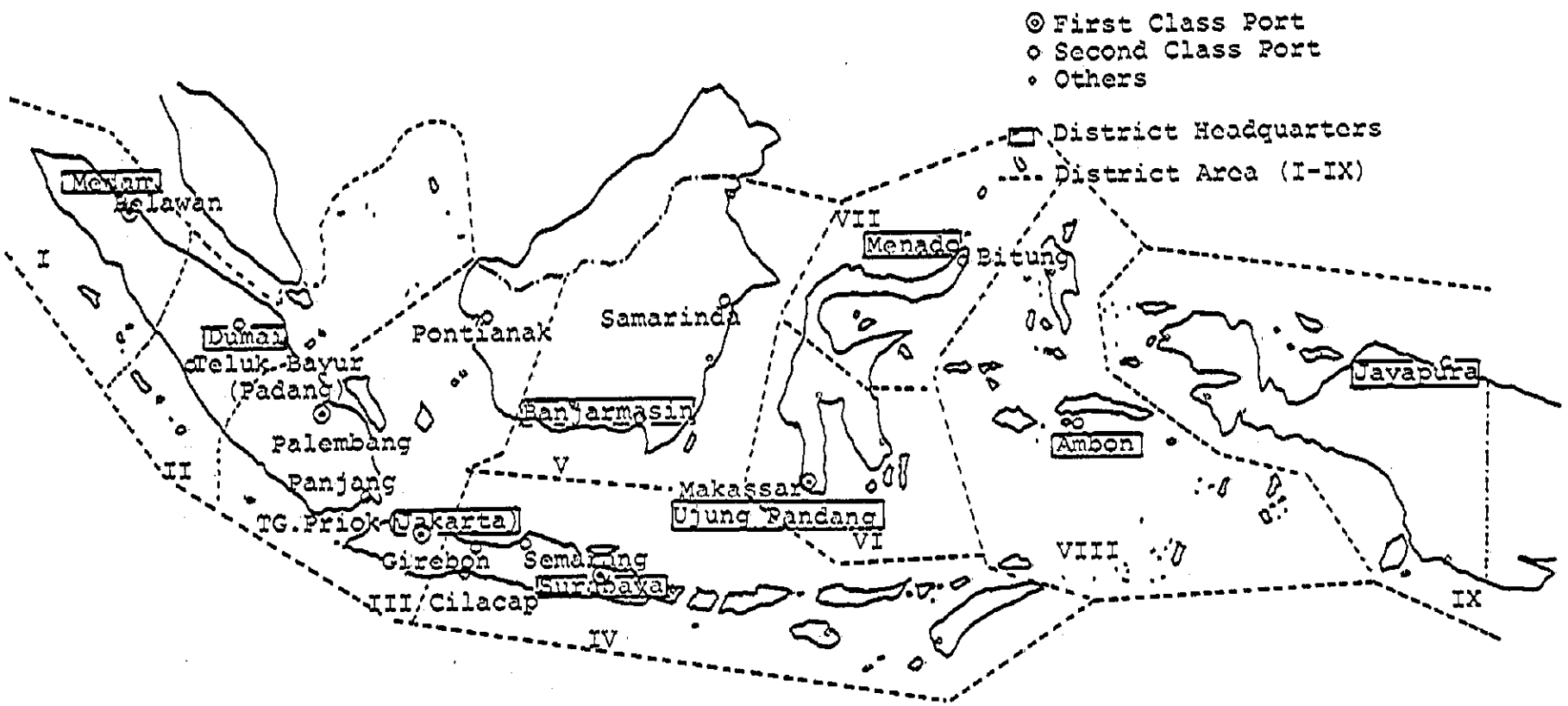
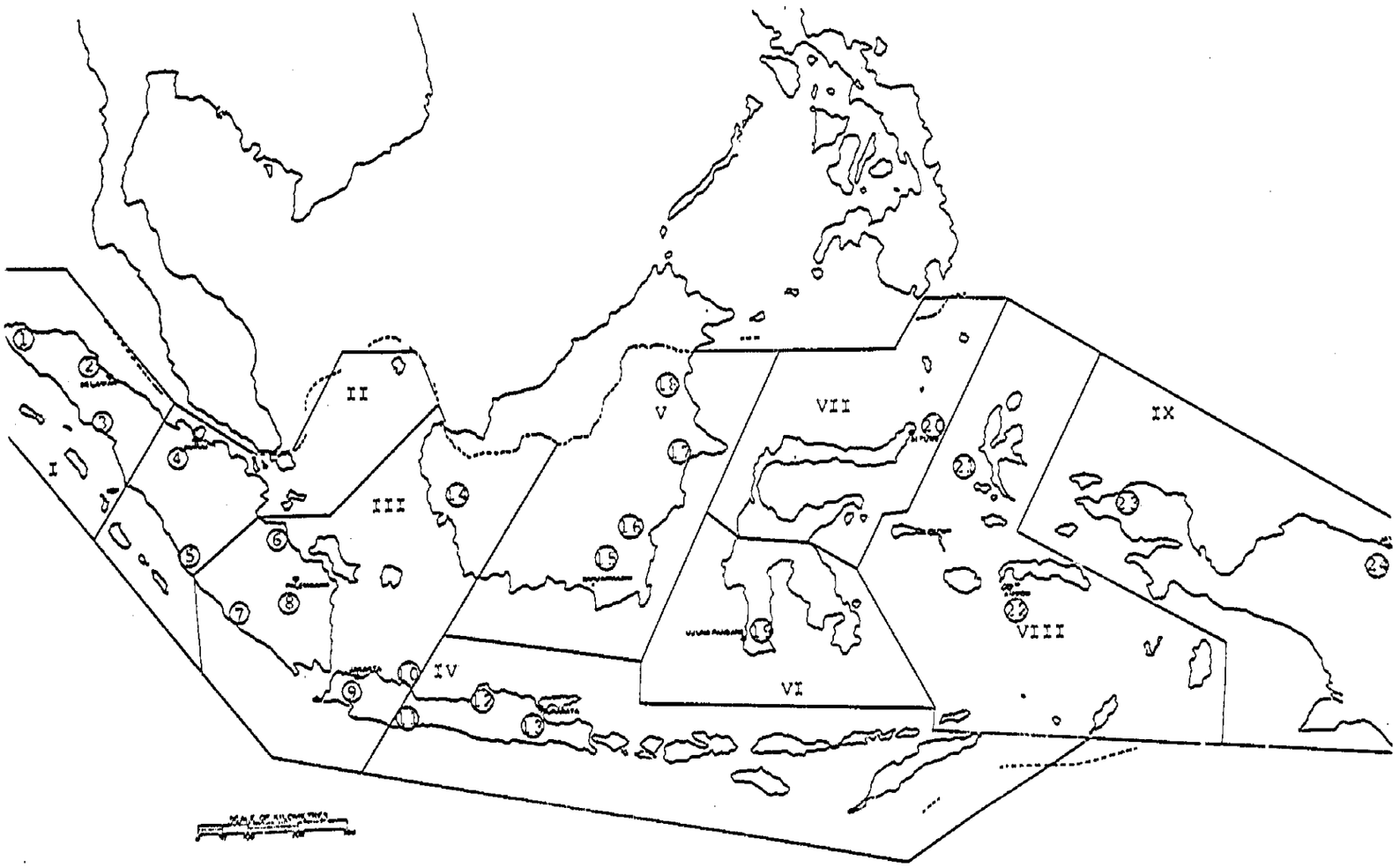


