Asia-Pacific FPP & Asia COSCAP Update
May 2011

Flight Procedure Programme

Cooperative Development of Operational Safety & Continuing Airworthiness Programme
Under ICAO Technical Co-operation Bureau.
COSCAP–SouthEast Asia

Cooperative Development of Operational Safety & Continuing Airworthiness Programme
Under ICAO Technical Co-operation Bureau
COSCAP-North Asia

Cooperative Developement of Operational Safety and Continuing Airworthiness
Under ICAO Technical Cooperation Programme
COSCAP-South Asia

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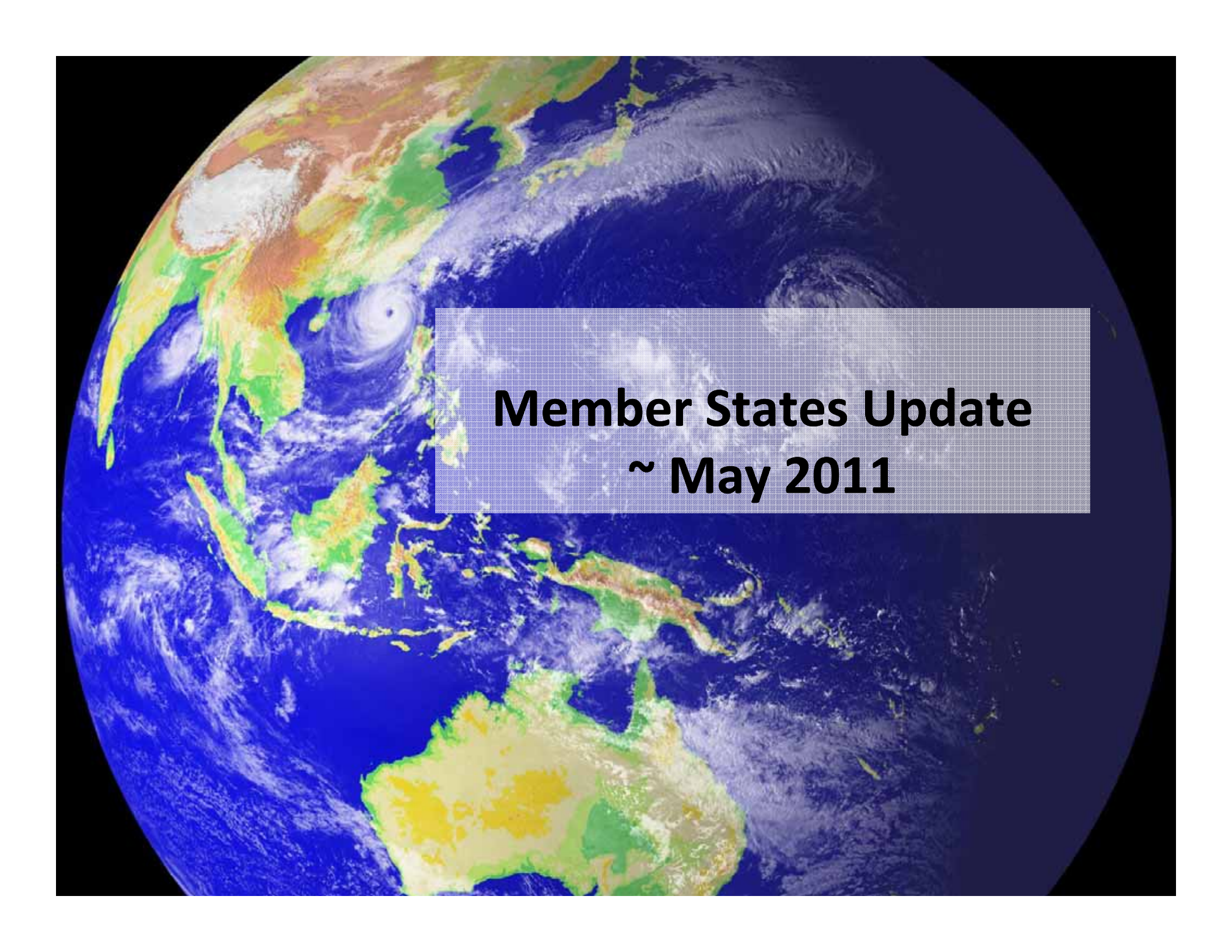
- **Action by the meeting**

