SUMMARY

This paper presents a summary of progress of the Performance Based Navigation Implementation Plan in Cambodia, Lao PDR, and Vietnam under the JICA Project of the Capacity Development for Transition to the New CNS/ATM System.

This paper relates to –

**Strategic Objectives:**
A: Safety
C: **Environmental Protection and Sustainable Development of Air Transport**

**Global Plan Initiatives:**
GPI-5 RNAV and RNP (Performance-based navigation)
GPI-21 Navigation systems

---

1  **INTRODUCTION**

1.1 The project will assist the three countries in Indochina region- Cambodia, Lao PDR, and Vietnam (CLV) in formatting the plans for introduction and transition of Future Air Navigation Systems related to Communications, Navigation, Surveillance, and Air Traffic Management which PBN project is part of its.

1.2 The joining three countries PBN project is an important resources is to be able to assist each country to go for success PBN Implementation.

1.3 The PBN activities will consist of five phases: Pre-Planning Phase, Planning Phase, Pre-Implementation Phase, Implementation Phase and Post-Implementation.
2. **FIVE PHASES OF PBN ACTIVITIES**

2.1 **Pre-Planning Phase**

Under this project of CLV PBN plan, each country appointed CNS/ATM Project Director, State PBN Manager and also the PBN Task Force leaders. Each of country projects consist of Civil Aviation Authority, stakeholders and other concerned organization.

2.2 **Planning Phase**

Formulate each state PBN roadmap

**PBN Roadmap for Cambodia**

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2016</th>
<th>2020</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oceanic Routes</strong></td>
<td>RNP4</td>
<td>RNP4 &amp; RNP2</td>
<td>GNSS, 4D RNP</td>
<td></td>
</tr>
<tr>
<td><strong>Continental Routes</strong></td>
<td>RNAV5</td>
<td>RNAV5 &amp; RNP2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TMA</strong></td>
<td>RNP1 SID/STAR</td>
<td></td>
<td>GNSS, 4D RNAV</td>
<td></td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>RNP APCH LNAV/VNAV</td>
<td></td>
<td></td>
<td>GNSS LANDING SYSTEM</td>
</tr>
</tbody>
</table>

**Between the Year 2013 – 2016**

1. **ENROUTE**

1). Oceanic Routes

- RNP4

2). Continental Routes

- RNAV5

2. **TMA**

1). RNP1 SID/STAR

- Phnom Penh International Airport by Q2 2013
- Siem Reap International Airport by Q4 2013
- Sihanouk International Airport by Q2 2014

2). RNAV1

- Phnom Penh International Airport by Q2 2013
- Siem Reap International Airport by Q4 2013
- Sihanouk International Airport by Q2 2014
- Other Domestic Airports (if required)

3. **Approach**

1). RNP APCH LNAV/VNAV

- Phnom Penh International Airport by Q2 2013
- Siem Reap International Airport by Q4 2013
- Sihanouk International Airport by Q2 2014
- Other Domestic Airports (if required)

2). RNP AR APCH

- Sihanouk International Airport by Q2 2014
- Siem Reap International Airport (feasibility for RWY 23) by Q4 2013
- Other Domestic Airports (if required)
### PBN Roadmap for Airports in Cambodia

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># PBN FP Designer</td>
<td>1 + 2</td>
<td>2 + 3</td>
<td>3 + 4</td>
<td>4 + 4</td>
<td>5 + 3</td>
</tr>
</tbody>
</table>

**Phnom Penh International Airport**

- RNP1
- RNAV1
- RNP APCH

**Siem Reap International Airport**

- RNP1
- RNAV1
- RNP APCH
- RNP AR
- If required

**Sihanouk International Airport**

- RNP1
- RNAV1
- RNP APCH
- RNP AR
- If required

**Battambang, Rattanakiri, and Preah Vihear Airports**

- RNP APCH
- RNP AR APCH
- If required

**Koh Kong, Stung Treng, Mondulkiri, and Kampong Chhnang Airports**

- RNP APCH
- RNP AR APCH
- If required

### PBN Roadmap for Lao

<table>
<thead>
<tr>
<th>2012</th>
<th>2016</th>
<th>2020</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oceanic Routes</td>
<td>RNP 4</td>
<td>RNP 4</td>
<td>GNSS, 4D RNP</td>
</tr>
<tr>
<td>Continental Routes</td>
<td>RNAV5</td>
<td>RNAV5 &amp; RNP2</td>
<td></td>
</tr>
<tr>
<td>TMA</td>
<td>RNAV 1 SID/STAR</td>
<td>RNP 2, RNP 4</td>
<td>GNSS, 4D RNAV</td>
</tr>
<tr>
<td>Approach</td>
<td>RNP APCH</td>
<td>RNP APCH</td>
<td>RNP AR APCH</td>
</tr>
</tbody>
</table>
Between the Year 2013 – 2016

1. ENROUTE

1). Oceanic Routes

2). Continental Routes

RNAV5

The route between major airports: H218 Vientiane – Luang Phabang, R474: Vientiane – Hanoi

All Domestic routes as required

All new routes

2. TMA

1). RNAV1 SID/STAR

- Vientiane International Airport by 30/05/2013*
- Luang Phabang International Airport by late 2013**