Figure 3-2 (2) PORT DEVELOPMENT PROJECT IN INDONESIA (PORTS UNDER PLANNING INCLUDED)



No.	Name of port	Rank of port	Project	Coorperation	Present Condition
1.	Ulee Lheue	3	-	Indonesia	-
2.	Belawan	1	Commercial port and oil berth	ADB. West Germany	Tender: West Germany
3.	Sibolga	3	-	-	-
4.	Dumai	1	Oil berth	-	-
5.	Teluk Tarusan	-	-	West Germany	F.S. Feasibility Study
6.	Jambi	3	-	-	-
7.	Bengkulu	3	-	Holland	F.S.
8.	Palembang	1	Industrial port	-	-
9.	Tanjung Priok	1	Container terminal	The World bank	Completed
10.	Cirebon	2	Commercial	West Germany	-
11.	Cilacap	3	Commercial port and oil berth	Australia	-
12.	Semarang	2	Commercial port	Japan	JICA OECF
13.	Surabaya	1	-	ADB	-
14.	Pontianak	3	Commercial port	-	-
15.	Banjarmasin	2	Commercial port	Japan	JICA OECF
16.	Balikpapan	2	Oil berth	Japan	Completed F.S. (There is idea commercial port)
17.	Samarinda	2	-	-	-
18.	Tarakan	4	Oil berth	-	-
19.	Ujung Pandang	1	Commercial port	-	-
20.	Bitung	2	Commercial port	Japan	-
21.	Ternate	4	-	-	-
22.	Ambon	2	Commercial port	Indonesia	-
23.	Sorong	3	Commercial port	Japan	Plan for F.S.
24.	Jayapura	2	-	-	-

Source: Japan Advisary Team

3-3 Maritime Communication System

Heretofore, the maritime communication system has been operated mainly by MF and HF Morse code telegraphy. However, in view of the ship size growth in recent years and from the viewpoint of efficient system operation, the utilization of HF radio telephony is gathering momentum. Furthermore, the demand for new services, such as DSC as well as NBDP telegraphy by automatic transmission and receiving, data transmission, AMVER and broadcasting services is expected to increase.

Many countries are readjusting their domestic laws in order to make them compatible with the practicing of SOLAS, 74 and Torremolinos, 77 for fishery ships. At the same time, all ships concerned will be legally obligated to have radio equipment installed aboard.

In Indonesia, plans are underway for gradual improvement of main domestic telecommunications networks by the introduction of microwave system and the utilization of domestic satellite system. And, with the improvement of domestic telecommunications networks, the density of ordinary subscriber telephones will also grow rapidly.

For the maritime communication system, the demand for its availability as an integral part of the public communication system will increase rapidly.

3-4 Maritime Safety and SAR System

It is considered that the existing set-up under the control of Directorate General of Sea Communications will be further strengthened for maritime safety in Indonesea having the Directorate General as its pivot. The matters concerned are aids to navigation, the development, improvement and maintenance of waterways, sea patrol, SAR, and handling process of the information on navigation safety as well as prevention of maritime oil pollution. It is also envisaged that the matter concerning traffic control shall be considered in the future to relieve maritime traffic congestion. Among the subjects above, what is especially desired for is the quality elevation of the sea patrol and SAR operations, of which KPLP is in charge: the build-up of maritime task force and the radio communicaitons network needed for the operations shall be planned through the implementation of enlarging in size and speed-up of the KPLP ships, and through the necessary installations including radio communications, and the education and training for the crew.

Furthermore for search and rescue, it is considered desirable to set up a proper maritime SAR system with an aim to become one of the Parties of SAR Convention, 1979 adopted by IMCO. In this instance, KPLP is the task force for the maritime SAR operations with the co-ordination of SAR National as it is so now, and the establishment of KPLP communications network is an important element in this regard.

In future aspect of SAR in Indonesia having the large water areas around, introduction of aircraft, especially that of helicopters will no doubt be taken into consideration for the maritime SAR operations, and therefore, it is necessary to take into account of the establishment of a KPLP maritime communications network including this effect so that joint operations for SAR can be carried out between SAR ships and supporting helicopters.

3-5 Integrated National Telecommunications System

3-5-1 Overview

The telecommunications network is a huge system of communications on national and international scales. The telecommunications services are inseparable from the national life and constitute indispensable information transmission media for the effective economic and social activities of the nation.

Telecommunications have developed with telegraph and telephone services as basic services. In the information-oriented society from now on, the diversified non-telephonic services, such as data communication and picture communication, in addition to the conventional telephone service, are increasing their importance.

Furthermore, the organic combination of data processing systems, which are fast being incorporated in social activities, and telecommunications is considered to make immense contributions to the greater development of information-oriented society in the future.

3-5-2 Future Telecommunications Network

The existing main telecommunications networks are the telephone network, telex network and data communication network. These networks, one independent of another, perform with their respective functions. Their services are governed by the separate numbering plans and charging systems. They operate by their own switching equipment and circuits fit for their own performance only.

If the new services expected in the future, such as data communication and picture communication, have their networks organized with independent, separate systems, the disadvantage in terms of engineering economy is only to ensue. For, it may be the case that while one network becomes fully occupied, other networks leave large idle capacity. The integrated services network is an optimum means to avoid such disadvantage and to allow the network utilization as occasion requires. By this means, the flexible, hence effective, use of network as a whole can be realized.

The rapid progress of digital technology represented by LSI and digital signal processing is such that the digital communication networks fit for non-telephonic services like data communication and picture communication are now the realities. Such digital networks can meet the high speed, high quality requirements for new services.

Thus, in the future development, major emphasis should be placed on the reality of Integrated Services Digital Network (ISDN) that comprises all aspects of telecommunications services including data and picture communications besides conventional telephony. This makes it possible to provide all kinds of telecommunications services by a single network.

3-5-3 Mobile Communication Network

As the social structure becomes diversified and upgraded, the demand for telecommunications services on an expanded scale increases. This demand represents the needs for communications available at any time and at any place. In order to meet this new demand by improving the communication network performances, it assumes basic importance to determine how best can the existing network be utilized to provide economical services to the user public.

From the viewpoint of service expansion, it can be pointed out that the conventional service between the fixed user terminals will be expanded to the service between the fixed and mobile user terminals and even between the mobile user terminals themselves. The mobile units will include ships, automobiles, trains and aircraft. Men and women on the move may also be among the mobile user terminals.

For the mobile communication network, it is most advantageous economically to constitute the subscriber system with the switching equipment for mobile communication and the radio circuit and to constitute the relay system by inter-network connection with the existing communication network.

The important points in the mobile communication network formation are, first, how to constitute the network and how to connect the mobile subscribers to the switching system for the mobile service; second, at what point to make the inter-network connection, i.e., the connection between the mobile communication network and the general communication network; third, how best to control communication circuit formulated as above for the purpose of efficient routing of mobile communication service calls.

Mobile communication service technically differs from the service between the fixed user terminals. Service to/from the mobile user terminals via radio circuit is subject to the elements that degrade the service quality, and such elements differ from those that exist on the wire circuit. Therefore, the technical countermeasure centering upon those service quality degrading elements is of utmost importance.

In view of the telecommunications network diversification which will continue unabated, the mobile communication network is bound to be included in the aforementioned ISDN when considered from the long-range viewpoint.

3-5-4 Telecommunication Toward Year 2000 in Indonesia

In Indonesia, the telecommunications network has already been improved and expanded through REPELITA I and II aimed at the upgrading of infrastructure. In these plans, the importance of transport and communication services is fully recognized because of their extensive relationships to the social and economic activities of the nation.

