


MINISTRY OF COMMUNICATIONS AND TRANSPORTATION
DEPARTMENT OF TELECOMMUNICATIONS

THE STUDY ON
THE STATE OF
INTERNET COMMUNICATIONS DEVELOPMENT IN
THE
RURAL AREAS OF DEMOCRATIC REPUBLIC OF KOREA

FINAL REPORT
(DATA BOOK)

NOVEMBER 2007

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MINISTRY OF COMMUNICATION, TRANSPORT, POST AND CONSTRUCTION
ENTERPRISE OF TELECOMMUNICATIONS LAO

THE STUDY
ON
THE TELECOMMUNICATIONS DEVELOPMENT
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT
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NOVEMBER 2002

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO.,LTD.

INFOCOM RESEARCH, INC.



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PREFACE

In response to a request from the Government of Lao People's Democratic Republic, the Government of Japan decided to conduct the Study on the Telecommunications Development in Lao People's Democratic Republic and entrusted the study to the Japan International Cooperation Agency (JICA).

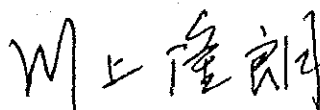
JICA dispatched a study team headed by Dr. Tomotaka TANIGUCHI of Nippon Koei Co., Ltd. organized by Nippon Koei Co., Ltd. and InfoCom Research, Inc. to Lao P.D.R. three times from October 2001 to November 2002.

The team held discussions with the officials concerned of the Government of Lao P.D.R., and conducted related field surveys. After returning to Japan, the team conducted further studies and compiled the final results in this report.

I hope this report will contribute to the improvement of the situation of telecommunication services in Lao P.D.R. and to enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Lao P.D.R. for their close cooperation throughout the study.

November 2002



Takao KAWAKAMI

President

Japan International Cooperation Agency

November 2002

Mr. Takao Kawakami
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Kawakami,

Letter of Transmittal

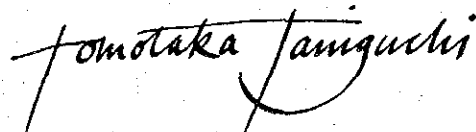
We are pleased to submit you the final report on the Study on The Telecommunications Development in Lao People's Democratic Republic.

This study was conducted by the joint venture of Nippon Koei Co., Ltd. and InfoCom Research, Inc. under a contract to JICA, during the period from October 2001 to November 2002. In conducting the study, we have formulated the Master Plan for the telecommunications development in Lao P.D.R. up to year 2015.

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 Public Management, Home Affairs, Posts and Telecommunications. We would also like to express our gratitude to the officials concerned of the Ministry of Communication, Transport, Post and Construction, the Enterprise of Telecommunications Lao and Embassy of Japan in Lao P.D.R. 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,



Tomotaka TANIGUCHI

Team Leader

The Study on The Telecommunications Development in
Lao People's Democratic Republic

Nippon Koei Co., Ltd.

THE STUDY
ON
THE TELECOMMUNICATIONS DEVELOPMENT
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT
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FIELD SURVEY RESULT

1. General

The Study Team conducted field survey to the following areas from November 1, 2001 to January 18, 2002 for collecting local information and acquiring knowledge of current situation of the socio-economy, telecommunication demand, IT service needs, and existing telecommunication facilities. The outline of the field surveys are shown in following Table 1.1 and 1.2.

Table 1.1 1st Field Survey Record in Rural

Date	Town Visited	Organizations or Sites Visited	Activity	Member of the Survey MCTPC/ETL & JICA Study Team
Nov. 12, 2001	Luangphrabang	Lao Telecom	Interview with Mr. Nornguene VILAVONGSA (Deputy Director)	Mr. Chaleun SIBOUNHEUANG Dr. Masafumi TANIFUJI Mr. Kosei Kada Mr. Hirotohi Akasaka
		MCTPC	Interview with Mr. Bounhang PHONGPHICHIT (Director)	
		Provincial Office	Interview with Mr. Vongsavanh THEPPHACHANH (Chief of Cabinet)	
Nov. 13, 2001	Luangphrabang	Luangphrabang Provincial Hospital	Interview with Dr. Sichanh HIMPAPHANH (Director)	Mr. Chaleun SIBOUNHEUANG Dr. Masafumi TANIFUJI Mr. Kosei Kada Mr. Hirotohi Akasaka
		Vocational School	Interview with Mr. Thongchanh PETHSANY (Director)	
		Banque pour le Commerce Extérieur Lao	Interview with Mr. Vanhkhamb VORAVONG (Manager)	
		Tourist Center	Interview with a Manager	
		Internet Café	Interview with a Manager	
Nov. 15, 2001	Pakse	Lao Telecom	Interview with Mr. Bounkhoun SAYSAVATH (Director)	Mr. Chaleun SIBOUNHEUANG Mr. Kosei Kada Mr. Hirotohi Akasaka
		MCTPC	Interview with Dr. Kung SOUKALOUN (Director)	
		Provincial Office	Interview with Mr. Sornxai SIPIHANDONE (Chief of Cabinet)	
	Luangphrabang	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Izumo HIDAKA
Nov. 16, 2001	Luangphrabang & P.Xnnoi site	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	Mr. Makoto HIRAIWA Mr. Werner GRUBLER
Nov. 19, 2001	Thakhek	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	
Nov. 20, 2001	Savannakhet	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	
Nov. 21, 2001	Pakse & M.Khoun	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	

Field Survey Result

Nov. 22, 2001	Sananxay (Attapue)	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	
Nov. 23, 2001	Thakhek	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	
Nov. 29, 2001	Phonsavanh (Xiengkhuang)	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	
Nov. 30, 2001	Maung Khoune	Regional Telecom Office and Technical Sites	Study on switching, transmission, outside plant, power, etc.	

Table 1.2 1st Field Survey Record in Vientiane Area

Date	Town Visited	Organizations or Sites Visited	Activity	Member of the Survey MC/PC/ETL & JICA Study Team
Nov. 5, 2001	Vientiane	Namphou Telecom Office	Study on switching, transmission, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Izumo HIDAKA Mr. Makoto HIRAIWA Mr. Werner GRUBLER
Nov. 6, 2001	Vientiane	Sisattank Telecom Office Xaysettha Telecom Office	Study on switching, transmission, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Izumo HIDAKA Mr. Makoto HIRAIWA Mr. Werner GRUBLER
Nov. 7, 2001	Vientiane	Namphou Telecom Office	Study on switching, transmission, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Izumo HIDAKA Mr. Makoto HIRAIWA Mr. Werner GRUBLER
Dec. 7, 2001	Vientiane	Sylom Telecom Office Sylom BST Office Nathom E/S Site	Study on, transmission, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Makoto HIRAIWA
Jan. 18, 2002	Vientiane	Namphou Telecom Office	Study on Switching, Fault Alarm, Traffic Data	Mr. Yonosuke HARADA

In order to obtain more data and information about fields, the Study Team carried out 2nd and 3rd field survey in rural shown in the following Table 1.3 and 1.4 and 2nd field survey in Vientiane Area as shown in the following Table 1.5.

Table 1.3 2nd Field Survey Record in Rural

Date	Town Visited	Organizations or Sites Visited	Activity	Member of the Survey MCTPC/ETL & JICA Study Team
Feb. 25, 2002	Pakkading	Site of under construction for new switching station	Observation of constructing	Mr. Snith Xaphakdy Mr. Vanthong Sosamphanh Mr. Sengsonexay KEOVANTHINE Mr. Souphalak MANGNOMEK Mr. Takehiko ADACHI Dr. Tomotaka TANIGUCHI Mr. Yonosuke HARADA Dr. Masafumi TANIFUJI Mr. Peter Biedermann Mr. Izumo HIDAKA
Feb. 25, 2002	Thakhek	Thakhek switching station	Study on switching, outside plant, power, etc.	
Feb. 25, 2002	Savannakhet	Khantabouli switching station	Study on switching, outside plant, power, etc.	
Feb. 26, 2002	Savannakhet	Khantabouli switching station	Study on switching, outside plant, power, etc.	
Feb. 26, 2002	Savannakhet	HF SSB telecom office	Conditions of line connection and customers utilization etc.	
Feb. 26, 2002	Savannakhet	KM35 micro repeater station	Observation of equipment and maintenance conditions etc.	
Feb. 26, 2002	Xeno	Xeno switching station	Study on switching, outside plant, power, etc.	
Feb. 26, 2002	Paxan	Paxan switching station	Study on switching, outside plant, power, etc.	
Feb. 26, 2002	Xepon	A village	Observation of village conditions, etc.	
Feb. 28, 2002	Luangphrabang	Lao telecom Luangprabang branch	Interview to Deputy director of Lao telecom Luangprabang	
Feb. 28, 2002	Luangphrabang	Luangprabang switching station	Study on switching, outside plant, power, etc.	
Feb. 28, 2002	Luangphrabang	Phanomh market	Observation of market conditions, etc.	
Feb. 28, 2002	Luangphrabang	Ban Shanghai village	Observation of village conditions, etc.	
Mar. 1, 2002	Luangphrabang	Kouangsi village	Observation of village conditions, etc.	

