NO. 1

JAPAN INTERNATIONAL COOPERATION AGENCY
(MINISTRY OF COMMUNICATIONS, TRANSPORT, POSTS AND CONSTRUCTION)
(THE LAO PEOPLE'S DEMOCRATIC REPUBLIC)

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF SATELLITE COMMUNICATION SYSTEM
IN
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

MARCH, 1995

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PREFACE

In response to a request from the Government of the Lao People's Democratic Republic, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Satellite Communication System and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Laos a study team headed by Mr. Yusuke Kitamura, Director, Training Div., Tsukuba International Center of JICA and constituted by members of KDD Engineering and Consulting, Inc. and Nippon Telecommunications Consulting Co., Ltd., from October 10 to November 5, 1994.

The team held discussions with the officials concerned of the Government of Laos, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Laos in order to discuss a draft report, and as this result, the present report was finalized.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Loa People's Democratic Republic for their close cooperation extended to the team.

March 1995

Kimio Fujita
President
Japan International Cooperation Agency

March 1995

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Satellite Communication System in Loa People's Democratic Republic.

This study was conducted by KDD Engineering and Consulting, Inc. and The Nippon Telecommunications Consulting Co., Ltd., under a contract to JICA, during the period September 29, 1994, to March 31, 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Lao P.D.R. and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

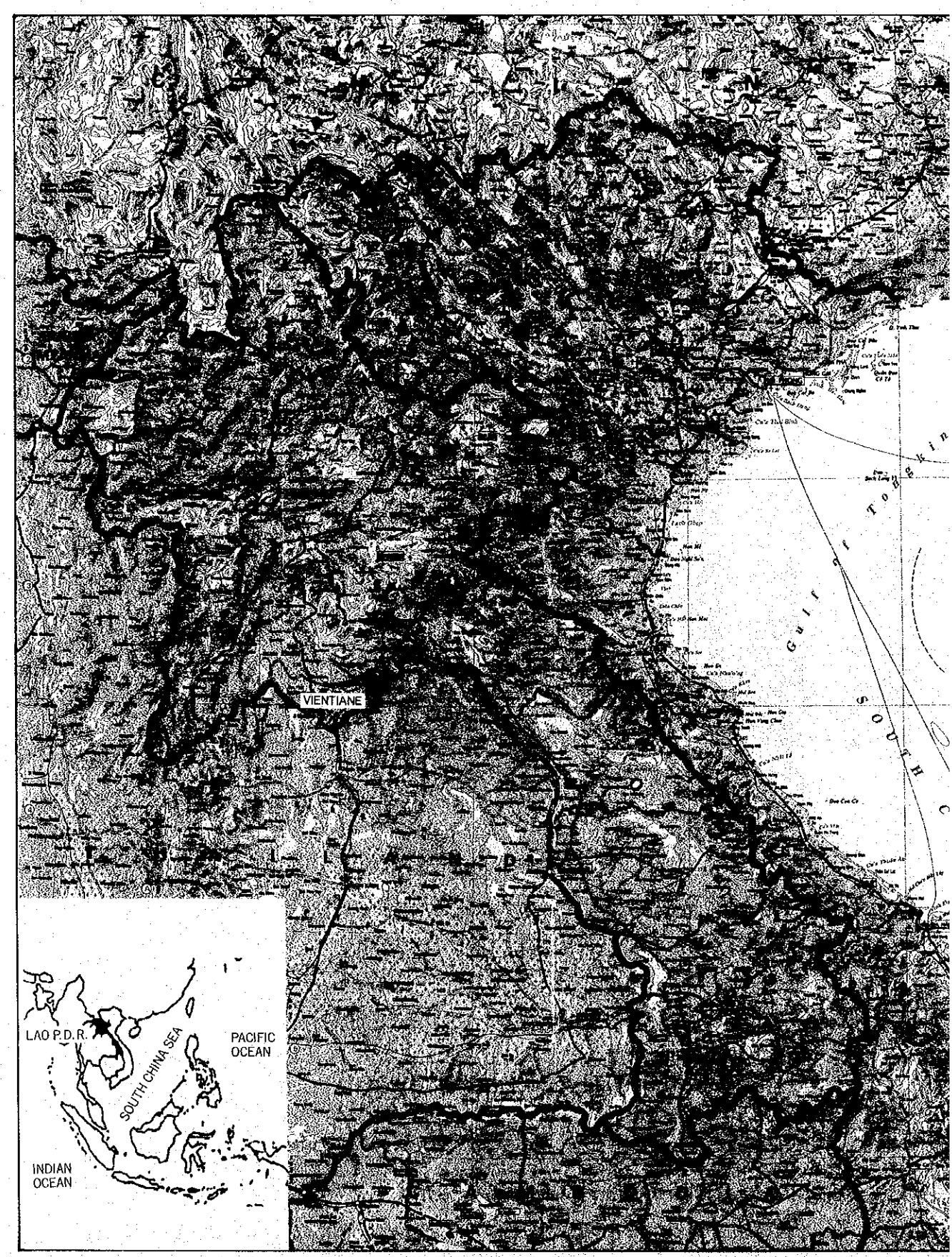
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and the Ministry of Posts and Telecommunications. We would also like to express our gratitude to the officials concerned of the Ministry of Communications, Transportation, Posts and Construction, Entreprise d'Etat des Postes et Telecommunications Lao for their cooperation and assistance throughout our field survey.