Telecommunications services, in particular, constitute the indispensable information media to the efficient national economic and social activities. As such, they require further improvement and expansion. This requirement is being fulfilled through REPELITA III which is now in progress.

The upgrading of telecommunications facilities is being carried out mainly in Jawa and Sumatra in the form of improvement and expansion of toll transmission network by microwave and submarine cable systems, as well as the promotion of automatic switching.

In 1967, the domestic satellite PALAPA A1 and A2 were launched with the U.S. aid. Indoesia is now the fourth domestic satellite holding country following the U.S., Canada and the Soviet Union. The PALAPA system forms the key transmission network of Indonesia, the world's largest archipelago country. At present, PALAPA is used also by the ASEAN countries for their domestic satellite communications.

The launching of second generation PALAPA to replace the existing PALAPA A1 and A2 is scheduled. With this, 75 new earth stations are under construction.

The on-going telecommunications network improvement and expansion plan of PERUMTEL remains effective up to the year 2000. This plan is to meet the user needs for new services, such as data, picture and mobile communications, besides replenishing the conventional telephone service. As a matter of fact, the demand for qualitative and quantitative elevation of the level of telecommunications services is being accelerated as the social activities continue to be sophisticated.

An outline of PERUMTEL's so-called telecommunication toward year 2000 in Indonesia follows:

Service dimensions as of the year 2000 are estimated at 3,300,000 telephone subscribers, 62,900 telex subscribers and 4,000 data transmission terminals. In realizing this objective, the digital switching system will perform a central role. For toll transmission, the microwave system, submarine cable system and PALAPA satellite system will be fully utilized, and the high quality, large capacity transmission will be realized. The whole network will cover the entire national territories of Indonesia.

The Project implementation concept is illustrated in Figure 3-5-4 (1) - (10).

For the planning of maritime radio communication network improvement and expansion, the best method is to utilize effectively the existing communication network of PERUMTEL and thereby formulate and manage the maritime radio communication network at minimum cost and at top efficiency.