Table 1.4 3rd Field Survey Record in Rural

Date	Town Visited	Organizations or Sites Visited	Activity	Member of the Survey MCTPC/ETL & JICA Study Team
July 1-2, 2002	Phongsali	Switching Station	Check MDF, Battery, Standby EG Telephone Switch, Microwave System, Rutel Equipment, Telephone, Switch, and Customer Counter	Mr. Vanthong Sosamphanh Mr. Takehiko ADACHI Mr. Kozo IWASO Mr. Sadao Koshikawa
July 2-3, 2002	Joudomxai	Switching Station	Check MDF, Telephone Switch, Microwave System, Rutel Equipment, Mobile Telephone System and Standby EG	

Table 1.5 2nd Field Survey Record in Vientiane Area

Date	Town Visited	Organizations or Sites Visited	Activity	Member of the Survey MCTPC/ETL & JICA Study Team
Feb. 20, 2002	Vientiane	Namphou Telecom Office	Study on customers office, switching, outside plant, power, etc.	Mr. Sengsonexay KEOVANTHINE Mr. Takehiko ADACHI Mr. Noriaki MATSUSHIMA Dr. Tomotaka TANIGUCHI Mr. Yonosuke HARADA Dr. Masafumi TANIFUJI Mr. Izumo HIDAKA
Feb. 21, 2002	Vientiane	Xaysettha Telecom Office Dommoon Telecom Office Thanogone Telecom Office	Study on customers office, switching, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Souphalak MANGNOMEK Dr. Tomotaka TANIGUCHI Mr. Yonosuke HARADA Mr. Izumo HIDAKA
Feb. 22, 2002	Vientiane	Paukaonang repeater station	Study on transmission, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Yonosuke HARADA Mr. Izumo HIDAKA
Feb. 23, 2002	Vientiane	Airport switching station Thongpong switching station Naxaythong switching station Sisattaha switching station Hahai switching station Tadcuva switching station Namphou switching station	Study on switching, outside plant, power, etc.	Mr. Hongsavanh VONGKHAMSAO Mr. Sengsonexay KEOVANTHINE Mr. Yonosuke HARADA Mr. Izumo HIDAKA

2. Demand Forecast and IT Services

2.1 Field Survey

Date:	Place to visit:	Persons to have met (Title)
Nov.12, 2001	<u>Luangphrabang</u>	
	(1) Lao Telecom Co.,Ltd. Luangphrabang Branch	(1) Mr. Nornguene VILAVONGSA (Dupty Director)
	(2) MCTPC Luangphrabang Province	(2) Mr. Bounnhang PHONGPHICHIT (Director)
	(3) Luangphrabang Provincial Government	(3) Mr. Vangsavanh THEPPHACHANH (Chief of the Provincial cabinet)
Nov.13, 2001	<u>Luangphrabang</u>	
	(4) Luangphrabang Provincial Hospital	(4) Dr. Sichanh HINPAPHANH (MD & Director)
	(5) Vocational School LPQ	(5) Mr. Thongchanh PETHSANY (Director)
	(6) Banque pour le Commerce	(6) Mr. Vanhkhram VORAVONG (Director)
	(7) Luangphrabang Tourist Center	(7) Mr. Nipha SAHAPHAN (Director)
	(8) Internetcafe "Planet"	(8) (Manager)
Nov.15, 2001	<u>Pakse</u>	
	(1) Lao Telecom Co.,Ltd. Pakse Branch	(1) Mr. Bounkhoum SAYAVATH (Director)
	(2) DCTDT Champasak Province	(2) Dr. Kung SOUKALOUN (Director)
	(3) Champasak Provincial Government	(3) Mr.Somxai SHPHANDONE (Chief of Cabinet)

Note: Attendant from MCTPC is Mr.Chaleun Sibounheuang.

2.2 Issues and discussions in the Sector

Luangphrabang

(1) Lao Telecom Co., Ltd.

- a) Obtained overall aspect of telecommunications infrastructure as follows;
 - Fix telephone subscriber: 2,000 lines
 - Mobile phone: 600 lines (only one antenna that covers 10 km range)
 - Population in the area: 360,000
 - Teledensity: 0.55 line/100 people (0.72 line/100 people including Mobile phone)

There are rural areas without telephone line.

- b) There is demand of telephone but LTC Luangphrabang Branch do not seized the actual demand.
- c) In the time slot of 8:00am to 10:00am, it is difficult to make inter-province call due to heavy traffic. Especially, there is much traffic between Luangphrabang to Vientiane.
- d) There are 15 booths of public phone in the province.
- e) There are about 10 Internet Cafés in the province. Most of users are foreign tourists. There should be some more demand for internet but at present only for foreign tourists and the 10 Internet Cafés can meet that demands.
- f) Problem: There is no maintenance and repairing staff or engineers at Lao Telecom Luangphrabang Branch. There is only few of stock of repair parts and spare parts. It is very difficult and hard to maintain and repair facilities in remote place.

(2) MCTPC Luangphrabang Province

- a) MCTPC Luangphrabang Province supervises LTC Luangphrabang Branch to contribute telecommunications development in the province. According to the telecommunications policy, every capital city should have telephone. There used very old radio communication system (12 short wave phone) in remote area.
- b) For MCTPC, beside telephone, electricity and transportation (road and bridge) are necessary to develop the province.
- c) MCTPC Luangphrabang Province is looking forward to the Master Plan.
- d) Mainly foreign tourists use the Internet But the more economic development in the province, the more its demand will be created. Demand of the Internet seems to be so large

(3) Luangphrabang Provincial Government

- a) Telecommunications infrastructure in the province is not good. Even the provincial government has a few telephone lines. There are no computers with Internet access in the provincial government. They recognized that more line of telephone is needed to provide better service to the citizen.
- b) Although Luangphrabang Provincial Government has keen interests in development of IT technology in the province, they do not understand how to develop IT itself and human resources with IT skill. Thus, they need any support from international donor agencies like UNDP, JICA to develop human resource.

(4) Luangphrabang Provincial Hospital

- a) Luangphrabang Provincial Hospital has 32 doctors, 106 assistants, 112 nurses and 200 beds and the largest hospital in the province. There are only two lines of telephone to access outside and use PBX inside of hospital. There is no public phone at the hospital. More telephone line is required. Especially for patients, public phone is necessary.
- b) There are 11 district hospitals with about 20 beds and they are connected by radio phone.
- c) The doctors, some nurses and accountants use 4 computers to process medical records, prescription, stock control of medicine.
- d) The doctor wants to use the Internet to obtain the latest medical information such as new treatment methods and new medicine. Also, he would like to exchange information to another doctors by e-mail.
- e) He understands that the Internet can be used to train young doctors or medical assistants in remote area if computers and the environment with the Internet access. It is very primitive but the Study Team found some potentials of IT applications in Laos; they are telemedicine (primitive tele-consultation or distant learning for the young doctor and medical assistants) and distant learning.
- f) Problem: Computer and the Internet access are still not affordable. No software in Lao.

(5) Vocational School LPQ

- a) There are two telephone lines and no public telephone at the school. 300 students live at the dormitory and they and their parents needs public phone.
- b) They started computer class in 1996. There are 7 basic computer courses (one course: 4 hours/week) such as word processing, spreadsheet and accounting. 12 computers are used at the course. The computer courses are very popular among the students because the young like to touch computers and learning computer skill and accountant increase job opportunity for the students.
- c) The school would like to access to the Internet for the students to learn more things from the Internet but there is budget constraint.

(6) Banque pour le Commerce

- a) They have 3 phone lines of which one line used for fax. They have some difficulty to call their Vientiane HQ in the time slot of 8:30am to 10:30.

Their monthly telephone charge is about 2 million kip (approx. US\$190.00).

- b) They have one computer with the Internet access by dial-up. But they do not access to the Internet (web-browsing or e-mail) fluently.
- c) They have an access to SWIFT (Inter bank settlement system) by phone.
- d) There is not large sized nor small-mid sized business that needs to use IT in the province.

(7) Luangphrabang Tourist Center

- a) There is one telephone line (telephone and fax) at the center. They have one computer with the Internet access by dial up. Ministry of Commerce and Tourist established the website for tourism in the province. The website www.mekongcenter.com provides information for tourist such as information on visa, links to airline and hotel.
- b) They used e-mail. There are tendency of increasing numbers of tourists from China and they communicate with the Chinese by fax because it is more convenient than e-mail because they can not read all the e-mail sent from the China because of difference of fonts encode.

(8) Internet Cafe "Planet"

- a) They were the first one who starts Internet Café in Luangphrabang but now there are 10 Internet Cafés. Business is getting tough. In order to compete with other Internet Cafés, they entered into price completion. There are Internet Café without license; so, the government should control and supervise Internet Café.
- b) Most of customs are foreign tourists. There were over 100 customs a day but now 50 customs a day because of competition of other Internet Cafés.
- c) They use Laotel to access the Internet but there is always traffic congestion and slow download of data after 9:00am to 10:00pm. So, they open from 8:00am in the morning till 12:00pm.

