

**FINAL REPORT
FOR THE STUDY
ON THE FUTURE DEMAND
OF THE INTER-ISLAND TRAFFIC
IN THE REPUBLIC
OF INDONESIA**

**STUDY REPORT
(PART A)**

PRESENT SITUATIONS

MARCH 1968

JAPAN INTERNATIONAL COOPERATION AGENCY

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(PART II)**

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JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団

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SECTION 1
SOCIOECONOMIC STUDY

SECTION 1
SOCIOECONOMIC STUDY

1.01 MAJOR SOCIOECONOMIC INDICES

(01) The major socioeconomic indices are summarized below.

- AREA : 1,919,443 km² , consisting of 13,677 islands.
 - POPULATION : 165,800,000 (1985)
- Average annual growth rate is 2.3% from 1971 to 1980.

- GROSS DOMESTIC PRODUCTS (GDP)

<u>Description</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
GDP (Current Prices)	45.4	54.0	59.6	71.2
GDP (1973 constant prices)	11.2	12.1	12.3	12.8
Growth Rate (Const. 1973, %)	9.9	7.9	2.2	4.2
GDP per capita (US\$)	495	571	589	579

GDP : Trillion Rp.

- GROSS DOMESTIC PRODUCT BY ORIGIN

<u>Origin</u>	<u>1965</u>	<u>1983</u>
Agriculture	59 %	26 %
Industry (Manufacturing)	12 % (8 %)	39 % (13 %)
Services	29 %	35 %
Total	100 %	100 %

- COMPOSITION OF LABOR FORCE

<u>Description</u>	<u>1965</u>	<u>1981</u>
Agriculture	57 %	58 %
Industry	16 %	12 %
Services	27 %	30 %
Total	100 %	100 %

- TRADE AND FOREIGN CURRENCY RESERVE

<u>Year</u>	<u>Export (1)</u>	<u>Import (2)</u>	<u>(1) - (2)</u>	<u>Reserve</u>
1983	21,146	16,352	4,794	4,809
1984	21,886	13,388	8,006	5,752

Unit : Millions US\$

1.02 PELITA AND ECONOMIC DEVELOPMENT

(02) The Government, established in 1965, implemented its first 5-Year National Development Plan, PELITA-I, over the period 1969/1970 - 1973/1974. Through implementation of PELITA-I, inflation was successfully overcome and rice production was increased. The average annual real GDP growth rate during the Plan Period was 7.7%. Subsequently, PELITA-II (1974/1975 - 1978/1979) was implemented. Although the oil price soared in 1973 at the time of the first oil crisis, the attained GDP growth rate of 6.9% was below 7.5% targeted for the second Plan Period; the world economic depression, and financial crisis, contributed to the missing of the target. Table-1.1 shows the real annual GDP growth rates during PELITA-I and PELITA-II. For the whole period from 1970 to 1979, the average annual GDP growth rate was 7.7%.

Table-1.1 Growth of Gross Domestic Products

Unit : Percent

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP	7.5	7.0	9.4	11.3	7.6	5.0	6.9	8.8	6.9	6.3
	PELITA-I					PELITA-II				

Source : Indonesia Handbook 1983

(03) PELITA-III was inaugurated in April 1979. During the first half of the Plan Period, the economy of Indonesia, supported by the prevailing high oil price, was very active. The serious depression of the world economy since 1981, however, and the great drop in the price of oil, contributed to significantly lowering the growth rate, which was only 2.2% in 1982. To cope with the situation, the Government devaluated the Rupiah currency, from Rp. 703/US\$1 to Rp. 970/US\$1 in order to promote exports and to increase revenue. In 1983, the growth rate recovered to 4.2%. The average GDP growth rate over the whole Plan Period was 6.1%.

just below the target of 6.5%. Table-1.2 presents a breakdown.

Table-1.2 Growth Rate of Real GDP - REPELITA-III

Unit : Percent

Industries	1979	1980	1981	1982	1983	Average
Agriculture, Forestry & Fishery	3.9	5.2	4.9	2.1	4.8	4.0
M i n i n g	- 0.2	- 1.2	3.3	-12.1	1.8	-2.0
Manufacturing	12.9	22.2	10.2	1.2	2.2	9.6
Electricity, Gas & Water Supply	20.6	13.6	15.4	17.4	6.9	13.6
Construction	6.4	13.6	15.4	5.2	6.2	9.0
Transportation & Communication	8.9	8.9	11.1	5.9	5.0	7.9
Services	7.5	12.3	9.5	5.2	4.5	7.8
Average	6.3	9.9	7.9	2.2	4.2	6.1

Source : Indonesia Handbook 1985

(04) The current plan, REPELITA-IV, has been underway since April of 1984. The targeted GDP growth rate is 5%; it has been set somewhat lower than those of the previous PELITAs in view of the unpredictability of the international supply-demand balance for oil. REPELITA-IV, aiming at the restructuring an economy which had so far been largely dependent on oil and gas, emphasizes the exportation of a broader range of goods, and the increased development of manufacturing industries. In addition, job creation must be sufficient to meet the new labor force of about 9.3 million that is expected to enter the labor market during the Plan Period. The target GDP growth rate of 5% is allocated to sectors as shown in Table-1.3. The relative importance of the agricultural sector and the mining sector will decline, while that of the manufacturing sector will grow.

Table-1.3 Composition of GDP by Sector

Unit : Percent

S E C T O R S	1983	1988	Annual Growth Rate
Agriculture, Forestry & Fishery	29.2	26.4	3.0
M i n i n g	7.4	6.6	2.4
Manufacturing	15.8	19.4	9.5
Construction	6.3	6.3	5.0
Transportation & Communication	6.0	6.0	5.2
Services & Others	35.3	35.3	5.0
T o t a l	100	100	5.0

Source : REPELITA-IV

(05) The gross domestic product during REPELITA-IV is expected to be Rp. 552 trillion; total investment is scheduled to be Rp. 145 trillion. The annual growth rate of investment, as shown in Table-1.4, is targeted to be 19.1%. In 1983, the ratio of the investment to GDP was 22.6%; this will increase to 29.0% in 1988. The development fund for the Government's investment is supported by the Government revenue reserve and foreign aid, as shown in Table-1.5. Government reserve for the development fund is sought from sources as shown in Table-1.6. About 61% of the reserve is expected to come from oil and gas revenues.

Table-1.4 Gross Domestic Product and Investment

(Rp. billion, current prices)

Item	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	REPELITA IV (Average increase rate)
1. GDP	73,692	84,465	96,579	109,624	123,515	138,127	552,309 (13.4%)
2. Investment	16,673	19,116	23,533	28,337	34,211	40,027	145,225 (19.1%)
a. Government Development Expenditures	9,196	10,459	12,849	15,415	18,543	21,343	78,609 (18.3%)
b. Others	7,482	8,657	10,684	12,922	15,668	18,684	66,615 (19.9%)
3. Investment/GDP Ratio	22.6 %	22.6 %	24.4 %	25.8 %	27.7 %	29.0 %	26.3 %

Source : REPELITA-IV

Table-1.5 Composition of Budgetary Development Funds

(Rp. billion, current prices)

	1984/85 (1)	1985/86	1986/87	1987/88	1988/89	REPELITA-IV
Government Savings	6,048.3	7,751.0	9,699.0	11,856.0	14,139.9	49,495.7
Official Aid and Loans	4,411.0	5,098.0	5,715.3	6,686.8	7,202.7	29,113.8
Budgetary Development Funds	10,459.3	12,849.0	15,414.3	18,542.8	21,342.6	78,609.5

Note (1) : Budget
Source : REPELITA-IV

Table-1.6 Domestic Revenues by Source

(Rp. billion, current prices)

Item	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	REPELITA IV (Average Increase rate)
1. Revenues from Oil and Natural Gas	8,869	10,367	12,668	15,227	17,874	20,623	76,758 (18.4%)
a. Oil	7,903	8,895	10,905	13,188	15,417	17,855	62,251 (17.7%)
b. Natural Gas	967	1,472	1,763	2,038	2,457	2,768	10,417 (24.1%)
2. Non-oil and gas Revenues	4,955	5,783	7,126	9,056	11,708	15,037	48,710 (24.9%)
a. Taxes	4,453	5,168	6,424	8,228	10,751	13,940	49,510 (25.7%)
b. Non-taxes	502	615	702	828	958	1,098	4,199 (16.9%)
T o t a l	13,824	16,150	19,794	24,283	29,582	35,660	125,468 (20.8%)

Source : REPELITA-IV

(06) As to the international trade balance, the current account deficits are offset by surplus in the capital account. Hence, the total balance of international payments is one of surplus; its value is shown in Table-1.7. Tables-1.8 and 1.9 show the breakdowns of imports and exports, by commodity. Oil and gas export occupies 65% of total exports in 1988, as compared with 73% in 1983. Import of raw materials and capital goods has, relative to consumables, somewhat increased.

Table-1.7 Balance of Payments Summary 1983/84 - 1988/89

(US \$ million, current prices)

Item	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
1. Export	19,310	19,875	22,433	25,332	28,223	31,116
2. Import	(17,103)	(17,287)	(18,979)	(20,844)	(22,906)	(24,799)
3. Services	(6,918)	(7,257)	(8,026)	(8,570)	(9,089)	(9,548)
Current Account	(4,711)	(4,669)	(4,572)	(4,082)	(3,770)	(3,231)
1. Official Transfer and Capital	6,030	5,481	5,079	5,070	5,568	5,713
2. Miscellaneous Capital	1,244	695	1,097	927	821	692
3. Government Debt Repayments	(988)	(1,297)	(1,380)	(1,665)	(2,169)	(2,536)
Capital Account	6,286	4,879	4,796	4,332	4,220	3,869
Balance of Payments	(1) 1,575 (2,061)	210	224	250	450	638

Note : Included in the 2,061 million total are "errors and omissions" of 486 million.

Source : REPELITA-IV

Table-1.8 Gross Value of Export

(US \$ million, current prices)

Item	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	Ave. Growth Rate (%)
I. Oil and LNG	14,140	13,825	15,424	17,317	19,008	20,363	7.6
1. Crude Oil & Oil Products	11,861	10,644	11,873	13,463	14,664	15,766	5.9
2. LNG	2,279	3,181	3,551	3,854	4,344	4,597	15.1
II. Non-Oil and LNG	5,170	6,050	7,009	8,015	9,215	10,753	15.8
1. Agricultural Products	2,597	2,859	3,123	3,395	3,717	4,160	9.9
2. Mining Products	652	740	841	963	1,066	1,166	12.3
3. Manufactured Products	1,921	2,451	3,045	3,657	4,432	5,427	23.1
Total Exports	19,310	19,875	22,433	25,332	28,223	31,136	10.0

Source : REPELITA-IV

Table-1.9 Value of Imports of Non-Oil and Gas

(US \$ million, current prices)

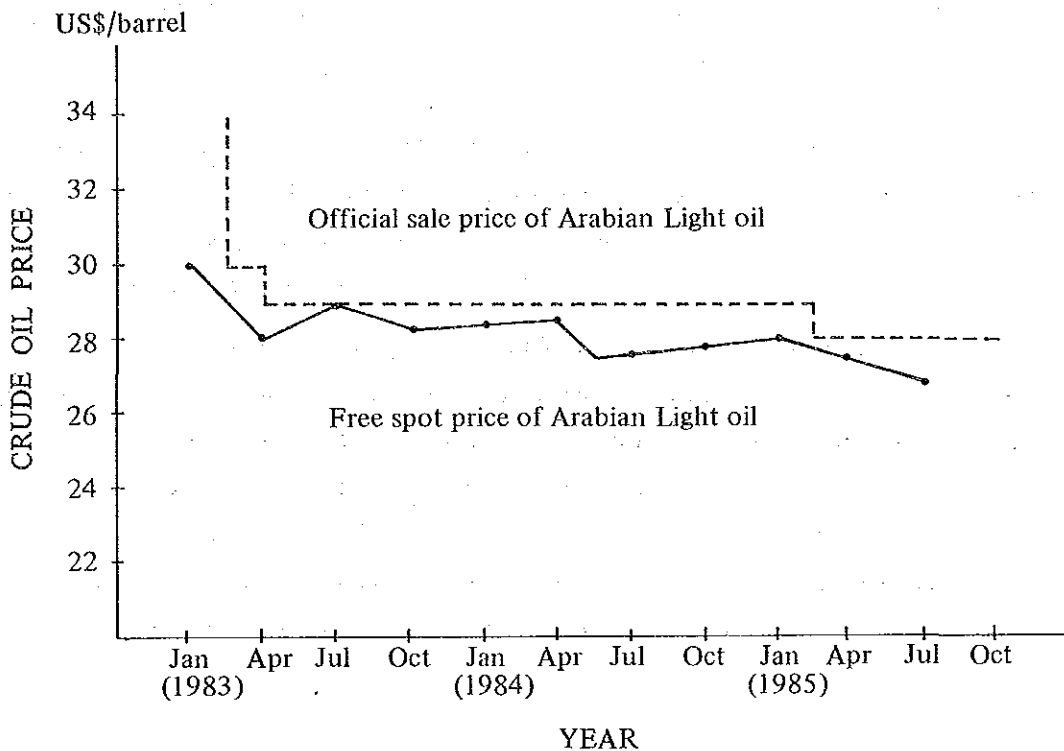
Item	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	Ave. Growth Rate (%)
1. Consumption Goods	1,767	1,780	1,825	1,921	1,976	1,904	1.5
a. Food	615	601	569	534	480	381	- 9.1
b. Non - Food	1,152	1,179	1,256	1,387	1,496	1,523	5.7
2. Materials	5,608	5,771	6,256	6,661	7,195	7,812	6.9
3. Capital Goods	5,429	5,619	6,401	7,429	8,465	9,478	11.8
T o t a l	12,804	13,190	14,482	16,011	17,636	19,194	8.4

Source : REPELITA-IV

1.03 DECLINE OF OIL PRICE AND AFTERMATH

(07) In 1981, the official OPEC selling price of crude oil was US\$34 per barrel. This price was cut down by US\$5 in March 1983, and by another US\$1 in January 1985, so that the price per barrel became US\$28. The spot prices of actual transactions, however, were below the official prices, as shown in Figure-1.1.

Figure-1.1 Change of Crude Oil Prices



(08) Since December 1985, when the basic policy of OPEC changed from one of maintaining a high price to one of maintaining market share, the market price of crude oil has drastically declined. The spot price per barrel was US\$25 in the beginning of January 1986, US\$20 in the latter half of that month, and below US\$10 in March 1986.

(09) At the OPEC meeting in August 1986, the OPEC countries decided to limit oil production to 16 million barrels per day in order to reraise the market price. As a result, the price recovered, rising from a low of US\$8 to a level of US\$15. Then, in December of 1986, OPEC decided to reapply a fixed price policy, and the official price was fixed at US\$18 per barrel. Actual transactions during that month, however, were made at prices between US\$14 and US\$16. The production rate declined to 15.8 million barrels per day. The price of Indonesia Minas Oil was US\$16.28 in January 1987, and US\$17.56 thereafter. The production rate of Indonesian oil was cut from 1.19 million barrels to 1.13 million barrels per day.

(10) The share of oil and gas in Indonesia's total international trade gradually increased from 50% in 1973 to a high of 82% in 1981. Therefore, the fluctuation of oil price directly and strongly affects Indonesia's international trade balance. Indeed, a fluctuation of US\$1 in the oil price is said to cause a change in the trade balance of US\$330 million. The value of exports reached its peak, at US\$18.8 billion, in 1981, and they gradually declined to US\$12.2 billion in 1985. The share of oil and gas in this figure accordingly fell to 68% (see Table-1.10), while the share of other products gradually rose from 1981's 18% to 32% in 1985.

Table-1.10 Balance of Payments (1980 - 1987)

(US \$ million, current prices)

Item	1980/81	1981/82	1982/83	1983/84	1984/85	(2) 1985/86	(3) 1986/87
I. Goods and Services							
1. Exports (FOB)	22,885	22,994	18,672	19,816	19,901	18,108	18,943
Oil and LNG	17,298	18,824	14,744	14,449	13,994	12,243	12,545
Non-oil and LNG	5,587	4,170	3,928	5,367	5,907	5,865	6,398
2. Import (FOB)	15,887 *	19,969 *	20,625 *	16,304 *	14,427 *	12,543 *	13,040 *
Oil and LNG	4,050 *	5,408 *	4,801 *	3,489 *	2,797 *	2,561 *	2,865 *
Non-oil and LNG	11,837 *	14,561 *	15,824 *	12,815 *	11,630 *	9,982 *	10,175 *
3. Services	4,867 *	5,815 *	5,086 *	7,663 *	7,442 *	7,644 *	8,117 *
Oil and LNG	2,647 *	3,655 *	2,777 *	3,589 *	3,381 *	3,859 *	3,869 *
Non-oil and LNG	2,220 *	2,160 *	2,309 *	4,074 *	4,061 *	3,785 *	4,248 *
4. Current Account	2,131	2,790 *	7,039 *	4,151 *	1,968 *	2,079 *	2,214 *
Oil and LNG	10,601	9,761	7,166	7,371	7,816	5,823	5,811
Non-oil and LNG	8,470 *	12,551 *	14,205 *	11,522 *	9,784 *	7,902 *	8,025 *
II. Capital Account	1,708	3,852	5,880	5,974	2,726	2,364	3,840
1. Official Aid and Loans	2,684	3,521	5,011	5,793	3,519	3,340	3,840
2. Miscellaneous Capital	361 *	1,140	1,795	1,191	499	625	203
3. Government Debt Repayments	615 *	809 *	926 *	1,010 *	1,292 *	1,601 *	1,777 *
I & II Total	3,839	1,062	1,159	1,823	758	285	52
III. S D R	62	--	--	--	--	--	--
IV. Errors and Omissions	1,165 *	2,050 *	2,125 *	247	91 *	247 *	--
V. Balance of Payments	2,736	988 *	3,280 *	2,070	667 *	38 *	52 *
VI. Foreign Currency Reserves	7,341	6,353	3,074	5,144	2,407	2,369	2,317

Note (1) : * indicates payment or deficit

(2) : Estimated

(3) : Official estimate

Source : President's speech for Independence Day of 1984; 1985 Budget;
"Survey of Recent Development" by Ross Muir published in
Bulletin of Indonesian Economic Studies, August 1986.

(11) In 1980, official foreign aid totaled to US\$2.7 billion, in 1983, it was US\$5.8 billion. The aid has subsequently fallen to the level of about US\$3.5 billion. It will, however, be increased in this fiscal year to help overcome the current unfavorable economic situation. It is noteworthy that the amounts of repayment, for principal and interest, has been increasing year by year; specifically US\$600 million in 1980, US\$1,600 million in 1985, and US\$1,800 million in 1986. As is clear in Table-1.5, about one-third of the development fund is covered by foreign aid. Therefore, both loans and repayments are likely to increase.

(12) On September 19, 1986, the Government devaluated the Rupiah, from Rp. 1,134/US\$1 to Rp. 1,644/US\$1. The exchange rates per U.S. dollar of the Rupiah were Rp. 994 in December 1983, Rp. 1,076 in December 1984, and Rp. 1,110 in May 1985. The 1986 devaluation of the Rupiah was aimed at correcting the international trade balance, which had been

damaged by the fall of the crude oil price in 1986. Devaluation also brings with it, however, such negative effects as the increasing of actual loan repayment amounts and the raising of import prices of raw materials and equipment, so the final result of which will be a rise of prices of commodities.

1.04 NATIONAL FINANCIAL SITUATIONS

(13) The Government, aware of the bitter experience of the previous government with inflation, has maintained the balance of revenue outflow and revenue inflow. Budgetary expenditure was expanded during the period from 1981 to 1985 in line with the increased earnings from the oil market. In 1986 however, due to decline of oil price, the budget was significantly tightened. The budget for 1987, announced in January 1987, showed a nominal increase of 6.4% over the previous year, but in real terms, taking the devaluation into account, the budget was actually reduced to 73% of the previous year's level. Table-1.11 shows the national budgets from 1981 through to the present.

Table-1.11 Government Budget (1981 - 1987)

(Rp billion, current prices)

Item	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	Changes from 1986 (%)
(Revenues)								
A. Internal revenues	12,274	13,757	13,824	16,149	18,678	17,832	17,236	- 3.3
1. Oil and LNG	8,575	9,122	8,869	10,367	11,160	9,738	6,939	- 28.7
(1) Oil	8,575	9,122	7,903	8,895	9,480	8,146	5,978	- 26.6
(2) LNG	-	-	967	1,472	1,680	1,593	961	- 39.7
2. Non-oil and LNG	3,699	4,635	4,955	5,783	7,518	8,094	10,298	27.2
B. Development revenues	1,626	1,851	2,742	4,411	4,368	3,589	5,547	54.6
Revenues Total	13,900	15,607	16,565	20,560	23,046	21,422	22,783	6.4
(Expenditures)								
A. Routine expenditures	7,501	7,002	7,275	10,101	12,399	13,126	15,027	14.5
1. Civil service	2,412	2,492	2,598	3,190	4,177	4,213	4,317	2.5
2. Goods procurement	994	1,021	1,099	1,208	1,452	1,367	1,175	- 14.0
3. Subsidies for regions	1,209	1,315	1,388	1,785	2,590	2,640	2,649	0.4
4. Debt interest & installment	964	976	1,417	2,686	3,559	4,223	6,805	61.1
a. Domestic	30	30	30	30	30	40	40	0
b. Foreign	934	946	1,387	2,656	3,529	4,183	6,765	61.7
5. Others	1,921	1,150	724	1,177	602	683	80	- 70.0
B. Development expenditures	6,399	8,606	9,290	10,459	10,647	8,296	7,757	- 6.5
Expenditures Total	13,900	15,607	16,565	20,560	23,046	21,422	22,723	6.4

Note : Draft budget

Source : "Indonesia Hand Book (1985)" published by Jakarta Japan Club;

"Survey of Recent Development" by Ross Muir, published in Bulletin of Indonesia Economic Studies, August 1986.

(14) The sectoral development budget allocations, from 1981 to the present, are shown in Table-1.12. Those sectors apportioned more than one billion Rupiah for 1986 and 1987 are:

- Agriculture and Irrigation
- Mining and Energy
- Communication and Tourism
- Education, Youth, and Culture

In the 1987 budget, funds for almost all of the sectors are below those of the previous year; the budget for transmigration was cut by as much as 66%, compared to the previous year. Nevertheless, the budget for communication and tourism (which includes transportation expenditures) was increased by 21%, showing the government's particular interest in improving this sector.