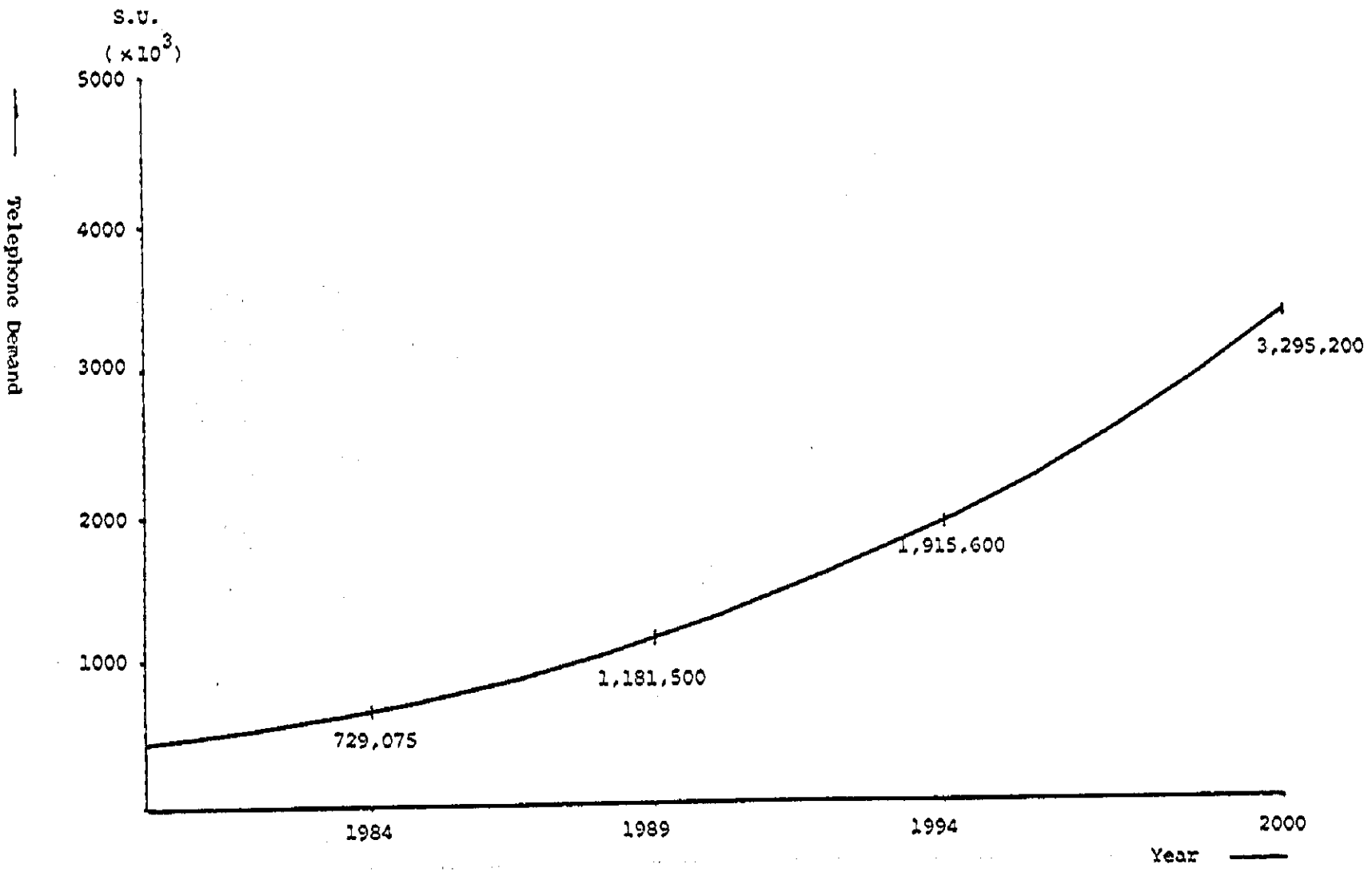


Fig. 3-5-4 (1) Telephone Demand Curve up to Year 2000

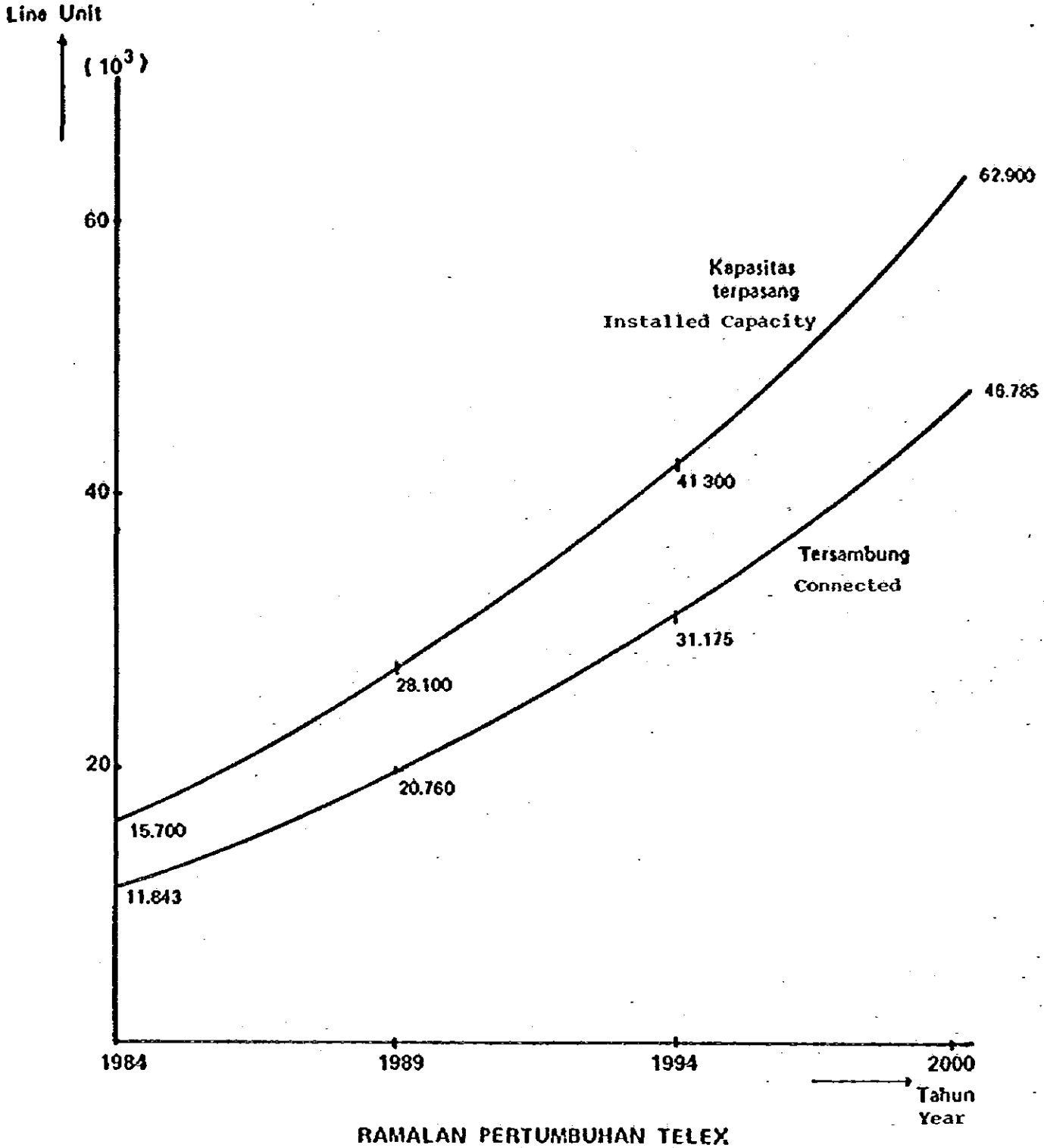


Fig. 3-5-4 (2) Telex Development Forecast up to Year 2000

