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**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
ETHIOPIAN TELECOMMUNICATIONS CORPORATION (ETC)**

**THE STUDY
ON
TELECOMMUNICATIONS DEVELOPMENT PLAN
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA**

Volume II

MASTER PLAN

FINAL REPORT

December 2002

**PANTEL INTERNATIONAL CO., LTD.
YACHIYO ENGINEERING CO., LTD.**

PREFACE

In response to a request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan decided to conduct the Study on Telecommunications Development Plan and entrusted the study to the Japan International Cooperation Agency (JICA).

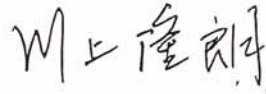
JICA selected and dispatched the study team headed by Mr. Ryoji Sasaki of Pantel International Co., Ltd. (consisting of Pantel International Co., Ltd. and Yachiyo Engineering Co., Ltd.) to Ethiopia, three times between March 2001 and November 2002. In addition, JICA set up the advisory committee headed by Mr. Takashi Miyashita, Senior Advisor, International Cooperation Division, Telecommunications Bureau, Ministry of Public Management, Home Affairs, Posts and Telecommunications between November 2001 and December 2002.

The team held discussions with the officials concerned of the Government of the Federal Democratic Republic of Ethiopia, and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and the enhancement of friendly relationship between the two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Federal Democratic Republic of Ethiopia for their close cooperation extended to the Study.

December 2002



Takao Kawakami

President

Japan International Cooperation Agency

Mr. Takao Kawakami
President
Japan International Cooperation Agency

December 2002

Dear Mr. Kawakami:

Letter of Transmittal

It is our great pleasure to submit to you the Final Report on the Study on Telecommunications Development in the Federal Democratic Republic of Ethiopia with cooperative efforts of Ethiopian Telecommunications Corporation and other parties concerned. The report has been prepared for the Government of the Federal Democratic Republic of Ethiopia to contribute to the telecommunication development in the country.

This report has been prepared by PANTEL INTERNATIONAL CO., LTD. and YACHIYO ENGINEERING CO., LTD, based on the contract with JICA. The study team conducted the work from November 2001 to December 2002.

The study aims at formulating the master plan for telecommunications development up to the year 2020 and feasibility study for priority projects which will be implemented by the year 2005 in the Federal Democratic Republic of Ethiopia.

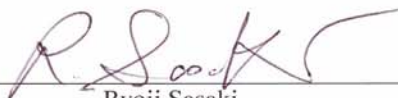
Objective areas of the study are the whole country for the master plan and several target areas for the feasibility study. Through field surveys and analyses of data/information collected, the master plan has been drawn up covering mainly development targets and strategies including sector business strategy, network development plan, implementation plan, operation/maintenance plan, organization and human resource development plan as well as cost estimate and project evaluation. The feasibility study has been carried out for three priority projects identified as the result of the master plan study.

The report consists of five volumes: the Summary, Master Plan, Feasibility Study, Supporting Report and the Data Book. The Summary presents the outline of the study results, and the Master Plan/ Feasibility Study Reports give all the Study results regarding telecommunication development. The Supporting Report describes the detailed study results, data and information referred during the study period, and detailed data for cost estimation. The Data Book presents the detailed data referred in the main report.

I wish to take this opportunity, on behalf of the Study Team, to express our deep gratitude to the officials concerned of the Japan International Cooperation Agency and other authorities concerned of the Government of Japan for providing valuable comments and suggestions. The Study Team wishes to offer our sincere appreciation to the officials concerned of Ministry of Finance and Economic Development, Ethiopian Telecommunications Corporation, and other authorities concerned of the Government of Ethiopia for their unlimited cooperation and assistance extended to the study team.

Finally, The Study Team earnestly hopes that this report will contribute to future telecommunications development in the Federal Democratic Republic of Ethiopia.

