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1. Member List of the Survey Team

(1) Preparatory Survey Team

Name	Position	Organization
Mr. Hiroyuki UEDA	Leader	Senior Advisor for Transportation Sector, JICA
Mr. Yoshihiro MIYAMOTO	Cooperation Planning	Deputy Director, Economic Infrastructure Dep., JICA
Mr. Takashi YAMAGUCHI	Consultant Leader CNS/ATM System Leading Planner	Japan Airport Consultants, Inc.
Mr. Yukimi TAJIMA	CNS/ATM System Planner 1	Japan Airport Consultants, Inc.
Mr. Suketoshi NAGANO	CNS/ATM System Planner 1	Nippon Koei Co., Ltd.
Mr. Koichi NISHIMURA	Construction/Installation/Cost Estimation Planner	Nippon Koei Co., Ltd.

(2) Outline Design Explanation Team

Name	Position	Organization
Mr. Hiroyuki UEDA	Leader	Senior Advisor for Transportation Sector, JICA
Mr. Yuya HUKADA	Cooperation Planning	Deputy Director, Economic Infrastructure Dep., JICA
Mr. Takashi YAMAGUCHI	Consultant Leader CNS/ATM System Leading Planner	Japan Airport Consultants, Inc.
Mr. Yukimi TAJIMA	CNS/ATM System Planner 1	Japan Airport Consultants, Inc.
Mr. Suketoshi NAGANO	CNS/ATM System Planner 1	Nippon Koei Co., Ltd.
Mr. Koichi NISHIMURA	Construction/Installation/Cost Estimation Planner	Nippon Koei Co., Ltd.

2. Survey Schedule

(1) Preparatory Survey

Day	Date		UEDA	MIYAMOTO	YAMAGUCHI	TAJIMA	NAGANO	NISHIMURA		
			Team Leader	Cooperation Planning	Consultant Leader	CNS/ATM System Planner 1	CNS/ATM System Planner 2	Construction/Installation/Cost Estimation		
1	June 6	Wed	X	NRT→BKK→VTE	X	NRT→BKK→VTE				
2	7	Thu		Same as consultant		Courtesy call JICA and DCA Explanation/Discussion of Inception Report				
3	8	Fri		Same as consultant		Vientiane International Airport site survey Discussion with DCA/LATM				
4	9	Sat		Arrived VTE		Same as consultant	Survey for system planning			
5	10	Sun			NRT→BKK→VTE					
6	11	Mon	Courtesy call JICA and DCA Discussion with DCA/LATM, Vientiane International Airport site survey							
7	12	Tue	Discussion with DCA/LATM, preparation of MD							
8	13	Wed	Xiengkhouang airport survey	Return to Japan VTE→BKK	Xiengkhouang airport survey	Pakse airport survey				
9	14	Thu	Discussion with DCA/LATM	X	Discussion with DCA/LATM					
10	15	Fri	MD signing Return to Japan		MD signing		Savannakhet airport survey			
11	16	Sat	X		Survey for system planning					
12	17	Sun								
13	18	Mon			Luang Phabang airport survey	Survey for system planning				
14	19	Tue			Luang Phabang airport survey	Survey for system planning				
15	20	Wed			Survey for system planning/construction/procurement/cost estimation					
16	21	Thu			Survey for system planning/construction/procurement/cost estimation					
17	22	Fri			Survey for system planning/construction/procurement/cost estimation					
18	23	Sat			Survey for system planning/construction/procurement/cost estimation					
19	24	Sun								
20	25	Mon			Survey for system planning/construction/procurement/cost estimation					
21	26	Tue			Survey for system planning/construction/procurement/cost estimation					
22	27	Wed			Survey for system planning/construction/procurement/cost estimation					
23	28	Thu			Survey for system planning/construction/procurement/cost estimation					
24	29	Fri			Return to Japan VTE→BKK		Discussion for technical memorandum with DCA/LATM Report to JICA Lao			
25	30	Sat			X		Survey for system planning			
26	July 1	Sun		Return to Japan VTE→BKK						
27	2	Mon		BKK→NRT						

(2) Outline Design Explanation

Day	Date		UEDA	HUKADA	YAMAGUCHI	TAJIMA	NAGANO	NISHIMURA
			Team Leader	Cooperation Planning	Consultant Leader	CNS/ATM System Planner 1	CNS/ATM System Planner 2	Construction/Installation/Cost Estimation
1	Nov. 12	Mon	NRT→BKK→VTE					
2	13	Tue	Explanation/Discussion of Draft Report/Outline Design Report					
3	14	Wed	Explanation/Discussion of Draft Report/Outline Design Report					
4	15	Thu	Explanation/Discussion of Draft Report/Outline Design Report					
5	16	Fri	Courtesy call JICA and Embassy of Japan, return to Japan VTE→BKK					
6	17	Sat	BKK→NRT					

3. List of Parties Concerned in the Recipient Country

Organization	Title	Name
DCA: Department of Civil Aviation	Director General	Yakua LOPANGKAO
	Deputy Director General	Vanpheng CHANTHAPHONE
	Deputy Director General	Intahnousone SISANONH
	Director of Air Navigation Division	Bountaeng SYMOON
	Deputy Director of Aeronautical Telecommunication Division	Keoviengxay KHAMPASEUTH
	Acting Director of Aeronautical Telecommunication Division	Bounthueng SOUMONTHA
LATM: Lao Air Traffic Management	Director General	Somchith VINITKEOPHAVANH
	Director of ATTSC	Sithideth SWANIOMANOTHEY
	Deputy Direct of ATSC	Manasananh KOUNLATH
	Deputy Director of ATTSC	Samay DOUANGBOUPHA
	ATTSC staff	Xaysavanh KITTANOUVONG
	ATTSC staff	Somphavanh KINGSADA
	ATTSC staff	Moukphamay THAMMAVONGSA
Lao Airlines	Flight Operation Deputy Director	Siphone SAVANHVONG
	Quality Assurance & Flight Safety Manager	Somlith SYHAVONG
	Airworthiness Inspector	Somphone VANNASOUK
Embassy of Japan in Lao PDR	First Secretary	Masahiko MITSUMOTO
JICA Laos Office	Chief Representative	Masato TOGAWA
	Senior Representative	Yoshiharu YONEYAMA
	Representative Infrastructure Sector	Yoko HATTORI
	Representative Infrastructure Sector	Mayumi MIYATA
JICA Expert	Leader/ATM Advisor	Hiroshi INOBUCHI
	CNS Advisor	Ryuichi NAGAI
CIT Lao Ltd.	Chairman	Jos van SCHAİK

4. Minutes of Discussions (M/D)

4.1 Minutes of Discussions [Preparatory Survey]

**MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
FOR THE PROVISION OF NEW SUITABLE EQUIPMENT
FOR TRANSITION TO NEW CNS/ATM SYSTEM
IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC**

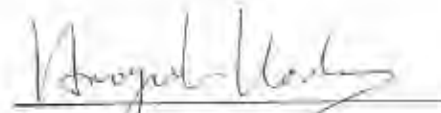
In response to a request from the Government of the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR"), Japan International Cooperation Agency (hereinafter referred to as "JICA") in consultation with the Government of Japan decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") for the Provision of New Suitable Equipment for Transition to New CNS/ATM System (hereinafter referred to as "the Project").

JICA sent the Preparatory Survey Team (hereinafter referred to as "the Team") to Lao PDR, headed by Mr. Hiroyuki Ueda, Senior Advisor of JICA, and was scheduled to stay in the country from June 6 to July 1, 2012.

The Team held discussions with officials concerned of the Government of Lao PDR and conducted a field survey in the study area.

In the course of discussions and field survey, the both sides confirmed the main items described in the attached sheets.

Vientiane, June 15, 2012



Hiroyuki Ueda
Leader
Preparatory Survey Team
Japan International Cooperation Agency



Yakua Lopangkao
Director General
Department of Civil Aviation
Ministry of Public Works and Transport

ATTACHMENT

1. Title of the Project

The both Japanese and Lao sides confirmed that the title of the Project shall be modified as "Project for the modernization of equipment for transition to new CNS/ATM systems". The title will be finalized upon confirmation by the higher authorities of the both countries.