Finally, we hope that this report will contribute to further promotion of the project.

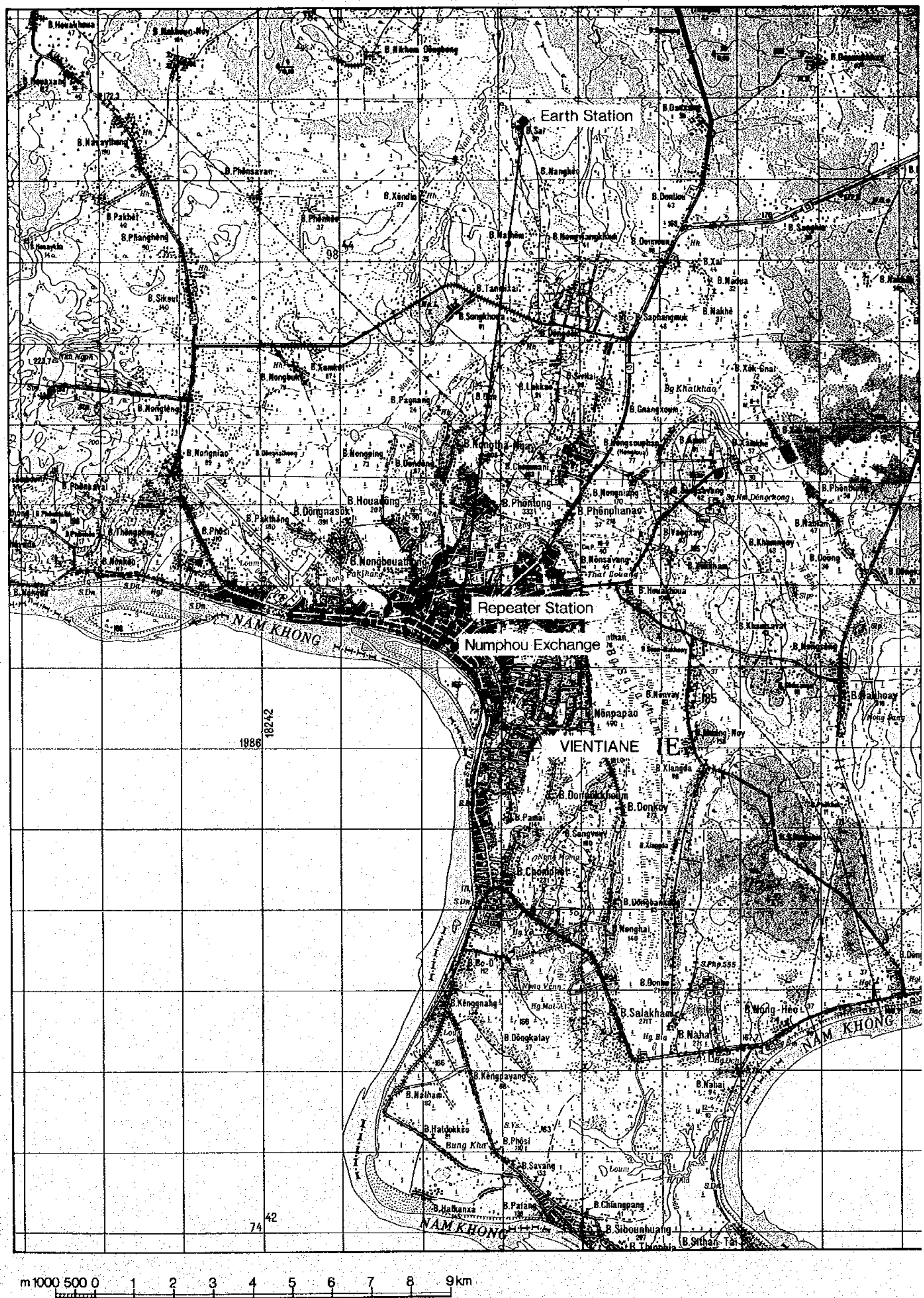
Very truly yours,

Toru Kizuka
Chief consultant
Basic design study team
on the Project for Improvement of Satellite
Communication System in the Loa People's
Democratic Republic
KDD Engineering and Consulting, Inc.
Nippon Telecommunications Consulting Co., Ltd.