2). RNP1 SID/STAR

- Pakse International Airport by late 2013
- Savanakhet International Airport by Q2 2015

3. Approach

1). RNP APCH LNAV/VNAV

- Vientiane International Airport by 30/05/2013*
- Luang Phabang International Airport by late 2013**
- Pakse International Airport by mid 2014
- Savanakhet International Airport by Q2 2015
- Other Domestic Airports (if required)

2). RNP AR APCH

- Vientiane International Airport by early 2014 (if required)
- Luang Phabang International Airport by late 2014 (if required)
- Pakse International Airport by early 2015 (if required)
- Savanakhet International Airport by late 2015 (if required)
- Other Domestic Airports (if required)

* Postpone from 2012
** Postpone from 2012, subject to availability of WGS-84 survey data

PBN Roadmap for Airports in Lao PDR

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># PBN FP Designer</td>
<td>1 + 2</td>
<td>2 + 4</td>
<td>3 + 5</td>
<td>3 + 5</td>
<td></td>
</tr>
<tr>
<td>Vientiane International Airport</td>
<td>RNAV1 SID/STAR</td>
<td>RNP APCH</td>
<td>RNP SID/STAR</td>
<td>RNP AR APCH (If required)</td>
<td></td>
</tr>
<tr>
<td>Luang Phabang International Airport</td>
<td>RNAV1 SID/STAR</td>
<td>RNP APCH</td>
<td>Subject to availability Of WGS-84 survey data</td>
<td>RNP SID/STAR</td>
<td>RNP AR APCH</td>
</tr>
<tr>
<td>Pakse International Airport</td>
<td>RNAV1 SID/STAR</td>
<td>RNP APCH</td>
<td>RNP SID/STAR</td>
<td>RNP AR APCH</td>
<td>If required</td>
</tr>
<tr>
<td>Savanakhet International Airports</td>
<td>RNAV1 SID/STAR</td>
<td>RNP APCH</td>
<td>RNP SID/STAR</td>
<td>RNP AR APCH</td>
<td>If required</td>
</tr>
</tbody>
</table>
### PBN Roadmap for Vietnam

+ Training Surveyor of WGS-84
+ Training PBN Designers, ATC
+ Formulate State PBN Implementation action
+ Plan for implementation of WGS-84
+ Establishment of CLV Flight Procedure office in Hanoi, Viet Nam with Panades Software (02 sets)

### 1- PHASE 1 (2013-2015)

A) Oceanic Route:
- RNP4 (30/30NM separation) for Oceanic Routes Routes of L642, M771, N892 and L625.
- Currently we are applied on to Oceanic Routes (east sea) of M771 L642, L625 and N892.

B) Continental Domestic Route:
- RNAV5 for the routes between major airports: W1 Hanoi - Da Nang - Ho Chi Minh
- All other domestic routes as required.
C) TMA:
- RNAV1: SID/STAR for the radar airports, 50% of international airports by 2013 and 75% by 2014.
- Basic RNP1 SID/STAR for the non radar airports

D) Approach:
- RNP APCH with Baro-VNAV in most possible airports, 30% of instrument runways by 2014 and 50% by 2015.
- RNP AR APCH for the mountainous or terrain surrounded airport: Dien Bien, Cam Ranh, Con Son, Phu Cat, Pleiku.

2- PHASE 2 (2016-2020)
A) Oceanic Route
- RNP2 for ocean routes of L642, M771, N892 and L625.
- RNP4 for all other new oceanic routes.

B) Continental International Route
- RNAV5 for the routes between major airports by the year 2016: R474 Hanoi – Vientiane, R468 Ho Chi Minh – Phnom Penh.
- RNAV5 for all new routes by the year 2016.

C) Continental Domestic Route:
- RNAV1 or RNAV2.
- Mandate RNAV1 or RNAV2 approval for the aircraft operating at/above FL290.

D) TMA:
- RNAV1 or RNP1 SID/STAR for 100% of international airports by 2016.
- RNAV1 or RNP1 SID/STAR for 70% of busy domestic airports where there are operational benefits.
- Mandate RNAV1 or Basic RNP1 approval for aircraft operating in higher density TMA: Noi Bai (Hanoi), Da Nang and Tan Son Nhat (Ho Chi Minh)

E) Approach
- RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016.
- Expansion of RNP AR APCH where there are operational benefits.

PBN Roadmap for Airports in Viet Nam

Airport Priority List for implementing approach procedures: A indicating completion by 2013, B by December 2014 and C by December 2016 except Phu Bai International airport will be implemented by December 2013
Agenda Item: 3.5

- Training Surveyor of WGS-84
- Training Designer, ATC Formulate State PBN Implementation Action
- Plan for implementation of WGS-84
- Establishment of CLV Flight Procedure office in Hanoi with Panades Software.

### 2.3 Pre-Implementation Phase

Execute Corrective Action Plan

- WGS-84
- TOD
- Design SIDs/STARs and IAP
- Develop PBN regulation and PBN Operational manual
- SMS

### 2.4 Implementation Phase

SIDs and STARs will be implemented on 28 June 2013.

### 2.5 Post-Implementation Phase

Annually joint meeting with three countries
3. ACTION BY THE MEETING

3.1 The meeting is invited to:
   a) note the information contained in this paper and
   b) Discuss any relevant matters as appropriate.

— END —