2. Objective of the Project

The both Japanese and Lao sides confirmed that the objective of the Project is to strengthen the aviation safety at major airports and air routes in Lao PDR by modernizing air navigation equipment.

3. Project Site

The both Japanese and Lao PDR sides confirmed that the sites of the Project are Vientiane, Savannakhet, Pakse, Luang Prabang and Xiengkhouang. Project sites are shown in Annex-1.

4. Objective of the Survey

The both Japanese and Lao PDR sides confirmed the objective of the Survey as follows:

- 4-1. To understand the background and objective of the Project and examine its impacts and appropriateness.
- 4-2. To consider the components, outline design and cost estimation of the Project based on the data and information collected from and the results of meetings with the Lao side.

5. Responsible and Implementing Agency

The both Japanese and Lao sides confirmed the implementing organizations as follows:

- 5-1 The responsible organization is the Ministry of Public Works and Transport (MPWT) of the Government of Lao PDR, represented by the Department of Civil Aviation (DCA).
- 5-2 The implementing organization is the Lao Air Traffic Management (LATM).
- 5-3 The organization charts of DCA and LATM are as shown in Annex-2 and 3 respectively.

6. Items Requested by the Government of Lao PDR

As a result of discussions between the both sides, the items in the following table were finally requested by the Lao side. The both side confirmed that the final components of the Project will be decided by the Japanese side in consideration of necessity, technical viability, sustainability, cost-effectiveness and available budget. Therefore, the Lao side understood that all the requested items may not be accepted as final components of the Project.



Item	Site
1. Aeronautical Information Services (AIS) Automation System	Vientiane
2. ATS Message Handling System (AMHS)	Vientiane
3. Remote Controlled Air-Ground (RCAG) VHF	4 locations
3.1 Replacement of RCAG VHF	Vientiane (2 frequencies), Savannakhet (1) and Xiengkhouang (2)
3.2 Installation of RCAG VHF	Paksong (1)
4. Air-Ground VHF for Aerodrome and Approach Controls	5 locations
4.1 Replacement of Aerodrome Air-Ground VHF	Vientiane (1), Savannakhet (1), Pakse (1), Luang Prabang (1) and Xiengkhouang (1)
4.2 Replacement of Approach Air-Ground VHF	Vientiane (1)
5. Air-Ground VHF for Emergency Services	5 locations
5.1 Replacement of Emergency Frequency for Aerodrome Air-Ground VHF	Vientiane (1)
5.2 Installation of Emergency Frequency for Aerodrome Air-Ground VHF	Savannakhet (1), Pakse (1), Luang Prabang (1) and Xiengkhouang (1)
6. Very Small Aperture Terminal (VSAT) Link	Vientiane - Xiengkhouang, Vientiane - Savannakhet and Vientiane - Paksong
7. Replacement of Instrument Landing System (ILS)	Vientiane
8. Flight Procedure Design System	Vientiane

7. A TS Message Handling System (AMHS)

The Lao side confirmed that there is no contractual arrangement to procure AMHS besides the request to the Government of Japan mentioned in this Minutes of Discussion.

8. Aeronautical Information Services (AIS) Automation System

The Lao side has concluded a contract with CIT Lao Ltd. for the installation of AIS Automation System, as a part of the comprehensive contract to supply and maintain air navigation systems in Lao PDR. However, the Lao side has an intention to remove this component regarding AIS Automation since this system is more effective when it is planned together with AMHS equipment to be installed by the Project. The Japanese side shall assess the appropriateness of inclusion of AIS Automation System as a component of the Project upon receipt of official statement by the relevant authority of the Lao side regarding modification of the said contract with CIT Lao Ltd. The Lao side shall inform the modification of the contract to the Japanese side by the end of June 2012 in written form signed by the signer (or higher level official) of the said contract. The Lao side understood that the intention to modify the contract does not ensure a commitment by the

Japanese side to implement the Project with such item since the Project is subject to the appraisal of the Government of Japan and JICA, and the approval of the Japanese Cabinet as mentioned in Section 1, Grant Aid Procedures of Annex 4: Japan's Grant Aid Scheme.

9. Installation of RCAG VHF at Paksong and Air-Ground VHF at Luang Prabang Airport

9-1. Air Traffic Control Tower of Luang Prabang Airport will be newly constructed with the cooperation from the Chinese Government by the end of year 2013. Air-Ground VHF equipment for Luang Prabang Airport under this Project is assumed to be installed at the new tower. Should the completion of the new tower be expected to delay beyond the delivery of the equipment under this Project, it will be installed at the existing tower. In such as case, the Lao side will be responsible for transfer of equipment from the existing tower to the new tower after completion of the new tower.

9-2. LATM is preparing to establish a new radar site at Paksong by the end of year 2013. The installation of RCAG VHF is considered to be installed at the same site with the radar. One set of RCAG VHF and VSAT equipment under this Project is assumed to be installed at the Paksong radar site. Should the completion of the new radar site be expected to delay beyond the delivery of the equipment under this Project, it will be installed at the Pakse Airport. In such as case, the Lao side will be responsible for transfer of equipment from the Pakse Airport to the Paksong radar site after completion of the new radar site.

10. Japan's Grant Aid Scheme

10-1. The Lao side understands the Japan's Grant Aid scheme explained by the Team, as described in Annex-4 and Annex-5.

10-2. The Lao side will take the necessary measures, as described in Annex-6, to facilitate the smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented, according to the existing agreement between the Government of Japan and the Government of Lao PDR.

11. Schedule of the Survey

The both sides confirmed the schedule of the Survey as follows:

11-1. The Team will continue the first field survey in Lao PDR until July 1, 2012.

11-2. JICA will prepare the draft Final Report and send a mission team to explain its contents to the Lao side in October 2012. JICA will explain details of the Project including the final components and cost estimation to the Lao side.

11-3. JICA will finalize the Final Report and send it to the Lao side around February 2013.

11-4. The above schedule is tentative and subject to change.

12. Other Relevant Issues

12-1. The Lao side understood the principle of the Japan's Official Development Assistance Charter, which stresses that ODA must not be utilized for military purposes or promoting international conflicts, and agreed to ensure that the equipment to be procured in the

Project will never be used for any military purposes.

- 12-2. The Lao side agreed that DCA and LATM shall ensure that all necessary measures will be taken to properly and effectively operate and maintain the equipment procured by the Project.
- 12-3. The Lao side requested that an appropriate Soft Component for capacity building for AIS automation system be considered in the Project. Japanese side took note of it and will evaluate necessity and effects of such activity.
- 12-4. The Lao side shall provide security measures for all concerned Japanese nationals working for the Project, if deemed necessary.
- 12-5. The Lao side shall, at its own expense, provide the Survey team with the following items in cooperation with other organizations concerned:
 - (1) security-related information as well as measures to ensure the safety of the survey team;
 - (2) information as well as support in obtaining medical service;
 - (3) data and information related to the Preparatory Survey;
 - (4) counterpart personnel;
 - (5) suitable office space with necessary equipment and services;
 - (6) credentials or identification cards;
 - (7) entry permits necessary for the survey team members to conduct field surveys; and
 - (8) support in obtaining other privileges and benefits if necessary.