INTRODUCTION

- **The purpose of this presentation is to provide an update on the PBN Implementation-related activities and support being provided to Member States/Administrations by the ICAO Flight Procedure Programme (FPP) and COSCAPs.**

ICAO Asia-Pacific FPP

Flight Procedure Programme

Member States Update
~ May 2011

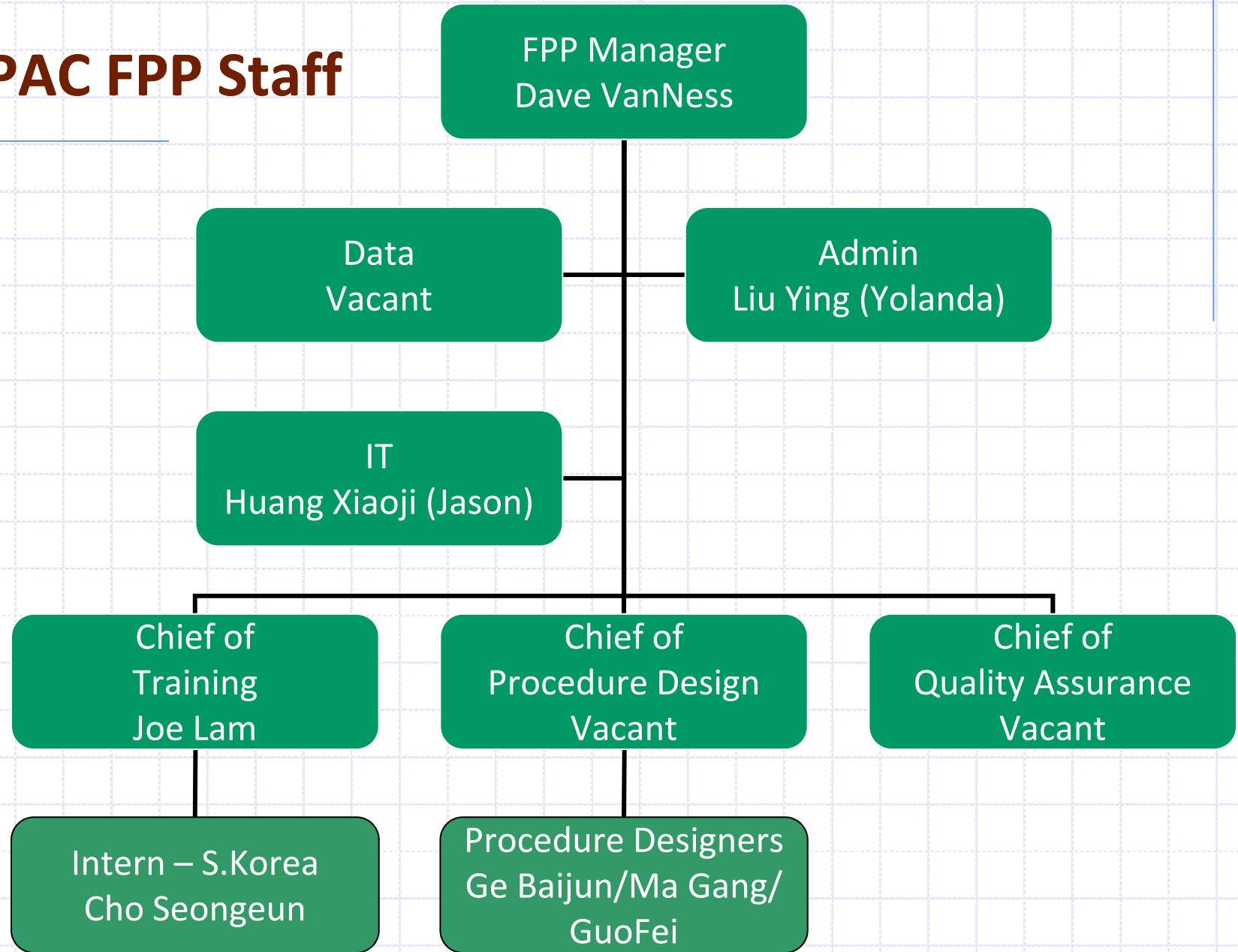| Active Participating States (11)	User Participating States (12)
China	Bangladesh
Hong Kong, China	Cambodia
Macao, China	Maldives
Dem. People's Republic of Korea	Malaysia
French Polynesia (France)	Myanmar
Mongolia	Nepal
Philippines	Pakistan
Republic of Korea	Sri Lanka
Singapore	Timor-Leste
Thailand	Afghanistan
Australia	Laos
	Vietnam