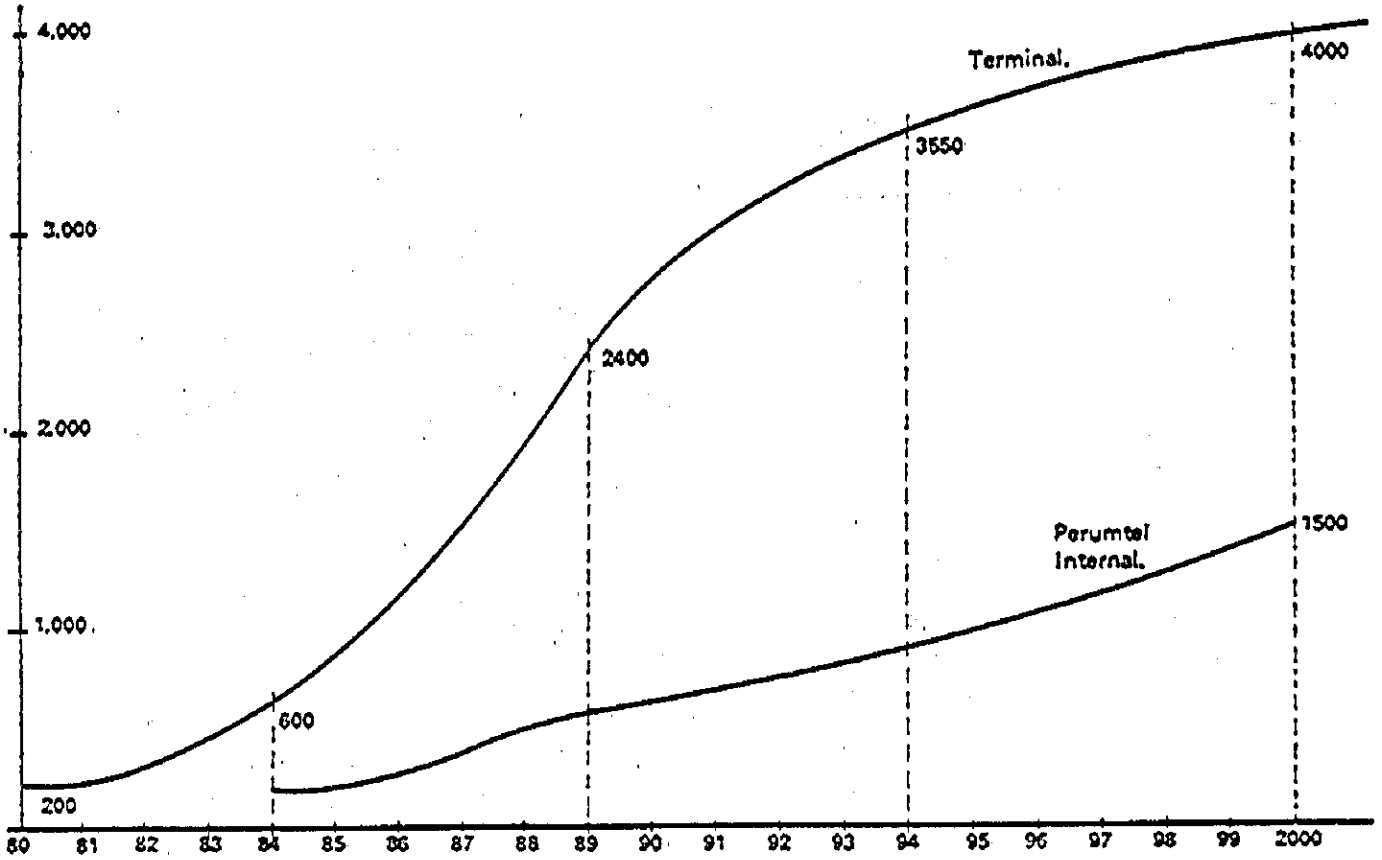


Fig. 3-5-4 (3) Data Terminal Development Forecast up to Year 2000

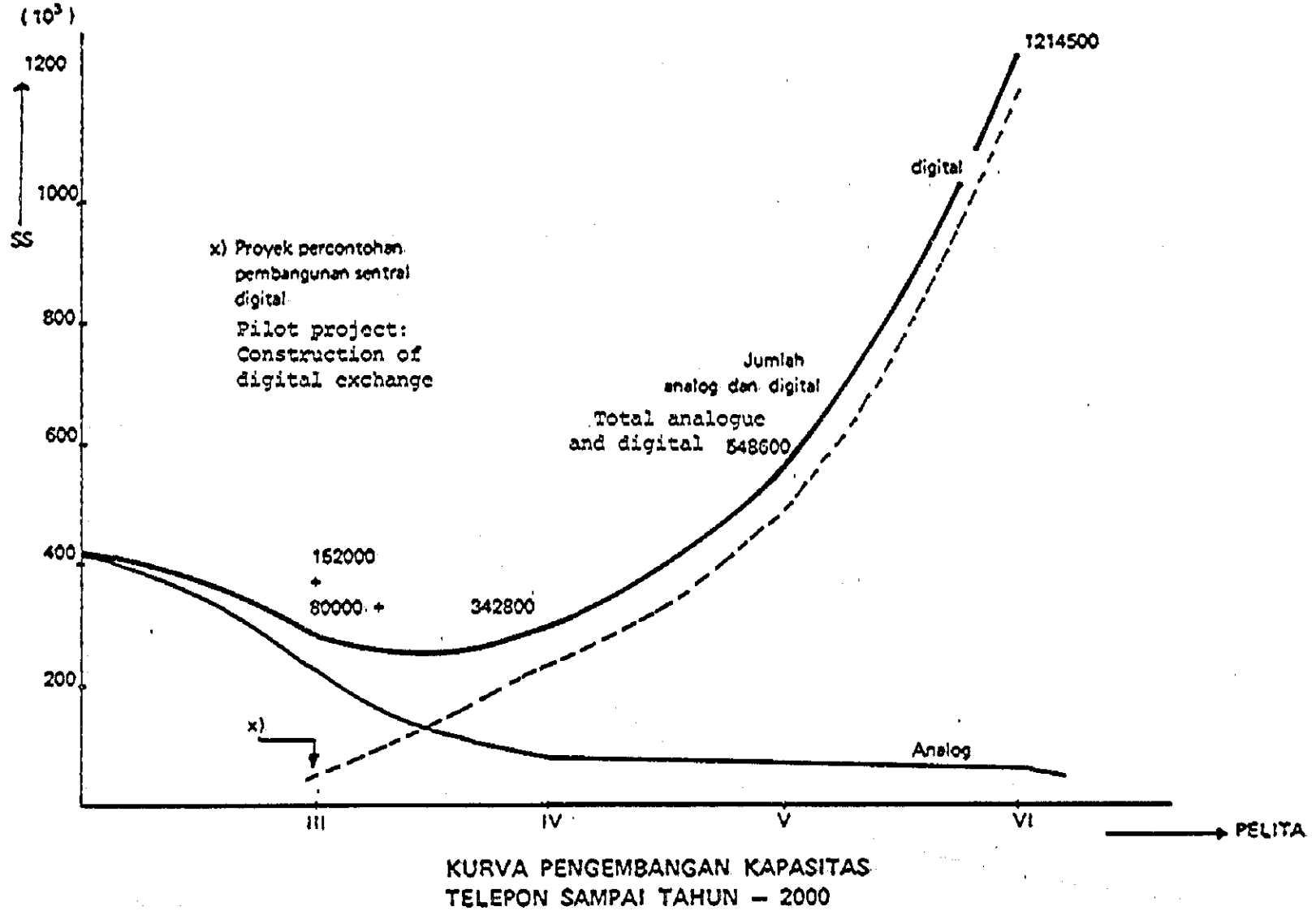
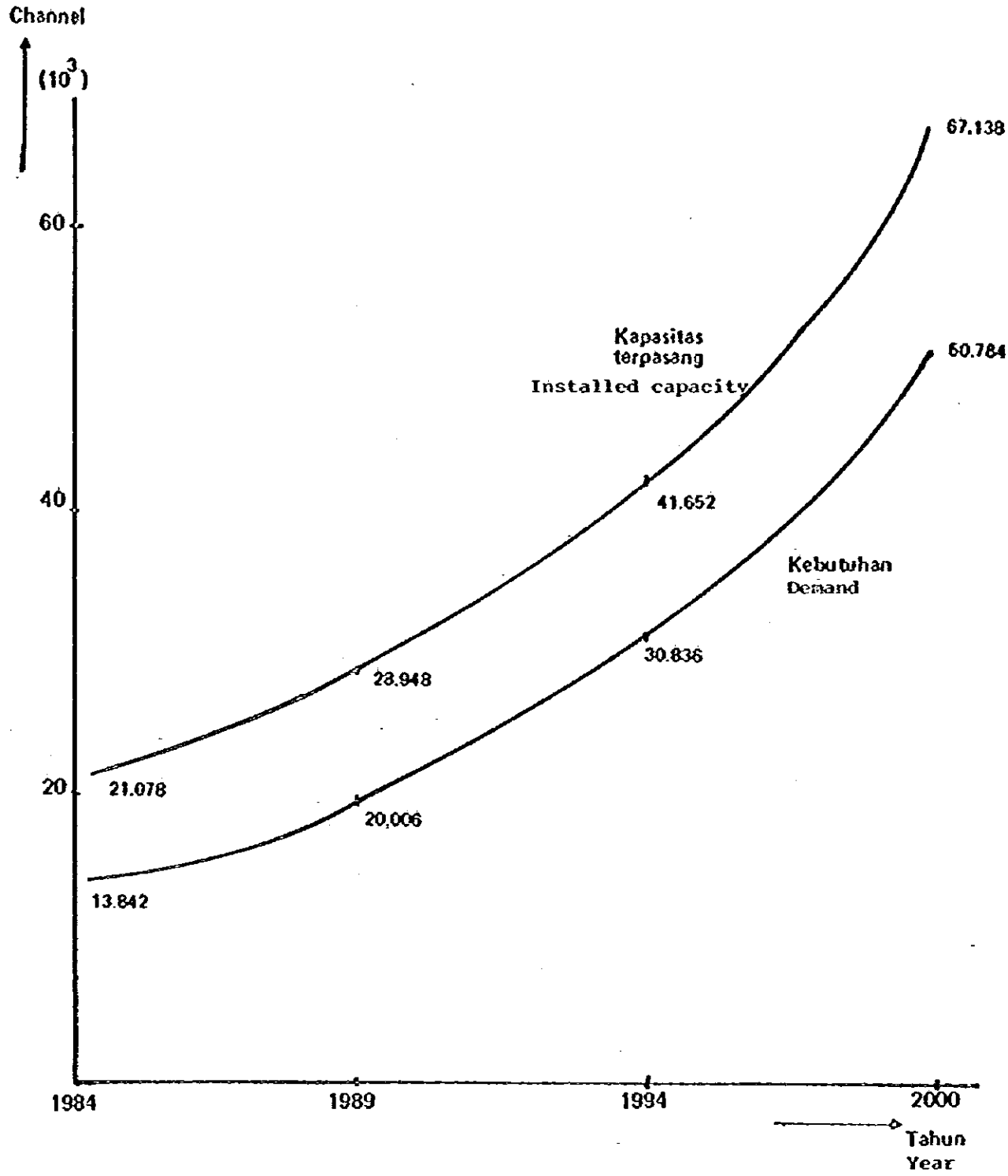