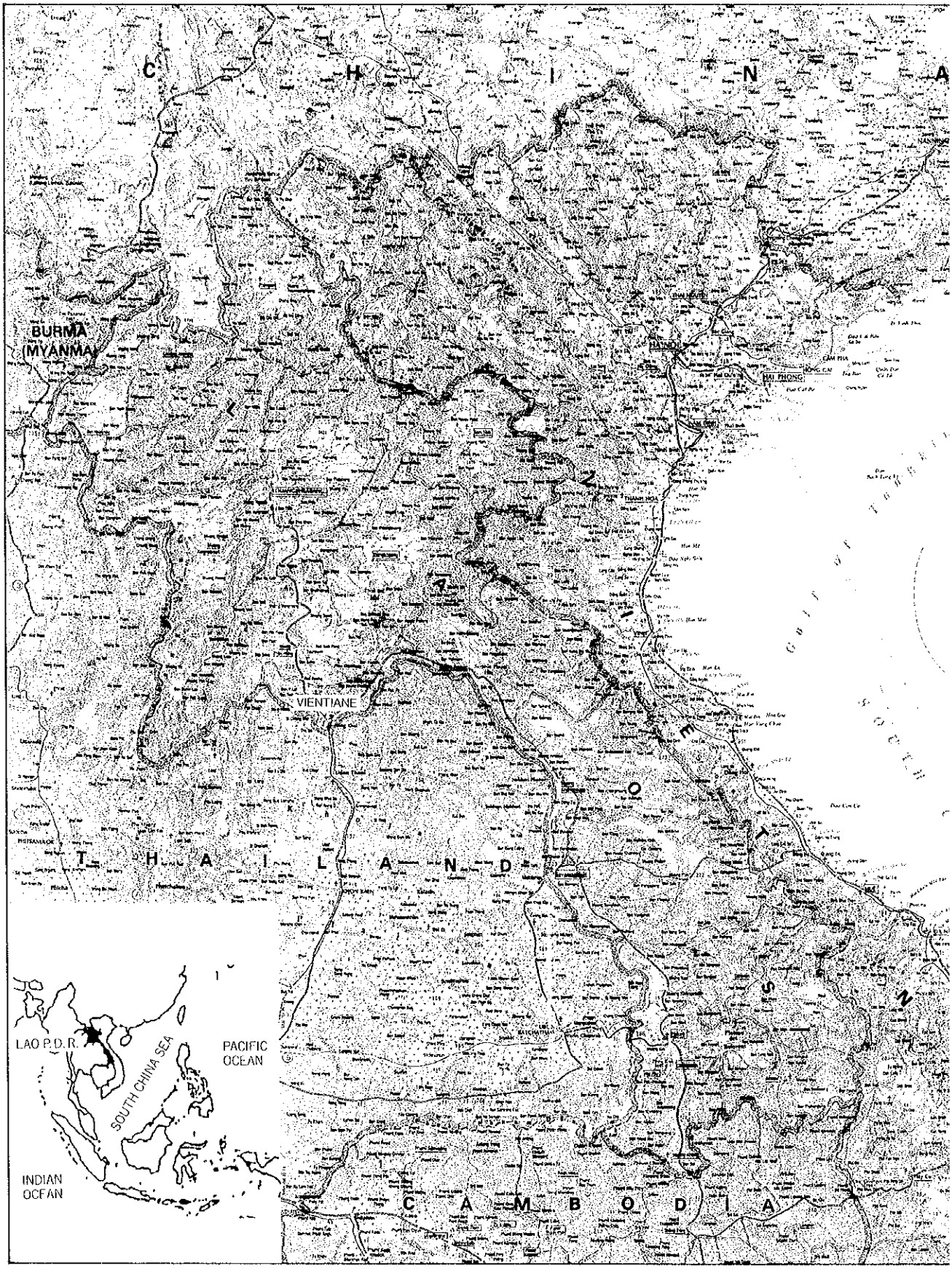
The Lao People's Democratic Republic



Project Sites



The Lao People's