Table-1.12 Development Expenditure Budget (1981-1987)

(Rp. billion, current prices)

Sector	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88 (draft)	Changes from 1986 (%)
1. Agriculture & Irrigation	941.9	1,252.5	1,323.8	1,401.7	957.8	1,105.5	1,180.7	6.8
2. Industry	330.3	366.1	448.1	650.0	111.5	489.3	229.7	- 53.1
3. Mining & Energy	683.5	938.2	1,116.0	1,300.9	258.4	1,036.6	1,129.1	8.9
4. Communication & Tourism	810.2	1,098.4	1,307.3	1,392.1	635.5	1,063.3	1,288.1	21.1
a. Road	395.9	508.1	590.7	592.6	365.5	581.1	744.5	28.1
b. Land Transportation	88.0	145.0	230.7	236.6	68.1	146.1	108.3	- 25.9
c. Sea Transportation	158.7	212.7	231.8	274.4	95.5	146.3	161.0	10
d. Air Transportation	122.1	162.9	163.2	189.2	80.9	103.0	172.4	67.4
e. Post & Telecommunications	24.3	42.9	63.9	70.7	9.3	68.7	84.8	23.4
f. Tourism	21.2	26.9	27.0	28.6	16.2	18.1	17.1	- 5.5
5. Trade & Cooperation	64.2	106.4	106.7	127.1	76.3	111.6	132.5	18.7
6. Manpower & Transmigration	435.9	605.8	621.9	675.1	539.8	394.5	156.6	- 60.3
a. Manpower	42.0	79.2	82.7	98.3	70.0	69.1	45.2	- 34.3
b. Transmigration	394.0	526.7	539.2	576.8	469.8	325.4	111.2	- 65.8
7. Regional, Rural & Urban Development	612.5	740.6	783.0	809.9	842.3	938.9	873.8	- 6.9
8. Religion	46.5	60.3	60.7	62.9	63.6	41.9	15.6	- 62.8
9. Education, Youth, Culture	786.7	1,301.7	1,329.3	1,501.9	1,273.0	1,145.9	1,021.5	- 10.9
10. Health, Welfare, Family Planning	258.4	322.1	344.0	408.0	303.6	311.6	207.7	- 33.3
11. Housing	156.0	281.3	297.1	432.7	273.9	332.7	412.0	23.8
12. Law	66.6	79.3	79.5	80.4	79.9	40.6	14.0	- 65.5
13. National Defense & Security	481.2	568.7	524.2	697.7	395.2	554.0	510.0	- 7.9
14. Information, Press	45.7	54.5	57.0	67.6	49.1	41.5	24.0	- 42.2
15. Science, Research & Technology	100.2	121.9	158.3	205.9	130.5	169.6	158.6	- 6.5
16. State Apparatus	190.2	223.0	187.4	162.0	174.3	127.0	45.4	- 64.3
17. Business Enterprise Development	200.5	264.8	264.9	226.9	11.3	202.0	191.1	- 5.4
18. Natural Resources & Environment	188.2	220.2	231.3	257.0	165.8	189.5	166.3	- 12.2
Total	6,399.2	8,605.8	9,290.3	10,459.3	6,349.8	8,296.0	7,756.6	- 6.5

Source : Same as the source of Table-1.11.

1.05 FUTURE OF THE INDONESIAN ECONOMY

(15) Throughout the 1970s, the economy of Indonesia achieved rapid progress. Because of the worldwide economic depression that started in the early 1980s, however, the Indonesian economy - which is largely dependent on the export of primary products such as crude oil, liquefied natural gas, tin, and palm oil - has been seriously damaged.

(16) The Government of Indonesia has been trying to promote industrialization so as to achieve restructuring of the economy, so that it is centered no longer on primary products, but rather on the manufacturing industries. Industrialization, however, has yet to mature, and the decline of primary product prices, caused by the worldwide recession, has seriously affected Indonesia's economic performance.

(17) From January through July of 1986, oil prices dropped drastically, going from US\$25/barrel to US\$8/barrel. To cope with this difficulty, the Government devaluated the Rupiah currency by 31%, and encouraged private manufacturing firms to export non-oil/gas products. Meanwhile, the budget for the fiscal year of 1987/1988 is a rather contracted one.

(18) The recent economic policy of the Government, affected by the world economic climate, appears to deviate from the original target of REPELITA-IV. The original average annual growth rate of GDP of 5% over the Plan Period is unlikely to be achieved. Although the GDP growth rate was as high as 6.1% in 1984, it had dropped to 1.9% in 1985.

(19) The Central Statistics Bureau recently announced that the 1986 GDP growth rate was 3.2%. A breakdown of GDP by sector is shown in Table-1.13. It is noteworthy that, in spite of the severely worsened economic conditions, the

Indonesian economy managed to achieve a moderate growth rate of 3.2%. This shows that the measures taken by the Government to cope with the economic crisis were appropriate and effective. The 5.5% growth rate of the industrial sector is the highest among all the sectoral rates, and shows the effects of the Government's policy to turn industry into the new leading sector of Indonesian economic development.

Table-1.13 GDP Growth Rates 1984 - 1986

(Based on 1983 constant prices)

Sectors	1984 *	1985**	1986**
Agriculture	5.5	3.4	2.5
- Food Crops	7.4	2.4	1.9
Mining	5.9	-5.6	4.2
Industry	15.6	5.9	5.5
- Non Oil/Gas	6.2	6.2	4.9
Electricity, Water & Gas	5.0	8.1	5.5
Construction	-2.8	1.7	-0.2
Commerce	2.4	-0.1	3.0
Transportation & Communication	8.9	6.1	1.3
Bank & Finance Institution	18.8	0.3	5.3
Service	4.8	6.5	2.8
TOTAL	6.1	1.9	3.2

Source : Central Bureau of Statistics

Note * : Revised figures

** : Preliminary figures

(20) Economists and business circles in Indonesia expect that 1987 will see higher growth than 1986. This expectation is based on the following factors:

- a) Indonesia's national income is on the upturn, and the balance of payments deficit is shrinking.
- b) Indonesia's revenues from exports of non-oil products are making an increasingly important contribution to the national economy, providing greater foreign exchange and fuller employment.

- c) Financial commitments totaling US\$3.2 billion were given by the IGGI (Inter-Governmental Group in Indonesia), allowing important development projects, ranging from infrastructural improvement to human resources development, to proceed.
- d) Indonesia's export products have now become competitive in world markets, and the price of oil is well above the US\$15 per barrel on which the 1987/88 budget was based.

(21) President Soeharto has predicted the economic situation in 1987 would not be as difficult as it was in 1986, as the world oil price, having passed its worst crisis, is remaining around US\$18 per barrel. Any price in excess of US\$15 serves to strengthen the position of the state budget. Moreover, prices of non-oil commodities abroad have improved.

(22) Although the optimistic views on 1987 economic trends outnumber the pessimistic views, there are some negative factors that seem to exist at present. A few of them are described below:

- a) The amount of foreign debt is said to be reaching about US\$35 billion. Accordingly, interest and principal repayment amounts are increasing. Increased repayment will negatively affect the balance of payments and the economic development.
- b) It is reported that the Indonesian inflation rate in 1986 was about 8.8%. This rate is not all that high in comparison with past devaluation-induced inflation rates. However, efforts should be taken to curb the inflation rate, so that confidence in the currency remains.
- c) It cannot be denied that technology and management skills in the private sector have not yet reached satisfactory levels. This might cause delay in the expansion of exports of Indonesian products. Since

the competition among developing countries to increase their exports is severe, strong efforts must be devoted to raising the ability of the private sector.

(23) In light of the above points, it is appropriate to predict that the economic growth rate of 1987 will be slightly higher than the rate of 1986, but will not reach the 5% target of REPELITA-IV. As to the trend of economic growth after 1987, it is reasonable to expect that until 1989 (which will be the first year of REPELITA-V), the economy will continue to adjust to the severe changes of conditions caused by the drastic fall of the primary commodities, including oil and gas. The Indonesian economy should enter a new period of moderate and stable economic growth rate from 1989.

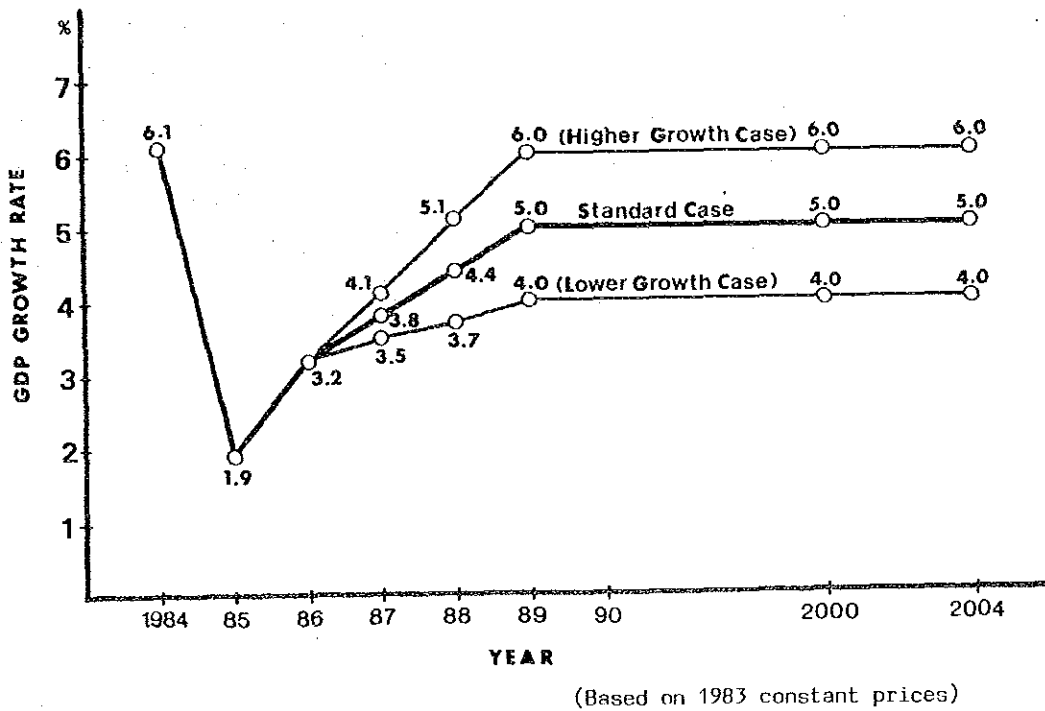
(24) The annual GDP growth rate for the period from 1989 to 2004 is predicted to be about 5%, based on the following considerations.

- a) Indonesia is endowed with strong economic development potentialities; it has extensive land area, a large labor force, and an abundance of natural resources. In particular, of course, the area is rich in oil and natural gas.
- b) The targeted annual growth rates for the past three PELITAs were: 7.5% for PELITA-II, 6.5% for PELITA-III and 5.0% for REPELITA-IV. Based on these figures, it is reasonable to anticipate a future growth rate of about 5%.
- c) From a global perspective, the world economy is entering into a third industrial revolution, in which high technologies are to be employed in the production of goods and services. These high technologies include electronics, robotics, and biotechnology. Productivity in various industries will dramatically increase. Although high technologies are first developed and applied in industrialized countries, they shall not

take long to penetrate into all countries. Industries productivity will achieve new levels as the world becomes a high technology society.

(25) To supplement the above mentioned forecast, two alternative forecasts are made, one assuming a higher than expected growth rate, and the other, a lower growth rate. For the former forecast, the growth rate in and after 1989 is assumed to be 6%. For the the lower growth-case forecast, the growth rate from 1989 onwards is assumed to be 4%. The growth rates for 1987 and 1988 are calculated on the basis of the straight lines connecting the two points of 3.2% (1985) and 6.0% (1989) for the higher growth case, and 3.2% (1985) and 4.0% (1989) for the lower growth case. The results of these forecasts are shown in Figure-1.2.

Figure-1.2 Forecast of Annual GDP Growth Rate (1984-2004)



1.06 POPULATION INCREASE BY PROVINCE

(26) During the REPELITA-IV period (1984/85 - 1988/89), the population increase in each province is predicted to be as shown in Table-1.14. The average annual increase rate of population of Indonesia as a whole is predicted to be 2.1%. Population increase should be faster than average in Sumatera and Kalimantan, while the increase rate for Jawa, 1.8%, will be lower. The different rates reflect the Government's policy to bring people from densely populated areas like Jawa to more scantily populated areas such as Sumatera and Kalimantan. This policy is aimed at attaining relatively even development throughout the country.

(27) In recent times in Indonesia, there is a clear trend of population concentration in urban areas. The average annual rate of population increase in urban areas, between 1961 and 1971, was 3.6%; the rate between 1971 and 1981 had increased to 5%. It is predicted that the urban population increase rate will continue to average about 5% annually. As shown in Table-1.15, the share of the urban population constituted 17% of the whole population in 1971, but 24% by 1983. It is predicted that in 1988, the last year of the REPELITA-IV, the urban population will account for 28% of Indonesia's total population.

Table-1.14 Trend of Population by Province

Province	Area (1000 km ²)	Population (million)		Average Annual Increase Rate (%)	Population Density (persons/km ²)	
		1983	1988		1983	1988
1 D.I. Aceh	55.4	2.8	3.2	2.7	51	58
2 Sumatera Utara	70.8	9.1	10.1	2.1	129	143
3 Sumatera Barat	49.8	3.6	4.0	2.1	71	80
4 Riau	94.6	2.4	2.7	2.4	25	29
5 Jambi	44.8	1.6	1.9	3.5	36	42
6 Sumatera Selatan	103.7	5.1	5.9	3.0	49	57
7 Bengkulu	21.2	0.9	1.1	4.1	43	52
8 Lampung	33.3	5.5	7.1	5.2	165	213
SUMATERA	473.6	31.0	36.0	3.0	66	76
9 D.K.I. Jakarta	0.6	7.3	8.8	3.8	12,167	14,667
10 Jawa Barat	46.3	29.7	33.4	2.4	641	721
11 Jawa Tengah	34.2	26.6	28.5	1.4	776	833
12 D.I. Yogyakarta	3.2	2.8	3.0	1.4	875	938
13 Jawa Timur	47.9	30.5	32.3	1.1	637	674
14 Bali	5.5	2.6	2.8	1.5	473	509
JAWA/BALI	137.7	99.5	108.8	1.8	723	790
15 Nusa Tenggara Barat	20.2	2.9	3.2	2.0	144	158
16 Nusa Tenggara Timur	47.9	2.8	3.1	2.1	59	65
17 Timor Timur	14.9	0.6	0.7	3.1	40	47
NUSA TENGGARA	83.0	6.3	7.0	2.1	76	84
18 Kalimantan Barat	146.8	2.7	2.9	1.4	18	20
19 Kalimantan Tengah	152.6	1.1	1.2	1.8	7	8
20 Kalimantan Selatan	37.7	2.2	2.4	1.8	58	64
21 Kalimantan Timur	202.4	1.4	1.9	6.3	7	9
KALIMANTAN	539.5	7.4	8.4	2.6	14	16
22 Sulawesi Utara	19.0	2.3	2.5	1.7	121	132
23 Sulawesi Tengah	69.7	1.4	1.7	4.0	20	24
24 Sulawesi Selatan	72.8	6.4	6.9	1.5	88	95
25 Sulawesi Tenggara	27.7	1.0	1.2	3.7	36	43
SULAWESI	189.2	11.1	12.3	2.1	59	65
26 Maluku	74.5	1.5	1.7	2.5	20	23
27 Irian Jaya	421.9	1.3	1.4	1.5	3	3
INDONESIA TOTAL	1,919.4	158.1	175.6	2.1	82	92

Source : REPELITA-IV

Table-1.15 Share of Population by Area

Unit : Million people

	1971	1980	1983	1988
Urban Areas	20.7 (17%)	32.8 (22%)	37.9 (24%)	48.4 (28%)
Village Areas	98.5 (83%)	113.9 (78%)	120.2 (76%)	127.2 (72%)
Total	119.2 (100%)	146.7 (100%)	158.1 (100%)	175.6 (100%)

Source : REPELITA-IV

1.07 GRDP BY PROVINCE

(28) The 1983 and 1985 gross regional domestic products* (GRDP), by province, are shown in Table-1.16. The provinces whose GRDP exceeded Rupiah 10 trillion in 1985 were Jawa Barat and Jawa Timur. The provinces which had GRDP of between Rupiah 8 and 10 trillion were D.K.I. Jakarta and Jawa Tengah. The provinces whose 1985 per capita GRDP exceeded Rupiah 1 million were Kalimantan Timur, Riau, D.I. Aceh and D.K.I. Jakarta. The provinces whose 1985 per capita GRDP had increased by more than 10% over the 1983 amounts were Kalimantan Timur, Bali, Jawa Barat, Jawa Tengah, Kalimantan Selatan, Lampung, and Jawa Timur.

(29) A point value for each province calculated according to the following formula, which taken into account per capita GRDP and GRDP per square kilometer.

$$\sqrt{\frac{\text{Per Capita GRDP}}{1,000} \times \frac{\text{GRDP/km}^2}{1,000,000}} = \text{Points}$$

According to the point value, each province is classified as either A, B, C, or D; these are defined as shown in Table-1.17. Table-1.18 shows the degree of economic development of each province.

Note * :

- (1) The amounts of GRDP are based on each province's GRDP Reports as received by the Central Bureau of Statistics (CBS) prior to the end of September, 1987. The reports from Jawa Timur, Timor Timur, Kalimantan Tengah and Irian Jaya had not yet arrived at the CBS. Therefore, the corresponding GRDP amount for 1983 were taken from "Provincial Income in Indonesia 1978 - 1983, Part II", published by the CBS. The amounts of GRDP in 1985 were calculated based on the amounts of GRDP in 1983, on the assumption that the percentage shares of these provinces' GRDPs did not change. As the GRDP of Timor Timur in 1983 was not listed in the CBS statistics, that province was omitted from tables related to the GRDP.
- (2) The amounts of GRDP in 1985 were based on the 1983 constant market prices.
- (3) The above notes apply to all GRDP tables in this subsection.

Table-1.16 Analysis of GRDP by Province (1)

Province	1983			1985 (1983 constant prices)			1985/1983	
	Population (1000)	GRDP (billion Rp)	Per Capita GRDP(1000Rp)	Population (1000)	GRDP (billion Rp)	Per Capita GRDP(1000Rp)	GRDP (%)	Per Capita GRDP (%)
1 D.I.Aceh	2,843	3,976.7	1,398.8	3,604	4,693.1	1,302.2	118.0	93.1
2 Sumatera Utara	9,016	3,329.8	369.3	9,518	3,713.3	390.1	111.5	105.6
3 Sumatera Barat	3,632	1,216.7	335.0	3,695	1,356.2	367.0	111.5	109.6
4 Riau	2,374	7,517.1	3,166.4	2,534	6,040.0	2,383.6	80.4	75.3
5 Jambi	1,628	432.8	265.8	1,741	481.5	276.6	111.3	104.0
6 Sumatera Selatan	5,100	3,095.6	607.0	5,453	3,631.4	665.9	117.3	109.7
7 Bengkulu	872	245.3	281.3	943	277.7	294.5	113.2	104.7
8 Lampung	5,465	1,038.8	190.1	6,033	1,265.7	209.8	121.8	110.4
SUMATERA	30,930	20,852.8	674.2	33,521	21,458.9	640.2	102.9	95.0
9 D.K.I.Jakarta	7,307	7,192.7	984.4	7,890	8,325.2	1,055.2	115.7	107.2
10 Jawa Barat	29,664	10,185.5	343.4	30,973	11,938.3	385.4	117.2	112.3
11 Jawa Tengah	26,611	7,279.1	273.5	27,145	8,326.3	306.7	114.4	112.1
12 D.I.Yogyakarta	2,839	763.4	268.9	2,990	821.4	274.7	107.6	102.2
13 Jawa Timur	30,473	10,347.7	339.6	31,281	11,710.8	374.4	113.2	110.2
14 Bali	2,594	901.2	347.4	2,659	1,064.8	400.5	118.2	115.3
JAWA/BALI	99,488	36,669.6	368.6	102,938	42,186.8	409.8	115.0	111.2
15 Nusa Tenggara Barat	2,918	516.2	176.9	3,071	582.0	189.5	112.7	107.1
16 Nusa Tenggara Timur	2,897	493.9	170.5	3,053	539.7	176.8	109.3	103.7
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	5,815	1,010.1	173.7	6,124	1,121.7	183.2	111.0	105.5
18 Kalimantan Barat	2,658	795.1	299.1	2,837	880.1	310.2	110.7	103.7
19 Kalimantan Tengah	1,055	483.6	458.4	1,149	546.5	475.6	113.0	103.8
20 Kalimantan Selatan	2,198	837.0	380.8	2,306	971.9	421.5	116.1	110.7
21 Kalimantan Timur	1,439	4,021.1	2,794.4	1,550	5,068.4	3,269.9	126.0	117.0
KALIMANTAN	7,350	6,136.8	834.9	7,842	7,466.9	952.2	121.7	114.0
22 Sulawesi Utara	2,262	671.6	296.9	2,394	704.5	294.3	104.9	99.1
23 Sulawesi Tengah	1,443	364.1	252.3	1,551	393.0	253.4	107.9	100.4
24 Sulawesi Selatan	6,376	1,749.6	274.4	6,651	1,946.9	292.7	111.3	106.7
25 Sulawesi Tenggara	1,031	294.3	285.5	1,092	338.0	309.5	114.8	108.4
SULAWESI	11,112	3,079.6	277.1	11,688	3,382.4	289.4	109.8	104.4
26 Maluku	1,534	441.0	287.5	1,646	502.3	305.2	113.9	106.2
27 Irian Jaya	1,269	892.4	703.2	1,368	1,014.9	741.9	113.7	105.5
MALUKU/IRIAN JAYA	2,803	1,333.4	475.7	3,014	1,517.2	503.4	113.8	105.8
INDONESIA TOTAL *	157,498	69,082.3	438.6	165,127	77,133.9	467.1	111.7	106.5

Note : Excludes Timor Timur

Table-1.17 Classification for Level of Development

Class	A	B	C	D
Point	Over 600	300 - 599	100 - 299	Under 99
Level of Development	Very high	High	Ordinary	Low

(30) In 1985, D.K.I.Jakarta was only one province belonging to class A. Provinces belonging to Class B were D.I. Aceh, Riau, Jawa Barat, and Jawa Timur. Provinces belonging to Class C were Sumatera Utara, Sumatera Barat, Sumatera Selatan, Jawa Tengah, D.I. Yogyakarta, Bali, Kalimantan Timur, and Sulawesi Utara. The remaining 13 provinces belonged to Class D. Provinces which had changed classes from 1983 were Sumatera Barat, (from D to C), and Jawa Barat and Jawa Timur (from C to B).