Sincerely yours,



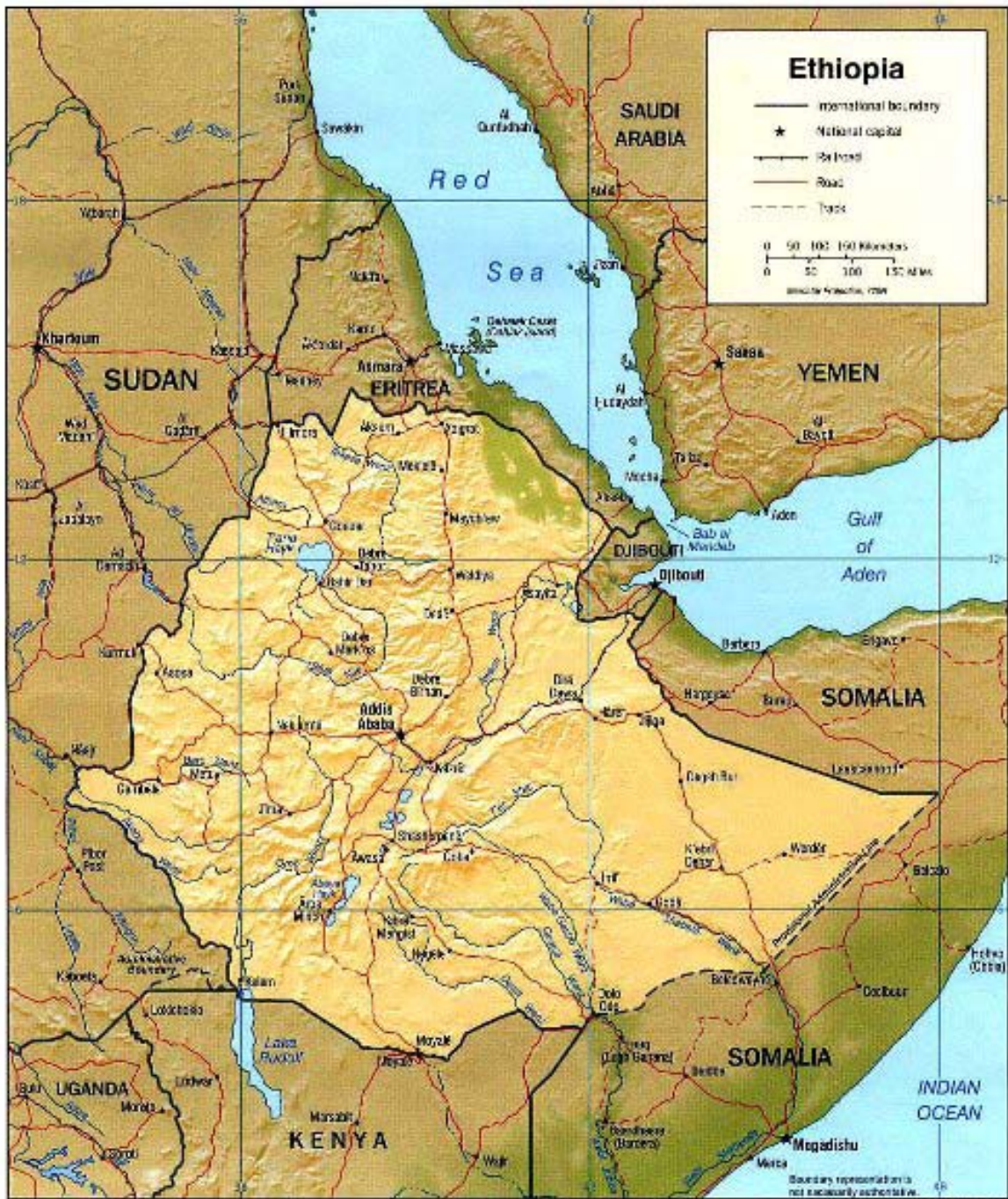
Ryoji Sasaki
Team Leader

Study on Telecommunications Development Plan
in the Federal Democratic Republic of Ethiopia

THE STUDY ON TELECOMMUNICATIONS DEVELOPMENT PLAN
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

COMPOSITON OF THE REPORTS

VOLUME I	SUMMARY
VOLUME II	MASTER PLAN
VOLUME III	FEASIBILITY STUDY
VOLUME IV	SUPPORTING DOCUMENTS FOR MASTER PLAN
VOLUME V	DATA FILE FOR MASTER PLAN