Pakse

(1) Lao Telecom Co.,Ltd

- A) Obtained overall aspect of telecommunications infrastructure as follows;
- B) Fix telephone subscriber:3,000 lines
- C) Mobile phone: 2,200 lines (only one antenna that covers 4 km range)
- D) There are rural areas without telephone line.
- E) There is demand of telephone but LTC Pakse Branch do not seized the

actual demand. But Pakse Bridge was constructed and the economic condition goes well and it is sure the telephone demand has a tendency to increase.

- F) There is a problem of connection between mobile phone and fixed line phone.
- G) There are 3 to 5 Internet Cafés in the province. Some of them are illegal.

(2) DCTDT Champasak Province

- A) Telecommunications infrastructure in the province is not good enough and DCTDT pay effort to provide telephone in the province in accordance with MCTPC's plan.
- B) DCTDT are looking forward to the nation-wide Mater Plan which including the telecommunications development plan.
- C) Some roads and Pakse Bridge was constructed in the province, MCTPC would like to build good telecommunications infrastructure (more telephone line) which supports further economic development in the province.

(3) Champasak Provincial Government

- A) Telecommunications infrastructure in the province is not good enough and further telecommunication development in the province will enhance economic development in the province. Champasak Provincial Government recognize that more line of telephone is needed to provide better service to the citizen.
- B) Mr.Sornxai SHPHANDONE is e-mail user and has his own mail address.

3. Network Planning and supplementary survey on Switching

3.1 Field Survey

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Jan,18, 2002	Vientiane Nampho by Mr. Harada	Switching Systems Fault Alarm Traffic Data	Fairly Good	

3.2 Issues and Problems identified

- (1) Minor alarms are almost on and there are a lot of minor problems on the systems. PCM slip and overload are most commonly seen during the survey.
- (2) Written standard are not identified. However, the operation books for switching systems are used for the standard. The documents are well written and are almost alternatives of the standard. It should be noted that the standard is necessary; however, the manuals are utilized for continuous operation.
- (3) There is no official logging book to record what is happened, when and how the problem is solved. Also, alarms and problems are stored in the switching systems is used to identify the problem. This caused the difficulty to trace the problem when occurred.

3.3 Possible Countermeasures

- (1) The sequence of trouble data should be collected for with the date, the name of operator, duration of trouble and so on together. Also those data should be stored in a same manor for future analysis.
- (2) Minor alarm should be analyzed periodically to identify hidden troubles and problems. I.e. if the overload alarm observed frequently, periodical checking may find the overloaded trunks easily and may add capacity or change the routing table to ease the situation.
- (3) It should be noted that the standard should be written in the future not depending the systems or manufacturers.
- (4) Periodic traffic observation may be necessary to identify the quality degrade before user claim occurred.

3.4 Initial improvement and assessment at present

- (1) To collect alarm data and traffic data periodically to identify the problem. How this should be done will be discussed with C/P in more detail in the future.
- (2) With the discussion with C/P, the most important point does not depend on the laziness nor unwritten standard or manuals, but also the lack of spare trunks and parts.

Whenever the troubles may find, no actions may be taken to ease or solve the problems. The Team should discuss with C/P for more in detail how the problem can be solved. This is not a simple solution and should be continued to seek the best or second best solution.

4. Transmission Lines and Outside Plant

4.1 Field Survey (Namphou, Sisattank, and Xaysettha)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date	Place			
Nov.2-3, 2001	Namphou, Sisattank Xaysettha	MDF, Cable Termination OFCable Term, Aerial Cables Drop wires	Normal Condition— except Aerial Cables and Drop wires	

4.1.1 Issues and Problems

- (1) The necessary pairs are not installed in the secondary cable. As the result, small pair cables (30-100p) are added frequently and repeatedly.
- (2) There are many aerial cables (more than three cables and more than 300 pairs) laid between poles.
- (3) Aerial cables and drop wires are laid very close to electric distributing lines and necessary separation is not kept.
- (4) In consideration of the spare pairs, the number of waiting applicants is critical to satisfy.
- (5) In some exchanges faulty cable pairs in the primary cables are observed— 2,017 pairs in Vientiane Area.
- (6) The number of Distribution Points is not enough at the secondary cables and too many drop wires are laid between poles.
- (7) The maintenance staffs have only simple testers and don't have any fault locator or other testing equipment.

4.1.2 Possible Countermeasures

- (1) The necessary pairs shall be supplied additionally ,especially in the secondary cables
— Rehabilitation work shall be planned and carried out.
- (2) Aerial cable shall be turned into underground cable gradually in the future in the urban areas as Vientiane.
- (3) Drop wires shall be changed into the secondary cables.
— Rehabilitation work shall be planned and carried out.
- (4) Faulty pairs shall be tested and repaired.
— Repair work shall be done by direct work and / or contractor's work
Proper fault locator or testing equipment shall be distributed to local

exchange staffs.

4.2 Field Survey (Luangprabang)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date	Place			
Nov.15-16, 2001	Luangprabang	MDF, Cable Termination Aerial Cables Drop wires	Normal Condition — except Aerial Cables and Drop wires	

4.2.1 Issues and Problems

- (1) There are many aerial cables (more than three cables and more than 300 pairs) laid between poles.
- (2) Aerial cables and drop wires are laid very close to electric distributing lines and necessary separation is not kept.
- (3) In consideration of the spare pairs, the number of waiting applicants is critical to satisfy.
- (4) The number of Distribution Points is not enough at the secondary cables and too many drop wires are laid between poles.
- (5) The maintenance staffs have only simple testers and don't have any fault locator or other testing equipment.
- (6) The drop wires are laid in the long distance (3 ~ 7 km).

4.2.2 Possible Countermeasures

- (1) The necessary pairs shall be supplied additionally ,especially in the secondary cables
 - Rehabilitation work shall be planned and carried out.
- (2) Aerial cable shall be turned into underground cable in the future.
- (3) Drop wires shall be changed into the secondary cables.
 - Rehabilitation work shall be planned and carried out.

4.3 Field Survey (Paksan, Phakhek, Savannakhet, Pakse, Khong, and Attapu)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date	Place			
Nov.19-23, 2001	Paksan, Phakhek, Savannakhet , Pakse, Khong, Attapu.	MDF, Cable Termination Aerial Cables and Drop wires	Normal Condition — except Aerial Cables and Drop wires	

4.3.1 Issues and Problems

- (1) There are many aerial cables (more than three cables and more than 300 pairs) lay between poles.
- (2) Aerial cables and drop wires are laid very close to electric distributing lines and necessary separation is not kept.
- (3) In consideration of the spare pairs, the number of waiting applicants is critical to satisfy (except Attapu).
- (4) In some exchanges faulty cable pairs in the primary cables are observed— 200 pairs in Paksan , 289 pairs in Savannakhet.
- (5) The number of Distribution Points is not enough at the secondary cables and too many drop wires are laid between poles.
- (6) The maintenance staffs have only simple testers and don't have any fault locator or other testing equipment.

4.3.2 Possible Countermeasures

- (1) The necessary pairs shall be supplied additionally ,especially in the secondary cables
— Rehabilitation work shall be planned and carried out.
- (2) Aerial cable shall be turned into underground cable gradually in the future in the urban areas.
- (3) Drop wires shall be changed into the secondary cables.
— Rehabilitation work shall be planned and carried out.
- (4) Faulty pairs shall be tested and repaired.
— Repair work shall be done by direct work and / or contractor's work

Proper fault locator or testing equipment shall be distributed to local exchange staffs.

4.4 Field Survery (Pekse)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date	Place			
Nov.29-30, 2001	Pekse	MDF, Cable Termination Aerial Cables and Drop wires	Normal Condition — except Aerial Cables and Drop wires	

4.4.1 Issues and Problems

- (1) There are many aerial cables (more than three cables and more than 300 pairs) lay between poles.

- (2) Aerial cables and drop wires are laid very close to electric distributing lines and necessary separation is not kept.
- (3) The number of Distribution Points is not enough at the secondary cables and too many drop wires are laid between poles.
- (4) The maintenance staffs have only simple testers and don't have any fault locator or other testing equipment.

4.4.2 Possible Countermeasures

- (1) Aerial cable shall be turned into underground cable gradually in the future.
- (2) Drop wires shall be changed into the secondary cables.
— Rehabilitation work shall be planned and carried out.
- (3) Proper fault locator or testing equipment shall be distributed to local exchange staffs.