Table-1.18 Analysis of GRDP by Province (2)

Province	1983				1985 (1983 constant prices)			
	Per Capita GRDP(1000Rp) (A)	Per Km2 GRDP(mil.Rp) (B)	Point (A X B)	Level	Per Capita GRDP(1000Rp) (C)	Per Km2 GRDP(1000Rp) (D)	Point (C X D)	Level
1 D.I.Aceh	1,399	71.8	317	B	1,302	84.7	332	B
2 Sumatera Utara	369	47.0	132	C	390	52.5	143	C
3 Sumatera Barat	335	24.4	90	D	367	27.2	100	C
4 Riau	3,166	79.5	502	B	2,384	63.9	390	B
5 Jambi	266	9.6	51	D	277	10.7	54	D
6 Sumatera Selatan	607	29.9	135	C	666	35.0	153	C
7 Bengkulu	282	11.6	57	D	295	13.1	62	D
8 Lampung	190	31.2	77	D	210	38.0	89	D
SUMATERA	674	44.0	172	C	640	45.3	170	C
9 D.K.I.Jakarta	984	12,191.0	3,464	A	1,055	14,110.5	3,858	A
10 Jawa Barat	343	220.0	275	C	385	257.8	315	B
11 Jawa Tengah	274	212.8	241	C	307	243.4	273	C
12 D.I.Yogyakarta	269	240.9	255	C	275	259.2	267	C
13 Jawa Timur	340	215.9	271	C	374	244.5	302	B
14 Bali	347	162.1	237	C	401	191.5	277	C
JAWA/BALI	369	266.3	313	B	410	306.4	354	B
15 Nusa Tenggara Barat	177	25.6	67	D	190	28.8	74	D
16 Nusa Tenggara Timur	170	10.3	42	D	177	11.3	45	D
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	174	14.8	51	D	183	16.5	55	D
18 Kalimantan Barat	299	3.4	40	D	310	6.0	43	D
19 Kalimantan Tengah	458	3.2	38	D	476	3.6	41	D
20 Kalimantan Selatan	381	22.2	92	D	422	25.8	104	D
21 Kalimantan Timur	2,794	19.2	232	C	3,270	25.0	286	C
KALIMANTAN	835	11.4	98	D	952	13.8	115	C
22 Sulawesi Utara	297	35.3	102	C	294	37.0	104	C
23 Sulawesi Tengah	252	5.2	36	D	253	5.6	38	D
24 Sulawesi Selatan	275	24.0	81	D	293	26.8	89	D
25 Sulawesi Tenggara	286	10.6	55	D	310	12.2	61	D
SULAWESI	277	16.3	67	D	289	17.9	72	D
26 Maluku	288	5.9	41	D	305	6.7	45	D
27 Irian Jaya	703	2.1	38	D	742	2.4	42	D
MALUKU/IRIAN JAYA	476	2.7	36	D	504	3.1	40	D
INDONESIA TOTAL *	439	36.3	126	C	467	40.5	138	C

Note : Excludes Timor Timur

1.08 AGRICULTURAL DEVELOPMENT BY PROVINCE

(31) The agricultural sector includes agriculture, livestock farming, forestry, and fishery. The average annual growth rate of the agricultural sector over the period of REPELITA-IV is predicted to be 3%. One of the important targets for this sector is Indonesian self-support in rice; the production of rice is targeted to increase from 23.5 million tons in 1983 to 28.6 million tons in 1988, or a 22% increase over the the Plan Period.

(32) Table-1.19 shows the values of agricultural production, by province, for 1983 and 1985. In 1983, the country's total agricultural production was Rupiah 15.9 trillion. In 1985, it had increased to Rupiah 17.9 trillion (at 1983 constant prices), or a 12.3% increase over 1983. However, the share of agricultural production in the total GDP of Indonesia increased slightly from 23.1% in 1983 to 23.2% in 1985.

(33) Per capita production increased by 7.1% from 1983 to 1985. Kalimantan Timur, Lampung, Jawa Barat, Sumatera Barat, and Jawa Timur showed the highest production increases, in excess of 10%. Increases of between 0 and 10% were seen for Sumatera Barat, Riau, Bengkulu, Jawa Tengah, Bali, Nusa Tenggara Barat, Kalimantan Tengah, Kalimantan Selatan, Sulawesi Selatan, Maluku, and Irian Jaya. The other 10 provinces showed decreased production.

Table-1.19 Agriculture Sector Production by Province

Province	1983			1985 (1983 constant prices)			1985/1983	
	Agriculture Production (bil. Rp) (A)	(A)/GRDP (%) (B)	Per Capita Agr. Prn. (1000Rp) (C)	Agriculture Production (bil. Rp) (D)	(D)/GRDP (%) (E)	Per Capita Agr. Prn. (1000Rp) (F)	Agriculture Production (%) (D)/(A)	Per Capita Agr. Prn. (%) (F)/(C)
1 D.I. Aceh	655.1	16.4	230.4	627.6	13.4	174.3	95.8	75.7
2 Sumatera Utara	1,021.4	30.7	313.3	1,166.7	31.4	122.6	114.2	108.2
3 Sumatera Barat	390.3	32.1	107.5	445.8	32.9	120.5	114.2	112.1
4 Riau	278.0	3.7	117.1	303.6	5.0	120.0	109.2	102.5
5 Jambi	141.4	32.7	86.9	150.8	30.7	86.6	106.6	99.7
6 Sumatera Selatan	593.1	19.2	116.3	620.0	17.1	113.8	104.5	97.9
7 Bengkulu	123.4	50.3	141.5	133.3	48.0	141.9	108.0	100.3
8 Lampung	474.9	45.7	86.9	599.3	47.4	99.4	126.2	114.4
SUMATERA	3,677.6	17.6	118.9	4,047.1	18.9	120.7	110.0	101.5
9 D.K.I. Jakarta	121.1	1.7	16.6	124.8	1.5	15.8	103.1	95.2
10 Jawa Barat	2,225.3	21.8	75.0	2,620.2	21.9	84.6	117.7	112.8
11 Jawa Tengah	2,521.4	34.6	94.8	2,828.0	34.0	104.2	112.2	109.9
12 D.I. Yogyakarta	238.4	31.2	84.0	232.9	28.4	77.9	97.7	92.7
13 Jawa Timur	3,491.7	53.7	114.6	3,949.6	33.7	126.3	113.1	110.2
14 Bali	390.3	43.3	150.5	423.4	39.8	159.2	108.5	105.8
JAWA/BALI	8,988.2	24.5	90.3	10,178.9	24.1	98.8	113.2	109.4
15 Nusa Tenggara Barat	271.7	52.6	93.1	302.4	52.0	98.5	111.3	105.8
16 Nusa Tenggara Timur	282.6	57.2	97.6	296.0	54.8	97.0	104.7	99.4
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	554.3	54.8	95.3	598.4	53.3	97.7	108.0	102.5
18 Kalimantan Barat	293.7	36.9	110.5	304.1	34.6	107.1	103.5	96.9
19 Kalimantan Tengah	162.9	33.7	154.4	184.1	33.7	160.1	113.0	103.7
20 Kalimantan Selatan	268.7	32.1	122.3	304.6	31.3	132.4	113.4	108.3
21 Kalimantan Timur	306.6	7.6	213.1	447.6	8.8	288.8	146.0	135.5
KALIMANTAN	1,031.9	16.8	140.4	1,240.4	16.6	158.2	120.2	112.7
22 Sulawesi Utara	240.9	35.9	106.5	234.2	33.2	97.6	97.2	91.6
23 Sulawesi Tengah	154.2	42.3	106.9	157.5	40.0	101.6	102.1	95.0
24 Sulawesi Selatan	777.1	44.4	121.9	870.2	44.7	130.9	112.0	107.4
25 Sulawesi Tenggara	138.8	47.2	134.6	145.6	43.1	133.6	104.9	99.3
SULAWESI	1,311.0	42.6	118.0	1,407.5	41.6	120.4	107.4	102.0
26 Maluku	189.1	42.9	123.3	211.3	42.1	128.8	111.7	104.5
27 Irian Jaya	193.2	21.7	152.3	219.7	21.7	160.4	113.7	105.3
MALUKU/IRIAN JAYA	382.3	28.7	136.4	431.0	28.4	143.0	111.7	104.8
INDONESIA TOTAL *	15,945.3	23.1	101.2	17,903.3	23.2	108.4	112.3	107.1

Note : Excludes Timor Timur

1.09 INDUSTRIAL DEVELOPMENT BY PROVINCE

(34) Development of the manufacturing industry is one of the main targets of Indonesian economic development. Until recently, the Indonesian economy was based on the primary products of the agricultural and mining sectors. A basic Governmental policy has been to change this one-sided economy into a modern and industrialized economy. Reflecting this policy, the average annual growth rate of the manufacturing sector, during REPELITA-IV, is targeted at 9.5%, which is far above the targeted annual growth rate of GDP.

(35) The values of 1983 and 1985 manufacturing industry production, by province, are shown in Table-1.20. Provinces whose 1985 production exceeded Rupiah one trillion were Jawa Barat, Jawa Timur, D.K.I. Jakarta, and Jawa Tengah. Provinces whose production was between Rupiah 500 billion and Rupiah one trillion were Sumatera Selatan and Sumatera Utara.

(36) Kalimantan Timur, D.K.I. Jakarta, Sumatera Selatan, and Riau had 1985 per capita production exceeding Rupiah 100 thousand. Jawa Barat, Kalimantan Selatan, Sumatera Utara, Jawa Timur, and Kalimantan Barat had per capita production of between Rupiah 50 thousand and Rupiah 100 thousand.

(37) Provinces which, in 1985, had greater than 15% share of overall manufacturing production were Sumatera Selatan, D.K.I. Jakarta, Jawa Barat, Kalimantan Barat, Sumatera Utara, and Jawa Timur. Provinces with shares between 10% and 15% were Kalimantan Selatan, Sumatera Barat, Jawa Tengah and Jambi.

Table-1.20 Manufacturing Sector Production by Province

Province	1983			1985 (1983 constant prices)			1985/1983	1985/1983
	M. Industries Production (bil. Rp) (A)	(A)/GRDP (%) (B)	Per Capita M. I. Prn. (1000 Rp) (C)	M. Industries Production (bil. Rp) (D)	(D)/GRDP (%) (E)	Per Capita M. I. Prn. (1000 Rp) (F)	M. Industries Production (%) (D)/(A)	Per Capita M. I. Prn. (%) (F)/(C)
1 D.I. Aceh	59.1	1.5	20.8	78.6	1.7	21.8	133.0	104.8
2 Sumatera Utara	466.2	14.0	51.7	557.2	15.0	58.5	119.5	113.2
3 Sumatera Barat	156.0	12.8	43.0	174.4	12.9	47.1	111.8	109.5
4 Riau	211.9	2.8	89.2	260.2	4.3	102.8	122.8	135.2
5 Jambi	40.7	9.4	25.0	52.5	10.9	30.1	129.0	120.4
6 Sumatera Selatan	705.1	22.8	138.3	763.6	21.0	140.1	108.3	101.3
7 Bengkulu	3.1	1.3	3.5	3.9	1.4	4.1	125.8	117.1
8 Lampung	80.3	7.7	14.7	107.2	8.5	17.8	133.5	121.1
SUMATERA	1,722.4	7.5	50.6	1,997.6	9.3	59.6	116.0	117.8
9 D.K.I. Jakarta	1,336.1	18.6	182.9	1,638.7	19.7	207.7	122.6	113.6
10 Jawa Barat	1,498.1	14.6	50.3	2,146.3	18.0	69.3	144.0	137.8
11 Jawa Tengah	501.3	11.0	30.4	1,056.4	12.7	38.9	131.8	129.2
12 D.I. Yogyakarta	66.4	8.7	23.1	69.6	8.5	23.3	104.8	99.6
13 Jawa Timur	1,550.7	15.0	50.9	1,758.6	15.0	56.2	113.4	110.4
14 Bali	39.0	4.3	15.0	48.9	4.6	18.4	125.4	122.7
JAWA/BALI	5,253.6	14.4	53.1	6,718.5	15.9	65.3	127.2	123.0
15 Nusa Tenggara Barat	11.9	2.3	4.1	13.5	2.3	4.4	113.4	107.3
16 Nusa Tenggara Timur	14.4	2.9	5.0	17.6	3.3	5.8	122.2	116.0
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	26.3	2.6	4.5	31.1	2.8	5.1	118.3	113.3
18 Kalimantan Barat	116.4	14.6	43.8	144.1	16.4	50.7	123.8	115.8
19 Kalimantan Tengah	48.1	9.9	45.6	54.4	9.9	47.3	113.1	103.7
20 Kalimantan Selatan	106.9	12.8	46.6	139.6	14.4	60.7	130.6	124.9
21 Kalimantan Timur	161.0	4.0	111.9	451.1	8.9	291.1	280.2	260.1
KALIMANTAN	432.4	7.0	58.8	789.2	10.6	100.7	182.5	171.3
22 Sulawesi Utara	36.3	5.4	16.0	40.1	5.7	16.7	110.5	104.4
23 Sulawesi Tengah	21.2	5.8	14.7	24.8	6.3	16.0	117.0	108.8
24 Sulawesi Selatan	75.2	4.3	11.8	77.6	4.0	11.7	103.2	99.2
25 Sulawesi Tenggara	2.4	0.8	2.3	3.0	0.9	2.8	125.0	121.7
SULAWESI	135.1	4.4	12.1	145.5	4.3	12.4	107.7	102.5
26 Maluku	22.4	5.1	14.6	30.5	6.1	18.6	136.2	127.4
27 Irian Jaya	7.5	0.9	6.1	8.8	0.9	6.4	112.8	104.9
MALUKU/IRIAN JAYA	29.9	2.3	10.8	39.3	2.6	13.1	130.1	121.3
INDONESIA TOTAL *	7,630.0	10.8	47.5	9,721.2	12.6	58.9	127.4	124.0

Note : Excludes Timor Timur

(38) As shown in Table-1.20, the manufacturing industry production in 1985 had increased over that of 1983 in all provinces. Per capita production also increased in all provinces, with the exception of D.I. Yogyakarta and Sulawesi Selatan. Provinces whose per capita production increased by more than 20% since 1983 were Kalimantan Timur, Jawa Barat, Jawa Tengah, Maluku, Sulawesi Tenggara, Kalimantan Selatan, Bali, Lampung, and Jambi. These figures suggest that the development of the manufacturing sector is proceeding with particular speed in the Jawa, Sumatera and Kalimantan areas.

1.10 MINING DEVELOPMENT BY PROVINCE

(39) The mining and quarrying sector is one of the most important Indonesia's industries. The main products of this sector are petroleum and natural gas, but coal, tin, copper, bauxite, gold, silver, kaolin, and other products are also produced. In 1983, the value of exported oil and gas was US\$16.2 billion, which accounted for 76.4% of the total value (US\$21.2 billion) of Indonesian exports. In 1985, the value of oil and gas exports had dropped to US\$12.7 billion, and its share was 68.7% of the total exports (US\$18.5 billion). Although reduced, this share is still extremely high, and oil and gas products remain as a central pillar of the Indonesian economy. Coal, mainly produced in Sumatera and Kalimantan, is also an important mining product. The average annual growth rate of the mining sector over the period of REPELITA-IV is predicted to be 2.4%.

(40) The 1985 value of mining production, by province, is shown in Table-1.21. The table shows that Riau, D.I. Aceh, Kalimantan Timur, and Jawa Barat had mining production valued above Rupiah one trillion (1983 prices); Sumatera Selatan and Irian Jaya had production between Rupiah 500 billion and Rupiah one trillion. For all other provinces (with the exception of Sumatera Utara, which had mining production of Rupiah 174 billion), the value of mining production was below Rupiah 100 billion.

(41) Considering share of the mining production in the total GRDP of each province, D.I. Aceh, Riau, Kalimantan Timur, and Irian Jaya had shares in excess of 50%, indicating that the mining industry, particularly oil and gas production, is the major industry of these provinces.

Table-1.21 Mining and Quarrying Sector Production by Province

Province	1983		1985 (1983 constant prices)		1985/1983	1985-1983
	Production (bil. Rp)	Share of GRDP (%)	Production (bil. Rp)	Share of GRDP (%)	Production (%)	Share of GRDP (%)
1 D.I.Aceh	2,736.3	68.8	3,396.0	72.4	124.1	+3.6
2 Sumatera Utara	187.8	5.6	174.1	4.7	92.7	-0.9
3 Sumatera Barat	10.4	0.9	16.8	1.2	161.5	+0.3
4 Riau	6,418.2	85.4	4,774.9	79.1	74.4	-6.3
5 Jambi	58.5	13.5	67.0	13.9	114.5	+0.4
6 Sumatera Selatan	646.4	20.9	930.3	25.6	143.9	+4.7
7 Bengkulu	1.7	0.7	2.2	0.8	129.4	+0.1
8 Lampung	2.9	0.3	3.2	0.3	110.3	0
SUMATERA	10,062.2	48.3	9,364.5	43.6	93.1	-4.7
9 D.K.I.Jakarta	0	0	0	0	0	0
10 Jawa Barat	1,733.4	17.0	1,375.3	11.5	79.3	-5.5
11 Jawa Tengah	31.3	0.4	41.2	0.5	131.6	+0.1
12 D.I.Yogyakarta	4.0	0.5	5.5	0.7	137.5	+0.2
13 Jawa Timur	21.1	0.2	23.4	0.2	110.9	0
14 Bali	5.9	0.7	4.2	0.4	71.2	-0.3
JAWA/BALI	1,795.7	4.9	1,449.6	3.4	80.7	-1.5
15 Nusa Tenggara Barat	8.7	1.7	10.5	2.0	120.7	+0.3
16 Nusa Tenggara Timur	2.0	0.4	2.8	0.5	140.0	+0.1
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	10.7	1.1	13.3	1.3	124.3	+0.2
18 Kalimantan Barat	3.8	0.5	2.8	0.3	73.7	-0.2
19 Kalimantan Tengah	2.6	0.5	3.0	0.5	115.4	0
20 Kalimantan Selatan	4.8	0.6	5.2	0.5	108.3	-0.1
21 Kalimantan Timur	2,855.5	71.0	3,350.6	66.1	117.3	-4.9
KALIMANTAN	2,866.7	46.7	3,361.6	45.0	117.3	-1.7
22 Sulawesi Utara	2.8	0.4	3.2	0.5	114.3	+0.1
23 Sulawesi Tengah	8.2	2.2	10.6	2.7	129.3	+0.5
24 Sulawesi Selatan	12.6	0.7	16.1	0.8	127.8	+0.1
25 Sulawesi Tenggara	29.2	9.9	27.3	8.1	93.5	-1.8
SULAWESI	52.8	1.7	57.2	1.7	108.3	0
26 Maluku	15.6	3.5	18.7	3.7	119.9	+0.2
27 Irian Jaya	481.3	53.9	547.3	53.9	113.7	0
MALUKU/IRIAN JAYA	496.9	37.3	566.0	37.3	113.9	0
INDONESIA TOTAL *	15,285.0	22.1	14,812.2	19.2	96.9	-2.9

Note : Excludes Timor Timur

1.11 TOURISM DEVELOPMENT BY PROVINCE

(42) The Government of Indonesia has been promoting development of the tourist industry as a means of increasing its foreign exchange. The development of the tourism also serves to increase local employment opportunities. About 50 million foreign visitors came to the ASEAN countries between 1979 to 1984, the distribution of the countries they visited is shown in Table-1.22. Indonesia has so far attracted fewer foreign visitors than the other ASEAN countries.

Table-1.22 Share of Foreign Visitors in ASEAN Countries

Country	Share (1979-1984)
Singapore	39.1%
Thailand	26.6%
Malaysia	12.8%
Philippines	13.0%
Indonesia	8.5%

(43) The number of foreign visitors to Indonesia in 1983 was 637,614. The average annual growth rate in the number of foreign visitors to Indonesia is predicted to be 14% over the REPELITA IV period. The number of foreign visitors in 1988 is therefore expected to be about 1.2 million.

(44) The number of hotel rooms is a basic index of the capacity of tourist industry. The number of hotel rooms in each province, in 1983 and in 1985, are shown in Table-1.23. In 1983, the total number of rooms in Indonesia was 85,429; this had increased to 94,716 by 1985. In terms of the number of rooms per 10,000 dwellers of each province (in 1985), Bali, Kalimantan Tengah, Kalimantan Timur, D.K.I. Jakarta, and D.I. Yogyakarta had more than 10 rooms, indicating that tourism facilities were developing faster in these 5 provinces than the others.

Table-1.23 Hotel Rooms by Province

Province	1983		1985		1985/1983	
	No. of Hotel Rooms (A)	Hotel Rooms per 10,000 Population (B)	No. of Hotel Rooms (C)	Hotel Rooms per 10,000 Population (D)	(C)/(A) (%)	(D)/(B) (%)
1 D.I.Aceh	1,963	6.90	2,259	6.27	115.1	90.9
2 Sumatera Utara	7,458	8.27	8,432	8.86	113.1	107.1
3 Sumatera Barat	1,871	5.15	2,091	5.66	111.8	109.9
4 Riau	1,722	7.25	2,206	8.71	128.1	120.1
5 Jambi	1,202	7.39	1,415	8.13	117.7	110.0
6 Sumatera Selatan	2,477	4.86	2,735	5.02	110.4	103.3
7 Bengkulu	721	8.27	882	9.35	122.3	113.1
8 Lampung	1,070	1.96	1,224	2.03	114.4	103.6
SUMATERA	18,484	5.98	21,244	6.45	114.9	107.9
9 D.K.I.Jakarta	10,366	14.19	11,085	14.05	106.9	99.0
10 Jawa Barat	11,000	3.71	11,797	3.81	107.2	102.7
11 Jawa Tengah	9,259	3.48	9,914	3.65	107.1	104.9
12 D.I.Yogyakarta	3,279	11.55	3,835	12.83	117.0	111.1
13 Jawa Timur	9,565	3.14	11,296	3.61	118.1	115.0
14 Bali	8,936	34.45	9,366	35.22	104.8	102.2
JAWA/BALI	52,405	5.27	57,293	5.57	109.3	105.7
15 Nusa Tenggara Barat	854	2.93	1,197	3.90	140.2	133.1
16 Nusa Tenggara Timur	865	2.99	1,100	3.60	127.2	120.4
17 Timor Timur	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NUSA TENGGARA	1,719	2.96	2,297	3.75	133.6	126.7
18 Kalimantan Barat	844	3.18	972	3.43	115.2	107.9
19 Kalimantan Tengah	1,967	18.64	2,203	19.17	112.0	102.8
20 Kalimantan Selatan	1,142	5.20	1,270	5.51	111.2	106.0
21 Kalimantan Timur	2,708	18.82	2,715	17.52	100.3	93.1
KALIMANTAN	6,661	9.06	7,160	9.13	107.5	100.8
22 Sulawesi Utara	781	3.45	858	3.58	109.9	103.8
23 Sulawesi Tengah	762	5.28	939	6.05	123.2	114.6
24 Sulawesi Selatan	3,130	4.91	3,184	4.79	101.7	97.6
25 Sulawesi Tenggara	370	3.59	427	3.91	115.4	108.9
SULAWESI	5,043	4.54	5,408	4.63	107.2	102.0
26 Maluku	657	4.28	782	4.75	119.0	111.0
27 Irian Jaya	460	3.62	532	3.89	115.7	107.5
MALUKU/IRIAN JAYA	1,117	3.99	1,314	4.36	117.6	109.3
INDONESIA TOTAL *	85,429	5.42	94,716	5.76	110.9	106.3

Note : Excludes Timor Timur

SECTION 2

AIR TRANSPORTATION

SECTION 2
AIR TRANSPORTATION

2.01 GENERAL

(01) The civil air transportation covers domestic and international air routes, including the scheduled flight, the non-scheduled flight, the general aviation flight, Haji flight and transmigration flight.