Annex-1: Project Site

Annex-2: Organization Chart of DCA

Annex-3: Organization Chart of LATM

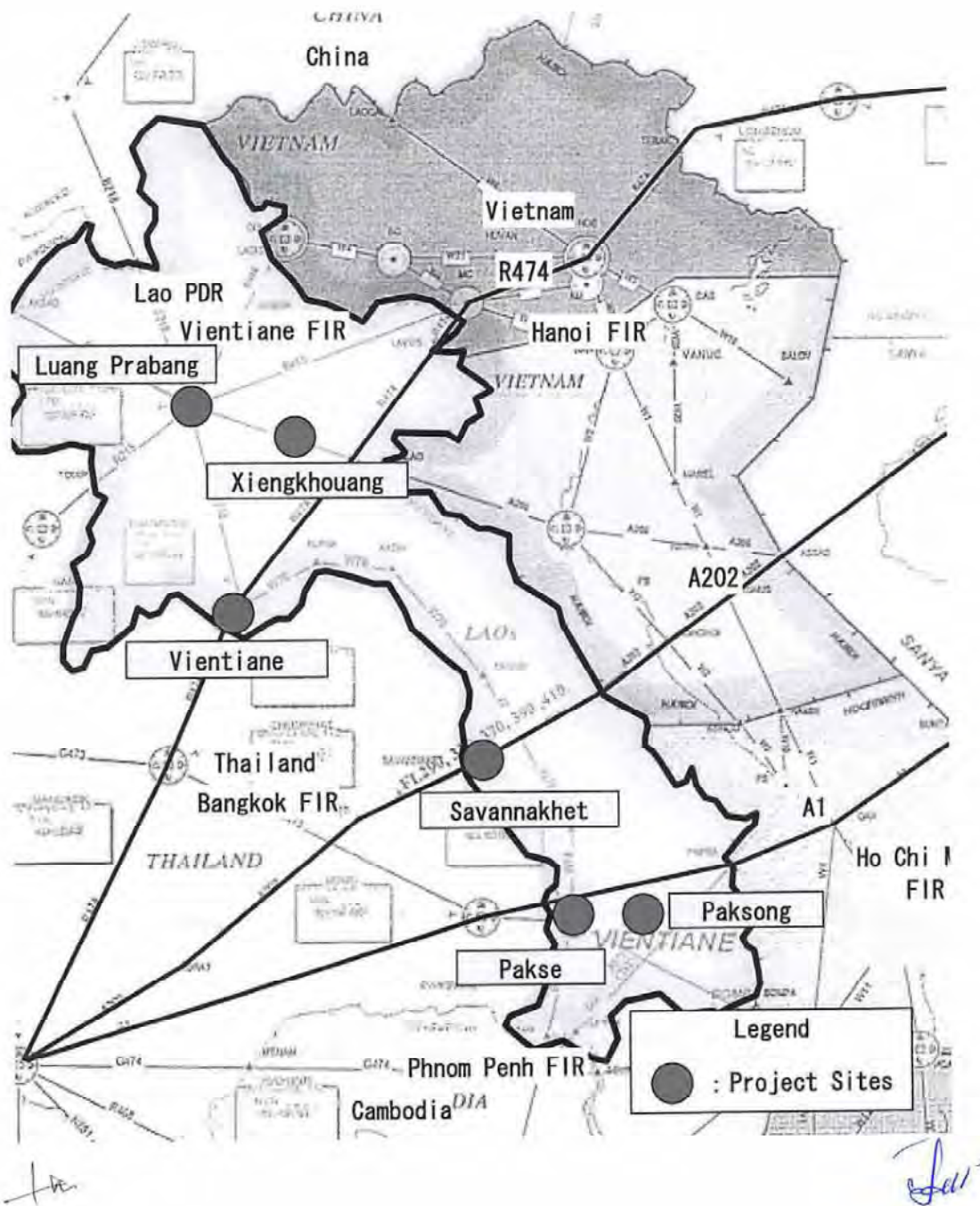
Annex-4: Japan's Grant Aid Scheme

Annex-5: Flowchart of Japan's Grant Aid Procedure

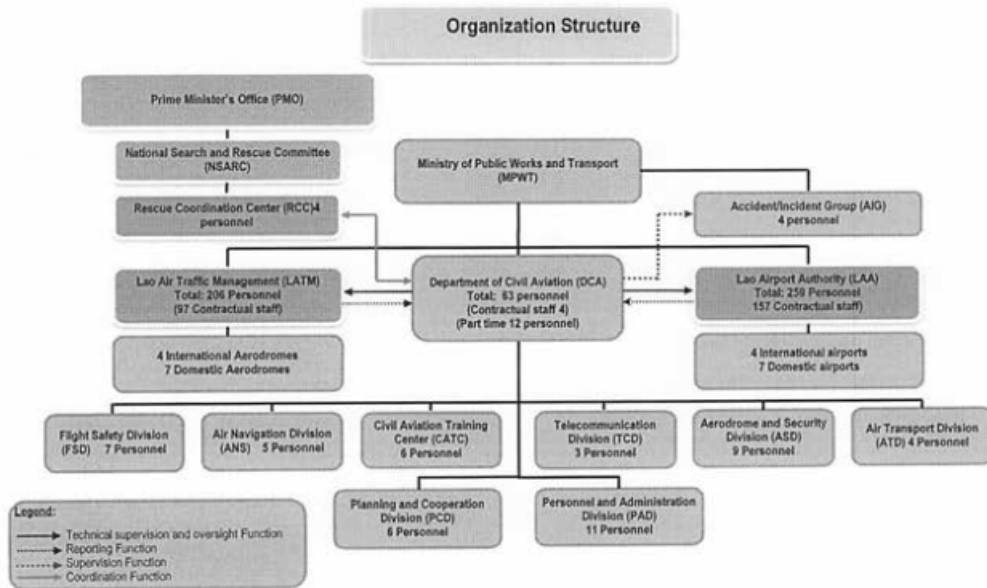
Annex-6: Major Undertakings to be taken by Each Government



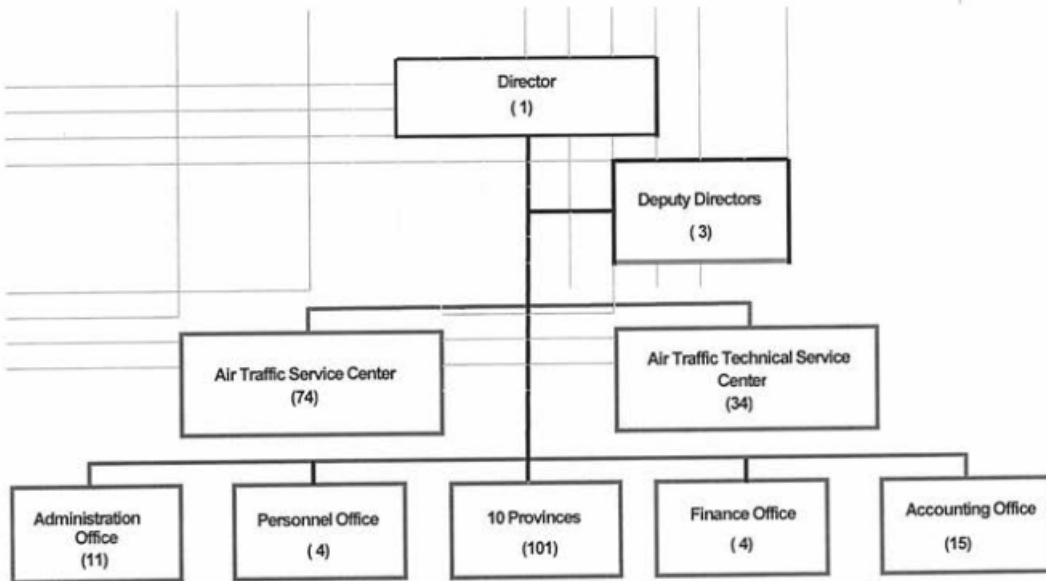
Annex-1: Project Site



Annex-2: Organization Chart of DCA



Annex-3: Organization Chart of LATM



(June 2011)

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Annex 4: Japan's Grant Aid Scheme

JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures:

- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the

products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

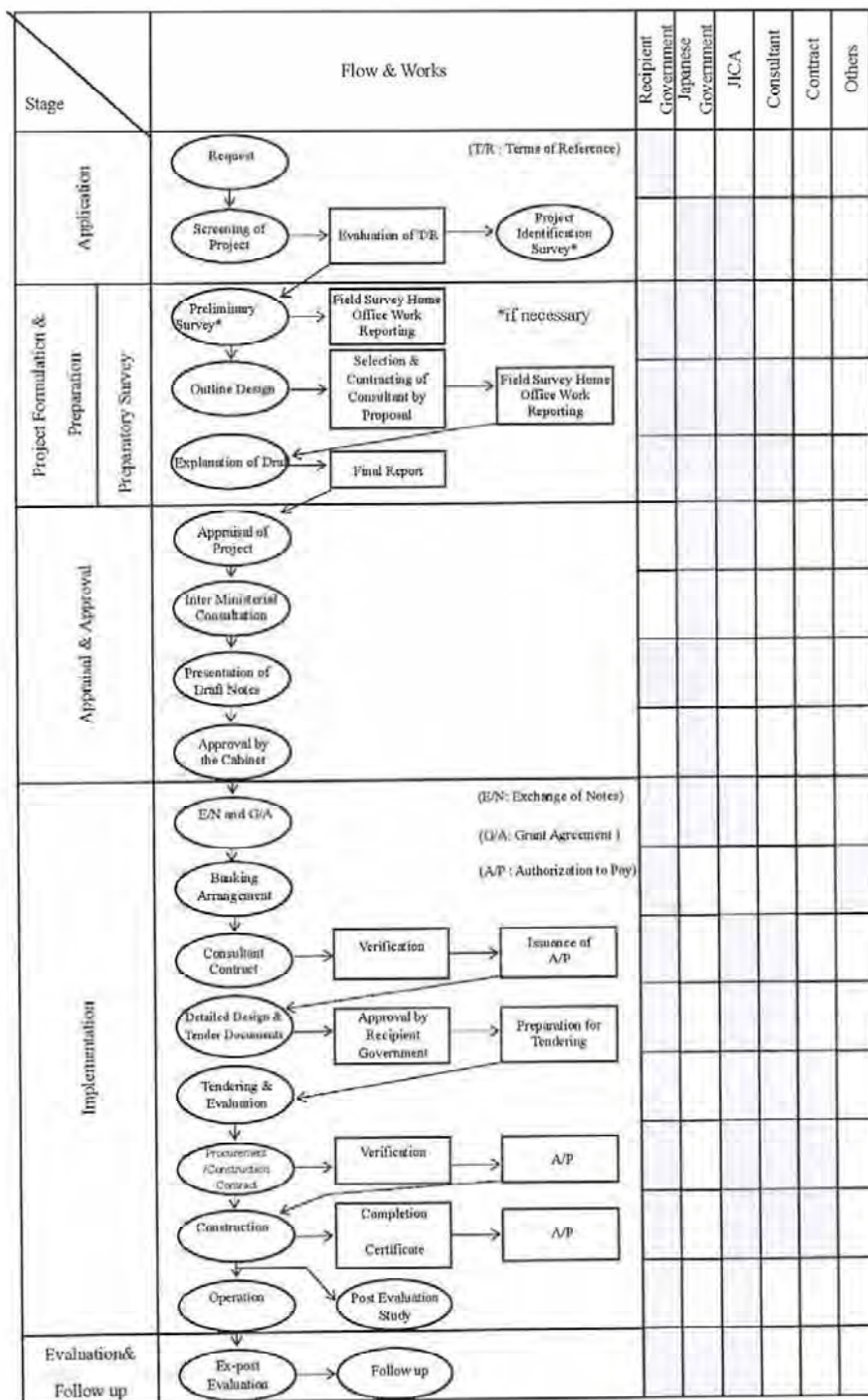
(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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Annex 5: Flowchart of Japan's Grant Aid Procedure



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Annex 6: Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To procure, deliver and install the equipment	●	
2	To provide training for operation and maintenance of the equipment	●	
3	To conduct works for installation of the equipment including removal of existing equipment, supply of electric power and others as required, prior to installation of the equipment.		●
4	To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of embarkation to the project site	●	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted.		●
6	To accord Japanese and third country nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the implementation of the Project.		●
7	To ensure that the products be maintained and used properly and effectively for the implementation of the Project.		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project.		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		●
	1) Advising commission of A/P		●
	2) Payment commission		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

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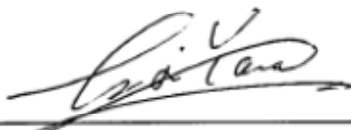
4.2 Technical Memorandum [Preparatory Survey]

**TECHNICAL MEMORANDUM ON THE PREPARATORY SURVEY
FOR THE “PROJECT FOR THE MODERNIZATION OF EQUIPMENT FOR
TRANSITION TO NEW CNS/ATM SYSTEMS”
IN THE LAO PEOPLE’S DEMOCRATIC REPUBLIC**

Based on the Minutes of Discussion dated June 15, 2012 signed by Mr. Yakua Lopangkao, Director General of Department of Civil Aviation, MPWT and Mr. Hiroyuki Ueda, Leader of Preparatory Survey Team of JICA, the Survey Team held technical discussions with officials concerned of the Government of the Lao PDR for the above-captioned survey to wrap-up the works carried out during their stay in the Lao PDR.

In the course of technical discussions and field survey, the both sides confirmed the main items described in the attached sheets.

Vientiane, June 29, 2012



Takashi Yamaguchi
Consultant Leader
JICA Survey Team



Yakua Lopangkao
Director General
Department of Civil Aviation

ATTACHMENT

1. ATS Message Handling System (AMHS)

AMHS requested in the Minutes of Discussion on June 15, 2012 was deleted from the requested items since this function and equipment has been installed.

Back ground

AFTN facility was installed in 1997 under the grant aid of the Japanese Government. To handle Y2K preparation, Aerothai had installed AFTN mini-switching software for domestic operation via telephone line to Luang Phabang. The survey team confirmed that AFTN/AMHS gateway was installed by CIT Lao Ltd. and served for domestic operation via telephone line to Luang Phabang, Savannakhet and Pakse, and the contractual obligation including one-year guarantee period expired on May 6, 2012.


2. Aeronautical Information Services (AIS) Automation System

As mentioned in the Minutes of Discussion on June 15, 2012, the Lao side informed the modification of the contract to the Japanese side by the letter Reg. No. 1609 dated June 28, 2012 signed by Mr. Yakua Lopangkao, Director General of Department of Civil Aviation, MPWT.

Technical support by the Japanese side concerning AIS & AMHS specifications and interface connection as well as operation & maintenance may be considered enhancing skill of Lao technical personnel in the scheme of Soft Components.

3. Basic Technical Requirements and Equipment Configuration of the Systems

The detailed system configuration of each project component will be considered following basic technical requirements:

- The system equipment characteristics will follow and conform to any relevant ICAO Recommendations including Annex/SARPs, and other related national or international regulations and agreements.
- The designs for the system will take into account human engineering considerations, for example, the Human-Machine Interface (HMI) of the operational and technical position should be of window type, multi-color and user-friendly graphical environment.
- The hardware and software for CNS/ATM systems should be fully redundant for continuous operation.
- The hardware of the CNS/ATM systems should be Commercial Off-The-Shelf (COTS) machines with state-of-the-art technology, having enough capacity for future developments. 

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Each system equipment configuration based on the basic technical requirements is shown in the table below;