Fig. 3-5-4 (4) Telephone Capacity Development Curve up to Year 2000



RAMALAN KEBUTUHAN CHANNEL
SAMPAI TAHUN 2000

Fig. 3-5-4 (5) Channel Demand Forecast up to Year 2000

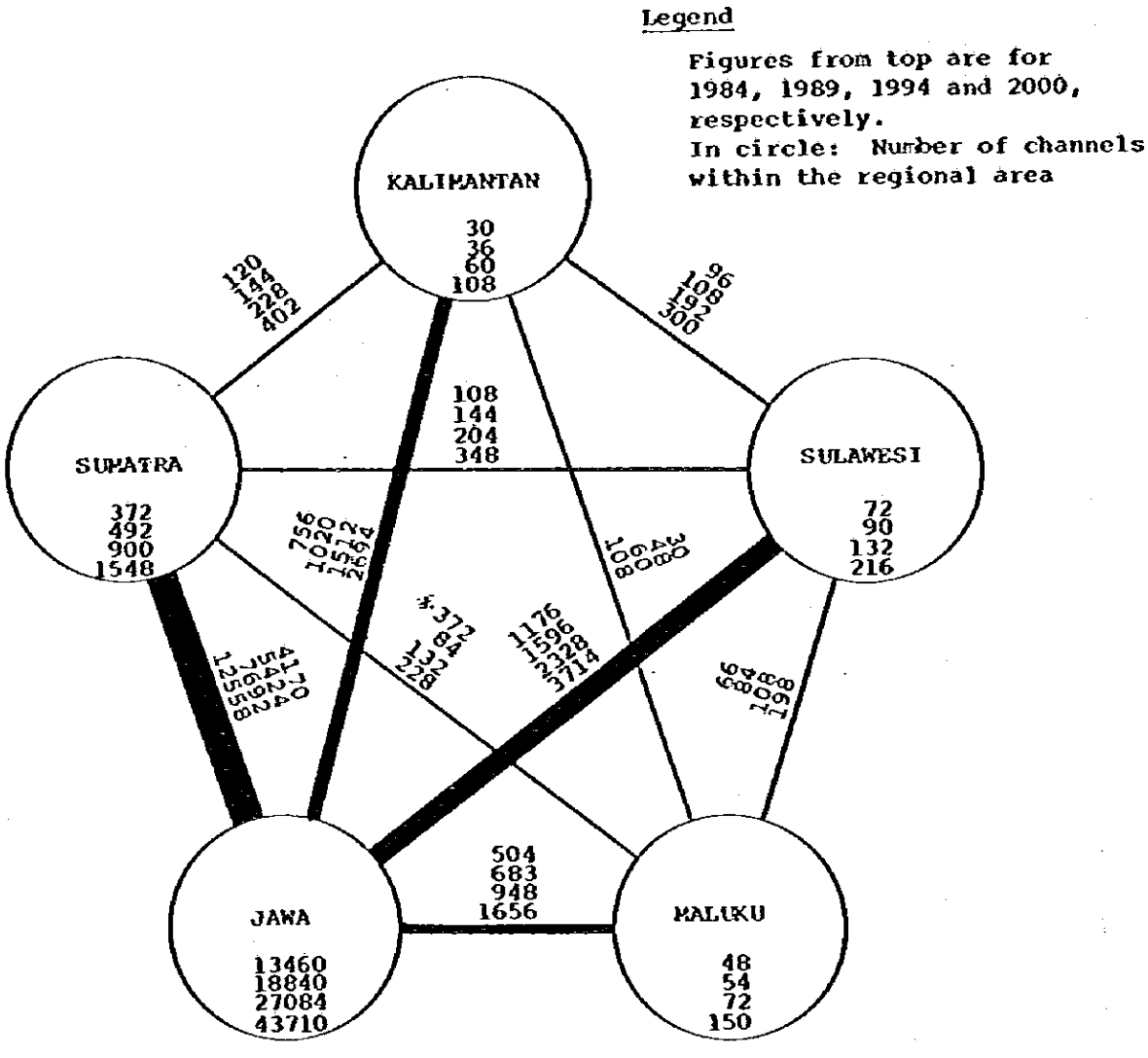


Fig. 3-5-4(6) Estimation of Required Inter-Island Groups Transmission Channels from 1984 through 2000