(02) The scheduled airlines are composed of the governments owned state companies and the private companies as listed below and the air route networks of the scheduled airlines are illustrated in Figure-2.1.

- Government Owned State Companies

PT. Garuda Indonesia

PT. Merpati Nusantara Airlines

- Private Companies

PT. Bouraq Indonesia Airlines

PT. Mandala Airlines

The non-scheduled airlines come to twenty (20) companies which are mostly air charter operator. Whereas, the general aviation companies registered amount to forty-four (44) companies as of 1987. Name of each airlines including the scheduled, the non-scheduled and the general aviatiions is presented in Table-2.1

(03) Air Transport Statistics for 1985 shows that the domestic passengers carried by the Government airlines come up to 4.6 millions and those transported by the private airlines correspond to 0.8 millions approximately in 1985. The international air passengers carried by Garuda Airways are recorded at about 0.9 millions in the same year. The passenger movement remains almost same level in the recent 4 years as is clear in Table-2.2.

(04) The domestic air freights are counted at about 49.0

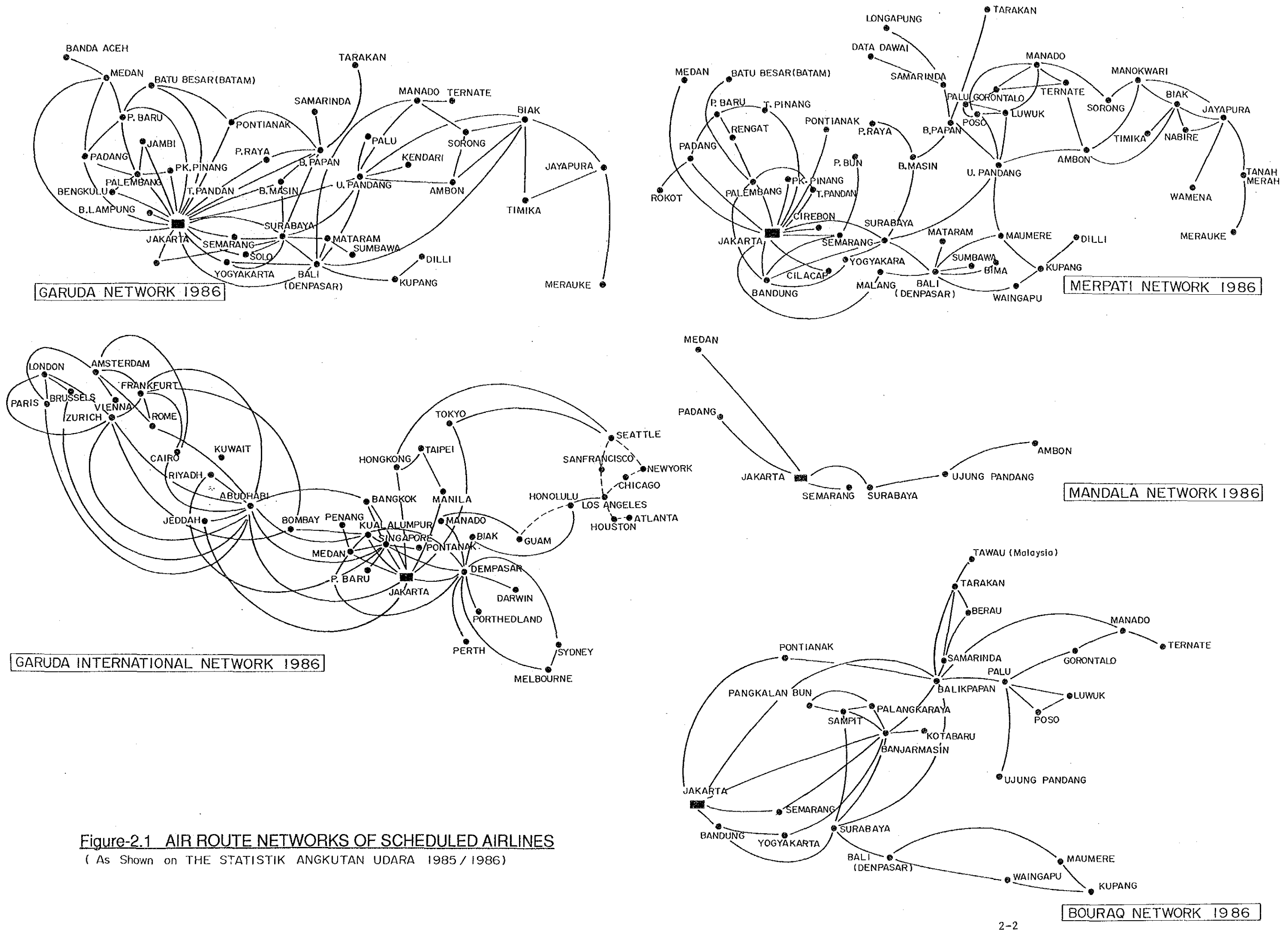


Figure-2.1 AIR ROUTE NETWORKS OF SCHEDULED AIRLINES
 (As Shown on THE STATISTIK ANGKUTAN UDARA 1985 / 1986)

Table-2.1(1) Airlines and Their Aircraft

1. Scheduled Airlines

No.	Airlines	Fleet	Note
1	PT. GARUDA INDONESIA	Boeing 747	6 *1
		Douglas DC-10	6
		Douglas DC-9	19
		Airbus A-300	9
		Fokker F-28-3000	6
		Fokker F-28-4000	28
		(Total)	74
2	PT. MERPATI NUSANTARA AIRLINES	Vickers Viscount VC-8	2 *1
		Fokker F-27-200/400	9
		Fokker F-27-500	6
		Hawker Siddeley HS-748	2
		Twin Otter DHC-6	17
		Casa CN-212 18 seats	15
		Casa CN-212 26 seats	6
		Lockeed Hercules L-100-1	2
(Total)	59		
3	PT. BOURAQ INDONESIA AIRLINES	Hawker Siddeley HS-748	16 *2
		Vickers Viscount VC-8	4
(Total)	20		
4	PT. MANDALA AIRLINES	Lockheed Electra L-188	5 *2
		Vickers Viscount VC-8	3
(Total)	8		
TOTAL			161

Source : *1 Based on hearings from airline officials

*2 INACA's Member List

*3 DAFTAR NAMA-NAMA PERUSAHAAN PENERBANGAN DALAM NEGERI YANG BEROPERASI DI INDONESIA

Table-2.1(2) Airlines and Their Aircraft

2. Non-Scheduled Airlines (1)

No.	Airlines	Fleet	Note
1	PT. AIRFAST INDONESIA	Hawker Siddeley HS-748	3 *2
		Fokker F-27	1
		Piper PA-23	1
		Beech Queen Air B-80	1
		Douglas DC-3	1
		Sikorsky S-58	7
		Bell 204B	4
		Bell 206B	2
	Alouette III	1	
	(Total)	21	
2	PT. ASAHI-TRANSNA HELICOPTERS	Bell 206	6 *2
		Bell 212	2
	(Total)	8	
3	PT. BAYU INDONESIA AIR	Douglas DC-4	2 *2
		Canadair CL-44	3
	(Total)	5	
4	PT. BRISTOW-MASAYU HELICOPTERS	Bell 206B	2 *2
		Bell 205A	4
		Bell 212	4
	(Total)	10	
5	PT. BALI INTERNATIONAL AIR SERVICE	BN-2A Islander	3 *2
		BN-2A Trislander	3
		Cessna 404 Titan	1
		Hawker Siddeley HS-748-2	1
	(Total)	8	
6	PT. DERAYA	Cessna 150/152	7 *2
		Cessna 172	2
		Cessna 402	2
		Cessna 320	1
		Casa CN-212-100	3
		Short Skyvan	2
		Hawker Siddeley HS-125-3	1
		Piper PA-23	1
		Piper PA-31	1
		Bell 206	1
		Wilga Stol A/C	1
	(Total)	22	

/conti..

Source : *1 Based on hearings from airline officials
*2 INACA's Member List
*3 DAFTAR NAMA-NAMA PERUSAHAAN PENERBANGAN DALAM NEGERI YANG BEROPERASI DI INDONESIA

Table-2.1(3) Airlines and Their Aircraft

2. Non-Scheduled Airlines (2)

No.	Airlines	Fleet	Note
7	PT. DERAZONA HELICOPTERS	Alouette II	2 *2
		Bell 206	8
		(Total)	10
8	PT. DIRGANTARA AIR SERVICE	BN-2A Islander	9 *2
		Fokker F-27	1
		Douglas DC-3/C-47	3
		Casa CN-212	3
		Bell 206A	1
		Bell 212	1
(Total)	18		
9	PT. EAST INDONESIA (ESTINDO)	Short Skyvan III	1 *2
		Short Skyliner III	1
		(Total)	2
10	PT. GATARI HUTAMA AIR SERVICE	Bell 412	8 *2
		Bell 212	8
		Bell 206	2
		(Total)	18
11	PT. INDONESIA AIR TRANSPORT	SA-365 Douphin	2 *2
		Piper PA-23-250	1
		Piper PA-31	4
		Beech 200 King Air	2
		BN-2A Islander	1
		Falcon 20F	1
		Alouette II	1
		Alouette III	4
(Total)	16		
12	PT. INDONESIA AVIATION CORPORATION	Beechcraft H-18S	4 *2
		BN-2A Islander	1
		Dornier Skyservant	2
(Total)	7		
13	JAKARTA AIRCRAFT ENGINEERING AND MAINTENANCE CORPORATION (JAEMCO)	Piper PA-38-112	3 *1
		Piper PA-25-250	1
		Douglas DC-3/C-47	3
		Cessna 172	1
		Golden Eagle	1
(Total)	9		

/conti..

Source : *1 Based on hearings from airline officials

*2 INACA's Member List

*3 DAFTAR NAMA-NAMA PERUSAHAAN PENERBANGAN DALAM NEGERI YANG BEROPERASI DI INDONESIA

Table-2.1(4) Airlines and Their Aircraft

2. Non-Scheduled Airlines (3)

No.	Airlines	Fleet	Note
14	PT. NATIONAL AIR CHARTER	Cessna 402A	1 *3
		Piper Aztec D	1
		Lockheed L-100-30	1
		(Total)	3
15	PT. NATIONAL UTILITY HELICOPTERS	Bell 205	6 *2
		(Total)	6
16	PT. SEMPATI AIR TRANSPORT	Fokker F-27-200/400	6 *2
		(Total)	6
17	PT. SAFARI AIR	Cessna 206	1 *2
		Piper PA-32-300	1
		Piper PA-34-200	2
		(Total)	4
18	PT. SAATAS-INDONESIA	Beech Queen Air 65	3 *2
		Grumman Goose G-21A	2
		(Total)	5
19	PT. SABANG MERAUKE AIR CHARTER	BN-2A-21 Islander	3 *2
		Piper PA-31	3
		Casa CN-212-100	3
		Piper PA-23	1
		(Total)	10
20	PT. TRANS NUSANTARA AIRWAYS	Douglas DC-3/C-47	1 *2
		Fokker F-27	4
		(Total)	5
TOTAL			193

Source : *1 Based on hearings from airline officials

*2 INACA's Member List

*3 DAFTAR NAMA-NAMA PERUSAHAAN PENERBANGAN DALAM NEGERI YANG BEROPERASI DI INDONESIA

Table-2.1(5) Airlines and Their Aircraft

3. General Aviation

No.	Company Name
1	AERO CLUB INDONESIA JAKARTA
2	ADVENTIST AVIATION INDONESIA
3	ASOCIATED MISSION AVIATION
4	PT. ASTRA INTERNATIONAL INC.
5	BAKOSURTANAL/AERO KARTO
6	PT. CALTEX PACIFIC INDONESIA
7	PT. CONDONG GARUT
8	DELI AERO CLUB MEDAN
9	DEPARTEMEN TRANSMIGRASI
10	DITJEN. BEA & CUKAI
11	DITJEN. IMIGRASI
12	DITJEN. PERHUBUNGAN UDARA
13	PT. DJAJANTI GROUP
14	PT. GEORGE PACIFIC INDONESIA
15	PT. GUDANG GARAM
16	PT. GUNUNG MADU PLANTATION
17	PT. INDUSTRI PESAWAT TERBANG NUSANTARA (I.P.T.N.)
18	PT. INTERNATIONAL NICKEL INDONESIA
19	JAKARTA FLYING CLUB
20	PT. JUANDA JAEMCO FLYING SCHOOL
21	PT. KAYAN RIVER INDAH PLYWOOD
22	PT. KAYAN RIVER TIMBER PRODUCTS
23	LEMBAGA PENERBANGAN DAN ANTARIKSA NASIONAL
24	MAY. JEND. SOLICHIN G. P.
25	MEDAN AERO CLUB
26	MINANG AERO CLUB
27	MISSION AVIATION FELLOWSHIP
28	PT. NUGRA SANTANA
29	PT. PELITA AIR SERVICE
30	PT. PENAS SURVEY UDARA
31	PT. PERKEBUNAN IX
32	PORTELA JAYA
33	PT. PP. BERDIKARI
34	PT. PERKEBUNAN II
35	PT. PERKEBUNAN IV
36	PULAU SERIBU AERO & AQUATIC CLUB
37	PUSAT PENDIDIKAN DAN LATIHAN PERHUBUNGAN UDARA/P.L.P.
38	REGIONS BEYOND MISSION UNION (R.B.M.U.)
39	PT. RIMBA JAYA RAYA
40	PT. SAC - NUSANTARA
41	PT. SOCFIN INDONESIA
42	UNCEN - SIL PROJECT
43	YAYASAN BETHEL
44	YAYASAN MISSI SUKU-SUKU TERPENCIL (Y.M.S.T.)

Source : DAFTAR NAMA-NAMA PERUSAHAAN PENERBANGAN DALAM NEGERI YANG BEROPERASI DI INDONESIA

thousands tons for the Government airlines and 4.8 thousands tons for the private airlines. The international air freights are recorded at 24.6 thousands tons. This means that the total air freight carried in 1985 amounts to 78.4 thousands tons. The historical trend of the cargo movement does not show any significant fluctuation.

(05) The civil aviations in Indonesia have been under the administration of the Ministry of Transport, Communications and Tourism. As shown in Figure-2.2, the Ministry covers, in addition to General Secretariat and General Inspectorate,

- Directorate General of Air Communications
- Directorate General of Sea Communications
- Directorate General of Land Communications
- Communication Research & Development Board
- Communication Educational & Training Board

Within this organization, the Directorate General of Air Communications (DGAC) are directly in charge of the operation of the civil aviations. DGAC is composed of the Air Transportation Directorate, Air Safety Directorate, Airports Directorate and Telecom and Nav-Aids Directorate. And each Directorate has the four or five sub-divisions as shown in Figure-2.3.

(06) On the other hand, the Agency for the Assessment and Application of Technology (Badan Pengkajian dan Penerapan Teknologi - BPPT) has been controlling the development of the aircrafts. The agency or BPPT, has the functions directly under and responsible to the President as prescribed

Table - 2.2 (A) Government Airlines Traffic
(Domestic Scheduled Flights)

DESCRIPTION	UNIT	1983	1984	1985
Aircraft - Km	000	71,576	73,722	74,100
Aircraft Departure		130,320	134,557	133,145
Hours Flown	number	178,664	181,917	185,191
Pax. Carried	number	4,513,571	4,585,006	4,581,254
Pax. - Km	000	3,939,178	3,405,471	3,363,573
Seat - Km	000	6,575,094	6,866,746	7,049,610
Pax Load Factor	%	51.6	49.5	47.7
Freight	ton	44,124	43,566	49,092
Ton - Km	000	319,531	316,306	319,454
a. Pax. Baggage	000	273,237	270,433	269,063
b. Freight	000	40,939	40,699	44,647
c. Mail	000	5,355	5,174	5,771
Avail. Ton-Km	000	701,106	732,554	746,359
Weight Load Factor	%	45.6	43.2	42.8

Table - 2.2 (B) Private Airlines Traffic
(Domestic Flight)

DESCRIPTION	UNIT	1983	1984	1985
Aircraft - Km	000	14,674	19,155	21,691
Aircraft Departure	number	29,833	36,784	34,308
Hours Flown	number	41,261	53,360	52,756
Pax. Carried	number	644,270	1,162,917	782,540
Pax. - Km	000	552,094	715,030	657,655
Seat - Km	000	789,948	1,090,522	984,830
Pax Load Factor	%	69.9	65.5	66.7
Freight	ton	5,174	5,521	4,782
Ton - Km	000	49,004	62,836	54,062
a. Pax. Baggage	000	42,399	56,824	48,933
b. Freight	000	5,693	4,986	4,368
c. Mail	000	912	1,026	761
Avail. Ton-Km	000	74,114	95,818	97,966
Weight Load Factor	%	66.1	65.5	55.1

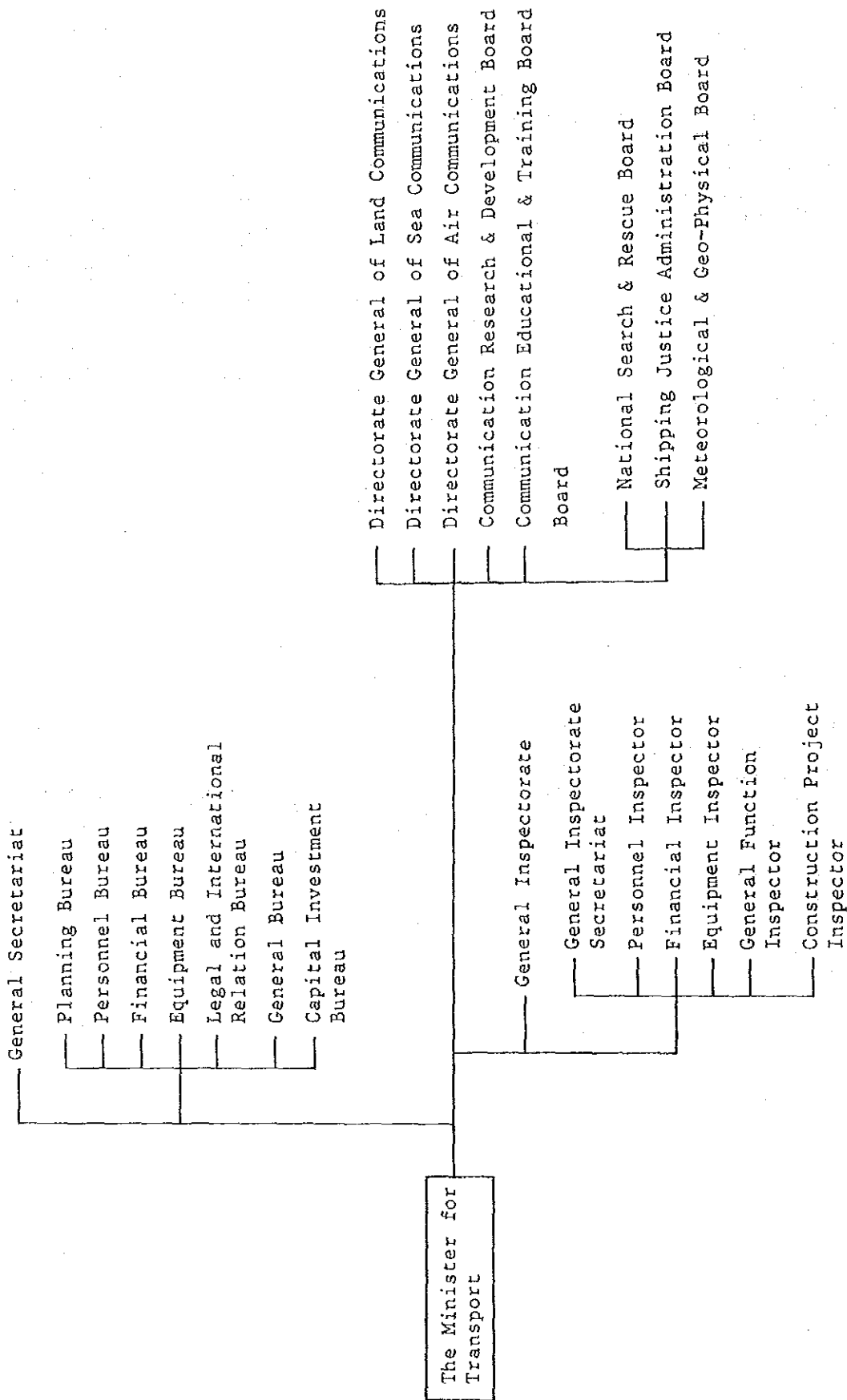


Figure-2.2 ORGANIZATION OF THE MINISTRY OF TRANSPORT

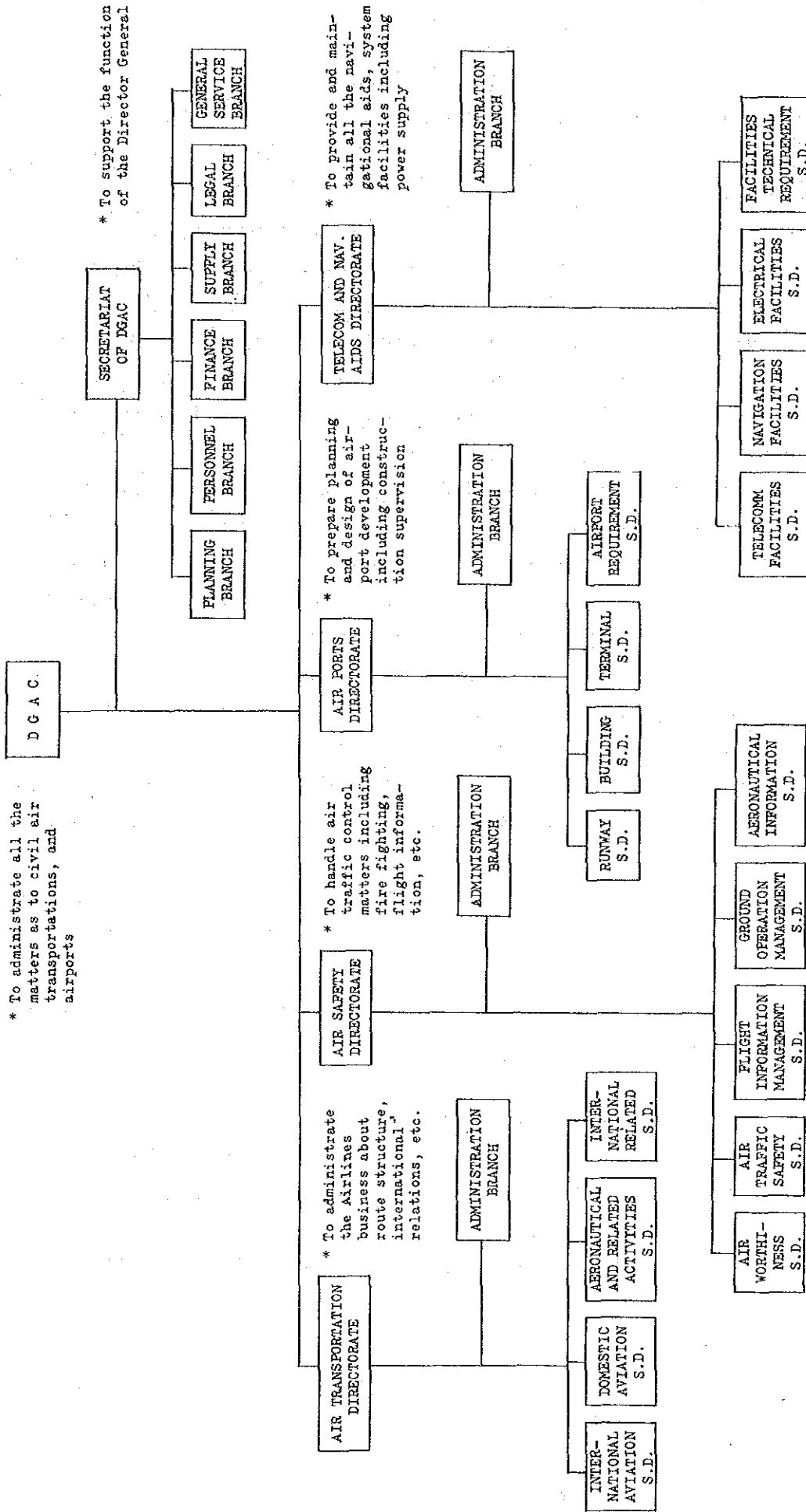


Figure-2.3 ORGANIZATION OF DIRECTORATE GENERAL OF AIR COMMUNICATION
(REGIONAL BRANCHES: Medan, Padang, Ujungpandang, Jayapura, Surabaya)

in the presidential Decree as follows.