Table 1 System Equipment Configuration 1/2

System	Item	Qty	Unit	Site						Remarks
				Vientiane	Luang Prabang	Phon	Savannakhet	Xiangbhouang	Phongsavang	
1 Aeronautical Information Service (AIS) Automation System	1-1 AIS Database/Management Server	2	set	2						
	1-2 Web Server	2	set	2						
	1-3 AIP Workstation	2	set	2						
	1-4 NOTAM Workstation	2	set	2						
	1-5 NET Workstation	2	set	2						
	1-6 System Management Workstation	2	set	2						
	1-7 AIS Terminal	0	set	0	1	1	1			
	1-8 UPS	0	set	3	1	1	1			500VA
	1-9 AIS Printer	13	set	10	1	1	1			
	1-10 GPS Clock	1	set	1						
	1-11 Redundant Fast Ethernet LAN	1	set	1						
	1-12 Firewall	1	set	1						
	1-13 Internet Router	1	set	1						
	1-14 Modem	0	set	5	1	1	1			
2 Air-Ground VHF-ER	3-1 VHF Transmitter with Antenna Changer	0	lot	2			1	2	1	Main/Standby, 50W
	3-2 VHF Receiver with Antenna Changer	0	lot	2			1	2	1	Main/Standby
	3-3 VHF Transmitting Antenna	0	set	2			1	2	1	Dipole Antenna
	3-4 VHF Receiving Antenna	0	set	2			1	2	1	Dipole Antenna
	3-5 Coaxial Arrestor	12	set	4			2	4	2	
	3-6 Coaxial Cable (100-2V)	240	m	80			40	80	40	
	3-7 Connector (100-2V)	12	set	4			2	4	2	
	3-8 Remote Control Equipment	1	set	1						7CH (1-frequency)
	3-9 Remote Control Equipment	2	set	1				1		2CH (2-frequency)
	3-10 Remote Control Equipment	2	set				1		1	1CH (1-frequency)
	3-11 Best Signal Selection & Signal Delay unit	1	set	1						
	3-12 UPS	1	set					1		1.5KVA, Rack-mount type
	3-13 UPS	3	set	1			1		1	1KVA, Rack-mount type
	3-14 18 inch Rack	7	set	3			1	2	1	VTE: TX/RX-2, RCE-1
3 Aerodrome/ Approach Air-Ground	4-1 VHF Transmitter with Antenna Changer	5	lot	1	1	1	1	1		Main/Standby, 10W (Aerodrome)
	4-2 VHF Transmitter with Antenna Changer	1	lot	1						Main/Standby, 50W (Approach)
	4-3 VHF Receiver with Antenna Changer	0	lot	2	1	1	1	1		Main/Standby
	4-4 VHF Transmitting Antenna	0	set	2	1	1	1	1		Dipole Antenna
	4-5 VHF Receiving Antenna	0	set	2	1	1	1	1		Dipole Antenna
	4-6 Coaxial Arrestor	12	set	4	2	2	2	2		
	4-7 Coaxial Cable (100-2V)	240	m	80	40	40	40	40		
	4-8 Connector (100-2V)	12	set	4	2	2	2	2		
	4-9 VHF Remote Control Unit	0	set		2	2	2	2		
	4-10 UPS	4	set		1	1	1	1		500VA, Rack-mount type
	4-11 18 inch Rack	7	set	3	1	1	1	1		

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Table 1 System Equipment Configuration 2/2

System	Item	Qty	Unit	Site						Remarks
				Vientiane	Luang Prabang	Phasao	Souvannabhat	Xiangbhouang	Paksong	
4 Air-Ground for Emergency	5-1 VHF Transmitter with Antenna Changer	4	lot		1	1	1	1		Main/Standby, 10W
	5-2 VHF Transmitter with Antenna Changer	1	lot	1						Main/Standby, 50W
	5-3 VHF Receiver with Antenna Changer	5	lot	1	1	1	1	1		Main/Standby
	5-4 VHF Transmitting Antenna	5	set	1	1	1	1	1		Dipole Antenna
	5-5 VHF Receiving Antenna	5	set	1	1	1	1	1		Dipole Antenna
	5-6 Coaxial Arrestor	10	set	2	2	2	2	2		
	5-7 Coaxial Cable (10D-2V)	200	m	40	40	40	40	40		
	5-8 Connector (10D-2V)	10	set	2	2	2	2	2		
	5-9 VHF Remote Control Unit	(4)	set		(1)	(1)	(1)	(1)		Remote control for emergency is made by VHF remote control unit of Aerodrome A/G.
5 VSAT Link	6-1 VSAT TX/RX	2	set				1		1	2CH (84kbs x 2)
	6-2 VSAT TX/RX	1	set					1		6CH (84kbs x 3)
	6-3 VSAT TX/RX	1	set	1						7CH (84kbs x 7)
	6-4 VSAT Antenna	4	set	1			1	1	1	Ø=2.7m, Inc. antenna pole
6 Instrument Landing System (ILS)	7-1 LLZ Equipment	1	lot	1						
	7-2 LLZ Antenna	1	lot	1						14-elements
	7-3 GP Equipment	1	lot	1						
	7-4 GP Antenna	1	lot	1						
	7-5 T-DME Equipment	1	lot	1						
	7-6 T-DME Antenna	1	lot	1						
	7-7 LLZ Power Supply Equipment	1	set	1						
	7-8 GP/T-DME Power Supply Equipment	1	set	1						
	7-9 Air Conditioner	4	set	4						
	7-10 ILS Remote Control Equipment	1	set	1						
	7-11 ILS Remote Wireless Equipment	2	lot	2						Inc. Modem
	7-12 High-Voltage Switchgears and Fuses	1	lot	1						For spare
	7-13 Low-Voltage MCCB	1	lot	1						For spare
7 Flight Procedure Design Software	8-1 Flight Procedure Design Software	1	lot	1						DCA head quarter
	8-2 Data base server/PC terminal with monitor	1	lot	1						
	8-3 Network equipment (switching hub)	1	set	1						
	8-4 Network equipment (fire wall)	1	set	1						
	8-5 Printer	1	set	1						
	8-6 UPS	1	set	1						500VA

Note: Further analysis will be implemented during the works for preparation of draft final report & equipment specification by the Survey Team.

Outline of each system diagram is as shown below:

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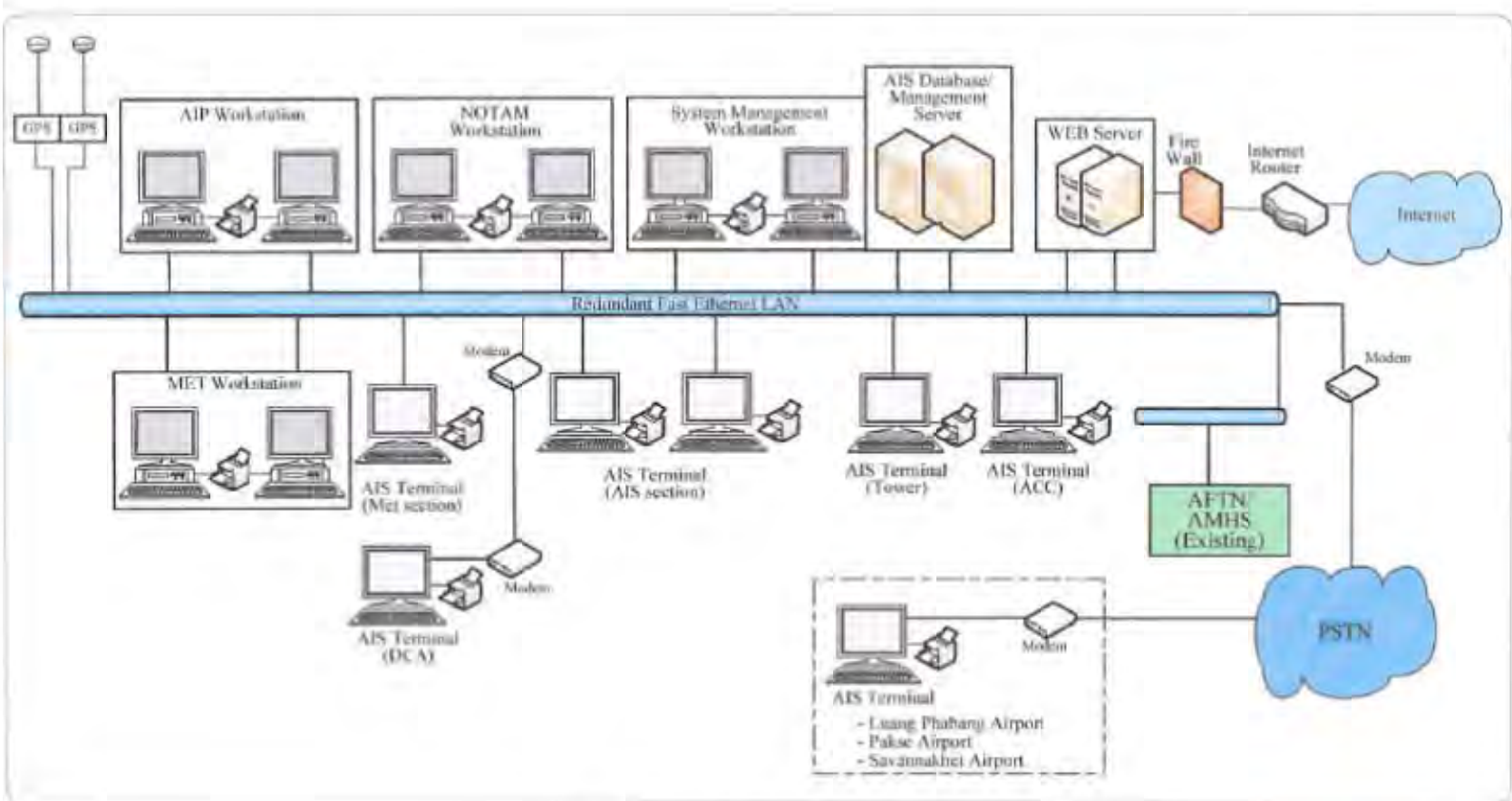