4.5 Inter-Provincial Network (Appendix)

4.5.1 Route Observation

Visiting Routes in the Fields		Check Items	Observation and Results	Remarks
Date	Route			
Nov.19-23, 2001	Vientiane to Pakse (785km) Pakse to Khong (165km) Pakse to Attapu (153km)	Topographical and Soil Conditions, Availability of Electricity, Condition of existing electric poles, Crossing of rivers, Underground or Aerial System.	There is no problem for the route of optical fiber cables.	
Nov.30, 2001	Pek to M.Khan (55km)	- do -	No problem	

4.5.2 Route and Reviews

- (1) Outline of Route - Vientiane to Pakse, Pakse to Khong

The route is along Road 13, almost flat except small slope near Pakse and KhoneSedome. At present 60~70km between Pakse and Savannakhet is under road construction. There are three or four small swamps (less than 100 m) near the Mekong(changeable in seasons) and several soft soil areas. The number of river crossings over 50 m and less than 100 m is seven in total. Availability of commercial electricity - (Not available - B.Thonagnami 30km ,B.Nadeing and Xeno 60km , B.Paxong 80km, M.Khongxedon 10 km)

(2) Reviews

- a) There are few problems about whether underground or aerial system, both systems are feasible to install.
- b) The availability of existing poles is possible in 60 % of the total distance at present.
- c) However, existing electric poles are laid with high voltage power lines and are expected to be laid of distributing lines and transformers additionally in very near future. To keep necessary clearance from electric facilities and from the ground is very difficult. The new poles for the optical fiber cable shall be installed on the opposite side of the existing power line.
- d) In the city areas as Paksan, Thakhek Savannakhet and Pakse, many secondary cables and drop wires are laid, also necessary clearance from electricity and from the ground cannot be maintained. In those areas the duct system shall be applied, manholes and long span ducts (up to 250 m) shall be installed.
- e) Road 13 has been constructed newly and some parts are still being under construction, along the route the construction work of other life-line facilities is expected. For the time being aerial system is preferable than underground system.
- f) The road crossing part of this road shall be done by underground pipe (siphon pipe) for the safety of the facility.

(3) Outline of the route - Pakse to Attapu (153 km), Pek to M.Khan (55km)

These two routes are along highland areas, passing some rocky areas (2~3km).

There are no river crossings but winding curves and some small slopes.

There is no problem about availability of electricity in the route, Pakse to Attapu.

(4) Reviews

- a) There is no problem about whether underground or aerial system. Both systems are feasible to install.
From economical standpoint, the aerial system is recommended.

5. Transmission and Radio Facilities

5.1 Field Survey (Luangprabang)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Nov.15, 2001	Luangprabang Province Luangprabang Site	Microwave (Alcatel French) Mobile Telephone Rural Radio (Alcatel Germany) HF SSB Radio (Codan Australia) Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh
Nov.16, 2001	Luangprabang Province P.Xnunoi Relay Site	Microwave Rural Radio Solar Battery	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.1.1 Issues and Problems for Sector Discussions

- (1) Low Operational Reliability of the 2GHz & 7GHz, 16 & 34Mbps Microwave Communications Equipment manufactured by Alcatel French dated May 1994.
- (2) Low Reliability of the 900Watts Solar Battery Power Supply supplied by Alcatel French (Manufacture / Frederic Power U.S.A) dated 1994.
- (3) Shortages of Spare Parts for Microwave and Rural radio Communications Facilities at the site.

5.1.2 Possible Countermeasures

- (1) Trouble shooting will be required by Local Maintenance staffs at the Site.
- (2) Observing that desired Spare parts are in shortage, the Inventory of Spare parts will be necessary throughout all sites in order to minimize system down period.

5.1.3 Initial Concerns/ overall recommendations at the stage of present study progress

- (1) The 2.4GHz 2Mbps Rural Radio Communications Networks at Luangprabang are not enough for the present demand, therefore this will require additional channels if possible or to consider Other communications System such as Optical Fiber Communications or VSAT System as soon as possible.
- (2) All sites must consider installing a Small Engine Generator (1 kW approx.) or other similar equipment for the backup of the Solar Battery Facility.
- (3) The Microwave Communications system will require that function is to acquire a dual-configuration in the case of both simulated and actual failures

at site in order to avoid a complete shutdown of the Communications Networks.

- (4) The Mobile telephone base station supplied by China Huacai will require to extend communication coverage from the present of 7 km.

5.2 Field Survey (Khammuane Province and Savannaket Province)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Nov.19, 2001	Khammuane Province Thakhek Site	Microwave (Alcatel French) Mobile Telephone HF SSB Radio (Codan Australia) Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh
Nov.19, 2001	Savannakhet Province Khanthabouli Site	Microwave (Alcatel French) HF SSB Radio (Codan Australia) Rural Radio (Alcatel Germany) Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.2.1 Issues and Problems for Sector Discussions

- (1) All 2 GHz /34 Mbits Microwave Communications and 2.4 GHz /2 Mbits Rural radio Communications System relay sites stationed on mountainous areas occasionally suffer due to lightning strike hits.
- (2) Low Reliability of the 900-Watt Solar Battery Power Supply, especially during the rainy season, supplied by Alcatel French (Manufacture / Frederic Power U.S.A) dated May 1994.
- (3) Shortage of Spare Parts for the Microwave Communications System manufactured by Alcatel French dated May 1994.

5.2.2 Possible Countermeasures

- (1) Trouble shooting will be required by Local Maintenance staffs at the Site.
- (2) Observing that desired Spare parts are in shortage, the Inventory of Spare parts will be necessary throughout all sites in order to minimize system down period.
- (3) To check earth resistance and assess facility grounding connections in connection with the lightning damage at all sites as soon as possible.

5.2.3 Initial Concerns/ overall recommendations at the stage of present study progress

- (1) All sites must consider installing a Small Engine Generator (1 kW approx.) or other similar equipment to act as a backup for the Solar Battery Facility.
- (2) Microwave Communications system will require to check a dual configuration function in the case of simulated failure at site, which is to avoid complete shutdown of Communications Networks failure.
- (3) Mobile telephone base stations (BTS) which is supplied by China Huaei, at both sites will require extended communications coverage to Telephone mobile subscribers from the present of 9 km .

5.3 Field Survery (Salavan Province)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Nov.20, 2001	Salavan Province Pakxe Site	Microwave Mobile Telephone HF SSB Radio Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh
Nov.21, 2001	Salavan Province M. Khong	Microwave Solar Battery Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.3.1 Issues and Problems for Sector Discussions

- (1) Low Operational Reliability of the 7Ghz /16Mbits Microwave Communications Equipment manufactured by AWA Plessy Australia dated June 1998.
- (2) Low Reliability of the 900-Watt Solar Battery Power Supply supplied by Alcatel French (Manufacture / Frederic Power U.S.A) last May 1994 during the rainy season.
- (3) The 2GHz/34Mbts 7GHz/16Mbts-Microwave and 2.4MHz/2Mbts-Rural Communications Relay sites occasionally suffer damages due to lightning hits.
- (4) Shortages of Spare Parts for Microwave Communications and Rural Radio Communications System on the all sites.

5.3.2 Possible Countermeasures

- (1) Trouble shooting will be required by Local Maintenance staffs at the Site.
- (2) Upon observing that there is a shortage of desired Spare parts, an Inventory of Spare parts will be necessary throughout all the sites in order to minimize system down periods.

- (3) To check earth resistance and assess facility grounding connections in connection with the lightning damage at all sites as soon as possible.

5.3.3 Initial Concerns/ overall recommendations at the stage of present study progress

- (1) The 2.4 GHz/2Mbts capacity of the Rural Radio Communications Network supplied by Alcatel Germany from Pakxe to Lamam is not enough for the present demand. Therefore, an increase in the capacity would be recommended for network improvement. It would also be wise to consider other communications systems such as Optical Fiber Communications or VSAT System in the near future. Likewise the 2GHz/32Mbts capacity of the Micro Radio Communications Network supplied by Alcatel French from Pakxe to Vientiane has almost the same condition and is urgently requiring upgrades for the increasing demand.
- (2) All relay sites must consider installing a Small Engine Generator (1 kW approx.) or similar equipment for the Solar Battery Facility backup.
- (3) Microwave Communications system will require to check a dual configuration function in the case of simulated failure at site, which is to avoid complete shutdown of Communications Networks failure.
- (4) The Mobile telephone base station (BTS) supplied by China Huaei will require an increase of communication coverage to mobile subscribers from the present 9 km range at Pakxe site.

5.5 Field Survey (Xekong Province)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Nov.22, 2001	Xekong Province Attapeu(Sanamxai) Site	Microwave Rural radio HF SSB Radio Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.5.1 Issues and Problems for Sector Discussions

- (1) Low Operational Reliability of the 7 GHz /16Mbts Microwave Communications Equipment manufactured by AWA Plessy Australia dated June 1998. Especially the network link between Pakxe terminal and Puson relay site (45.4 km span) occasionally cut -off due to unknown reason from 8PM night till 2AM next early morning.
- (2) Low Reliability of the 900Watts Solar Battery Power during raining season supplied by Alcatel French (Manufacture / Frederic Power U.S.A) last May 1994.

- (3) The 7GHz/16Mbts-Microwave and 2.4MHz/2Mbts- Rural Communications System on the Relay sites occasionally suffer due to lightning hits at all sites.
- (4) Shortages of Spare Parts for Microwave Communications and Rural Radio Communications System on the all sites.