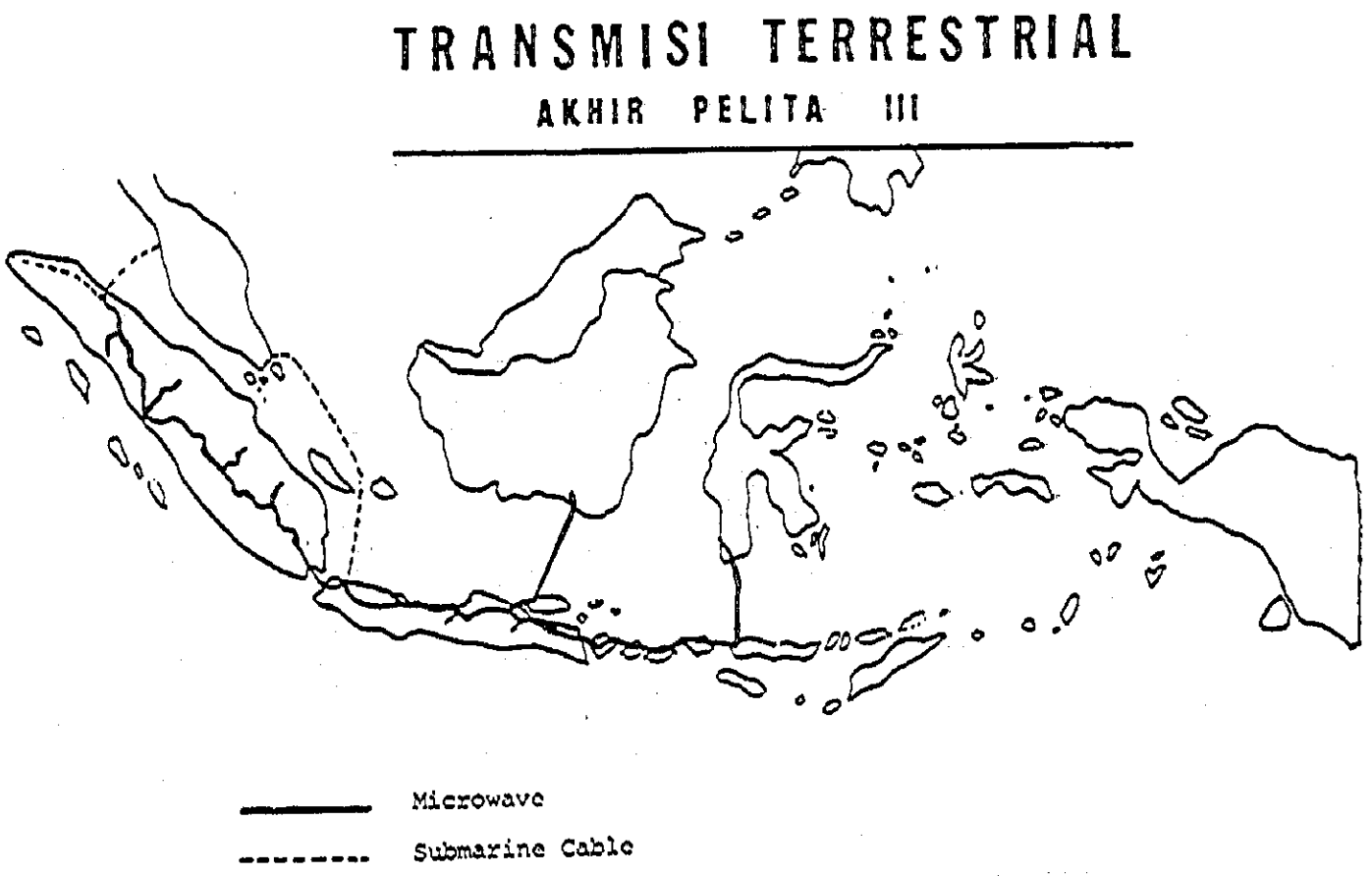


Fig. 3-5-4 (7) Terrestrial Transmission by the end of Pelita III

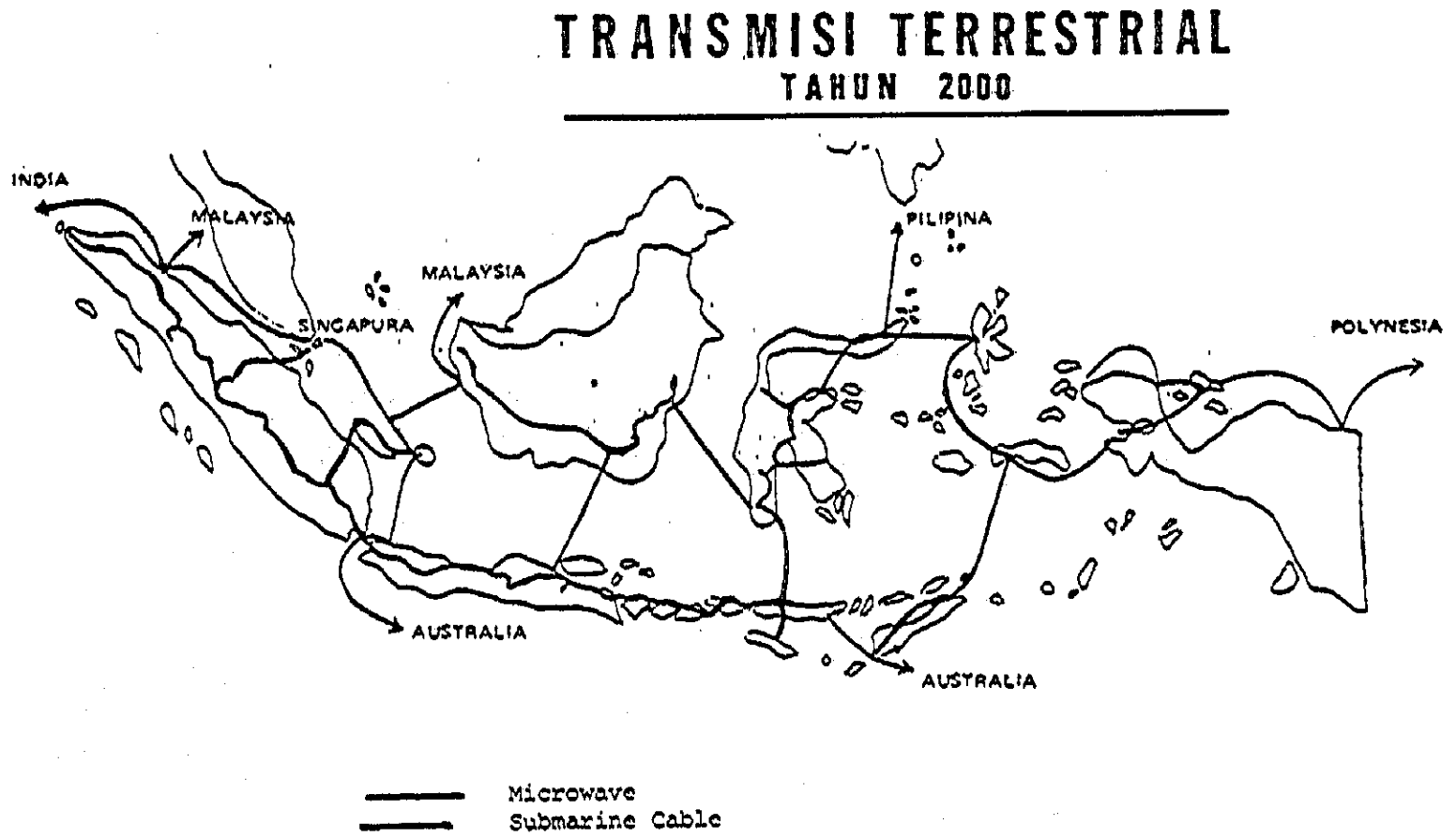


Fig. 3-5-4 (8) Terrestrial Transmission as of Year 2000

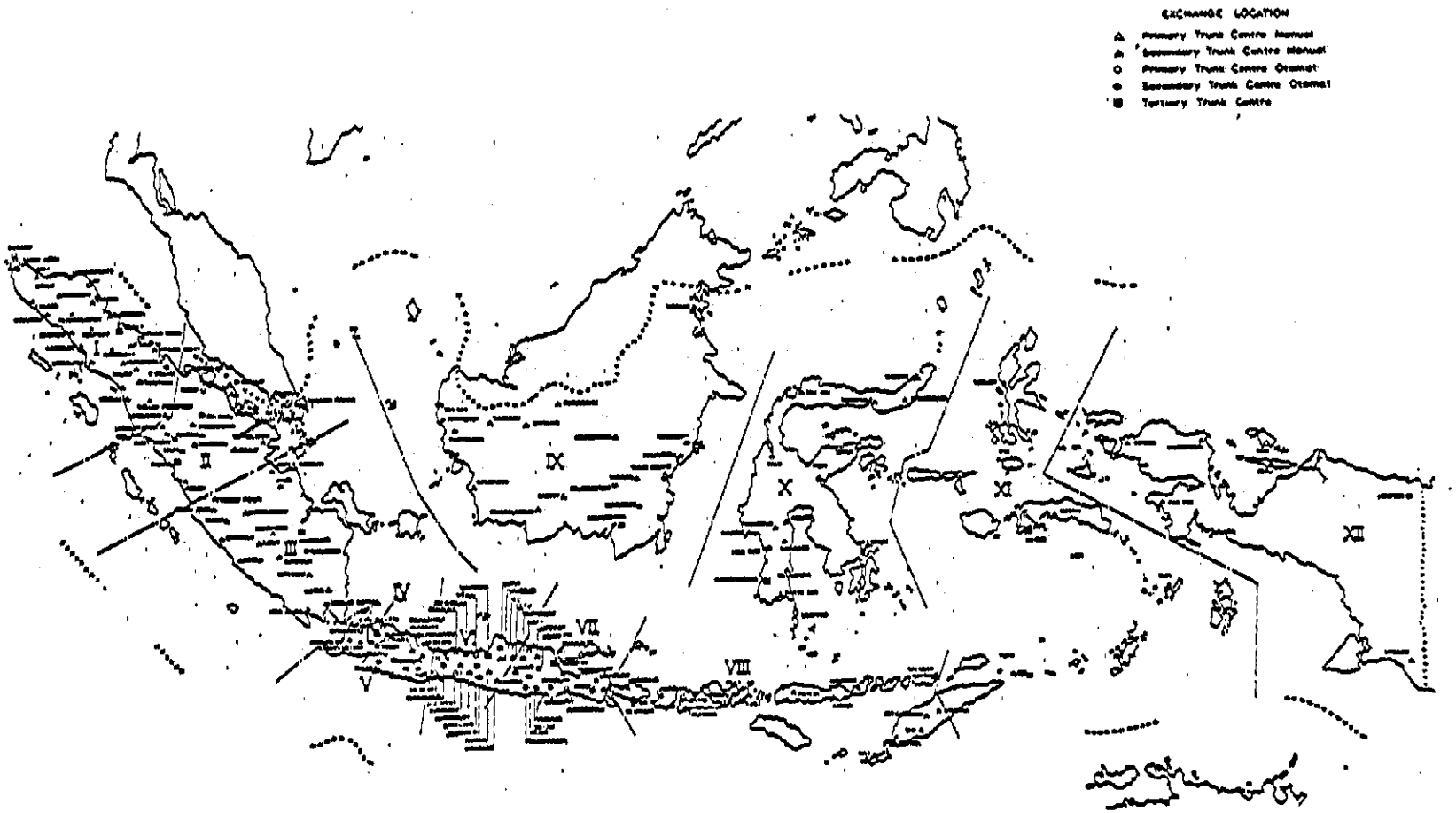


Fig. 3-5-4(9) - EXCHANGE LOCATION

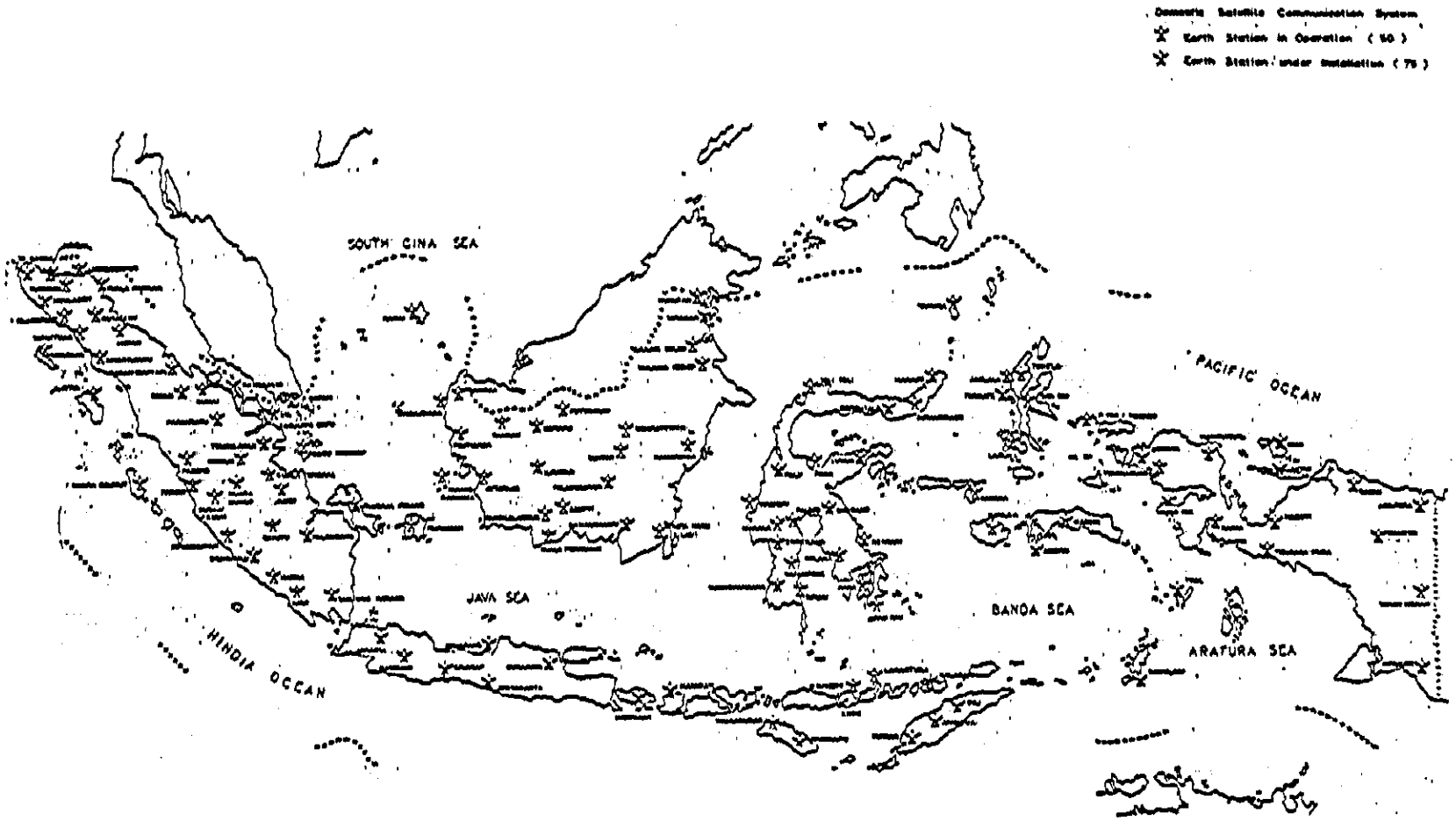


Fig. 3-5-4(10) - DOMESTIC SATELLITE COMMUNICATION SYSTEM

3-6 Maritime Satellite System

3-6-1 INMARSAT

The MARISAT system is the first one to realize maritime mobile satellites for telecommunications. The system's space segments consist of three satellites orbiting in the geostationary satellite orbits, above the Atlantic, Pacific and Indian Oceans, therefore these are having the global coverages. Although the system management is by the MARISAT Consortium of U.S.A., the system is open for utilization to all states. The services of the system started since July 1976. As of January 1982, it is utilized by about 1,000 ships.

On the other hand, IMCO proposed that the maritime satellite utility be employed not only in public correspondences but also in communications relating to distress and safety of life at sea, efficient ship operation and management, and improvement of navigation technology at sea. The IMCO proposal was discussed at the several meetings of the Inter-Governmental Conference, and in the third meeting in September 1976, the Convention on the International Maritime Satellite Organization and the Operating Agreement on the International Maritime Satellite Organization were adopted. Then, in July 1979, the conditions for the entry into force of the Convention were satisfied and the International Maritime Satellite Organization (INMARSAT) was inaugurated. At that time, the number of states represented in INMARSAT, the Signatories, was 15. As of December 1981, the number of the Signatories increased to 37 states*.

* The 37 states are as follows:
United States, U.S.S.R., Byelorussian SSR, Ukrainian, United Kingdom, Norway, Japan, Italy, France, Federal Republic of Germany, Greece, The Netherlands, Canada,