- To control and evaluate the execution of programmes and application of technology and foster technology transfer;
- To encourage cooperation between government and private organizations at home and abroad in the assessment and application of technology;
- To develop and foster basic and applied sciences relevant to the applications of technology, and to coordinate programmes for their successful applications in technology and industry;
- To assess, apply and further develop technology for increasing the quality of life and human settlement, industrial processes, energy conversion and conservation, electronics and informations; and to develop laboratories and physical facilities;
- To assess and apply technology in industry; and in the utilization of natural resources for development;
- To assess, develop and apply operation research, management, system analysis and technology regulation methods as well as to develop simulations and models for national development;
- To develop the capabilities and skills of scientific personnel and to develop and manage facilities required for the functions of BPPT.

To this end, BPPT was established and has the organization as presented in Figure-2.4.

(07) In connection with the aircraft industry, there is a private manufacturing company, named as the Indonesian Aircraft Industries (IPTN). The company presently has been developing and manufacturing the turboprop aircraft of CN-212 and CN-235, and the helicopters of BO-105, BELL-412 and SA-332.

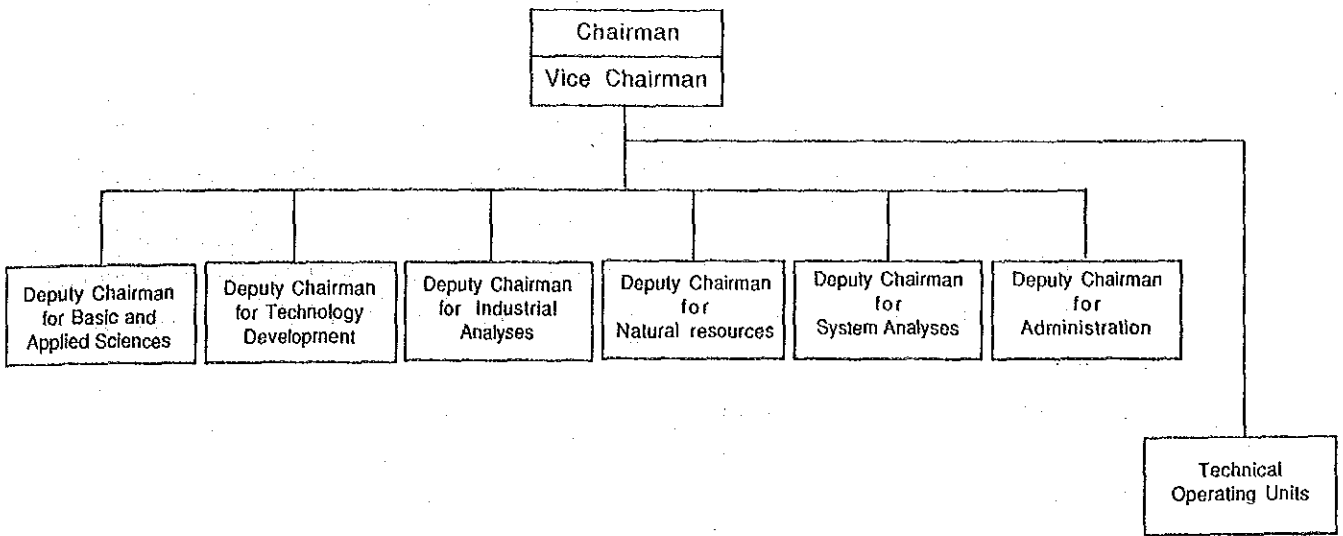


Figure-2.4 Organization Chart , BPP. Technologi

2.02 AIRPORTS

(08) There are more than 600 airports in Indonesia including the simple airstrips for the pioneer flight. Out of these, about 160 airports are under control of DGAC, as listed in Table-2.3. The Table shows the airport code, the airport city name, the airport location, the runway length, as defined below.

- The airport code consists of 7 digits.
- The first two digits stand for island names as defined below:

01	Sumatera	02	Jawa and Bali
03	Nusa Tenggara	04	Kalimantan
05	Sulawesi	06	Maluku
07	Irian Jaya		

- The second two digits show the province an airport belongs to:

01	D. I. Aceh	02	Sumatera Utara
03	Sumatera Barat	04	Riau
05	Jambi	06	Sumatera Selatan
07	Bengkul	08	Lampung
09	D. K. I. Jakarta	10	Jawa Barat
11	Jawa Tengah	12	D. I. Yogyakarta
13	Jawa Timur	14	Bali
15	Nusa Tenggara Barat	16	Nusa Tenggara Timur
17	Timor Timur	18	Kalimantan Barat
19	Kalimantan Tengah	20	Kalimantan Selatan
21	Kalimantan Timur	22	Sulawesi Utara
23	Sulawesi Tengah	24	Sulawesi Selatan
25	Sulawesi Tenggara	26	Maluku
27	Irian Jaya		

- The last three digits are serial numbers.
- The airport city name entered in Table is the name of the city where an airport exists.
- The location of an airport is presented in longitude and latitude in Table. The longitude is expressed in the east longitude in degrees. The latitude of a posi-

Table-2.3(1) Data of Airport

No.	Airport City Name	City Code	Airport Location		Airport Category	Runway Length (m)	Airport Code
			Longitude	Latitude			
1	Sabang	101001	95.21	-5.52	V	1250	3000
2	Banda Aceh	101002	95.25	-5.31	II	1850	3001
3	Lhok Seumawe	101003	95.56	-5.13	V	800	3002
4	Meulaboh	101004	96.13	-4.15	IV	900	3003
5	Sinabang	101005	96.14	-2.25	IV	750	3005
6	Tapaktuan	101008	97.18	-3.18	IV	750	3004
7	P.Panjang	101009	97.19	-2.03	IV	1400	3160
8	Medan	102010	98.40	-3.33	I*	2900	3006
9	Sidikalang	102011	98.21	-2.43	IV	750	3007
10	Prapat	102012	98.56	-2.35	IV	750	3008
11	Rantauprapat	102013	99.42	-2.16	O	750	3009
12	Sibolga	102014	98.35	-1.33	IV	1400	3010
13	Padang Sidempuan	102015	99.27	-1.23	IV	750	3011
14	Gn.Sitoli	102016	97.37	-1.16	IV	750	3012
15	P.Tanah Bala	102017	98.27	-0.06	-	-	3161
16	Lubuksikaping	103018	100.02	-0.11	III	1300	3013
17	Padang	103021	100.21	0.53	II*	2150	3016
18	Siberut	103022	99.04	1.26	V	650	3017
19	Sipora	103023	99.41	2.05	V	750	3018
20	Dumai	104024	101.26	-1.35	II	1800	3015
21	Pakanbaru	104025	101.27	-0.28	II	2150	3014
22	Rengat	104026	103.19	-0.20	III	1300	3019
23	P.Batam	104027	104.06	-1.07	II	2500	3020
24	Natuna	104029	108.23	-3.57	III	1500	3021
25	Jambi	105030	103.39	1.38	II	1670	3022
26	Muara Bungo	105031	101.58	1.22	IV	815	3023
27	Sungai Penuh	105032	101.22	2.06	IV	650	3024
28	Lubuk Linggau	106033	103.09	3.09	IV	1000	3026
29	Palembang	106034	104.42	2.54	I	2200	3028
30	Kayu Agung	106035	104.52	3.19	IV	1300	3029
31	Muara Enim	106036	103.50	3.36	IV	900	3027
32	Bangka	106038	106.08	2.10	II	1520	3030
33	Tg.Pandan	106039	107.45	2.45	III	1650	3031
34	Bengkulu	107040	102.20	3.52	III	1800	3025
35	Kotabumi	108041	104.56	4.46	-	-	3162
36	Tanjung Karang	108042	105.11	5.15	II	1520	3032
37	Jakarta(CGK)	209043	106.39	6.08	I*	3660	3033
38	Pandeglang	210044	106.11	6.29	II	1800	3034
39	Tangerang	210045	106.34	6.18	II	1600	3035
40	Sukabumi	210049	106.58	6.55	-	-	3036
41	Bandung	210051	107.35	6.54	II	1959	3037
42	Cirebon	210052	108.23	6.35	O	725	3033
43	Tasikmalaya	210053	108.17	7.25	III	1200	3039
44	Tegal	211054	109.08	6.51	-	-	3040
45	Semarang	211055	110.23	6.59	II	1650	3043

Table-2.3(2) Data of Airport

No.	Airport City Name	City Code	Airport Location		Airport Category	Runway Length (m)	Airport Code
			Longitude	Latitude			
46	Cilacap	211056	109.03	7.38	V	660	3041
47	Kebumen	211057	109.32	7.42	-	-	3042
48	Cepu	211058	111.32	7.12	IV	900	3046
49	Solo	211059	110.45	7.31	III	1850	3044
50	Yogyakarta	212060	110.26	7.47	II	1850	3045
51	Madium	213061	111.30	7.37	O	1800	3047
52	Kediri	213062	112.03	7.47	-	-	3048
53	Surabaya	213063	112.46	7.22	I*	3000	3049
54	Sumenep	213064	113.56	7.04	IV	850	3051
55	Malang	213065	112.44	7.54	II	2250	3050
56	Banyuwangi	213066	113.41	8.10	II	2000	3052
57	Denpasar	214067	115.10	8.45	I*	2700	3053
58	Ampenan	315068	116.04	8.32	III	1600	3054
59	Sumbawa Basar	315069	117.25	8.30	IV	1470	3055
60	Bima	315070	118.42	8.30	III	1400	3056
61	Ruteng	316071	120.29	8.35	IV	1300	3057
62	Ende	316072	121.30	8.52	V	900	3058
63	Maumere	316073	122.15	8.38	III	1470	3059
64	Lamatukang	316074	123.39	8.22	IV	750	3060
65	Alor	316075	124.34	8.13	V	850	3061
66	Tambolaka	316076	119.24	9.24	O	1300	3062
67	Waingapu	316077	120.18	9.40	III	1500	3063
68	Sabu	316078	121.50	10.30	V	800	3064
69	Rote	316079	122.50	10.53	V	1100	3065
70	Naikliu	316080	123.50	9.30	O	1500	3066
71	Kupang	316081	123.40	10.10	II	1850	3067
72	Atambua	316083	124.54	9.20	IV	850	3068
73	Baucau	317084	126.23	8.37	III	3000	3070
74	Dili	317085	125.31	8.32	III	1750	3069
75	Singkawang II	418088	109.40	-1.05	IV	970	3071
76	Pontianak	418089	109.24	0.09	I	1655	3072
77	Sanggau	418090	110.31	-0.09	O	600	3073
78	Putusibau	418091	112.56	-0.50	IV	850	3074
79	Sintang	418092	111.29	-0.04	IV	900	3075
80	Ketapang	418093	109.58	1.51	IV	1000	3076
81	Muaratewe	419094	114.53	0.31	O	600	3077
82	Buntok	419095	114.50	1.44	IV	600	3078
83	Palangka Raya	419097	113.56	2.16	II	1650	3079
84	Sampit	419098	112.59	2.33	V	855	3080
85	Pangkalan Bun	419099	111.40	2.45	III	1600	3081
86	Rantau	420100	115.13	2.59	-	-	3082
87	Batu Licin	420101	115.59	3.28	O	1300	3085
88	Kotabaru	420102	118.26	3.17	III	900	3086
89	Banjarmasin	420103	114.45	3.27	I	1870	3083
90	Tanjung Selor	421104	117.26	-2.50	O	750	3089

Table-2.3(3) Data of Airport

No.	Airport City Name	City Code	Airport Location		Airport Category	Runway Length (m)	Airport Code
			Longitude	Latitude			
91	Long Bawan	421105	115.41	-3.52	V	700	3087
92	Tarakan	421106	117.34	-3.20	III	1650	3088
93	Tg.Redep	421107	117.26	2.09	V	760	3090
94	Samarinda	421109	117.09	0.27	III	900	3091
95	Balikpapan	421110	116.54	1.16	I*	1800	3092
96	Tanah Grogot	421111	116.13	1.52	IV	640	3093
97	Melanguane	522112	126.42	-4.03	IV	850	3094
98	Tahuna	522113	125.25	-3.43	IV	850	3095
99	Manado	522114	124.55	-1.32	I*	2500	3096
100	Bolaang Mongondow	522115	124.22	-0.42	O	710	3097
101	Gorontalo	522116	122.55	-0.39	III	1650	3098
102	Toli-Toli	523117	120.48	-1.08	IV	850	3099
103	Palu	523118	119.53	0.55	II	1625	3100
104	Poso	523119	120.43	1.24	IV	1117	3101
105	Salea	523120	121.36	1.56	-	-	3102
106	Luwuk	523121	122.46	1.01	IV	850	3103
107	P.Banggai	523122	123.36	1.40	-	-	3104
108	Malili	524123	121.06	2.38	IV	850	3105
109	Mamuju	524124	119.02	2.35	IV	710	3106
110	Makale	524125	119.52	3.05	O	750	3107
111	Watampone	524127	120.05	4.55	-	-	3108
112	Ujung Pandang	524128	119.33	5.04	I*	2500	3109
113	Benteng	525130	120.33	6.06	-	-	3110
114	Kendari	525131	122.26	4.05	III	1650	3111
115	Kolaka	525132	121.32	4.18	IV	1050	3112
116	Kasiputo	525133	122.08	4.49	-	-	3113
117	Bau-Bau	525134	122.33	5.31	O	850	3114
118	Raha	525137	122.36	4.48	O	1200	3115
119	Morotai	626138	128.20	-2.04	V	1000	3116
120	Galela	626139	127.50	-1.49	IV	750	3117
121	Ternate	626140	127.26	-0.50	III	1400	3118
122	Buli Serani	626141	128.09	-1.12	-	-	3119
123	Labuha	626142	127.30	0.39	V	850	3120
124	P.Obi	626143	127.35	1.23	-	-	3121
125	P.Gebe	626144	129.48	0.13	-	-	3122
126	Mangole	626145	125.09	1.47	V	1200	3123
127	Taliabu	626146	124.33	1.37	O	900	3124
128	P.Burn	626147	127.05	3.15	IV	1400	3125
129	Seram	626148	128.53	3.21	V	850	3126
130	Ambon	626149	128.05	3.42	II	1850	3127
131	Bula	626150	130.30	3.06	O	985	3128
132	Geser	626151	131.23	4.01	-	-	3129
133	Bandanaera	626152	129.55	4.35	V	700	3130
134	Langgur	626153	132.43	5.40	O	1300	3131
135	Saumlaki	626154	131.18	7.57	O	850	3132

Table-2.3(4) Data of Airport

No.	Airport City Name	City Code	Airport Location		Airport Category	Runway Length (m)	Airport Code
			Longitude	Latitude			
136	P. Babar	626155	129.38	7.50	-	-	3133
137	P. Wetar	626156	126.05	7.40	-	-	3134
138	P. Waka	626157	134.33	5.53	V	850	3135
139	P. Waigio	727158	130.53	0.22	-	-	3136
140	P. Salawati	727159	130.44	0.13	-	-	3137
141	P. Misool	727160	130.03	1.46	-	-	3138
142	Sorong	727161	131.07	0.56	III	1650	3139
143	Manokwari	727162	134.03	0.53	III	1400	3140
144	Bintuni	727163	133.31	2.06	V	650	3141
145	Fak-Fak	727164	132.13	2.56	IV	630	3142
146	Kaimana	727165	133.41	3.39	V	1500	3143
147	Timika	727166	136.54	4.32	II	1800	3144
148	Paniai	727167	135.30	3.22	III	1150	3145
149	Enarotali	727168	136.25	3.55	IV	600	3146
150	Waren	727169	136.23	2.16	O	470	3147
151	Serui	727170	136.14	1.52	IV	650	3148
152	Sarmi	727171	138.45	1.51	IV	900	3149
153	Jayapura	727172	140.31	2.34	II	1850	3150
154	Oksibil	727173	140.36	4.51	V	600	3151
155	Jaayawijaya	727174	138.57	4.04	III	1500	3152
156	Agast	727175	138.15	5.31	O	1000	3153
157	Kepi	727176	139.27	6.40	V	675	3154
158	Tanah Merah	727177	140.18	6.06	IV	1050	3155
159	Merauke	727178	140.28	8.37	III	1850	3156
160	Okaba	727179	139.42	8.06	V	600	3157
161	Kimaan	727180	138.51	7.52	O	600	3158
162	Biak	727181	136.07	1.12	II*	3570	3159

Source : 1. AERONAUTICAL INFORMATION PUBLICATION INDONESIA (AIP),
Aeronautical Information Service, DGAC.
2. DIRECTORY OF AERODROMES FOR LIGHT AIRCRAFT, VOLUME I & II,
Ninth Edition, 1987 (Dok.PA.500.1.87),
Aeronautical Information Service, DGAC.
3. DATA DAN PRASARANA POKOK BANDAR UDARA, POSISI: NOVEMBER 1987,
DGAC

Note : 1. "*" in the airport category means an international airport
2. "O" in the airport category means a private or military airport
3. "-" in the airport category means no airport exist at this area

tive number corresponds to the south latitude in degrees and the negative latitude means the north latitude in degrees respectively.

- Runway length of an airport is presented in meters.
- N.S.A. stated in Table means the "non-scheduled airlines". Non-scheduled airlines are available at present at the airport with the letter "a" in Table.

(09) Whereas, the airports listed in Table-2.3 are classified in accordance with their respective operational function and capacity as follows.

- CATEGORY-I, International/Major Airport

(10 Airports for International and Regional Air Services)

International and major domestic airports as a national gateway, operation of representative air services between national capital city and regional metropolitan cities and/or between regional metropolitan cities in an international and primary domestic air routes of Indonesia, having a minimum runway length of 3,000 m capable of accommodating a maximum aircraft of B-747 class wide body jet.

- CATEGORY-II, Border/Major Airport

(18 Airports for Regional Air Services)

Regional domestic airport, operation of mass transport services between Jakarta & Surabaya and regional metropolitan cities in primary and secondary domestic air routes, having a minimum runway length of 2,300 m capable of accommodating a maximum aircraft of DC-10 and/or A-300 class large body jet.

- CATEGORY-III, Domestic/Feeder Airport

(25 Airports for Provincial Air Services)

Provincial domestic airports, operation of semi-mass transport services between provincial cities & towns in secondary and tertiary domestic air routes, having a minimum runway length of 1,800 m capable of accommodating a maximum aircraft of F-28 class middles

body jet.

- CATEGORY-IV 52 & CATEGORY-V 55 Airports for Domestic/Pioneer Airports

Pioneer and municipal small domestic airports, operation of local short distance (commuter flight) air services between municipal cities & towns including remote areas and solitary islands in tertiary and access domestic air routes, having a minimum runway length of 800 m capable of accommodating a maximum aircraft of DHC-6 and any other small body planes of fixed wing (STOL) and rotary wing (VTOL).

- In addition, approximate 400 air strips or air stations without control of DGAC, accommodate non-scheduled flight of the general aviation in tertiary and access domestic air routes by STOL and VTOL of private enterprise, and they are not classified yet as airport of the civil aviation.

The approximate location of the airports is shown in Figure-2.5.

(10) The major airports servicing the civil aviation come to 93 airports in 1985. Their location by area is as shown in Table-2.4.

Table-2.4 Number of Airport by Area

AREA	NUMBER OF AIRPORT
Sumatera	17
J a w a	10
Bali & Nusa Tenggara	17
Kalimantan	14
Sulawesi	10
Maluku	4
Irian Jaya	21
Total	93

Comparing to the density of population, Irian Jaya has 21 airports as tabulated - above. This comes from the fact that the land access within Irian Jaya is difficult.

(11) While, the nation is divided into six civil aviation regions (Wilayah). The numbers of the airports under the control of DGAC are tabulated below.

Table-2.5 Numbers of Airport by Aviation Region

AVIATION REGION	NUMBERS OF AIRPORT
Wilayah I (North Sumatera)	21
Wilayah II (South Sumatera, West Kalimantan & West Jawa)	25
Wilayah III (East Jawa, East Kalimantan)	30
Wilayah IV (Sulawesi & Maluku)	33
Wilayah V (Irian Jaya)	28
Wilayah VI (Bali, Nusa Tenggara & Timor)	23
T O T A L	160

The approximate boundary of the six civil aviation regions are shown in Figure-2.5.