5.5.2 Possible Countermeasures

- (1) Trouble shooting will be required by Local Maintenance staffs at the Site.
- (2) Upon observing that there is a shortage of desired Spare parts, an Inventory of Spare parts will be necessary throughout all the sites in order to minimize system down periods.
- (3) To check earth resistance, which is affected by lightning damage at all sites as soon as possible.

5.5.3 Initial Concerns/ overall recommendations at the stage of present study progress

- (1) The 2.4Ghz/2Mbts capacity of the Rural Radio Communications Network supplied by Alcatel Germany from Pakxe to Lamam via Attapeu is not enough for the present demand. Therefore, an increase in the number of capacity would be recommended for network improvement. It would also be wise to consider other communications systems such as Optical Fiber Communications or VSAT System in the near future.
- (2) All relay sites must consider installing a Small Engine Generator (1 kW approx.) or similar equipment for the Solar Battery Facility backup.
- (3) Microwave Communications system will require to check a dual configuration function in the case of simulated failure at site, which is to avoid complete shutdown of Communications Networks failure.
- (4) The span loss and fading level calculation would be required for analysis and trouble shooting of the occasional link cut-off newly installed between Pakxe terminal and Puson relay site.

5.6 Field Survey (Xiengkhang Province and Knoune District)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Nov.29, 2001	Xiengkhang Province Phonesavanh Site	Microwave Mobile Telephone HF SSB Radio Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh
Nov.30, 2001	Knoune District Maung Khoune	Rural Radio HF SSB Radio & Solar Battery	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.6.1 Issues and Problems for Sector Discussions

- (1) Low Operational Reliability of the 7 GHz 34Mbits Microwave Communications Equipment manufactured by Alcatel French dated May 1994.
- (2) Low Reliability of the 900Watts Solar Battery Power Supply supplied by Alcatel French (Manufacture / Frederic Power U.S.A) last May 1994.
- (3) Shortages of Spare Parts for all on site facilities.
- (4) Electrical Supply is not stable from own the 75KVA Diesel engine generator, which is supplying instead of commercial power because the power is not available from 23:00 to 18:00 of the next day.

5.6.2 Possible Countermeasures

- (1) Troubleshooting will be required by Maintenance staffs at the Site.
- (2) Upon observing that there is a shortage of desired Spare parts, an Inventory of Spare parts will be necessary throughout all the sites in order to minimize system down periods.

5.6.3 Initial Concerns/ overall recommendations at the stage of present study progress

- (1) The 2.4GHz/2Mbts capacity of the Rural Radio Communications Networks supplied by Alcatel Germany at Maung Khoun district is not enough for the present demand. Therefore, an increase in the number of channels would be recommended for system improvement. It would also be wise to consider other communications systems such as Optical Fiber Communications or VSAT System in the near future.
- (2) All-sites must consider installing a Small Engine Generator (1 kW approx.) or similar equipment for the Solar Battery Facility backup.
- (3) Microwave Communications system will require to check a dual configuration function in the case of simulated failure at site, which is to avoid complete shutdown of Communications Networks failure.
- (4) The Mobile telephone base stations supplied by China Huaei will require an increase of communication coverage to Telephone mobile subscribers from the present 7 km range.

5.7 Field Survey (Vientiane City)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
Dec.7, 2001	Vientiane City , Sylom Site Nathom E/S Site	Microwave (NEC) E/S Site · STD-C (NEC) Mobile Telephone (HUAWEI) Power Supplies Antenna Tower	Normal Condition	ETL Counterpart Mr.Hongsavanh

5.7.1 Issues and Problems for Sector Discussions

(1) Satellite Earth station installed by JICA grant:

Although the 7 GHz 34Mbps PDH Microwave Communications system between Sylom and Nathom E/S Site is in good condition and has High operational reliability at present, there is no Back-up Network system in case of Present Network trouble.

(2) The 900 MHz 2W Mobile Telephone Base Systems supplied by HUAWEI China has limited service area to the Telephone mobile subscribers in Vientiane.

5.7.2 Possible Countermeasures

(1) Provide Back-up communications networks between Saylom and satellite Earth Station in order to have an emergency back-up network circuit. This should be done as soon as possible.

(2) Installing additional Mobile Telephone Base Systems for improving the present condition. in Vientiane.

5.7.3 Initial Concerns/ overall recommendations at the stage of present study progress

The SDH Microwave STM-1 system between Sylom and Nathom E/S will be more preferable for use rather than utilizing an Optical Communication cable due to safety reasons.

Field Survey Result

6. Switching Facilities

6.1 Field Survey

Date	Place	Check Items	Observations and Results	Remarks
Nov.5, 2001	Vientiane Municipality: <u>Vientiane</u> - ETL F-150 LS Xaysetha1, 5,000 LU - LTC S-12 LS Xaysetha2, 3,000 LU - ETL F-150 ITLS Numphou1, 10,000 LU - LTC S-12 TLS Numphou2, 7,000 LU - Numphou Telex exchange - Numphou Internet	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration, Telex Cisco router	Fairly Good	
Nov. 9, 2001	Vientiane Municipality: <u>Vientiane</u> - ETL F-150 RSU Thadeua, 204 LU - ETL F-150 RSU Nahai, 284 LU containerized	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration,	Fairly Good	
Nov. 15, 2001	Luangphrabang province: <u>Luangphrabang</u> - ETL F-150 TLS Luangphrabang1, 1,048 LU - LTC S-12 TLS Luangphrabang2, 1,280 LU - Luangphrabang Internet	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration, Cisco router	Fairly Good	
Nov. 16, 2001	Luangphrabang province: <u>Luangphrabang</u> - Transmission and Rurtel relay station on the hilltop	Visual checks of all equipment	Fairly Good	

Date	Place	Check Items	Observations and Results	Remarks
Nov. 19, 2001	Bolikhamxay province: <u>Paksanh</u> - LTC S-12 LS Paksanh, 1,024 LU Khammoune province: <u>Thakhek</u> - ETL F-150 TLS Thakahek1, 2,360 LU - LTC S-12 LS Thakhek2, 1,024 LU - Rurtel Central station - GSM BTS	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration,	Fairly Good	
Nov. 20, 2001	Savannakhet province: <u>Khanthabouli</u> - ETL F-150 TLS Khanthabouli1, 3,424 LU - LTC s-12 TLS Khanthabouli2, 2,048 LU - Rurtel Central station - GSM BTS - Khanthabouli Internet	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration, Cisco router	Fairly Good	
Nov. 21, 2001	Champassack province: <u>Pakse</u> - ETL F-150 TLS Pakse1, 2,704 LU - LTC S-12 TLS Pakse2, 1,024 LU - Rurtel Central station - GSM BTS <u>Khong Island branch</u> Transmission relay station	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration,	Fairly Good	
Nov. 22, 2001	Champassack province: <u>Khongxedon</u> LTC S-12 LS Khongxedon, 512 LU	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration,	No services, Transmission completely down	

Field Survey Result

Date	Place	Check Items	Observations and Results	Remarks
Nov. 29, 2001	Xiengkhouang province: <u>Pek</u> - LTC S-12 RSU Pek, 1,024 LU - LTC S-12 LS Pek, 1,512 LU - Rurtel subscriber station - GSM BTS	Switch, MDF, DDF, Rectifier, Batteries, Power, O&M organization, Spares administration,	Fairly Good	
Dec. 7, 2001	Vientiane municipality: <u>Vientiane</u> LTC GSM MSC Saylom 30,000 Subscriber	MSC, BSC, OMC, Network structure	Fairly Good	
Dec. 12, 2001	Vientiane municipality: <u>Vientiane</u> LTC Billing center	Organization, Hardware/ Software utilized	Fairly Good	

6.2 Overall Comments

- (1) All systems are fairly good operated and maintained to provide just basic communication services to the customers except Khongxedon S-12 switching site, where during the site visit no services was possible, because the transmission was completely down.
- (2) The staff is motivated but complains about not sufficient training received and in general lack of spares and consumables to run the systems smoothly.
- (3) All the sites visited were in rather clean condition and kept tidy, except in some sites in the northern and southern regions, where staff either was sleeping between the rack rows or preparing some food. This should in general not be allowed for technical rooms
- (4) It was repeatedly noticed that faulty spare modules were piled up in the technical rooms and not packed in their protective cover. This will lead to further damage and should be avoided.

6.3 Issues and Problems identified

- (1) Minor alarms as well as major alarms could be seen often on the Alarm panels installed in the exchanges. They were either not noticed or lack of coordination and organization led to such ignorance. Furthermore, missing spares or resources lead to situations, that faults can not be repaired for some times.