FPP Phase 2

- **The FPP Steering Committee in its second meeting agreed on the necessity to continue the FPP past the initial three years for which it was established.**

- **Phase 2 for the FPP will start Jan 1, 2013 and run until Dec 31, 2017.**

- **FPP Phase 2 Planning Meeting, 31 May – 1 Jun, in Bangkok.**

- **The final decision on a host State for FPP Phase 2 will be made at the 3rd Meeting of the FPP Steering Committee in December 2011.**
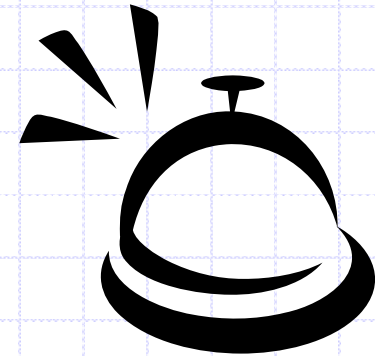
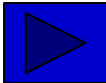# New office, New Classroom since Dec 2010

APAC FPP Staff

FPP Manager
Dave VanNess

Data
Vacant

Admin
Liu Ying (Yolanda)

IT
Huang Xiaoji (Jason)

Chief of Training
Joe Lam

Chief of Procedure Design
Vacant

Chief of Quality Assurance
Vacant

Intern – S.Korea
Cho Seongeun

Procedure Designers
Ge Baijun/Ma Gang/GuoFei

Asia-Pacific FPP Services

Procedure Design Support

Asia-Pacific FPP Office

Training

Quality Assurance

Asia-Pacific FPP Service

Training

ICAO Procedure Designer Training Phases

Competency (vertical axis)

Time (horizontal axis)

Legend

🟩 (green)	Currently Available
🟨 (yellow)	Under development
⬜ (grey)	Not provided by FPP

* Duration subject to coordination

Recurrent & Refresher Training

Advanced Training e.g. Airspace Design

On-the-job Training (OJT)*

Advanced Training e.g. RNP AR Procedure Design

Initial Training (PBN Procedure Design) ~ 3 weeks

Initial Training (Basic PANSOPS Training) ~ 4 weeks

Ab Initio Training ~ 1 week

Initial Training Courses for States (Completed)

- **PANS OPS Procedure Design Initial Course**
  - Jul 2010: 15 students from 8 States/Administrations
  - Jan 2011: 25 students from 13 States/Administrations

- **PBN Procedure Design Course (prereq: Initial Course)**
  - Sep 2010: 24 students from 10 States/Administrations
  - Mar 2011: 20 students from 10 States/Administrations

Advanced Training Courses for States (Completed)