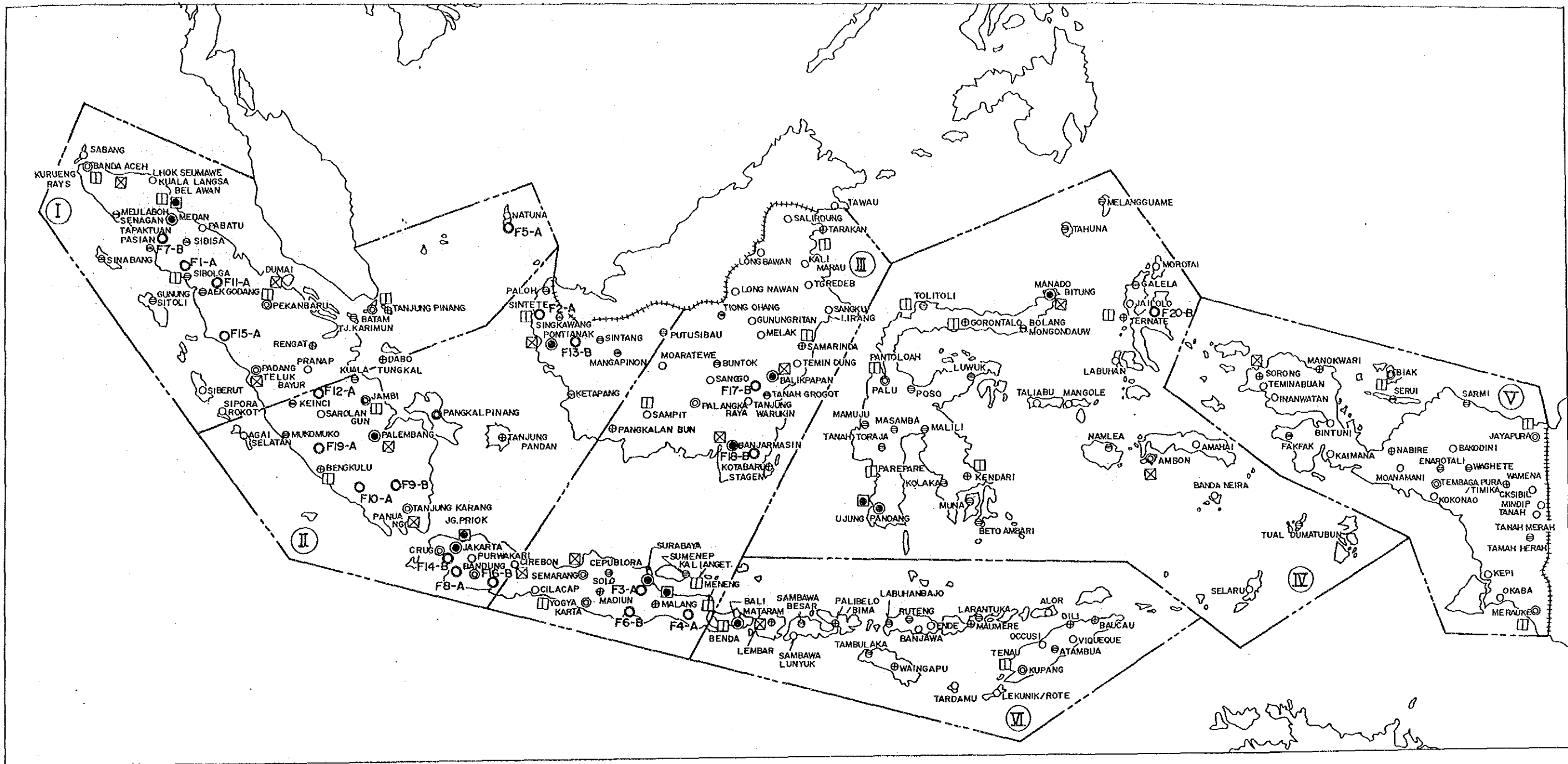


Figure-2.5 LOCATION PLAN OF EXISTING AIRPORT (1986/1987), Not to Scale

LEGEND :

- | | |
|--|----------------------------|
| International/Regional, Major Airport (Category-I) ----- ○ | Gateway Sea Port ----- ◻ |
| Regional, Border/Major Airport (Category-II) ----- ○ | Collector Sea Port ----- ◻ |
| Provincial, Feeder Airport (Category-III) ----- ○ | Trunk Sea Port ----- ◻ |
| Municipal, Pioneer Airport (Category-IV) ----- ○ | |
| Municipal, Pioneer Airport (Category-V) ----- ○ | |
| Existing Domestic Air Route ----- See "Air Route Network of Scheduled Airlines, 1985-1986" | |
| New Airport, Category-IV and V (Pioneer), ----- ○FI-A | |
| proposed by the Future Demand of the Inter-Island Traffic Project' 1987 | |
| Boundary Line and Number of Civil Aviation Region: [I] | |

2.03 NAVIGATION AIDS (NAVAIDS)

(12) The Area Responsibility covers the air traffic service system, the air traffic control facility, the air navigation facility, the air lighting system and the airport distance. The published Aeronautical Information Publication (A.I.P) prepared by DGAC gives every detail of the air traffic services available in Indonesia.

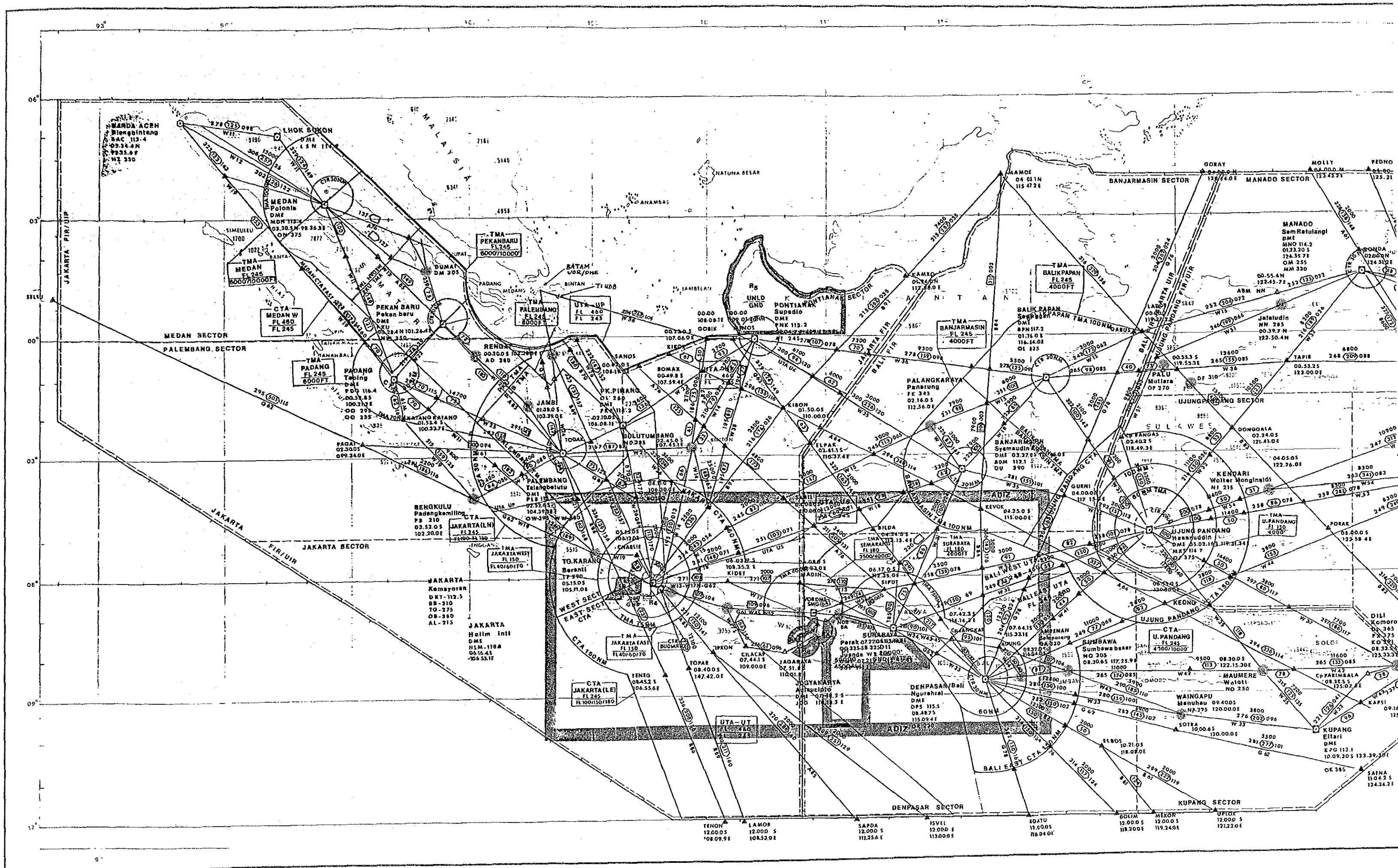
(13) A.I.P. contains the subjects of general information, aerodromes, communications, meteorology, air traffic rules and services, facilitation, search and rescue and aeronautical chart published. The air traffic rules and services are illustrated in Figure-2.6. The air traffic control is conducted in the following air spaces.

- In control areas, upper control areas and on airways.
- In terminal control areas and control zones at controlled aerodromes equipped with approach and landing aids.
- In aerodrome traffic zones at other controlled aerodromes.

(15) In general, the air traffic rules and procedures in force and the organization of air traffic services are in conformity with ICAO standards, Recommended Practices and Procedures. Within the Indonesian FIR/UIR, military and training requirements and in case of the activity of some volcanoes have led to the establishment of a number of prohibited restricted danger or even warning areas. Such prohibited restricted areas is shown in the attached Figure-2.6.

(16) The Radio Navigation Services include:

- LF/MF Non-directional Beacon (NDB)
- Instrument Landing System (ILS)
- VHF Omni-directional Radio Range (VOR)
- Distance Measuring Equipment (DME)



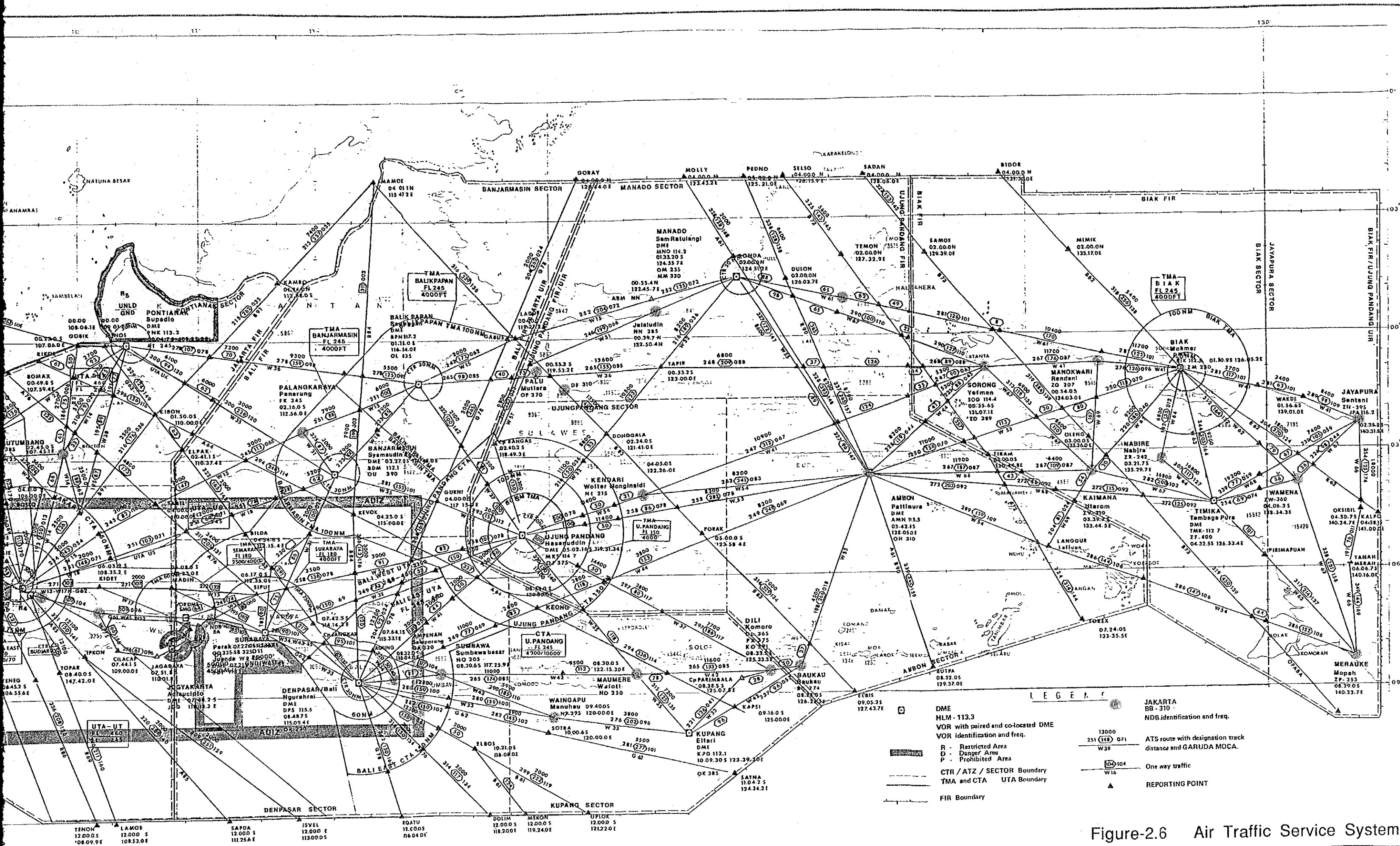


Figure-2.6 Air Traffic Service System

- Primary and Secondary Approach Radar

These radio navigation services available in Indonesia are shown in Figures-2.7, 2.8 and 2.9.

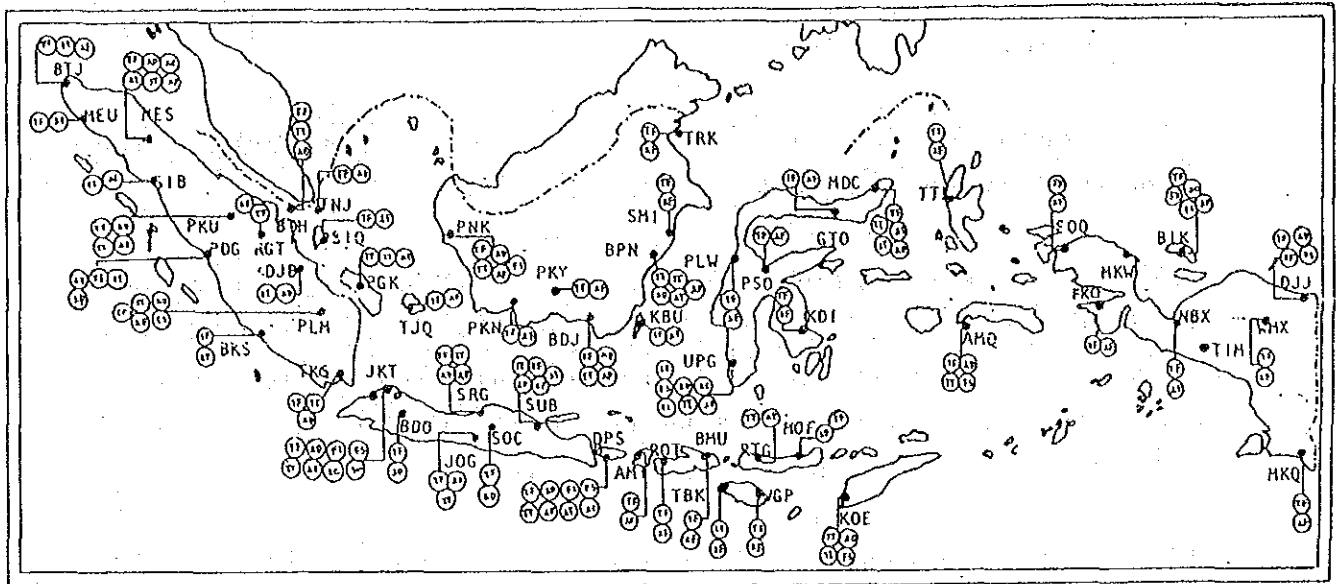
(17) The Air Traffic Service System is divided into four (4) FIRs, that is: Jakarta FIR, Bali FIR, Ujung Pandang FIR and Biak FIR, and two(2) UIRs Jakarta UIR and Ujung Pandang UIR. This system can also be referred to the geographical configuration of Indonesian archipelago.

(18) It is reported that there are about 284 NAVAIDS inventoried for both en-route and terminal which are composed of :

- VOR (VHF Omnidirectional Range)
- DME (Distance Measuring Equipment)
- NDB (Non-Directional Range)
- LLZ (Instrument Landing System Localizer)
- G/S (Instrument Landing System Glide Slope Indicator)
- OM (Outer Marker as a component of ILS)
- MM (Middle Marker as a component of ILS)
- PSR (Primary Surveillance Radar)
- SSR (Secondary Surveillance Radar)
- LOC (Compass Locator)
- RVR (Runway Visual Range Indicator) excluding VASIS (Visual Approach Slope Indicator System)

There are some other NAVAIDS not listed-above.

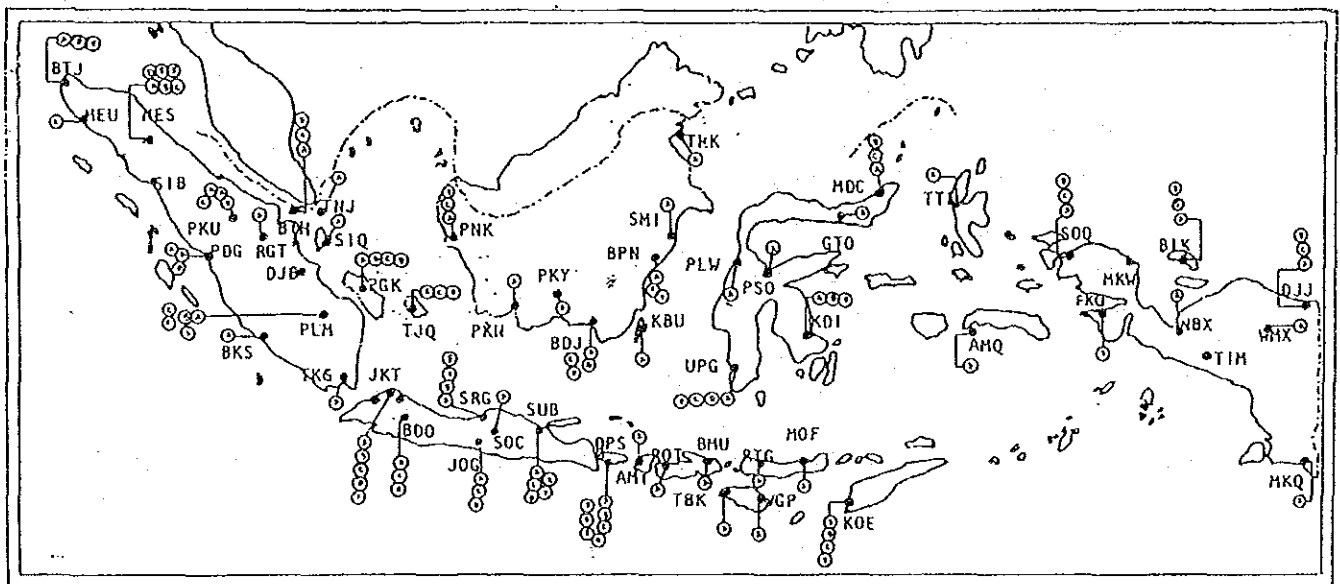
(19) The existing DME/VOR and DVOR, totaling 34 stations, are summarized in Table-2.6 and listed in Table-2.7.



NOTES :

- TF - R/T Radio Telephony
- TT - RTT Radio Tele Type
- AF - AFIS Aerodrome Flight Information Service
- AD - ADC Aerodrome Control
- AP - APP Approach Control
- AC - ACC Area Control Centre
- FI - FIC Flight Information Centre
- FS - FSS Flight Service Station
- AT - ATIS Automatic Terminal Information Service
- SM - SMC Surface Movement Control

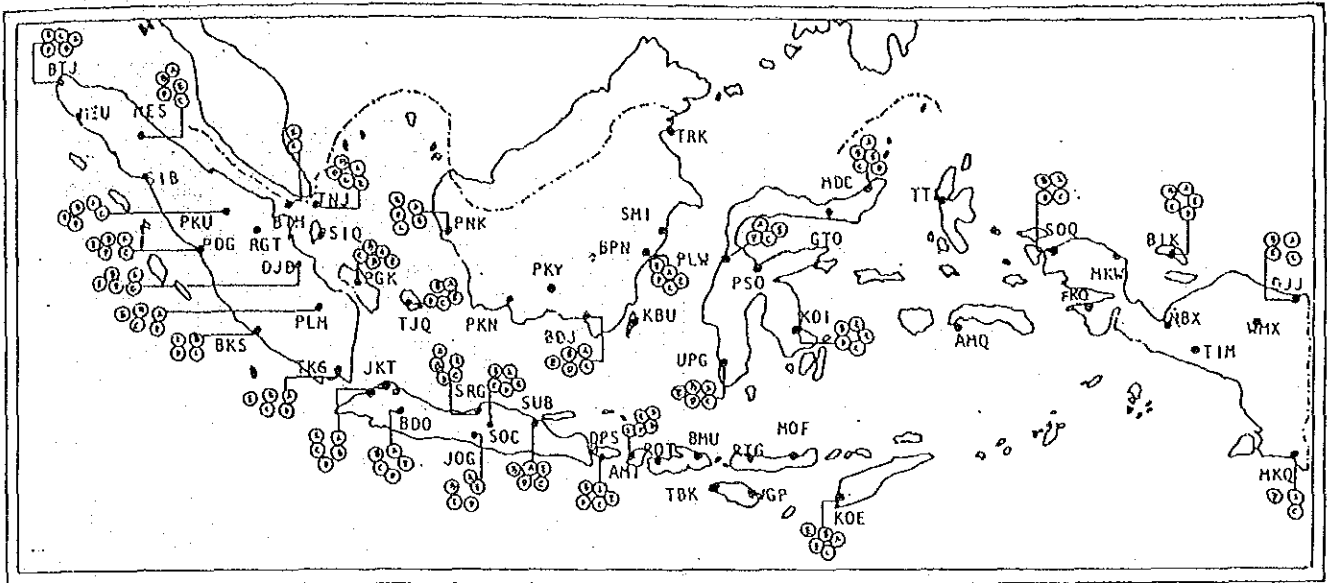
Figure-2.7 AIR TRAFFIC CONTROL FACILITY



NOTES :

- A. Non Directional Beacon (NDB)
- B. Conventional VOR (CVOR)
- C. Doppler VOR (DVOR)
- D. Distance Measuring Equipment (DME)
- E. Primary Surveillance Radar (PSR)
- F. Secondary Surveillance Radar (SSR)
- G. Instrument Landing System (ILS)

Figure-2.8 AIR NAVIGATION FACILITY



NOTES :

- A. Runway LIGHT
- B. Approach LIGHT
- C. Visual Aid Slope Indicator System (VASIS)
- D. Runway End Identification Light (REIL)
- E. S I G N A L S

Figure-2.9 AIR LIGHTING SYSTEM

Table-2.6 Summary of Existing DME/VOR and DVOR

AVIATION REGION	NO. OF STATION
- Kanwil-I	6 stations
- Kanwil-II	11 stations
- Kanwil-III	5 stations
- Kanwil-IV	6 stations
- Kanwil-V	4 stations
- Kanwil-VI	2 stations
Total	34 stations

The power of these equipment is one (1) Kilowatt for DME/VOR and 100 Watt for DVOR, having 150 NM range.