Figure 1-1 AIS System Diagram

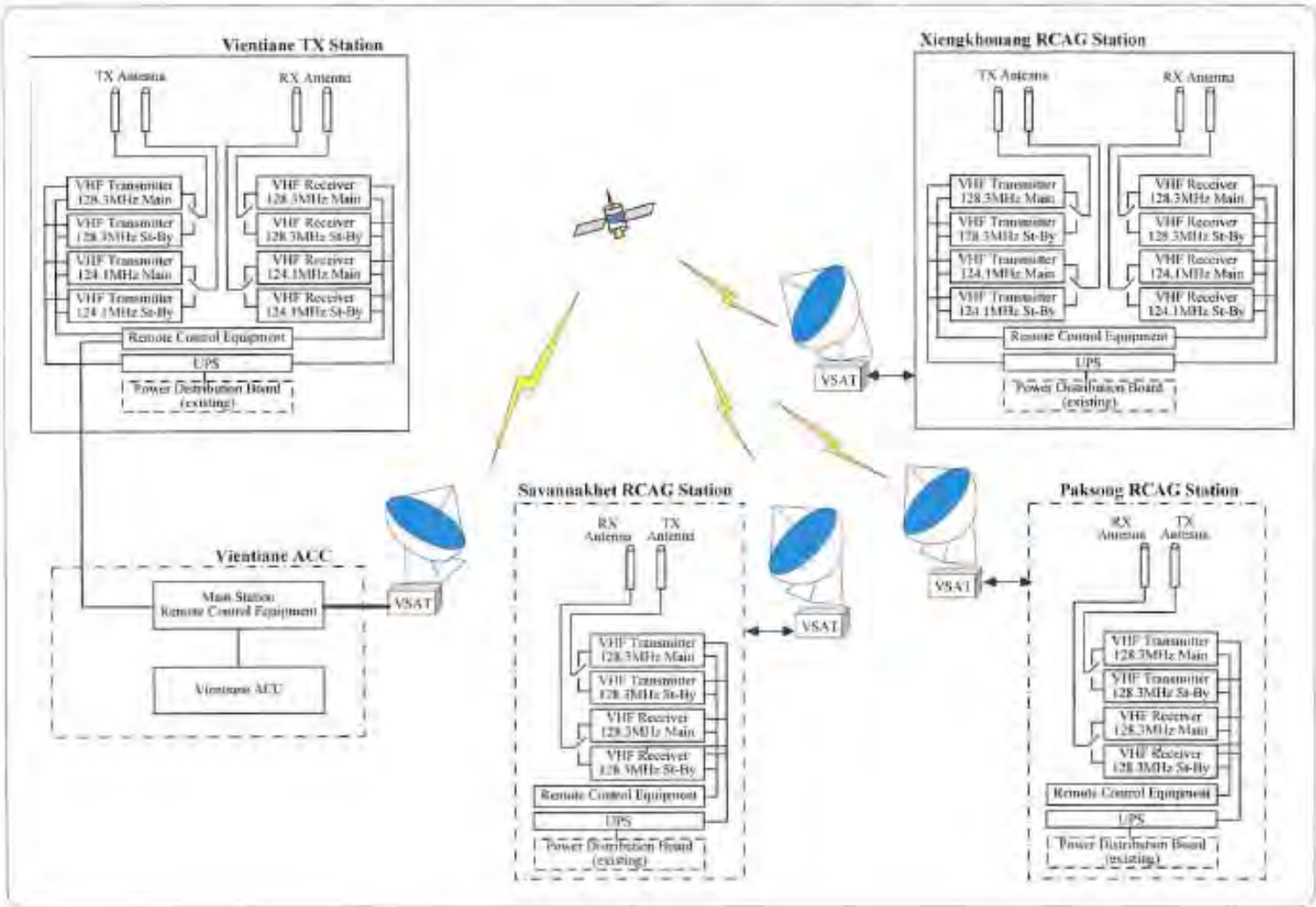


Figure 1-2 RCAG/VSAT System Diagram

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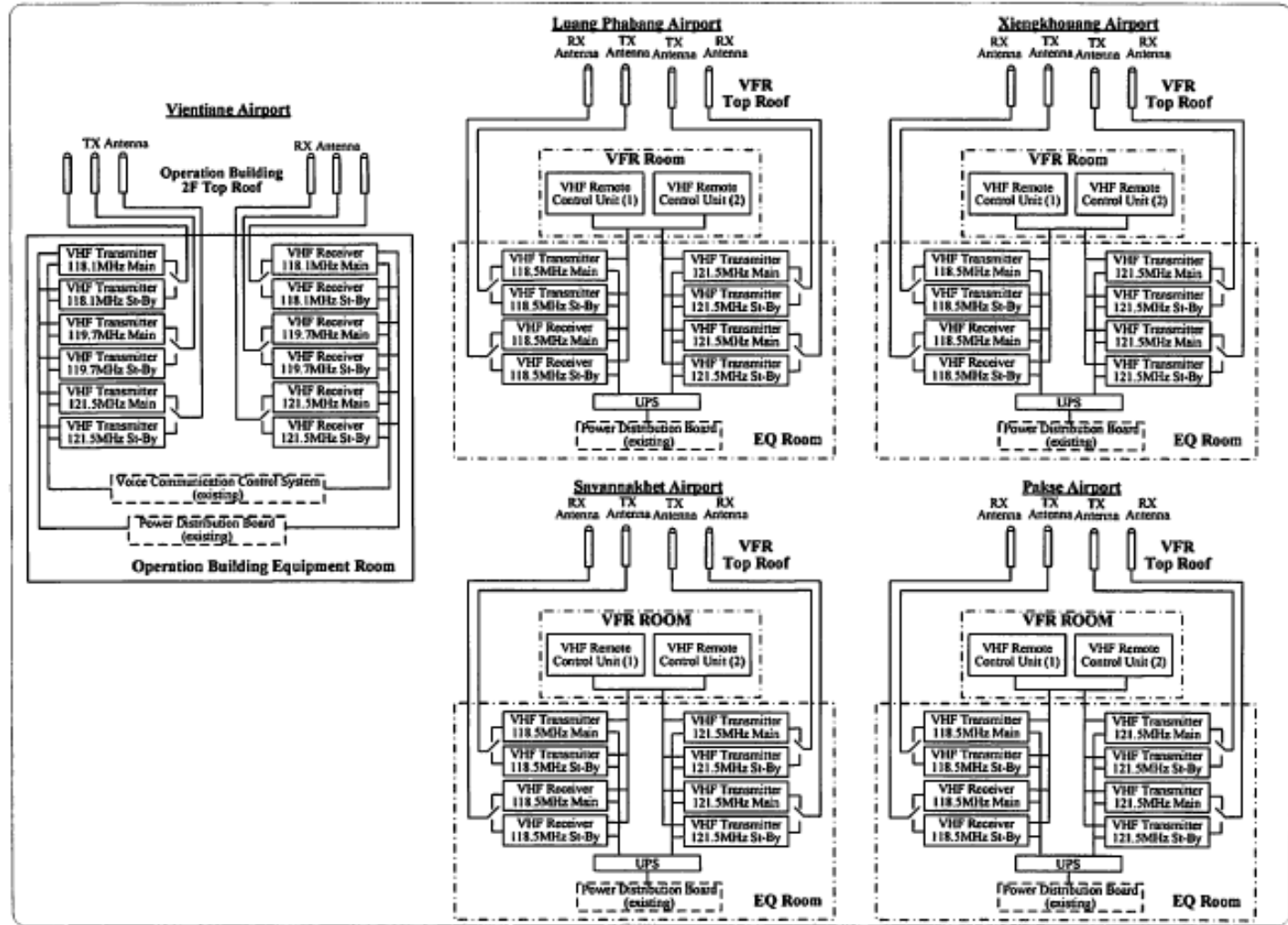