Democratic Republic



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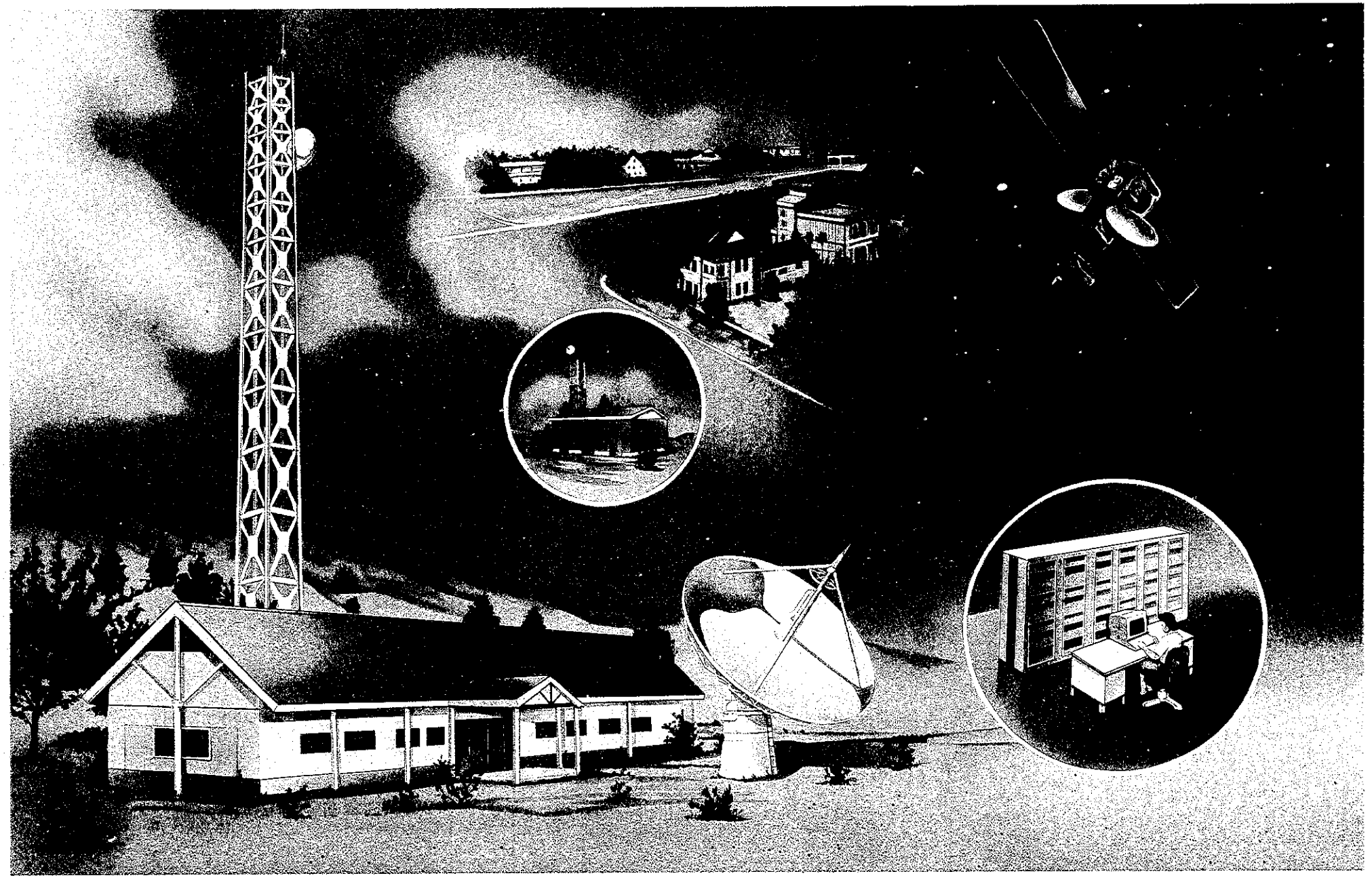