Most of VOR and DME, which are important Nav aids to make an aircraft establish precisely on ILS course, are reported as good as per Table-2.7. As a matter of fact, however, some stations of VOR and/or VOR/DME have been known under the limited status, such like as shutdown, test only and on request.

Table-2.7(1) Existing VOR, DME

KANWIL: I

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
MEDAN	05-23	DME(VOR)	11 KW	150 NM	1976	CH:86X, MDN	GOOD
		DME(VOR)	11 KW	150 NM	-	CH:77X, MNM	GOOD/ON TEST
-	-	DVOR	100 W	150 NM	1979	113.9 MHZ. MDN	GOOD
		DVOR	100 W	150 NM	-	113.0 MHZ. WMN	GOOD/ON TEST
BANDA ACEH	17-35	DME(VOR)	11 KW	150 NM	1986	CH:81X, BAC	GOOD
		DVOR	100 W	150 NM	1981	113.4 MHZ. BAC	-
BATAM	04-22	DME(VOR)	11 KW	150 NM	1983	CH:107X, BTM	-
		DVOR	100 W	150 NM	-	116.0 MHZ. BTM	-
PADANG	16-34	DME(VOR)	11 KW	150 NM	1977	CH:111X	-
		DVOR	100 W	150 NM	-	116.4 MHZ. PDC	-
PEKANBARU	18-36	DME(VOR)	11 KW	150 NM	-	CH:58X, PKU	-
		DVOR	100 W	150 NM	-	112.1 MHZ. PKU	-

KANWIL: II

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
JAKARTA-HALIM	06-24	DME(VOR)	11 KW	150 NM	1977	CH:80X	GOOD
		DVOR	150 W	150 NM	1973	113.3 MHZ. HLM	-
JAKARTA-INDRNY	-	DME(VOR)	11 KW	150 NM	1986	CH:111X, IMO	-
		DVOR	100 W	150 NM	-	116.4 MHZ. IMO	-
JAKARTA-SOE/TA	07-25	DME(VOR)	11 KW	150 NM	1985	CH:83X, CKG	-
		DVOR	100 W	150 NM	-	113.6 MHZ. CKG	-
PALENBANG	11-29	DME(VOR)	11 KW	150 NM	1977	CH:120X, PLB	-
		DVOR	100 W	150 NM	1978	115.5 MHZ. PLB	-
PONTIANAK	15-33	DME(VOR)	11 KW	150 NM	1978	CH:79X, PNK	-
		DVOR	100 W	150 NM	-	113.2 MHZ. PNK	-
BANDAR LUMPUNG	14-32	DME(VOR)	11 KW	150 NM	1985	CH:97X, TKG	-
		DVOR	100 W	150 NM	-	115.0 MHZ. TKG	-
BANDUNG	11-29	DME(VOR)	11 KW	150 NM	1979	CH:117X, BND	-
		DVOR	100 W	150 NM	-	117.0 MHZ. BND	-
CURUG/BUDIARTO	-	DME(VOR)	11 KW	150 NM	1984	CH:105X, BTD	-
		DVOR	100 W	150 NM	-	115.8 MHZ. BTD	-
JANBI	13-31	DME(VOR)	11 KW	150 NM	1986	CH:122X, JMB	-
		DVOR	100 W	150 NM	-	117.5 MHD. JMB	-
PANGKAL PINANG	16-34	DME(VOR)	11 KW	150 NM	1977	CH:89X, PKP	-
		DVOR	100 W	150 NM	1981	114.2 MHZ. PKP	-
TANJUNG PANDAN	18-36	DME(VOR)	11 KW	150 NM	-	CH:114X, TPN	ON TEST
		DVOR	100 W	150 NM	1982	116.7 MHZ. TPN	GOOD

KANWIL: III

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BALIKPAPAN	107-25	DME(VOR)	11 KW	150 NM	1978	CH:119X, BPN	GOOD
		DVOR	100 W	150 NM	1977	117.2 MHZ. BPN	-
BANJARHASNIN	10-18	DME(VOR)	11 KW	150 NM	1977	CH:58X, BDN	-
		DVOR	100 W	150 NM	1979	112.1 MHZ. BDN	-
SURABAYA	10-28	DME(VOR)	11 KW	150 NM	1977	CH:78X, SBY	-
		DVOR	100 W	150 NM	-	113.1 MHZ. SBY	-
SEMARANG/DEMAK	13-31	DME(VOR)	11 KW	150 NM	1976	CH:84X, SHG	-
		DVOR	100 W	150 NM	1983	113.7 MHZ. SHG	-
TARAKAN	06-24	DME(VOR)	11 KW	150 NM	1983	CH:113X, TRK	-
		DVOR	100 W	150 NM	-	116.6 MHZ. TRK	-

KANWIL: IV

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
MANADO	18-36	DME(VOR MND)	11 KW	150 NM	1977	CH:89X, MNO	GOOD
		DME(VOR TDO)	11 KW	150 NM	1986	CH:94X, TDO	-
-	-	DVOR MNO	100 W	150 NM	1977	114.2 MHZ. MNO	-
		DVOR TONDANO	100 W	150 NM	1986	114.8 MHZ. TDO	-
UJUNG PANDANG	18-31	DME(VOR)	11 KW	150 NM	1977	CH:94X, IUPG	-
		DVOR	100 W	150 NM	-	114.7 MHZ. HKS	-
AMBON	04-22	DME(VOR)	11 KW	150 NM	1980	CH:102X, AMN	-
		DVOR	100 W	150 NM	-	115.5 MHZ. AMN	-
PALU	15-33	DME(VOR)	11 KW	150 NM	1986	CH:109X, PAL	-
		DVOR	100 W	150 NM	-	116.2 MHZ. PAL	-
KENDARI	08-26	DME(VOR)	11 KW	150 NM	-	CH:97X, KDI	ON TEST
		DVOR	100 W	150 NM	-	115.0 MHZ. KDI	ON TEST

Table-2.7(2) Existing VOR, DME

KANWIL: V

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BIAK	11-29	DME(VOR)	11 KW	150 NM	1979	CH:72X, BIK	GOOD
"	"	DVOR	100 W	150 NM	1977	112.5 MHZ, BIK	"
JAYAPURA	12-20	DME(VOR)	11 KW	150 NM	1984	CH:109X, JPA	"
"	"	DVOR	100 W	150 NM	1981	116.2 MHZ, JPA	"
NERAUKE	16-34	DME(VOR)	11 KW	150 NM	1987	CH:105X, MKO	"
"	"	DVOR	100 W	150 NM	"	115.8 MHZ, MKE	"
SOSONG	04-22	DME(VOR)	11 KW	150 NM	"	CH:91X, SOG	ON TEST
"	"	DVOR	100 W	150 NM	"	114.4 MHZ, SOG	"

KANWIL: VI

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BALI	07-27	DME(VOR)	11 KW	150 NM	1976	CH:102X, DPS	GOOD
"	"	DVOR	100 W	150 NM	1981	115.5 MHZ, DPS	"
KUPANG	07-25	DME(VOR)	11 KW	150 NM	1980	CH:59X, KPG	"
"	"	DVOR	100 W	150 NM	"	112.2 MHZ, KPG	"

"On request" stated-above means that an airline has to give a prior notice to ask the station to turn on the air, before an aircraft flying to a destination where such station exists. The prior notice should be given usually 24 hours in advance, but it differs depending on the case of not only flight distance but also natures of problem mentioned before. Nature of problem of such facilities are likely to be caused by;

- Lack of spare parts
- Shortage of maintenance technicians
- Malfunction of the system
- Limited fuel supply for electric generation
- Limited operation hour of airport where the station be located
- Uncertain schedule of flight test (non-official on air)

(20) There are 131 NDB facilities including NDB HR, NDB MR, NDB LR and NDB Locator as summarized in Table-2.8 and tabulated in Table-2.9.

Table-2.8 Summary of NDB Facilities

AVIATION REGION	NO. OF STATION
- Kanwil-I	18 stations
- Kanwil-II	24 stations
- Kanwil-III	23 stations
- Kanwil-IV	28 stations
- Kanwil-V	38 stations
Total	131 stations

These are mostly an old type of low range of 100 watts with coverage of 60 NM. There are a bunch of NDB facilities which need to be replaced. Most of such NDBs are the ones made of the old tube circuit type, which has not been on the production any more. The percentage of NDBs which is desirable to be replaced is as follows.

Table-2.9(1) Existing NDB

KANWIL: I

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
MEDAN	05-23	INDB HR	13 KW	1300 NM	1986	375 KHZ. ON	GOOD
BATAH	04-22	INDB MR	1500 W	1150 NM	"	370 KHZ. 8M	"
RENGAT	10-28	INDB MR	11 KW	1150 NM	1984	280 KHZ. AD	"
BANDA ACEH	17-35	INDB MR	1500 W	1150 NM	1970	330 KHZ. NZ	NEED CAHNGE
PADANG	16-34	INDB	1500 W	1150 NM	1972	295 KHZ. OQ	"
		INDB LOCATOR	180 W	150 NM	1974	325 KHZ. OQ	"
PEKANBARU	18-36	INDB MR	1500 W	1150 NM	1971	350 KHZ. NW	"
DABO/SINGKEP	14-32	INDB MR	1500 W	1150 NM	1975	320 KHZ. NE	"
TANJUNG PINANG	04-22	INDB MR	1500 W	1150 NM	1972	385 KHZ. TI	"
GUNUNG SITOLI		INDB LR	1100 W	160 NM	1976	244 KHZ. GI	"
MEULABOH		INDB LR	1100 W	160 NM	"	200 KHZ. NH	"
PD. SIDENPUAN		INDB LR	1100 W	160 NM	1978	233 KHZ. AG	"
SIBISA/PRAPAT		INDB LR	1100 W	160 NM	"	251 KHZ. BS	"
SIBOLGA		INDB MR	1500 W	1150 NM	1975	215 KHZ. SK	"
SINABANG		INDB LR	1100 W	160 NM	1979	389 KHZ. SG	"
T. BALAI KARINUN		INDB LR	1100 W	160 NM	1978	410 KHZ. YG	"
TAPAKTUAN		INDB LR	1100 W	160 NM	"	230 KHZ. TP	"
MENTAWAI		INDB LR	1100 W	160 NM	"	332 KHZ. ST	"

KANWIL: II

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
PALEMBANG	11-29	INDB HR	11 KW	1200 NM	1986	395 KHZ. OW	GOOD
JANBI	13-31	INDB HR	11 KW	1150 NM	1986	365 KHZ. NX	"
JAKARTA-HALIM	06-24	INDB MR	1750 W	1150 NM	1974	215 KHZ. AL	"
PONTIANAK	15-33	INDB MR	1500 W	1150 NM	1975	245 KHZ. AT	NEED CAHNGE
BANDAR LAMPING	14-32	INDB MR	1500 W	1150 NM	1975	290 KHZ. TF	"
BANDUNG	11-29	INDB MR	1500 W	1150 NM	1975	300 KHZ. OY	"
PANGKAL PINANG	16-34	INDB MR	1500 W	1150 NM	1972	260 KHZ. OI	"
TANJUNG PANDAN	18-36	INDB MR	1500 W	1150 NM	1972	285 KHZ. ND	"
BANDUNG	11-29	INDB LOCATOR	1100 W	160 NM	1975	300 KHZ. YY	"
KUALA TUNGKAL		INDB LR	1100 W	160 NM	1976	233 KHZ. KT	"
NANGAPINOH		INDB LR	1100 W	160 NM	1982	223 KHZ. NH	"
PALOH		INDB LR	1100 W	160 NM	"	271 KHZ. PH	Not yet insta
PUTUSIBAU		INDB LR	1100 W	160 NM	1975	360 KHZ. PB	NEED CHANGE
SINGKAWANG		INDB LR	1100 W	160 NM	1975	210 KHZ. NT	"
KERINCI		INDB LR	1100 W	160 NM	1976	201 KHZ. KC	"
MUKO-MUKO		INDB LR	1100 W	160 NM	1980	249 KHZ. MO	BROKEN
CURUG/BUDIARTO		INDB LR	180 W	160 NM	1976	400 KHZ. TN	NEED CHANGE
BENGKULU	13-31	INDB LR	180 W	160 NM	1972	210 KHZ. PB	"
KETAPANG		INDB LR	150 W	160 NM	1986	333 KHZ. KP	GOOD
SINTANAG		INDB LR	150 W	160 NM	1986	405 KHZ. SG	"
JAKARTA-SOE/TA	07L-25R	INDB LOC 07L	125 W	125 NM	1986	324 KHZ. GL	GOOD
	07R-25L	INDB LOC 07R	125 W	125 NM	"	282 KHZ. GR	"
	07R-25L	INDB LOC 25L	125 W	125 NM	"	258 KHZ. CL	"
	07L-25R	INDB LOC 35R	125 W	125 NM	"	242 KHZ. CR	"

KANWIL: III

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BANJARMASIN	10-28	INDB HR	12.5 KW	1300 NM	1973	390 KHZ. OU	NEED CHANGE
BALIKPAPAN	07-25	INDB MR	1500 W	1150 NM	1973	365 KHZ. OL	"
SURABAYA	10-28	INDB MR	1500 W	1150 NM	1975	325 KHZ. SB	"
		INDB MR	1500 W	1150 NM	"	400 KHZ. WR	ON TEST
PARANGKARAYA	16-34	INDB HR	13 KW	1300 NM	1984	345 KHZ. FK	GOOD
SEMARANG	13-31	INDB MR	1500 W	1150 NM	1975	350 KHZ. DC	NEED CHANGE
SEMARANG/BLORA		INDB MR	1500 W	1150 NM	1976	240 KHZ. BA	"
YOGYAKARTA	09L-27R	INDB MR	1500 W	1150 NM	1975	270 KHZ. OF	"
SOLO	08-26	INDB MR	1500 W	1150 NM	1977	255 KHZ. SO	"
TARAKAN	08-24	INDB MR	1500 W	1150 NM	1979	398 KHZ. OT	"
KOTABARU/STAGEN		INDB LR	1100 W	160 NM	1976	347 KHZ. SN	SINGLE SET
PANGKALAN BUN		INDB LR	1100 W	160 NM	1976	238 KHZ. PH	"
SAMARINDA	04-22	INDB LR	1100 W	160 NM	1986	404 KHZ. IG	NEED CHANGE
BUNTOK/SANGGAU		INDB LR	1100 W	160 NM	1976	217 KHZ. BK	"
LONG BAWAN		INDB LR	1100 W	160 NM	1976	356 KHZ. LN	"
SUMENEP		INDB LR	1100 W	160 NM	1976	200 KHZ. MP	"
TANAH GROPT		INDB LR	1100 W	160 NM	1976	202 KHZ. LO	"
TIONG OHANG		INDB LR	1100 W	160 NM	"	290 KHZ. LO	Not yet insta
GUNUNG SEKIP		INDB LR	1100 W	160 NM	1979	319 KHZ. GN	NEED CHANGE
KALIHARAU/BERAU		INDB LR	1100 W	160 NM	1976	232 KHZ. KM	"
LONG BAHAN		INDB LR	1100 W	160 NM	"	227 KHZ. LO	Not yet insta
MUARATEWE		INDB LR	1100 W	160 NM	1976	347 KHZ. MW	NEED CAHNGE
SAMPIT		INDB LR	150 W	160 NM	1986	305 KHZ. SP	GOOD

Table-2.9(2) Existing NDB

KANWIL: IV

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
UJUNG PANDANG	113-31	INDB HR	13 KW	1300 NM	1986	375 KHZ. OJ	GOOD
MANADO	118-36	INDB HR	12.5 KW	1300 NM	1973	256 KHZ. MD(EX OH)	NEED CHANGE
PALU	115-33	INDB HR	1500 W	1150 NM	1973	280 KHZ. PO	"
GORONTALO	109-27	INDB HR	1500 W	1150 NM	1973	285 KHZ. NH	"
KENDARI	108-26	INDB HR	1500 W	1150 NM	1975	285 KHZ. NI	NEED CHANGE
BETOANBARI		INDB LR	1100 W	160 NM	1978	274 KHZ. BR	"
GALELA		INDB LR	1100 W	160 NM	1978	201 KHZ. GL	"
KAU		INDB LR	1100 W	160 NM		382 KHZ. KU	Not yet insta
KOLAKA		INDB LR	1100 W	160 NM	1975	260 KHZ. PA	NEED CHANGE
KOSANBI/HUNA		INDB LR	1100 W	160 NM	1978	348 KHZ. MN	"
LUNUK		INDB LR	1100 W	160 NM	1975	250 KHZ. LK	"
HAMUJU		INDB LR	1100 W	160 NM	1979	235 KHZ. MU	"
MASANBA		INDB LR	1100 W	160 NM	1977	244 KHZ. NB	"
NELANGGUANE		INDB LR	1100 W	160 NM	1978	215 KHZ. NC	"
NAMLEA		INDB LR	1100 W	160 NM	1979	290 KHZ. NA	"
POSO		INDB LR	1100 W	160 NM	1975	310 KHZ. DF	"
TAHUNA/NAHA		INDB LR	1100 W	160 NM	1975	400 KHZ. TA	"
TOLI-TOLI		INDB LR	1100 W	160 NM	1976	370 KHZ. TO	"
TUAL		INDB LR	1100 W	160 NM	1975	335 KHZ. TL	"
AMAHAI		INDB LR	1100 W	160 NM	1976	278 KHZ. AM	"
BANDANAIIRA		INDB LR	1100 W	160 NM	1982	372 KHZ. BN	"
BOLANGMONGCONDOW		INDB LR	1100 W	160 NM	1978	392 KHZ. BH	TURNED OFF
LABUHA		INDB LR	1100 W	160 NM	1979	307 KHZ. LA	NEED CHANGE
SAUNLAKI		INDB LR	1100 W	160 NM	1981	244 KHZ. SM	BROKEN
TANATORAJA		INDB LR	1100 W	160 NM	1978	401 KHZ. MK	NEED CHANGE
MARADO	118-36	INDB LOCATOR	180 W	150 NM	1972	330 KHZ. SR(EX MH)	"
AMBON	104-22	INDB HR	12.5 KW	1300 NM	1975	340 KHZ. OH	"
TERNATE		INDB LR	180 W	150 NM	1971	265 KHZ. TR	"

KANWIL: V

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BIAK	111-29	INDB HR	13 KW	1300 NM	1986	230 KHZ. ZN	GOOD
MERAUKE	116-34	INDB HR	13 KW	1300 NM	1986	253 KHZ. ZP	"
NABIRE		INDB HR	11 KW	1150 NM	1984	242 KHZ. ZR	"
SORONG	104-22	INDB HR	11 KW	1150 NM	1984	389 KHZ. ZO	"
FAK-FAK		INDB HR	11 KW	1150 NM	1984	310 KHZ. ZY	"
MANOKWARI		INDB HR	1500 W	1150 NM	1973	207 KHZ. ZQ	NEED CHANGE
WAMENA		INDB HR	1500 W	1150 NM	1983	222 KHZ. ZW	GOOD
JAYAPURA	112-30	INDB HR	11 KW	1150 NM	1986	395 KHZ. ZN	"
ARSO		INDB LR	1100 W	160 NM	1980	370 KHZ. ZS	TURNED OFF
BINTUNI		INDB LR	1100 W	160 NM	1982	347 KHZ. BI	NEED CHANGE
BOKONDINI		INDB LR	1100 W	160 NM	1982	261 KHZ. BD	"
ENAROTALI		INDB LR	1100 W	160 NM	1985	318 KHZ. ZL	GOOD
MULIA		INDB LR	1100 W	160 NM	1985	214 KHZ. AZ	"
MUTING		INDB LR	1100 W	160 NM	1985	203 KHZ. NG	GOOD
OKSIBIL		INDB LR	1100 W	160 NM	1979	342 KHZ. ZX	NEED CHANGE
SARMI		INDB LR	1100 W	160 NM	1982	200 KHZ. SI	"
SERUI		INDB LR	1100 W	160 NM	1982	298 KHZ. ZU	"
TANAH MERAH		INDB LR	1100 W	160 NM	1986	295 KHZ. ZH	GOOD
WAGHETE		INDB LR	1100 W	160 NM	1981	375 KHZ. ZQ	NEED CHANGE

KANWIL: VI

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BALI	109-27	INDB HR	12.5 KW	1300 NM	1971	230 KHZ. OR	GOOD
KUPANG	107-25	INDB HR	12.5 KW	1300 NM	1972	385 KHZ. OK	"
DILI KOMONO	108-26	INDB HR	1500 W	1150 NM	1984	391 KHZ. KO	"
MAUMERE	105-23	INDB HR	1500 W	1150 NM	1973	250 KHZ. NO	NEED CHANGE
SUMBWA BESAR		INDB HR	1500 W	1150 NM	1972	305 KHZ. NQ	"
WAINGAPU		INDB HR	1500 W	1150 NM	1972	295 KHZ. NR	"
AHPENAN		INDB HR	1500 W	1150 NM	1971	330 KHZ. GA	"
ATAMBUA		INDB LR	1100 W	160 NM	1975	300 KHZ. AA	"
BAUCAU		INDB LR	1100 W	160 NM	1978	305 KHZ. BC	"
LAKANTUKA		INDB LR	1100 W	160 NM	1975	288 KHZ. LN	"
SATARTACIK		INDB LR	1100 W	160 NM	1975	210 KHZ. RG	"
TAMBOLAKA		INDB LR	1100 W	160 NM		201 KHZ. WK	(maker going to replace)
BAJAWABA/FLORES		INDB LR	1100 W	160 NM	1978	281 KHZ. BW	NEED CHANGE
BIMA/PALIBELO		INDB LR	1100 W	160 NM	1984	223 KHZ. PO	GOOD
ENDE		INDB LR	1100 W	160 NM	1975	350 KHZ. DE	NEED CHANGE
OECUSI		INDB LR	1100 W	160 NM		337 KHZ. CS	Not yet insta
ROTE/LEKUNIK		INDB LR	1100 W	160 NM	1975	410 KHZ. RD	NEED CHANGE
SABU/TARDANU		INDB LR	1100 W	160 NM	1975	270 KHZ. TU	"
SUAE		INDB LR	1100 W	160 NM		340 KHZ. SA	Not yet insta

Table-2.10 Percentage of NDBs Desirable to Be Replaced

AVIATION REGION	PERCENTAGE
- Kanwil-I	83 %
- Kanwil-II	54 %
- Kanwil-III	74 %
- Kanwil-IV	86 %
- Kanwil-V	37 %
- Kanwil-V	68 %

(21) Terminal NAVAIDS such as LLZ, G/S, OM and MM have been installed at the following major airports, while details of them are shown in Table-2.11.