- **Continuous Descent Operations (CDO) Workshop**
  - **Apr 2010: 15 students from China**
- **PBN Airspace Design Instructor Workshop**
  - **Feb 2011: 6 students from 4 States/Administrations**
- **PBN Procedure Designer On-the-Job Training (OJT)**
  - **Nov 2010: 2 students from DPR Korea**
- **RNP AR PD COURSE (prereq: Initial and PBN)**
  - **Apr 2011: 25 students from 9 States/Administrations**

Training Course Timetable ~ 2011 Q2

Date	Course	Duration (Class Days)
18-21 Apr (Completed)	RNP AR PD Course	4
TBN or on request	PBN Airspace Concept Workshop	4
On request	Procedure Design OJT	15

Training Course Timetable ~ 2011 Q3

Date	Course	Duration (Class Days)
4-29 Jul	Pans-Ops PD Initial Course	20
TBN or on request	PBN Airspace Concept Workshop	5
On request	Procedure Design OJT	15

- **2-year Training Course Timetable, please visit:**

www. fpp-icao.org

Asia-Pacific FPP Future Plan

- **In-State PBN Airspace Concept Workshops**

- **PBN Implementation Workshops (w/COSCAPs)**

- **Procedure Design OJT**

- **Advanced Training Courses, e.g.**

  - **RNP AR procedure design**

- **PBN/PANS OPS Recurrent/Refresher Training**

- **GeoTITAN procedure design tool training**

- **Procedure design & Quality Assurance Support**

ICAO Asia COSCAPs

Cooperative Development of Operational Safety & Continuing Airworthiness Programme
Under ICAO Technical Co-operation Bureau

COSCAP-North Asia

Cooperative Development of Operational Safety & Continuing Airworthiness Programme
Under ICAO Technical Co-operation Bureau.

COSCAP-SouthEast Asia

Cooperative Developement of Operational Safety and Continuing Airworthiness
Under ICAO Technical Cooperation Programme

COSCAP-South Asia

Asia COSCAP Background

- The COSCAPs are dedicated forums for cooperation and coordination in matters related to flight safety.

- Each COSCAP operates independently under the direction of a steering committee comprised of the Directors General of participating Civil Aviation Authorities, ICAO and other organizations and companies interested in supporting aviation safety.

COSCAP-SA	COSCAP-SEA	COSCAP-NA
India Bangladesh Pakistan Bhutan Nepal Maldives Sri Lanka	Cambodia Hong Kong (China) Macao (China) Indonesia Lao PDR Malaysia Myanmar Philippines Singapore Thailand Viet Nam Brunei Darussalam Timor-Leste	China Republic of Korea Dem. People's ROK Mongolia