The Project for Improvement of Satellite Communication System
in The Lao People's Democratic Republic

SUMMARY

Summary

Although the Lao People's Democratic Republic (the Lao PDR) has promoted moderate socialist programs since the revolution by the Lao People's Revolutionary Party in 1975, economic development was impeded by a deadlock in the planned economy caused by the centralization of power. To revitalize the economy, the Government of the Lao PDR in 1986 adopted a new economic policy which is called the "new economic mechanism." This program has encouraged more autonomy for national enterprises, the promotion of foreign trade and investment, and a liberalization of the nationwide distribution system.

The Government of Lao PDR recognized the importance of telecommunication services and actively promoted, since 1986, the improvement of telecommunication systems through programs called "Telecom I" and "Telecom II."

Especially in Telecom II starting in 1990, the telephone network covering the six major cities, including the capital Vientiane, was upgraded, making a quantum leap improvement in the domestic telecommunications network. The above mentioned introduction of the telephone switching systems for the six cities was made possible by grant aid from Japan.

International communications connect the Lao PDR by microwave (60 lines) to neighboring Thailand, and by satellite communications (75 lines) with other countries. Since the existing earth station for satellite communications is relatively small, it will soon be unable to cope with increasing demand.

As the existing earth station is small (standard F-3 size), high charges must be paid for satellite use. Moreover, since most international calls are routed via Australia, transit fee payments increase costs in comparison with direct trunks. These problems can be solved by constructing a new earth station for international telecommunications, but it is rather hard to procure the capital for constructing a new earth station for international communications due to the financial status of the Lao PDR.

For this reason, the Laotian Government requested the Japanese Government for grant aid for the improvement of international telecommunications for nationals, economic development by foreign investment promotion by improving the international communications infrastructure.

The initial request consisted of construction of a Standard-A earth station and construction of microwave transmission systems (from the earth station to Numphou Exchange, and from the earth station to the television broadcasting station).

Based on this request, the Japanese Government, after thorough examination, decided to perform a Basic Design Study. According to this decision, JICA sent a basic design study team to the Lao PDR from October 10 through November 5, 1994.