Figure 1-3 VHF Air to Ground System Diagram

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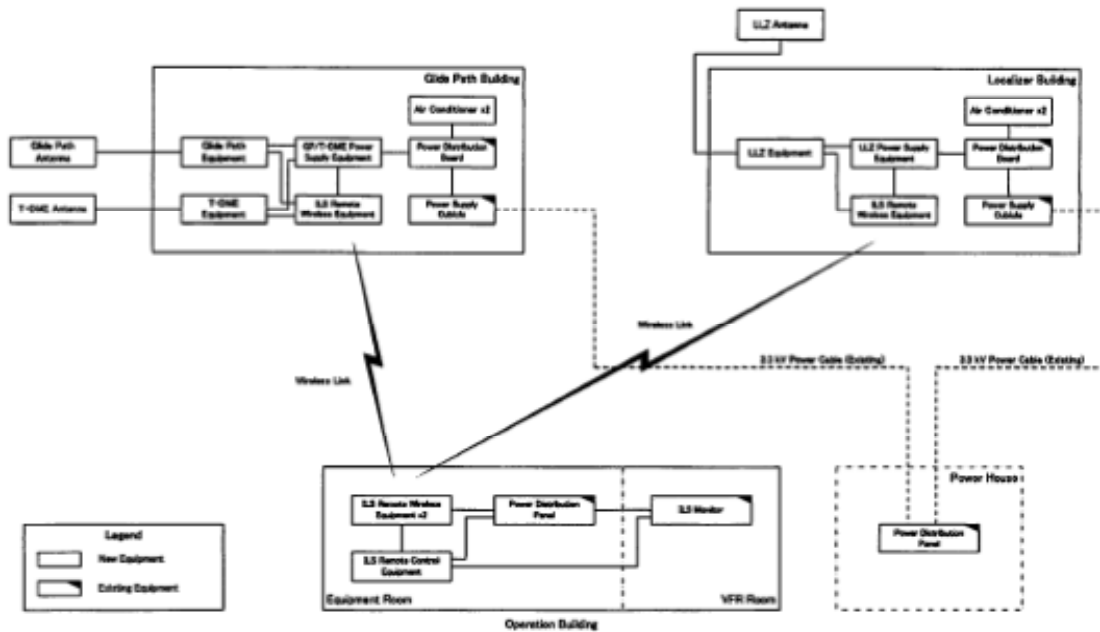


Figure 1-3 ILS System Diagram

4. The responsibility of the works to be implemented by the Lao side is as follows:

1) Vientiane

- At present, there is no enough space for installing AIS equipment at AIS room in the ATC operation building. Since there are several equipment which do not operate at the equipment room and FIC room, those equipment and office desks should be dismantled or relocated by the Lao side to make the space and necessary power feeders for the new system equipment at each room.
- The connection interface between AIS automation and existing AFTN/AMSS should follow the ICAO Doc. 9880 part 2 “Ground-Ground Applications, Air Traffic Services Message Handling Services (ATSMHS)”. The detailed connection interface of existing AFTN/AMSS should be disclosed by the Lao side for the system design of AIS automation.
- Cable installation and connection for VHF voice in-output signal between RCAG remote control equipment and existing VCCS at equipment room in the ATC operation building will be carried out by the Japanese side. This work, however, should be implemented in collaboration with Lao side.
- Cable installation and connection for output of radar data from the VSAT communication equipment should be carried out by the Lao side.
- Following existing ILS equipment should be dismantled by the Lao side before installing new ILS equipment.
 - LLZ equipment including DC power supply and all low voltage cables
 - LLZ antenna including antenna network equipment, near field monitor antenna and

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all coaxial cables

- GP equipment including DC power supply and all low voltage cables
- GP antenna including antenna network equipment and near field monitor antenna and all coaxial cables
- T-DME equipment and all low voltage cables
- T-DME antenna including cables

2) Luang Phabang

- Installation space including necessary power feeder for new system equipment at VFR room, equipment room and operation room in the new control tower, which will be constructed by the end of 2013 should be provided by the Lao side. The connection between AIS modem and PSTN should be made by Lao side.

3) Xiengkhouang

- At present, there is no enough space for installing new RCAG transmitters & receivers at existing RCAG equipment room. The existing equipment and office desks should be relocated by the Lao side to make the space and necessary power feeders for the new transmitters & receivers at the room.
- Cable installation and connection for input of radar data to the VSAT communication equipment should be carried out by the Lao side.
- Although VHF air to ground antennas for aerodrome and emergency will be installed on the top roof of control tower, installation space is limited. The existing un-operational antennas should be dismantled or relocated by the Lao side to make the space for new antennas.

4) Pakse

- Installation space including necessary power feeder for AIS terminal, printer and modem in the new operation building, which will be constructed by the end of 2013 by DCA should be provided by the Lao side. The connection between AIS modem and PSTN should be made by the Lao side.
- Although VHF air to ground transmitters and receivers for aerodrome and emergency control services will be installed at equipment room in the 3F of the control tower, installation space is limited. Existing equipment such as ATIS should be relocated by the Lao side to make space for the new transmitters and receivers.
- As to the VHF air to ground antennas, installation space on the top roof of existing control tower is limited. The existing un-operational antennas should be dismantled or relocated by the Lao side to make the space for installing new antennas.

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5) Savannakhet

- Installation space including necessary power feeder for AIS terminal, printer and modem at FIC/METEO room in the passenger terminal building should be provided by the Lao side. The connection between AIS modem and PSTN should be made by the Lao side.
- New RCAG transmitters & receivers and VSAT communication equipment will be installed in the new RCAG shelter, which will be constructed by the end of 2012 by CIT Lao. The Lao side should coordinate with CIT Lao and provide adequate space and necessary power feeder for the new equipment. The construction of new RCAG shelter must complete before installing new equipment and the Lao side has to provide the drawing of new RCAG shelter to the Survey Team as soon as possible.
- Cable installation and connection for input of radar data to the VSAT communication equipment should be carried out by the Lao side.
- Although VHF air to ground transmitter and receivers for aerodrome and emergency will be installed at equipment room in the control tower, installation space is limited. The existing un-operational equipment at equipment room should be dismantled or relocated by the Lao side to make the space for installing the new equipment.
- As to the VHF air to ground antennas, installation space on the top roof of control tower is limited. The existing un-operational antennas should be dismantled or relocated by the Lao side to make the space for installing the new antennas.

6) Paksong

- RCAG transmitters & receivers and VSAT communication equipment will be installed in the new radar building to be constructed by the end of 2013. Adequate space and necessary power feeder for the new equipment should be provided by the Lao side. The Lao side should provide the drawing of new radar building to the Survey Team as soon as possible.

5. Item to be Decided

The Soft Components regarding AIS & AMHS technical support by Japanese side is mentioned in Para. 2.

6. Clarification of Collected Data and Information

The Survey Team requested further collaboration of DCA/LATM for clarification of data and information collected as well as collection of additional data and information if such necessity arises, DCA/LATM accepted the request.

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4.3 Minutes of Discussions [Outline Design Explanation]

**MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY
ON
THE PROJECT FOR THE MODERNIZATION OF EQUIPMENT
FOR TRANSITION TO NEW CNS/ATM SYSTEMS
IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
(EXPLANATION OF DRAFT OUTLINE DESIGN REPORT)**

On the basis of the field survey in the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") in June 2012, and the following technical examination in Japan, Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a Draft Outline Design Report on the Project for the Modernization of Equipment for Transition to New CNS/ATM Systems in the Lao People's Democratic Republic.

JICA Preparatory Survey Team (hereinafter referred to as "the Team") headed by Mr. Hiroyuki Ueda, Senior Advisor of JICA, explained to and consulted with the concerned officials of the Government of the Lao PDR on the contents of the Draft Outline Design Report during its stay in Vientiane from November 12 to 16, 2012.

As a result of discussions, the both sides confirmed the main items described in the attached sheets.