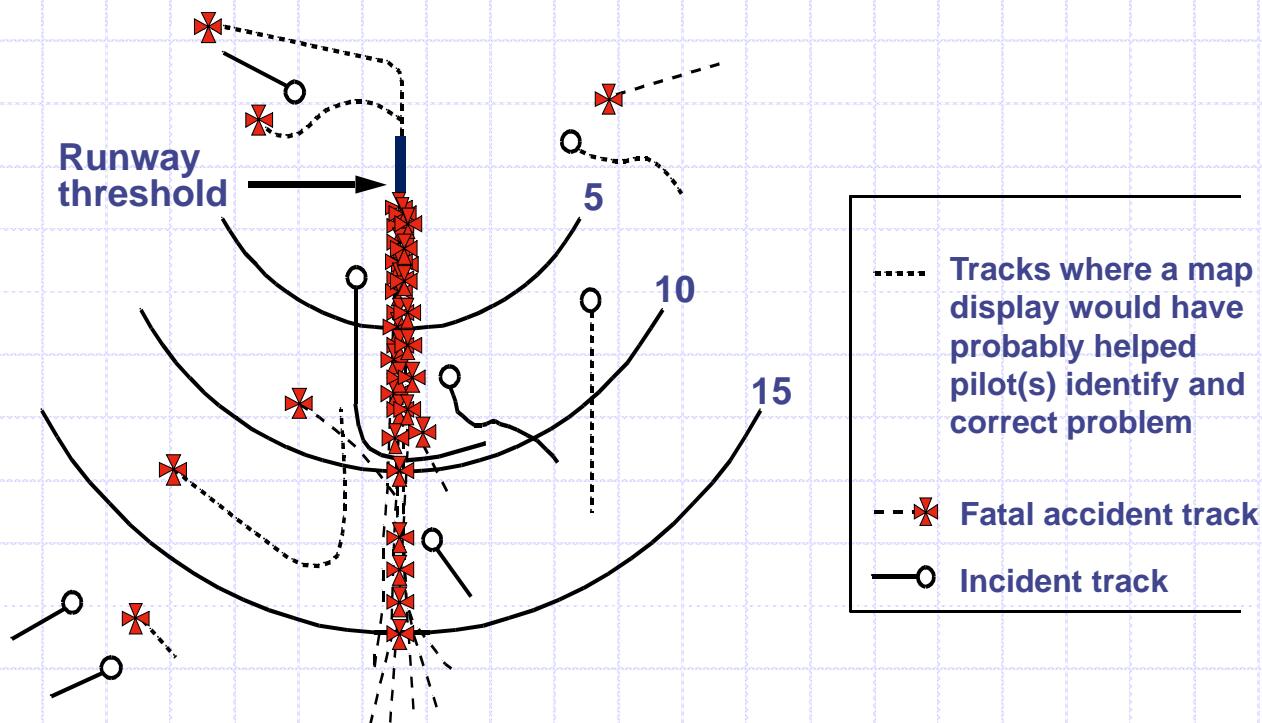# Approach and Landing Accident (ALA)

- **The accident risk is five times greater for commercial aircraft flying a non-precision approach than flying a precision approach.**

- **The approach and landing (from the outer marker to landing) typically comprise 4% of the flight time, yet accounts for 45% of the hull losses.**

CFIT Facts

- **60% of CFIT accidents occur on NP approaches**
- **47% occurred during step-down NP approaches**
- **Almost all accidents occurred in darkness or IMC**
- **48% in mostly flat terrain**
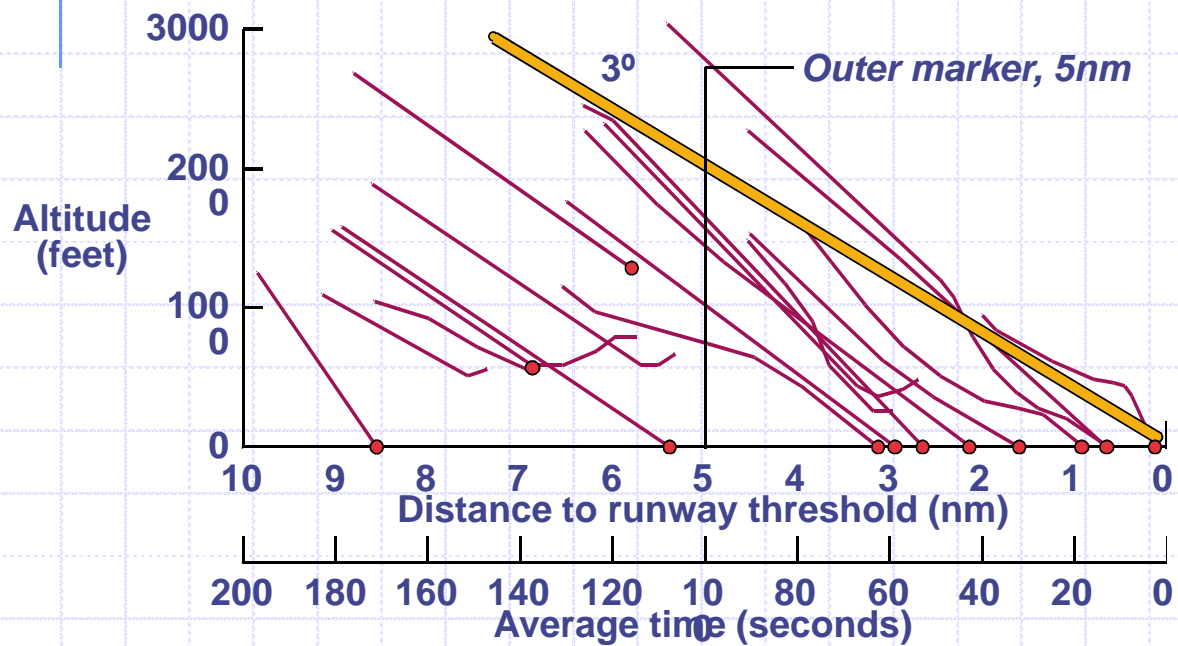- **Most common cause: descent below MDA**