Final Report

The Study on Telecommunications Development Plan
in the Federal Democratic Republic of Ethiopia

VOLUME II Master Plan

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List of Abbreviations

Abbreviations		Abbreviations		
A:	AA	Addis Ababa	L: LAN	Local Area Network
	AC	Area Code	LE	Local Exchange
	ADLI	Agricultural Development Led Industrialization	LRE	Low Rate Encoder
B:	BSC	Base Station Controller	M: MEA	Multi Exchange Area
	BTS	Base Transceiver Station	MoFED	Ministry of Finance and Economic Development
C:	CC	Country Code	MSC	Mobile Switching Center
	CCS	Common Channel Signaling	MSSP	Multiplex Section Shared Protection
	CDMA	Code Division Multiple Access	N: NGO	Non-Governmental Organization
	CIMIS	Corporate Integrated Management Information System	NMS	Network Management system
	CMR	Children Mortality rate	O: O&M	Operation and Maintenance
	CPU	Central Process Unit	OC	Office Code
	CRT	Cathode Ray Tube	OPGW	Optical Fiber Composite Overhead Ground Wire
	CSA	Central Statistical Authority	OPMC	Outside Plant Maintenance Center
D:	DAMA	Demand Assignment Multiple Access	OPS	Operator Service
	DCME	Digital Circuit Multiplication Equipment	P: PC	Primary Center
	DECT	Digital Enhanced Cordless Telecommunications	PCO	Public Call Office
	DF	Direction Finder	PDC	Personal Digital Cellular Telecommunication System
	DRCS	Digital Radio Concentrator System	PDCA	Plan, Do, Check, Action.
	DRMASS	Digital Radio Multi-Access Subscriber System	PDH	Plesiochronous Digital Hierarchy
E:	EPECO	Ethiopian Electric Power Corporation	PHS	Personal Handy-phone System
	EIRR	Economic Internal Rate of Return	POP	Point of presence
	ERL	Erlang	PRSP	Poverty Reduction Strategic Programme
	ETA	Ethiopian Telecommunications Agency	PSDP	Power Sector Development Programme
	ETC	Ethiopian Telecommunication Corporation	PSTN	Public Switched Telephone Network
	ETSI	European Telecommunication Standards Institute	Q: QoS	Quality of Service
F:	FIRR	Financial Internal Rate of Return	R: RAX	Remote Area Exchange
	FIRROE	Financial Internal Rate of Return on Equity	RSDP	Road Sector Development Programme
	FIRROI	Financial Internal Rate of Return on Investment	RSS	Remote Switching System
	FOT	Fiber Optic Transmission System	S: SC	Secondary Center
G:	GC	Gregorian Calendar	SCF	Standard conversion Factor
	GDP	Gross Domestic Product	SCPC	Single Channel per Carrier
	GK	Gate Keeper	SDH	Synchronous Digital Hierarchy
	GMT	Greenwich Mean Time	SIM	Subscriber Identity Module
	GoE	Government of Ethiopia	SIP	Standard Installation Practice
	GOS	Grade of Service	SMS	Short Message System
	GPRS	General Packet Radio Service	SN	Subscriber Number
	GRDP	Gross Regional Domestic Product	SOP	Standard Operation/Maintenance practice
	GSM	Global System for Mobile communications	STM	Synchronous Transfer Mode
	GW	Gateway switch	T: TDM	Tandem
H:	HF	High Frequency	TDMA	Time Division Multiple Access
	HQ	Headquarters	TQC	Total Quality Control
	HSDP	Health Sector Development Program	TVRO	TV Receiving Only
I:	ICB	International Competitive Bid	U: UHF	Ultra High Frequency
	ICT	Information And Communication Technology	UMTS	Universal Mobile Telecommunication System
	IMT	International Mobile Telecommunication system	UNEP	United Nations Environment Programme
	IP	Internet Protocol	USD	United State Dollar
	IT	Information Technology	V: VHF	Very High Frequency
	ITU	International Telecommunication Union	VoIP	Voice over Internet Protocol
	ITU	International Telecommunication Union	VSAT	Very Small Aperture Terminal
J:	JICA	Japan International Cooperation Agency	W: WLL	Wireless Local Loop