- (2) The technical documentation and handbooks are all available in the exchanges, but 'Rules and Regulations for the Operation and Maintenance of Digital Switches' are not available and should be elaborated and distributed as soon as possible. These are guidelines for the staff to advise them how to react in certain cases of system malfunction. Furthermore, introduction of Centralized Operation and Maintenance along with proper Spares administration should be introduced as soon as possible.
- (3) There are no logbooks available for keeping track of faults and their clearance, so no information was available e.g. number of faults in a month or repeated faults in the same equipment or the duration of faults, etc.
- (4) The Fujitsu exchanges in Kanhabouli, Thakhek and Pakse and in the Vientiane area are connected so centralized O&M could be possible, but in reality there is no such centralized O&M, all the exchanges are manned and controlled locally because of no such organization.
- (5) Since no Centralized Operation and Maintenance is introduced so far in the network, especially in severe cases of faults, e.g. SS7 link faults or routing problems, the staff act only in the view of their part of the network not having the total network condition in mind. This can lead to further network congestion and overload. Only restriction to change the routing from a central level can assure to have the network configured in the optimal way.
- (6) Since synchronization is not consequently applied in the network the staff did not understand what slip errors are or how it can be requested from the system for a specific trunk group. This is an important issue which can lead to trunk group congestion and processor overload, wrong dialling and subscriber frustration.
- (7) Traffic measurements like Trunk Group measurements, Destination measurements, SS7 Link Load measurements, Grade of Service measurements, etc. is not realized and executed in any of the switches of the network. Therefore, no actual information can be achieved about the utilization of trunk groups, important information like call completion rate, etc. can be gathered from the system and possible remedies undertaken.
- (8) In some provinces (e.g. Attapeu) Rurtel equipment is installed which subscribers do not have numbers according to the numbering scheme, but numbers from the host switch they are connected to. All digital switches are flexible to allocate numbers as it is needed, which should be applied in such cases.
- (9) Internet access as of today is heavily congested and should be expanded to cater for the fast growing number of customers needs.

- (10) It was seen in some places that there are two diesel generator sets available on site. Since diesel generators are backup devices, only one needs to be provided if continuous mains power is available.
- (11) In some sites technical equipment was powered by solar power equipment. After connection to continuous mains power such devices are no longer needed and could be deployed elsewhere in the network, where needed.
- (12) The earthing in some places should be checked if appropriate and according to the technical standards. Bad earthing can lead to degradation of the whole system and cause total destruction in the worst case.

6.4 Initial improvement and assessment at present

- (1) Observing the alarm panels in the exchanges and take adequate measures is the minimum what should be done. The next step is to apply basic rules and regulations for centralized O&M for the areas possible, i.e. Vientiane and the southern region. In the long term a concept of centralized Operation and Maintenance has to be developed and implemented (see O&M plan, Switching Implementation plan).
- (2) The spares administration has to be strengthened to overcome the very weak situation in all the exchanges in the network. This is one of the major tasks in Centralized O&M.
- (3) Traffic administration need to be introduced and should be made a continuous tasks to get the planning section all the needed information for the transmission capacity planning at hand and to utilize the existing capacity most economically. This is one of the major tasks in Centralized O&M as well.

7. Rural Telecommunications

7.1 Field Survey (Phongsali)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
July 1-2, 2002	Phongsali	MDF, Battery Standby EG Microwave Equipment Rutel System Telephone Switch Customer Counter	Normal Condition – except uninstalled telephone switch	

7.1.1 Issues and Problems

- (1) The national road to lead until Phongsali from Pak Ou is not well maintained. In addition the roads pass very deep mountain areas.
- (2) We felt the encountering difficulty of laying optical fiber cables in future.
- (3) Also, we felt that single solution for rural telecommunications would be unrealistic and adequate solution should be considered to match the local environment.
- (4) Even the provincial capital Phongsali is not 24 hours power supply. At the moment electricity is supplied from 18:00 to 23:00. The rural telecommunications will face power supply problem everywhere.
- (5) The telephone switch S12 has been installed. However, because of the lack of trained technicians, there was no near sight to bring the system to work. Even though large scale expansion of telecommunications network is planned, the recruiting and training of the staff should coincidence with it.

7.1.2 Possible Countermeasures

- (1) The telecommunication development plan shall be coordinated with power supply plan and the integrated rural development project.
- (2) Lao P.D.R. will not be able to expect that all technical documents are supplied in Lao language from overseas suppliers. Therefore, enhancement of foreign language lesson shall be seriously considered in educational institutes and also as in-house training. Otherwise the large scale expansion of telecommunications expansion will not be able to supply Quality of Service to customers.

7.2 Field Survey (Oudomxai)

Visiting Places in the Fields		Check Items	Observations and Results	Remarks
Date:	Place:			
July 2-3, 2002	Oudomxai	MDF, Telephone Switch Microwave System Rutel Equipment Mobile Telephone System Standby EG	Normal Condition — except frequent trouble in Microwave system	

7.2.1 Issues and Problems

- (1) Because of the lack of water in dam during dry season, commercial power supply is unstable.
- (2) This causes some inconvenience for telecommunications facility.
- (3) Because of the insufficient solar battery power supply during rainy season and winter time, the microwave system becomes inactive some times. In addition, the direction of antenna is changed by strong wind. For the maintenance of microwave system, the access road has not been built adequately and the maintenance work becomes troublesome. Further more the stock of spare parts is insufficient.

7.2.2 Possible Countermeasures

- (1) When the telecommunication system is constructed, stable long term usage should be considered as a very important factor, even though the initial cost will be slightly higher. A Japanese proverb says: Stingy person will lose all his money. For the reference, NTT sometimes spent millions dollars for the construction of new access road to microwave repeater station enabling for car to be able to reach to repeater station.
- (2) There will be possibility that the solar battery has worn during long year's usage. Therefore the remaining capacity shall be measured and if necessary it should be replaced with new one.

8. Internet Café Survey in Vientiane

The Study Team had conducted Internet Café Survey in Vientiane from February 20 to February 26, 2002. The Study Team visited 28 Internet Cafés and interviewed owner and staff of each Internet Café. The Study Team will analyze the result in terms of demand of the Internet and new telecommunication services using the Internet.

(1) Estimated total number of Internet Café in Vientiane

The Study Team estimated total number of Internet Café including hotel, guesthouse, restaurant and travel agent that provide similar service is 50 because of followings;

- According to KPL, as of December 2001, number of officially registered Internet Café is 27.
- Most of Internet Café use GlobeNet's wireless Internet access services. There are 50 organizations including Internet Café using GlobeNet's wireless Internet access services.
- The Study Team went along major road in Vientiane and found 28 Internet Café.

Thus, the Study Team estimates as follows;

- (1) Minimum: **28**
- (2) Number of hotel, guest house, restaurant and travel agent that provide similar services: **15**
- (3) Internet Café located not on road or inside of building (where the Study Team never have chance to visit): **7**

$$(1) + (2) + (3) = 50$$

(2) Type of Internet Café

The Study Team observed that there were three types of Internet Café in Vientiane. Those three types are;

- A.** Most of customer are foreigners and foreign tourists
- B.** Most of customer are Lao students (who enjoy chat and game)
- C.** Internet Café ran by computer shop (PC can be also used as demonstration)

Name of Internet Café	Type of Internet Café	Location of Map
Somphankeo Senguthai	A	(1)
CYBERIA	A	(2)
O-Zone	B	(3)
Computer Mart	C	(4)
Green Net	B	(5)
Planet Online Café	A	(6)
AI Computer	A	(7)
PP Internet & Guest House	A	(8)
C-Net	B	(9)
Hot Net	B	(10)
T-Net	B	(11)
Smart Net	B	(12)
SIMUANG INTERNET	B	(13)
Millennium Internet	B	(14)
P Net	A	(15)
L.B.M Internet	B	(16)
Sea Net	B	(17)
OK Internet	B	(18)
I-Net	A/B	(19)
Fine Net	B	(20)
Star Net	A	(21)
ITIC Computer	C	(22)
J-Net	A	(23)
X-Net	B	(24)
Internet Café	B	(25)
NOUNE	B	(26)
Smooth Net Café	B	(27)
Teen Net	B	(28)

(3) Attachment:

Attachment 1: Survey Form

Attachment 2: Map of Internet Café in Vientiane

DATE : February 20, 2002.

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Internet Café Survey Sheet

Name		Somphonkeo Samsuthai
Number of Staff: Establishment :		3 , 2001
Address(or Area)		Samsanthai RD.
Open hours		8:00 AM to 12:00 PM
System and Facilities	No of PC	12
	Spec of PC	400 - 850 Mhz
No of User	Am	40
	Pm	50
	After 9:00pm	
Type of User	Am	tourists 80%
	Pm	—
	After 9:00pm	—
Customer visited per day (Average sales per day)		30
Average of hours per one customer		60 mn
E-mail or Browsing(Accessed contents)		Email - Chat - Information - News
Rate		400 kip / a mn
Services provided		Laonet
Request to Telecom Carriers		
Others:		Japanese

DATE: February 20, 2002

(2) ↙

Internet Café Survey Sheet

Name		CYBERIA
Number of Staff: Establishment :		2 people 8:30 Start 1999
Address(or Area)		
Open hours		8:30 → 10:00 PM.
System and Facilities	No of PC	6
	Spec of PC	AMD K6 2 : 450 MH
No of User	Am	20 people
	Pm	30 people
	After 9:00pm	5 people
Type of User	Am	Business man.
	Pm	
	After 9:00pm	Travis
Customer visited per day (Average sales per day)		40 - 60 people.
Average of hours per one customer		20" - 30"
E-mail or Browsing(Accessed contents) Rate		e-mail, New.
Services provided		
Request to Telecom Carriers		LTC.
Others:		10: AM - 12 AM connection is busy

DATE :

Ⓑ

Internet Café Survey Sheet

(1) Name		Ozone
(2) Number of Staff:		2
(3) Establishment :		2001
(4) Address(or Area)		Shim.
(5) Open hours		9-12 AM ~ 10-00 PM
(6) System and Facilities	No of PC	12
	Spec of PC	Duron 400
(7) No of User	Am	15
	Pm	14
	After 9:00pm	10
(8) Type of User	Am	} student 80%
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		65 chat, check mail
(10) Average of hours per one customer		1.00 hr
(11) E-mail or Browsing (Accessed contents)		↓
(12) Rate		lookip/mos
(13) Services provided		Glob Cam. radio.
(14) Request to Telecom Carriers or IPS		slow, always fail
(15) Others:		Interviewee : Mr. Suthiya.