CFIT ALAs

● **Map location of CFIT Accidents/incidents**

   – **From runway threshold, 40 accidents/incidents**

Runway threshold →

5

10

15

Tracks where a map display would have probably helped pilot(s) identify and correct problem

✳ Fatal accident track

○ Incident track

In most of the CFIT accidents, the airplane was lined up with the runway.

CFIT ALAs

- **Vertical profile of some recent CFIT accidents/incidents**

There was a lack of vertical situation awareness.

Chart axes: Altitude (feet) — 3000, 2000, 1000, 0; Distance to runway threshold (nm) — 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0; Average time (seconds) — 200, 180, 160, 140, 120, 100, 80, 60, 40, 20, 0. Labels: 3°, Outer marker, 5nm.

VNAV Path Availability

Total number of non-ILS procedures, % flyable in VNAV

- Europe   1028 / 93%
- Africa   330 / 87%
- S. America   337 / 56%
- Middle East   468 / 87%

- USA   4400 / 90%
- Canada   657 / 90%
- Asia/Pacific   639 / 90%

PBN Operational Approval

- **PBN Task Force Meeting 6 endorsed COSCAP efforts to support PBN Operational Approval**

- **PBN Model Regulation completed and sent to COSCAP States and ICAO (August 2010)**

- **Model COSCAP PBN Operational Approval Handbook completed (August 2010)**

PBN Operational Approval - Training

PBN Ops. Approval training programmes developed:

- **PBN Operational Approval Familiarization Workshop – 2 days**
- **PBN Operational Approval Course – 5 days**
- **PBN RNP AR Operational Approval Course – 3 days**
- **Course information and outlines available on request**

PBN Operational Approval - Training

- **26 – 30 April 2010 (Singapore):**

  PBN Operational Approval "pilot" Course

- **7 – 11 June 2010 (Australia):**

  PBN Operational Approval Course

- **30 – 31 August 2010 (Thailand):**

  PBN Operational Approval Workshop - Familiarization

- **6 – 17 September 2010 (China):**

  COSCAP-NA PBN Operational Approval Course and PBN Operational Approval – RNP AR

PBN Operational Approval - Training

- **1 – 5 November 2010 (Thailand):**

  PBN Operational Approval Course – COSCAP-SEA

- **8 – 10 November 2010 (Thailand):**

  PBN Operational Approval RNP AR Course

- **14 – 18 November 2010 (Abu Dhabi):**

  PBN Operational Approval Course – COSCAP-GS

- **16 – 20 May 2011 (Vietnam only):**

  PBN Operational Approval Course – COSCAP-SEA

- **6 – 10 June 2011 (Philippines only):**

  PBN Operational Approval Course – COSCAP-SEA

- **15 – 19 August 2011 (Thailand):**

  PBN Operational Approval Course – All Asia COSCAPs

FPP-COSCAP PBN Implementation Workshops

- **Workshop with all stakeholders in a specific State supported by Flight Procedures Programme (FPP), COSCAP, IATA, Boeing**

- **Discuss State PBN Implementation plan and assess impediments to PBN Implementation in the State**

- **Identify next steps and establish short term target dates (<2 years) on moving forward with implementation**