- | | |
|------------------------|------------------------|
| - Medan, 1984 | - Palembang, 1984 |
| - Jakarta- Halim, 1984 | - Soekarno-Hatta, 1985 |
| - Surabaya, 1985 | - Banjarmasin, 1985 |
| - Ujung Pandang, 1981 | - Manado, 1986 |
| - Ambon, 1986 | - Biak, 1984 |
| - Jayapura, 1985 | - Denpasar, 1976 |

Remarks:

- 1) The years stated-above are the years of commissioning of facilities.
- 2) Manado airport has had an aircraft operational problem because of existence of high peak on left side close to the ILS course

(22) Most of NAVAIDS seems functioning well. The following problems, however, have been identified.

- Difficult access to a navigational station for maintenance
- Shortage of spare parts, technicians and fuel supply
- Limited electricity supply
- Limited airport operation hours

Table-2.11(1) Existing ILS, PADAR

KANWIL: I

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
MEDAN	05-23	ILS G/S	15 W	25 NM	1984	NULL REF. 334.4 MHZ. 3°	GOOD
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 110.10 MHZ. 18DN	-
-	-	ILS MM	11 W	-	-	1200 m FR END R/W 05	-
-	-	ILS OM	11 W	-	-	8660 m FR END R/W 05	-
-	-	PADAR PSR	12 KW PEAK	120 NM	1977	L BAND. 1300/1340 MHZ	-
-	-	PADAR SSR	12.5 KW PK	240 NM	1980	1030/1090 MHZ	-
PEKANBARU	18-36	RADAR SSR	13.5 KW	240 NM	1978	1030/1090 MHZ	-

KANWIL: II

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
JAKARTA-HALIM	06-24	ILS DME	11 KW	150 NM	1984	CH: 52X COLOG. G/SIHLN	GOOD
-	-	ILS G/S	15 W	25 NM	-	333.5 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	111.7 MHZ. 1HLM	-
-	-	ILS MM	11 W	-	-	950 m FR END R/W 06	-
JAKARTA-SOE/TA	107R-25L	ILS G/S 25L	15 W	25 NM	1985	331.7 MHZ. 3°	-
-	107L-25R	ILS G/S 25R	15 W	25 NM	-	330.8 MHZ. 3°	-
-	107R-25L	ILS LLZ 25L	15 W	25 NM	-	111.1 MHZ.	-
-	107L-25R	ILS LLZ 25R	15 W	25 NM	-	110.9 MHZ. 1CGR	-
-	107R-25L	ILS MM 25L	12 W	-	-	FOR R/W 25L	-
-	107L-25R	ILS MM 25R	12 W	-	-	FOR R/W 25R	-
-	107R-25L	ILS OM 25L	12 W	-	-	7307 m FR END R/W 25L	-
-	107L-25R	ILS OM 25R	12 W	-	-	6439 m FR END R/W 25R	-
PALEMBANG	11-29	ILS G/S	15 W	25 NM	1984	SB REF. 329.6 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 110.5 MHZ. 3°	-
-	-	ILS MM	11 W	-	-	1050 m FR END R/W 29	-
-	-	ILS OM	11 W	-	-	7200 m FR END R/W 29	-
JAKARTA-HALIM	06-24	RADAR PSR	1400 KW PK	190 NM	1977	S BAND. 2710/2745 MHZ	-
-	-	RADAR SSR	12.5 KW PK	180 NM	-	1030/1090 MHZ	-
JAKARTA-SOE/TA	07-25	PADAR PSR	13.5 MW	150 NM	1985	L BAND. 1305/1345 MHZ	-
-	-	PADAR SSR	12.5 KW	250 NM	-	1030/1090 MHZ	-
PALEMBANG	11-29	RADAR PSR	1650 KW	190 NM	1977	S BAND. 2750/2850 MHZ	-
-	-	RADAR SSR	12.5 KW	180 NM	-	1030/1090 MHZ	-

KANWIL: III

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
BANJARMASIN	10-28	ILS G/S	15 W	25 NM	1985	NULL REF. 330.2 MHZ. 3°	GOOD
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 110.7 MHZ. 18DN	-
-	-	ILS MM	11 W	-	-	1160 m FR END R/W 10	-
-	-	ILS OM	11 W	-	-	1160 m FR END R/W 10	-
SURABAYA	110-28	ILS G/S	15 W	25 NM	-	NULL REF. 334.4 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 110.1 MHZ. 1SB	-
-	-	ILS MM	11 W	-	-	1000 m FR END R/W 10	-
-	-	ILS OM	11 W	-	-	7250 m FR END E/W 10	-
SEMARANG	113-31	RADAR SSR	12.5 KW	240 NM	1980	1030/1090 MHZ	-

KANWIL: IV

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMMISS INSTAL	EQUIPMENT DATA	CONDITION
MANADA	118-36	ILS G/S	15 W	25 NM	1986	NULL REF. 330.8 MHZ	GOOD
-	-	ILS LLZ	15 W	25 NM	-	2F. 14E. 110.9 MHZ. 1HNO	-
-	-	ILS MM	11 W	-	-	1050 m FR END R/W 36	-
-	-	ILS OM	11 W	-	-	7700 m FR END R/W 36	-
UJUNG PANDANG	113-31	ILS DME	11 KW	150 NM	1981	CH: 50X. IUPG	-
-	-	ILS G/S	15 W	25 NM	-	NULL REF. 332.3 MHZ. 3°	-
-	-	ILS G/S	15 W	25 NM	-	SB REF. 332.3 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 113.3 MHZ. IUPG	-
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 113.3 MHZ. IUPG	-
-	-	ILS MM	11 W	-	-	1050 m FR END R/W 13	-
ANBON	104-22	ILS DME	11 KW	150 NM	1986	CH: 40X. COLLOC G/S. 1AHN	-
-	-	ILS G/S	15 W	25 NM	-	SB REF. 335.0 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	2F. 12E. 110.3 MHZ. 3°	-
-	-	ILS MM	11 W	-	-	975 m FR END R/W 04	-
UJUNG PANDANG	113-31	RADAR PSR	12 MW PK	120 NM	1981	L BAND. 1274/1333 MHZ	-
-	-	RADAR SSR	12.5 KW	240 NM	-	1030/1090 MHZ	-

Table-2.11(2) Existing ILS, PADAR

KANWIL: V

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMNISI INSTAL	EQUIPMENT DATA	CONDITION
BIAK	11-29	ILS DME	11 KW	150 NM	1984	CH: 42X. COLLOC. G/S IBIK	GOOD
-	-	ILS G/S	15 W	25 NM	-	NULL REF. 329.6 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	1F. 12E. 110.6 MHZ. IBIK	-
-	-	ILS NN	1 W	-	-	950 a FR END R/W 11	-
JAYAPURA	12-20	ILS DME	11 KW	150 NM	1985	CH: 40X. COLLOC. G/S. IJPA	-
-	-	ILS G/S	15 W	25 NM	-	CE. 335.0 MHZ. 3°	-
-	-	ILS LLZ	15 W	25 NM	-	2F. 14E. 110.3 MHZ. IJPA	-
-	-	ILS NN	1 W	-	-	1080 a FR END R/W 30	-

KANWIL: VI

LOCATION	R/W	EQUIPMENT	POWER	RANGE	COMNISI INSTAL	EQUIPMENT DATA	CONDITION
BALI	09-27	ILS DME	11 KW	150 NM	1981	CH: 40X. COLLOC. G/S. IDPS	GOOD
-	-	ILS G/S	110 W	118 NM	1976	CE. 335.0 MHZ. 3°	-
-	-	ILS LLZ	110 W	118 NM	-	1F. 110.3 MHZ. IDPS	-
-	-	ILS NN	1 W	-	-	950 a FR END R/W 27	-
-	-	RADAR PSR	1650 KW PK	190 NM	1977	S BAND. 2750/2850 MHZ	-
-	-	RADAR SSR	2.5 KW PK	180 NM	1978	1030/1090 MHZ	-

2.04 COMMUNICATIONS

(23) As to communication for aeronautical services, there are systems as follows.

- AFS or Aeronautical Fixed Service
 - * AFTN or Aeronautical Fixed Telecommunication Network
 - * ATS or Aeronautical Telecommunication System, Direct Speech Circuit
- AMS or Aeronautical Mobile Service
 - * VHF ER (Extended Range) Communications
 - * HF En-Route Communications
 - * Terminal VHF Communications
- MET or Meteorological Telecommunications

(24) AFTN has been operating through Perumtel Satellite and microwave leased channel as shown in Figures-2.10 and 2.11. Some RTT (Radio Teletype) and ATS Direct Speech Circuits are still being operated on HF. There exists AMSC or Automatic Message Switching Center at:

- Jakarta, Soekarno-Hatta (WIIIFY)
- Medan (WIMMYF)
- Palembang (WIPPYF)
- Surabaya (WRSSYF)
- Denpasar (WRRRYF)
- Ujung Pandang (WAAAYF)

There were 16 land line circuits (LTT-2 CH) to connect with the local stations as of 1985 April. These have been increased up to 22 circuits. There are 4 more circuits under plan.

(25) As to ATS Direct Speech Circuit, there are 9 Voice and Teletype circuits at present connecting major stations through Perumtel satellite and microwave leased channels as shown on Figure-2.12. There are 24 more circuits under plan.

(26) ATC-Pilot direct communication sometimes can not

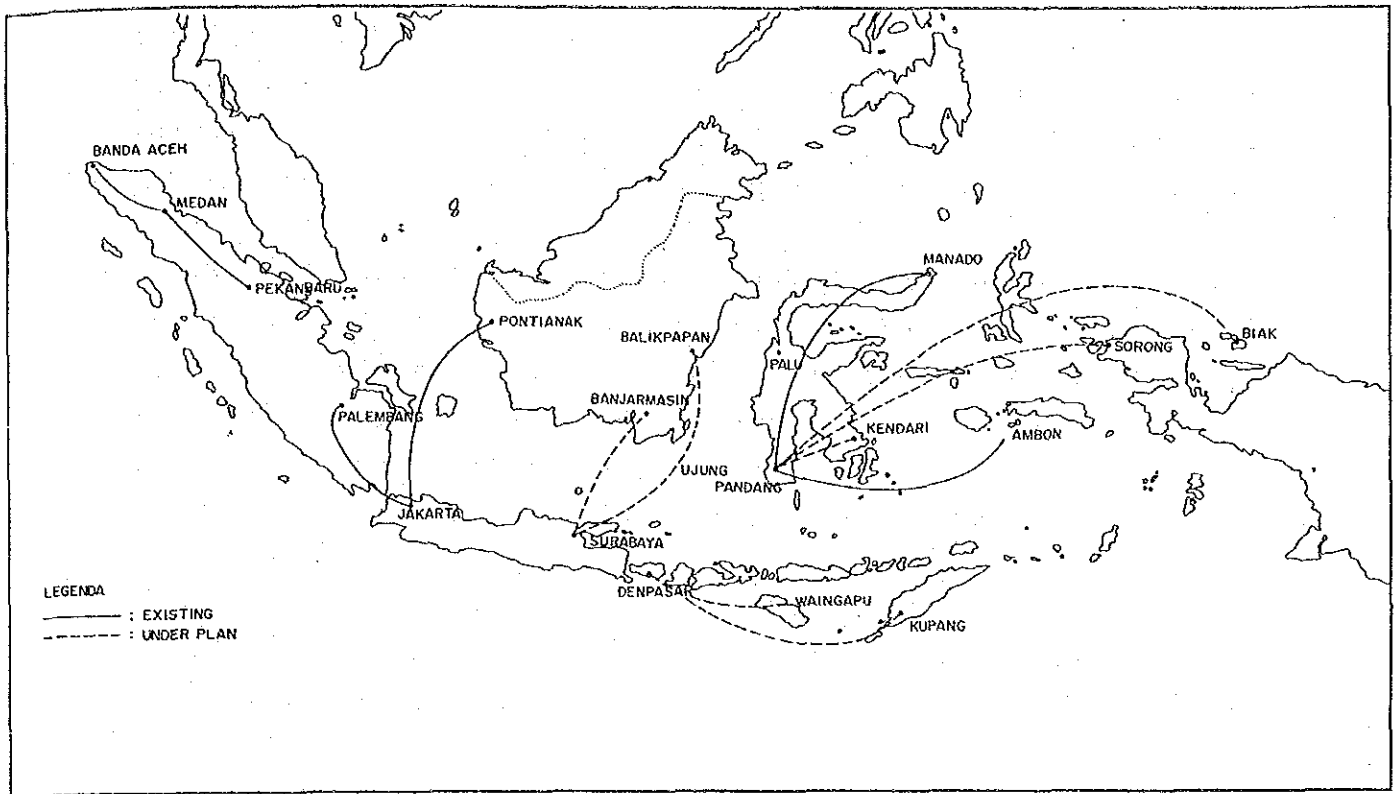


Figure-2.13 VHF EXTENDED RANGE CIRCUIT (AIR-GROUND)

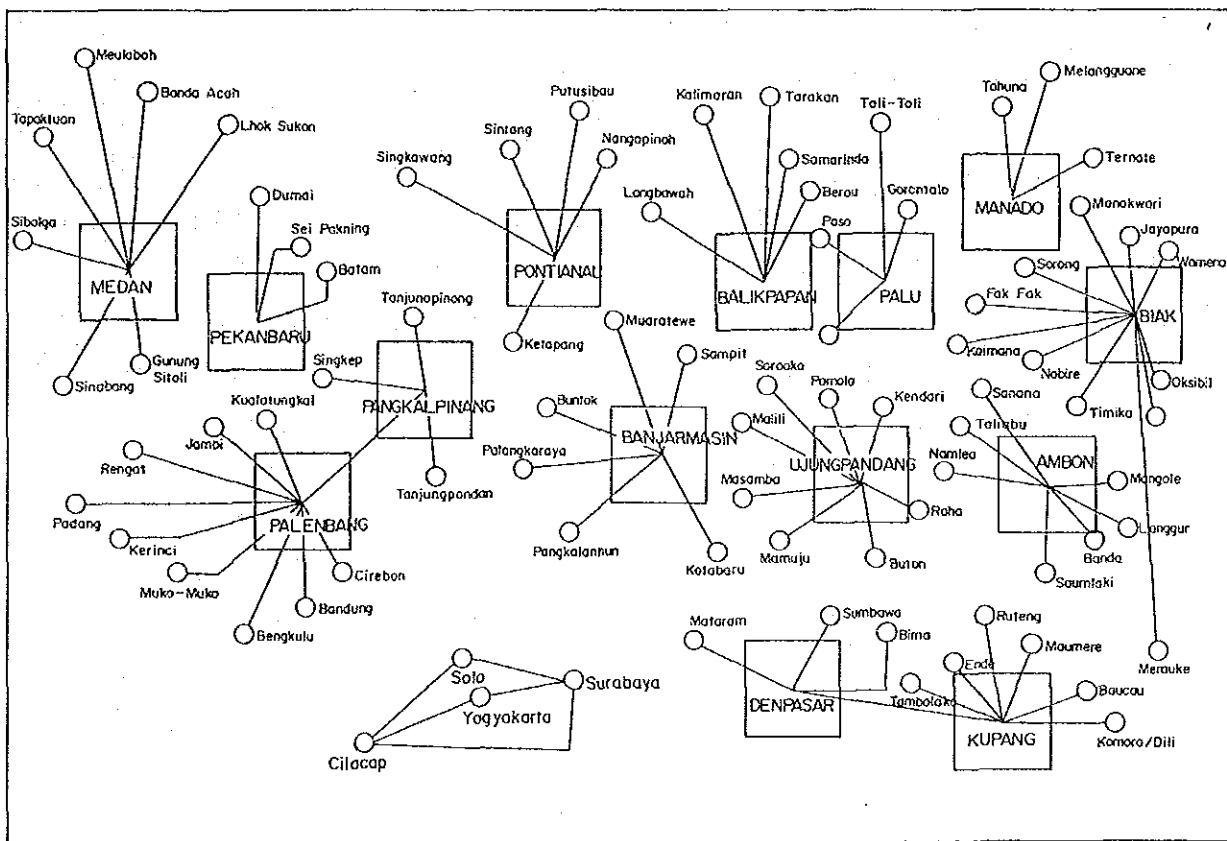


Figure-2.14 FIXED VOICE NETWORK TO CONNECT SMALL AIRFIELD WITH ACC

Updated 31 Oct 87

(27) HF communications to provide FIS for international en-route flight are available at Jakarta, Bali and Ujung Pandang. There are also FIS for domestic en-route flights. Improvement of these communications would be necessary.

(28) VHF equipments for Approach and Aerodrome Control Services at most of the local airports is of an old tube-circuit type. Their serviceability seems better in comparison with that for en-route, because the equipments are not necessarily to have long range, and they are located at the airports easy to access for maintenance.

(29) ATC of Jakarta FIR/UIR and its operation are hereinafter described. ACC at Chengkareng is divided into 2 sectors, Upper and Low. The former is further subdivided into as follows.

- UK, Upper Kalimantan
- US, Upper Semarang
- UP, Upper Palembang
- UT, Upper Tanjung Karang

The latter is composed of;

- LN, Low north
- LE, Low east

The actual peak day IFR movement is recorded at 473 on May 27 from the data between January through June, 1987. The peak hour movement of that day is 37, as shown on Table-2.12. Flight Data Processing strips of that day are summarized in Table-2.13.

Table-2.12 Peak-Day/Peak-Hour IFR Movement

PERIOD: JANUARY - JUNE 1987

NUMBER	MONTH	TOTAL	RANGE	PEAK HOUR	AVERAGE PER DAY	STANDARD DEVIATION
			WITH DATE/DAY	(WIB/TOTAL) INDONESIA WEST TIME		
1	January	11.931	348 - 429 05/Monday - 04/Sunday	17.00 - 18.00 29	348	19.0
2	February	10.649	342 - 432 23/Monday - 06/Friday	15.00 - 16.00 39	382	18.0
3	March	11.676	243 - 405 15/Sunday - 10/Tuesday	15.00 - 16.00 38	373	18.5
4	April	11.406	336 - 409 23/Thursday - 03/Friday	15.00 - 16.00 41	380	19.7
5	May	12.184	343 - 473 04/Monday - 27/Wednesday	15.00 - 16.00 37	393	27.9
6	June	12.077	370 - 447 08/Monday - 18/Thursday	15.00 - 16.00 38	401	19.3

* Including International Flights

* Peak-day for all Islamic: Date 29/30 MAY 1987

Table-2.13 Chengkareng ACC Traffic Handling from FDP (Peak Day)

[UPPER]														LEGEND:			
FL	410	390	370	350	330	310	290	280	270	260	250	UNKNOWN	TOTAL	FL : Flight Level			
OVF		3	5	13	6	3	2	0	2	0	20	0	34	OVF: Over Flight			
DEP:	1	5	10	7	12	9	17	7	1	1	1	2	73	DEP: Departure			
ARR:	2	5	10	9	12	3	7	18	4	1	1	5	77	ARR: Arrival			
													184				
[LOW]																	
FL	155	115/135		TOTAL													
OVF	1	1		2													
FL	390	370	350	330	310	290	280	270	260	250	240	230	220	210	175	170	165
DEP:	4	7	6	6	12	20	6	4	6	6	9	9	2	7	1	1	4
FL	155	150	145	135	130	125	115	110	UNKNOWN		TOTAL						
DEP:	5	3	2	1	4	1	3	3	4		136						
[LOW]																	
FL	390	370	350	330	310	290	280	270	260	250	240	230	220	210	175	165	155
ARR:	1	3	4	5	3	3	8	2	1	13	13	5	9	0	2	2	4
FL	150	145	140	135	125	120	115	105	100	099	UNKNOWN		TOTAL				
ARR:	3	6	3	2	5	6	4	1	9	1	14		132				
<u>GROUND TOTAL 454</u>																	

2.05 AERONAUTICAL METEOROLOGY

(30) As to the aeronautical meteorology, the five regional centers are located at Jakarta, Medan, Ujung Pandang, Denpasar and Jayapura. Area meteorological watch for Jakarta and Bali FIRs is provided at Jakarta, while Ujung Pandang and Biak FIRs done by Ujung Pandang. Based on ICAO Annex 3 standards and recommendations, briefing and flight documentation are provided at MET offices of the airports. Flight Meteorological Services are available from:

- Main Meteorological Office (MMO):
Class-I Station
- Dependent Meteorological Station (DMO):
Class-II Station
- Supplementary Meteorological Station (SMO):
Class III Station.

(31) There are four types of aeronautical meteorological services as mentioned below.

A) Forecast services are provided by MMO to the five Forecast Area, which are under the supervision of the respective MMO such as:

- Forecast Area I : Polonia, Medan
- Forecast Area II : Halim Perdana Kusuma, Jakarta
- Forecast Area III : Ngurah Rai, Denpasar and
Juanda, Surabaya
- Forecast Area IV : Hasanuddin, Ujung Pandang
- Forecast Area V : Frans Kaisiepo, Biak

B) Meteorological reports for take-off and landing are prepared every half hour. Weather forecast for landing is in a form of Trend Type Landing Forecast, which is issued every half or one hour and limited to airports served by MMO or DMO.

The meteorological informations are provided directly to Aerodrome Control Tower. The presentation modes vary, depending on the equipment available at the airport concerned.

C) In-flight services on the meteorological information are available as requested through the Flight Information Center or the appropriate ACC to which MET office prepares and issues information (METAR & SPECI) every half or one hour.

SIGMAT transmission and warning information are issued on the first priority. VOLMET broadcast of METAR, SPECI and AIREP are provided by Singapore to the specific airports.

Chengkareng is now conducting VOLMET broadcast of METAR and SPECI. Some major airports have ATIS for broadcasting meteorological information.

D) RVR (Runway Visual Range) is measured by MET office at the airports as the horizontal visual guidance for a pilot on the critical landing phase.