November 15, 2012

Hiroyuki Ueda

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Yakua Lopangkao

Director General

Department of Civil Aviation

Ministry of Public Works and Transport

ATTACHMENT

1. Project Title

Based on the Minutes of Discussions signed by the both sides on June 15, 2012 and the following official procedures in Japan and the Lao PDR, the project title was changed to “the Project for the Modernization of Equipment for Transition to New CNS/ATM Systems in the Lao People's Democratic Republic” (hereinafter referred to as “the Project”).

2. Components of the Draft Outline Design Report

The Lao side agreed and accepted in principle the contents of the Draft Outline Design Report including draft technical specifications of the equipment. The list of equipment to be procured is indicated in Annex-1.

3. Confidentiality of the Cost Estimation and Equipment Specifications

The both sides agreed that the Project Cost Estimation as attached in Annex-2 and equipment specifications in the Draft Outline Design Report should never be disclosed to any third parties until all the contracts for the Project are concluded.

4. Undertakings by the Government of Lao PDR

The Lao side confirmed that they would undertake the following preparatory work and administrative procedures for the Project implementation at its expenses.

1) Vientiane International Airport		
AIS Automation System	ATC Operation Building	1. Un-operational equipment at FIC room and AIS room should be dismantled or relocated to make installation space for AIS system. Necessary power feeders (3kVA, 0.5kVA x 2) for the new system equipment at each room should be provided.
RCAG	Equipment Room	2. Cable installation and connection for VHF voice in-output signal between RCAG remote control equipment and existing VCCS at equipment room in the ATC operation building will be implemented by the Japanese side. Collaboration with Lao side will be needed for the above works.
VSAT	ATC Operation Building	3. Un-operational equipment should be dismantled or relocated to make installation space for VSAT equipment. Cable installation and connection for output of radar data and VHF voice line from the VSAT communication equipment should be carried out.
ILS	Airfield	4. Existing ILS equipment including antennas should be dismantled before installing new ILS equipment. Necessary power feeders (LLZ 0.7 kVA, GP/T-DME 1kVA) should be provided.
2) Luang Phabang International Airport		
AIS Terminal	New Control Tower	5. Connection between AIS modem and PSTN (Public Switched Telephone Networks) should be undertaken.
VHF Air to Ground for		6. Construction of new control tower facility should be completed by the start of installation works for VHF equipment.

Aerodrome Control		
3) Xieng Khouang Airport/RCAG Site		
RCAG	RCAG Site	7. The existing equipment and office desks should be relocated to make installation space for RCAG equipment. Necessary power feeders (1.5kVA) should be provided for the new transmitters & receivers at the equipment room.
VSAT		8. Cable installation and connection for input of radar data to the VSAT communication equipment should be carried out.
VHF Air to Ground for Aerodrome Control	Control Tower	9. The existing un-operational antennas should be dismantled or relocated to make installation space for new antennas.
4) Savannakhet International Airport		
AIS Terminal	Terminal Building	10. Connection between AIS modem and PSTN (Public Switched Telephone Networks) should be undertaken.
RCAG	New RCAG Site	11. The construction of new RCAG shelter must be completed before installing RCAG equipment. Adequate space and necessary power feeder (1kVA) for the new equipment should be provided. Cable installation and connection for input of radar data to the VSAT communication equipment should be carried out.
VHF Air to Ground for Aerodrome Control	Control Tower	12. The existing un-operational equipment and antennas should be dismantled or relocated to make installation space for new equipment and antennas. Necessary power feeder (0.5kVA) for the new equipment should be provided.
5) Pakse International Airport		
AIS Terminal	New Office Building	13. Construction of new office building beside control tower should be completed by the start of installation works for AIS terminal.
VHF Air to Ground for Aerodrome Control	Control Tower	14. The existing ATIS equipment should be relocated to make the space for new equipment. Necessary power feeder (0.5kVA) for the new equipment should be provided. 15. The existing un-operational antennas should be dismantled or relocated to make the space for new antennas.
6) Paksong Radar Site		
RCAG/VSAT	New Radar Building	16. The construction of access road, commercial power line and communication line should be completed before installing new equipment. Provide adequate space and necessary power feeders (1kVA) for the new equipment. Cable installation and connection for input of radar data to the VSAT communication equipment should be carried out.
6) Administrative Procedures		
17. Tax exemption and Customs clearance		
18. Provision of facilities to the consultants and suppliers of the Project such as permissions for their entry into Lao PDR and stay therein, entry to the project sites, conduct of installation works, etc. for the implementation of the Project		
19. Payment of the commissions to the Japanese bank for banking services based upon banking arrangement (B/A)		

5. Installation of Air-Ground VHF at Luang Phabang Airport and RCAG VHF at Paksong

The both sides reconfirmed the following regarding RCAG VHF at Paksong and Air-Ground VHF

at Luang Phabang Airport.

- 1) The Lao side will inform JICA if the completion of the new control tower at Luang Phabang Airport and/or new radar site at Paksong will be delayed from the originally planned end of 2013.
- 2) Should the completion of the new control tower delay beyond the delivery of RCAG VHF under this Project, this equipment will be installed at the existing control tower. In such a case, the Lao side will be responsible for transfer of the equipment from the existing control tower to the new control tower after completion of the new control tower.
- 3) Should the completion of the new radar site delay beyond the delivery of Air-Ground VHF under this Project, this equipment will be installed at the Pakse Airport. In such a case, the Lao side will be responsible for transfer of the equipment from the Pakse Airport to the Paksong radar site after completion of the new radar site.

6. AIS/AMHS Interface Specifications

The both sides confirmed that interface specifications between AIS automation system under this Project and AMHS under CIT Lao contract should be identical. The Japanese side assumes that AIS/AMHS interface would comply with “ICAO Doc 9880, Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols”. The Lao side will provide detailed information to the Japanese side by the start of the detailed design if there are any deviations in the interface specifications of the AMHS from the ICAO Doc. 9880.

7. Operation and Maintenance of the Equipment

The Lao side will secure enough personnel and budget necessary for operation and maintenance of the equipment to be procured by the Project as estimated in the Draft Outline Design Report.

8. Capacity Building for AIS Automation System

The Japanese side explained that the training for AIS Automation System requested in the Minutes of Discussions on June 15, 2012 would be provided as a part of the supplier’s contract. The Lao side understood the explanation.

9. Japan's Grant Aid Scheme

The Lao side fully understood the scheme of the Japan's Grant Aid and the necessary measures to be undertaken by the Lao side as explained by the Team and described in Annex-4 and Annex-5 of the Minutes of Discussions signed on June 15, 2012.

10. Schedule of the Survey

JICA will complete the Final Report of the Preparatory Study and send it to the Lao side around February 2013.

Annex-1: List of Equipment to be Procured

Annex-2: Project Cost Estimation

Annex-1: List of Equipment to be Procured

Item	Site
1. Aeronautical Information Services (AIS) Automation System	Vientiane
2. Remote Controlled Air-Ground (RCAG) VHF	4 locations
2.1 Replacement of RCAG VHF	Vientiane (2 frequencies), Savannakhet (1) and Xieng Khouang (2)
2.2 Installation of RCAG VHF	Paksong (1)
3. Air-Ground VHF for Aerodrome and Approach Controls	5 locations
3.1 Replacement of Aerodrome Air-Ground VHF	Vientiane (1), Savannakhet (1), Pakse (1), Luang Phabang (1) and Xieng Khouang (1)
3.2 Replacement of Approach Air-Ground VHF	Vientiane (1)
4. Air-Ground VHF for Emergency Services	5 locations
4.1 Replacement of Emergency Frequency for Aerodrome Air-Ground VHF	Vientiane (1)
4.2 Installation of Emergency Frequency for Aerodrome Air-Ground VHF	Savannakhet (1), Pakse (1), Luang Prabang (1) and Xieng Khouang (1)
5. Very Small Aperture Terminal (VSAT) Link	Vientiane - Xieng Khouang, Vientiane - Savannakhet and Vientiane - Paksong
6. Replacement of Instrument Landing System (ILS)	Vientiane
7. Flight Procedure Design System	Vientiane

Annex-2: Project Cost Estimation

This page is closed due to the confidentiality.