During the field survey, the study team held discussions with officials of the Laotian government and relevant organizations, and the situation was carefully examined. The initial request turned out to have some points that need to be changed or reinforced. These points are :

(1) The television transmission network, while deemed necessary in the future, is not in great demand for the time being and therefore was deleted from the request.

(2) Although 70 lines including one television channel were initially requested, the numbers of lines and destinations to be installed will be calculated according to the demand forecast in the study.

(3) The increase of international trunks, although not included in the initial request, will be accomplished to provide the necessary capacity shortage of the telephone switching system.

(4) To reinforce international switching functions, presently insufficient, the telephone switching system and billing system will be fortified.

From an examination based on the premise that this project will be carried out with grant aid from Japan, it has been judged appropriate that the project should be implemented in two separate phases. Each phase is as follows:

Phase 1: Reinforcement of functions and expansion of line capacity of the existing telephone switching system and billing system

Phase 2: Construction of a Standard-A earth station and approach link, together with associated necessary station buildings.

The Basic Design is as follows:

- As a result of the demand forecast, 154 international lines and 15 destinations will be initially installed.

Phase 1 construction:

- The existing switching system should have 9 additional DTI (Digital Trunk Interface)'s and

associated necessary facilities.

- The international functions of the existing switching system and billing system should be reinforced.

Phase 2 construction:

- The earth station should be a Standard-A type with a 16 meter diameter antenna.
- The communication system should be the IDR (Intermediate Data Rate) type.
- The communications satellite should be an INTELSAT satellite at 66 degrees.
- The approach link should be a digital type with transmission rate of 34 Mbit/s.
- The approach link should consist of an unattended repeater station to be constructed in Vientiane, an optical fiber cable system to connect Numphou Exchange and the repeater station, and a microwave transmission system using the 7 GHz frequency band to connect the transit station and the earth station.
- The approach link should include two routes of underground ducting from Numphou Exchange to the repeater station, and two towers, one approx. 60 meters high in the repeater station and one approx. 40 meters high in the earth station, for the microwave transmission system.
- In the earth station, a satellite communications building and an engine generator house should be constructed, while in the repeater station, an engine generator house should be constructed.

Major facilities and equipment for each phase are as follows:

Phase 1 (Numphou Exchange)		
Item		Quaantity
Equipment for expansion	Digital Trunk Interface	9
	Switchboard	5
	Display equipment	1
	Input/output interface	1
	Measuring equipment	1
Upgrade of functions	Signaling	1
	Traffic measurement	1
	Billing system	1
	Return-traffic function	1
Equipment newly installed	Standard clock	1
	Echo canceler	11

Phase 2 (Earth Station, Repeater Station, Numphou Exchange)		
Item		Quantity
Standard-A earth station	Antenna system	1
	Ground Communication Equip.	1
	Monitor and Control system	1
	Power supply	1
Approach Link	Microwave transmission system	1 each at E/S and R/S
	Tower	1 each at E/S and R/S
	Digital terminal equipment	1 each at E/S and C/S
	Fiber-optic transmission system	1 each at R/S and C/S
	Fiber-optic cable	2 routes (conduit-type)
	Power supply	1 at R/S
Station building	Satellite communications building	1 at E/S
	Engine generator house	1 each at E/S and R/S

Remarks: E/S: Earth Station, R/S:Repeater Station, C/S:Numphou Central Station

The expected duration of time for implementation of the project is as follows:

	Detail Design	Implementation
Phase 1	2 months	10.5 months
Phase 2	4 months	12 months

This project will relieve of the present shortage of international lines and provide beneficial effects such as improved quality of international telephone calls and reduction of the costly transit charge and minimization of the satellite use charge. These effects will improve the financial foundation of the operating agency and support the development activity on the domestic networks, too. In addition, it is anticipated that there will be no concerns about manpower and cost for maintaining the systems; the cost can be recovered by the revenues from international telecommunications services.

As these beneficial effects are expected and no particular problems on organizational structure and financial situations for maintaining the systems are foreseen, the implementation of this project as a grant aid is concluded to be extremely significant.

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