DATE :

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JICA Study Team

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Internet Café Survey Sheet

(1) Name		Computer Mart
(2) Number of Staff:		3.
(3) Establishment :		2001.
(4) Address(or Area)		SAMSENTHAI RD.
(5) Open hours		8:30AM - 9:00PM.
(6) System and Facilities	No of PC	10.
	Spec of PC	Pentium II 400 - 128 MB RAM
(7) No of User	Am	20 -
	Pm	40.
	After 9:00pm	-
(8) Type of User	Am	Tourist - worker 30-20% foreigner
	Pm	student.
	After 9:00pm	-
(9) Customer visited per day (Average sales per day)		60 -
(10) Average of hours per one customer		30 -
(11) E-mail or Browsing (Accessed contents)		Email & chatting.
(12) Rate		100 K/m.
(13) Services provided		LTC.
(14) Request to Telecom Carriers or IPS		Hard to connect, easy disconnect TOO Expensive
(15) Others:		Interviewee : Nisongphalm - - Korean User - Japanese User -

DATE :

JICA Study Team

5)

9)

Internet Café Survey Sheet

(1) Name		GreenNet
(2) Number of Staff:		2
(3) Establishment :		2002
(4) Address (or Area)		Nakhom Village
(5) Open hours		9 Am - 11. pm
(6) System and Facilities	No of PC	10
	Spec of PC	Celeron 850 H Ram 128 m
(7) No of User	Am	10
	Pm	30
	After 9:00pm	
(8) Type of User	Am	Student. Lao people.
	Pm	Student Lao people
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		40 (GAME)
(10) Average of hours per one customer		1 hour
(11) E-mail or Browsing (Accessed contents)		Sombouni 2 yatra com E-mail. Game
(12) Rate		4,000 K / 1 hour
(13) Services provided		Waiting New ISP.
(14) Request to Telecom Carriers or IPS		slow
(15) Others:		Interviewee : Somboun

DATE :

⑥

Internet Café Survey Sheet

(1) Name		PLANET ONLINE CAFE
(2) Number of Staff:		3
(3) Establishment :		1999
(4) Address (or Area)		209 SETHATHIRAT RD
(5) Open hours		8:30 am to 11:00 pm
(6) System and Facilities	No of PC	7
	Spec of PC	IBM PC 300 400 Mhz / 64 MB
(7) No of User	Am	200
	Pm	350
	After 9:00pm	50
(8) Type of User	Am	Tourists
	Pm	—
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		400
(10) Average of hours per one customer		30 min
(11) E-mail or Browsing (Accessed contents)		Browsing, hotmail.com yahoo.com
(12) Rate		150 kip/min
(13) Services provided		Planet Online ISP
(14) Request to Telecom Carriers or IPS		No
(15) Others:		Interviewee : THANOUSONE PHONAMAT

DATE :

(7) ✓

Internet Café Survey Sheet

(1) Name		AI computer
(2) Number of Staff:		5
(3) Establishment :		Sep 1999
(4) Address(or Area)		80 Sethathurath Rd. Vientiane
(5) Open hours		8:00 - 24:00
(6) System and Facilities	No of PC	
	Spec of PC	300 - 900 MHz 128 MB memory 15"
(7) No of User	Am	30
	Pm	60
	After 9:00pm	20
(8) Type of User	Am	Tourist 90%
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		100
(10) Average of hours per one customer		50 min
(11) E-mail or Browsing (Accessed contents)		E-mail
(12) Rate		100 kip/min
(13) Services provided		KPL leased line
(14) Request to Telecom Carriers or IPS		Upgrade International bandwidth
(15) Others:		Interviewee : ✓

DATE :

(8) ✓

Internet Café Survey Sheet

(1) Name		P-P internet & guest house.
(2) Number of Staff:		4 People
(3) Establishment :		2000
(4) Address(or Area)		Hai Sok
(5) Open hours		8:00AM - 11:30 PM.
(6) System and Facilities	No of PC	10
	Spec of PC	AMB 800
(7) No of User	Am	30
	Pm	25
	After 9:00pm	20
(8) Type of User	Am	Tourist 80.1.
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		email - chat 70
(10) Average of hours per one customer		30 min.
(11) E-mail or Browsing (Accessed contents)		email - chat
(12) Rate		150 kip/min
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		/
(15) Others:		Interviewee : LA .

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3

Internet Café Survey Sheet

(1) Name		C-net
(2) Number of Staff:		3 - 4 - People
(3) Establishment :		July, 2001.
(4) Address(or Area)		Ban Hadsady Neua
(5) Open hours		8 a.m - 11.00 p.m .
(6) System and Facilities	No of PC	10
	Spec of PC	Celeron 400
(7) No of User	Am	2 - 3 people
	Pm	7
	After 9:00pm	2 - 3
(8) Type of User	Am	Tourist 20% , student - 80% , 30% phages
	Pm	/
	After 9:00pm	/
(9) Customer visited per day (Average sales per day)		13
(10) Average of hours per one customer		30 minutes
(11) E-mail or Browsing (Accessed contents)		email - chat .
(12) Rate		100 kip / min
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		slow , disconnected disconnected
(15) Others:		Interviewee : Thip.

DATE :

(10) ✓

Internet Café Survey Sheet

(1) Name		Hot net
(2) Number of Staff:		3
(3) Establishment :		2001
(4) Address (or Area)		Saylorn
(5) Open hours		10 (8:00 - 11:00PM).
(6) System and Facilities	No of PC	8
	Spec of PC	Pentium III
(7) No of User	Am	10
	Pm	20
	After 9:00pm	10
(8) Type of User	Am	student 80%
	Pm	-
	After 9:00pm	-
(9) Customer visited per day (Average sales per day)		40
(10) Average of hours per one customer		30 minutes.
(11) E-mail or Browsing (Accessed contents)		E-mail, chat
(12) Rate		100 Baq / minute
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		✓
(15) Others:		Interviewee: Tour.

DATE :

(11) ✓

Internet Café Survey Sheet

(1) Name		T-NET (NO INTERVIEW)
(2) Number of Staff:		NO manager nor owner
(3) Establishment :		
(4) Address (or Area)		
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:		Interviewee :

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(12) ✓

Internet Café Survey Sheet

(1) Name		Smart Net
(2) Number of Staff:		4
(3) Establishment :		
(4) Address(or Area)		Saphan Hongkang village, Phnom Penh road.
(5) Open hours		16 hrs
(6) System and Facilities	No of PC	9
	Spec of PC	Pentium
(7) No of User	Am	20
	Pm	40
	After 9:00pm	15
(8) Type of User	Am	students and general people.
	Pm	General
	After 9:00pm	students.
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		1.5 hrs.
(11) E-mail or Browsing (Accessed contents)		E-mail, Game, telephone call.
(12) Rate		100 rps/minute.
(13) Services provided		lob nail
(14) Request to Telecom Carriers or IPS		The service not faster enough. sometime it request time out.
(15) Others:		Interviewee : Amorsam.

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(13) ✓

Internet Café Survey Sheet

(1) Name		SIMUANG INTERNET (INTERVIEW)
(2) Number of Staff:		
(3) Establishment :		(No manager nor owner)
(4) Address(or Area)		
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:	Interviewee :	

DATE :

(14) ✓

Internet Café Survey Sheet

(1) Name		Millennium Internet.
(2) Number of Staff:		Mr. Bounsavath (1)
(3) Establishment :		1/10/2001.
(4) Address (or Area)		Samsaeng.
(5) Open hours		8:30 - 23:00.
(6) System and Facilities	No of PC	16.
	Spec of PC	Pentium III. 866MHz
(7) No of User	Am	10
	Pm	10
	After 9:00pm	10
(8) Type of User	Am	Student
	Pm	—
	After 9:00pm	—
(9) Customer visited per day (Average sales per day)		30.
(10) Average of hours per one customer		30 min.
(11) E-mail or Browsing (Accessed contents)		E-mail.
(12) Rate		100 KIP/min.
(13) Services provided		Globe. net.
(14) Request to Telecom Carriers or IPS		Slow, Registering is too expensive
(15) Others:		Interviewee : Bounsavath.