Kuwait, Spain, Sweden, Australia, Brazil, Denmark, India, Poland, Singapore, China, Argentina, Belgium, Finland, New Zealand, Bulgaria, Portugal, Algeria, Chile, Egypt, Iraq, Liberia, Omen, the Philippines, Sri Lanka.

Activities to be made by the INMARSAT Organization are discussed and determined in the Council of the Organization.

Main decisions for activity items so far are as follows:

(1) Procurement of Space Segment

To lease MARECS Satellites(ESA), INTELSAT-V-MCS(INTELSAT), MARISAT(MARISAT Consotium) and arrange them as operational or standby satellites in the geostationary satellite orbits above the Atlantic, Pacific or Indian Oceans.

(2) Schedule for Operation

In February 1982, the satellites of the system will come into services at the same date. With this, the MARISAT services will shift to the INMARSAT services.

(3) Technical Specifications of Ship Earth Station

In principle, the MARISAT Specifications will be taken over to the INMARSAT's. Therefore, the ship earth stations utilizing the MARISAT system at present can continue to take operation with the INMARSAT system without any change of the facilities.

(4) Coast Earth Station Plan (scheduled by the end of 1982)

Atlantic Ocean Satellite Coverage:

Southbury Station (USA, existing)
Goonhilly Station (UK)
Futino Station (Italy)
Umm-Al-Aish Station (Kuwait)
Odessa Station (USSR)
Pleumur Bodou Station (France)

Indian Ocean Satellite Coverage:

Yamaguchi Station (Japan, existing)
Eik Station (Norway)
Futino Station (Italy)

Pacific Ocean Satellite Coverage:

Santa Paula Station (USA, existing)
Ibaraki Station (Japan)
Singapore Station (Singapore)

(5) Services to be provided

Basic services are telegraph, telephone and telex services. Among additional services there are facsimile transmission through telephone channel, medium speed data transmission and broadcasting. Distress communications are given absolute priority in accordance with the ITU Radio Regulations.