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(15) ✓

Internet Café Survey Sheet

(1) Name		P. net .
(2) Number of Staff:		3
(3) Establishment :		2000 .
(4) Address(or Area)		Ban Xienghann .
(5) Open hours		8.30 - 23.20 .
(6) System and Facilities	No of PC	9
	Spec of PC	celeron 733
(7) No of User	Am	10
	Pm	15
	After 9:00pm	8
(8) Type of User	Am	Tourists
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		100 kip / min 10 min
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		100 kip / min
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		is slow, disconnect
(15) Others:		Interviewee : Phai ban .

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Internet Café Survey Sheet

(1) Name		L. B. M. INTERNET.
(2) Number of Staff:		3.
(3) Establishment :		10 / 201.
(4) Address (or Area)		Ban fry.
(5) Open hours		8:30 - 11 P.M.
(6) System and Facilities	No of PC	10
	Spec of PC	Celeron 900, 128 MB
(7) No of User	Am	15
	Pm	30
	After 9:00pm	1
(8) Type of User	Am	90% Lao
	Pm	90% Lao
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		45 p.
(10) Average of hours per one customer		1 hr
(11) E-mail or Browsing (Accessed contents)		mail, chat, games, type
(12) Rate		100 kip / mn
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		alway fail
(15) Others:		Interviewee: MISS. Pathana, SANANIKONE

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(17) L

Internet Café Survey Sheet

(1) Name		Sea-net
(2) Number of Staff:		20
(3) Establishment :		2001
(4) Address(or Area)		Phonthan
(5) Open hours		9 Am - 11 PM
(6) System and Facilities	No of PC	8
	Spec of PC	Lg
(7) No of User	Am	15
	Pm	20
	After 9:00pm	20
(8) Type of User	Am	student (60%)
	Pm	students (60%)
	After 9:00pm	student + other (
(9) Customer visited per day (Average sales per day)		50
(10) Average of hours per one customer		40 min.
(11) E-mail or Browsing (Accessed contents)		email - chat
(12) Rate		100 kip.
(13) Services provided		Globe net
(14) Request to Telecom Carriers or IPS		
(15) Others:		Interviewee : Xiang

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Internet Café Survey Sheet

(1) Name	OK (NO INTERVIEW)	
(2) Number of Staff:		
(3) Establishment :		
(4) Address(or Area)	(NO manager nor owner)	
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:	Interviewee :	

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Internet Café Survey Sheet

(1) Name		I-net
(2) Number of Staff:		5
(3) Establishment :		2000.
(4) Address(or Area)		Amou Village
(5) Open hours		10. AM - 11. PM
(6) System and Facilities	No of PC	Intel 750 / 8
	Spec of PC	Intel 750
(7) No of User	Am	5
	Pm	30
	After 9:00pm	15
(8) Type of User	Am	student and staff, (foreigner 40%)
	Pm	— — — — —
	After 9:00pm	— a — — — — —
(9) Customer visited per day (Average sales per day)		50
(10) Average of hours per one customer		30 mn.
(11) E-mail or Browsing (Accessed contents)		E-mail
(12) Rate		100 K / mn
(13) Services provided		Globe com
(14) Request to Telecom Carriers or IPS		Voice chat, faster access.
(15) Others:		Interviewee : NINU.

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(20) ✓

Internet Café Survey Sheet

(1) Name		Pine net
(2) Number of Staff:		1
(3) Establishment :		2000
(4) Address(or Area)		And U.
(5) Open hours		8 - 10 PM.
(6) System and Facilities	No of PC	13.
	Spec of PC	750 MHz
(7) No of User	Am	20
	Pm	40
	After 9:00pm	
(8) Type of User	Am	student 70%.
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		60.
(10) Average of hours per one customer		1 hrs.
(11) E-mail or Browsing (Accessed contents)		Chat email. VoIP.
(12) Rate		100 kip/min.
(13) Services provided		Globe com.
(14) Request to Telecom Carriers or IPS		
(15) Others:		Interviewee : Ko

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Internet Café Survey Sheet

(1) Name		Star net
(2) Number of Staff:		4
(3) Establishment :		2001
(4) Address(or Area)		Anou
(5) Open hours		8 - 22:00
(6) System and Facilities	No of PC	12
	Spec of PC	800 MHz
(7) No of User	Am	10
	Pm	30
	After 9:00pm	—
(8) Type of User	Am	for users 90.1
	Pm	for users 90.1
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		40
(10) Average of hours per one customer		30 min.
(11) E-mail or Browsing (Accessed contents)		email, chat, news.
(12) Rate		100 kip/min.
(13) Services provided		Internet Globe net
(14) Request to Telecom Carriers or IPS		
(15) Others:		interviewee : silasa

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Internet Café Survey Sheet

(1) Name		ITC. Computer
(2) Number of Staff:		2.
(3) Establishment :		1/2000-
(4) Address(or Area)		Sathathitane street, Vientiane Lao
(5) Open hours		10h per day.
(6) System and Facilities	No of PC	9.
	Spec of PC	Compatible. Computer.
(7) No of User	Am	15
	Pm	15
	After 9:00pm	20
(8) Type of User	Am	- Foreigner. 90/.
	Pm	-
	After 9:00pm	-
(9) Customer visited per day (Average sales per day)		- 50.
(10) Average of hours per one customer		30 hour .
(11) E-mail or Browsing (Accessed contents)		Email.
(12) Rate		100 / min.
(13) Services provided		Global. Com.
(14) Request to Telecom Carriers or IPS		↳ [breeze. Modem-]
(15) Others:		Interviewee : Vilaysak.

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Internet Café Survey Sheet

(1) Name		J - net
(2) Number of Staff:		4
(3) Establishment :		2003
(4) Address(or Area)		Hansdee tai
(5) Open hours		8.00 - 8.00 PM
(6) System and Facilities	No of PC	12
	Spec of PC	800 MHz
(7) No of User	Am	20
	Pm	10
	After 9:00pm	10
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		40
(10) Average of hours per one customer		1 hr
(11) E-mail or Browsing (Accessed contents)		email, voip.
(12) Rate		100 kip/m
(13) Services provided		Globe com.
(14) Request to Telecom Carriers or IPS		
(15) Others:		Interviewee : sin paseoth.

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Internet Café Survey Sheet

(1) Name		X-NET (NO INTERVIEW)
(2) Number of Staff:		
(3) Establishment :		(no manager)
(4) Address(or Area)		
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:	Interviewee :	

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Internet Café Survey Sheet

(1) Name		Internet Café (near Ambassador's Residence) (no interview)
(2) Number of Staff:		
(3) Establishment :		(No manager)
(4) Address (or Area)		
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:	Interviewee :	

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Internet Café Survey Sheet

5703 or 5704

(1) Name		NOUNE (game only)
(2) Number of Staff:		
(3) Establishment :		(No managers)
(4) Address(or Area)		
(5) Open hours		
(6) System and Facilities	No of PC	
	Spec of PC	
(7) No of User	Am	
	Pm	
	After 9:00pm	
(8) Type of User	Am	
	Pm	
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		
(10) Average of hours per one customer		
(11) E-mail or Browsing (Accessed contents)		
(12) Rate		
(13) Services provided		
(14) Request to Telecom Carriers or IPS		
(15) Others:	Interviewee :	

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Internet Café Survey Sheet

(1) Name		smooth hot cafe
(2) Number of Staff:		4
(3) Establishment :		2001
(4) Address(or Area)		Phon Xay
(5) Open hours		8:00; 22:30
(6) System and Facilities	No of PC	15
	Spec of PC	AMD 800MHz
(7) No of User	Am	20
	Pm	50
	After 9:00pm	15
(8) Type of User	Am	workers / foreman 90%
	Pm	student / foreman 10%
	After 9:00pm	student / worker
(9) Customer visited per day (Average sales per day)		85
(10) Average of hours per one customer		1h
(11) E-mail or Browsing (Accessed contents)		chat / Email
(12) Rate		100/min 4000/h
(13) Services provided		Globe Cam.
(14) Request to Telecom Carriers or IPS		network slow,
(15) Others:		Interviewee : Pheng Phon DITHANADHANE.

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Internet Café Survey Sheet

(1) Name		NET TEEN-NET
(2) Number of Staff:		1
(3) Establishment :		2001
(4) Address (or Area)		
(5) Open hours		NO FIX TIME
(6) System and Facilities	No of PC	10
	Spec of PC	DURAN 750 MHz
(7) No of User	Am	
	Pm	6
	After 9:00pm	
(8) Type of User	Am	
	Pm	Foreigner, Students
	After 9:00pm	
(9) Customer visited per day (Average sales per day)		30
(10) Average of hours per one customer		30 min
(11) E-mail or Browsing (Accessed contents)		chat, email
(12) Rate		100 Kip/min
(13) Services provided		LAO PLABA (= Global Com)
(14) Request to Telecom Carriers or IPS		
(15) Others:		Interviewee :