FPP-COSCAP PBN Implementation Workshops

- 7 – 11 Feb 2011, Indonesia
- 6 – 10 Mar 2011, Brunei
- 24 – 29 Mar 2011, Sri Lanka
- 31 Mar – 1 Apr 2011, Nepal
- 4 – 7 Apr 2011, Mongolia
- 13 – 17 Jun 2011, Myanmar
- 20 – 23 Jun 2011, Laos
- 22 – 25 Aug 2011, Bangladesh
- 17 – 21 Oct 2011, Hong Kong
- Timor Leste – approach/SIDs/STARS under development (FPP/COSCAP)
- 24 – 28 Oct 2011 (proposed), Rep. of Korea
- Cambodia – To be confirmed

Attachment I

- **Example of a highly targeted PBN Implementation Workshop**
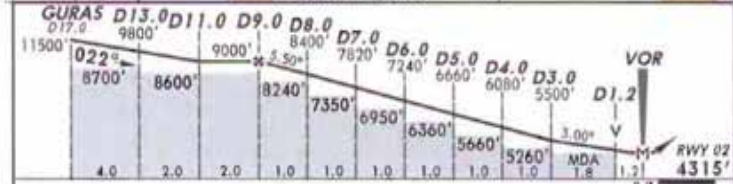
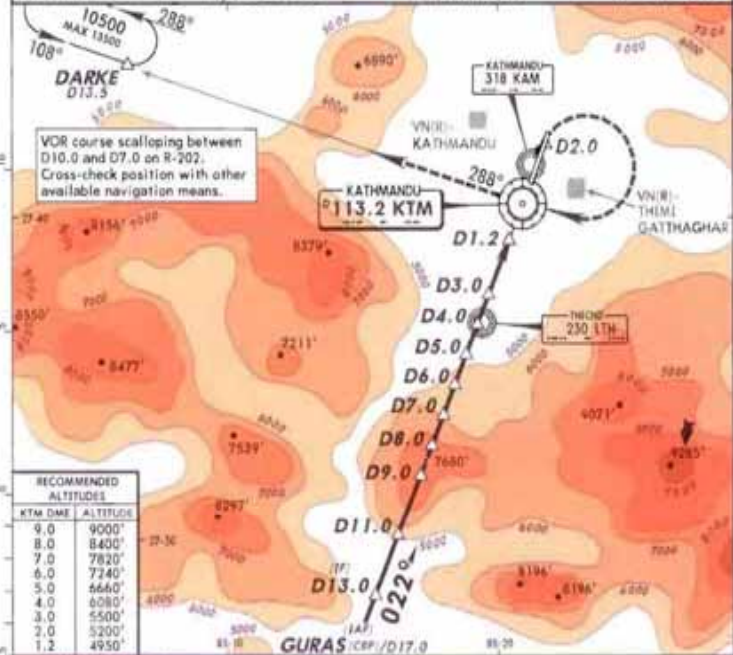**PBN Implementation Workshop**

Kathmandu, Nepal

31 March – 1 April 2011

JEPPESEN
JeppView 3.7.3.0

VNKT/KTM
TRIBHUVAN INTL
4 MAR 11 (13-1) Eff 10 Mar
MISSED APCH CLIMB GRAD MIM 5.0%
KATHMANDU, NEPAL
VOR DME Rwy 02

*ATIS 127.0	*KATHMANDU Aprsach 120.6 125.1	*KATHMANDU Tower 118.1	*Ground 121.9

VOR KTM 113.2	Final Apch Crs 022°	Procedure Alt D9.0 9000' (4685')	MDA(H) 4950' (635')	Apt Elev 4390' RWY 4315'

MISSED APCH: Climb STRAIGHT AHEAD to 5500', then turn RIGHT (MAX 185 KT) to VOR at or above 7500'. Follow R-288 to DARKE at or above 10500'. Do not turn before MAP.

MSA KTM VOR

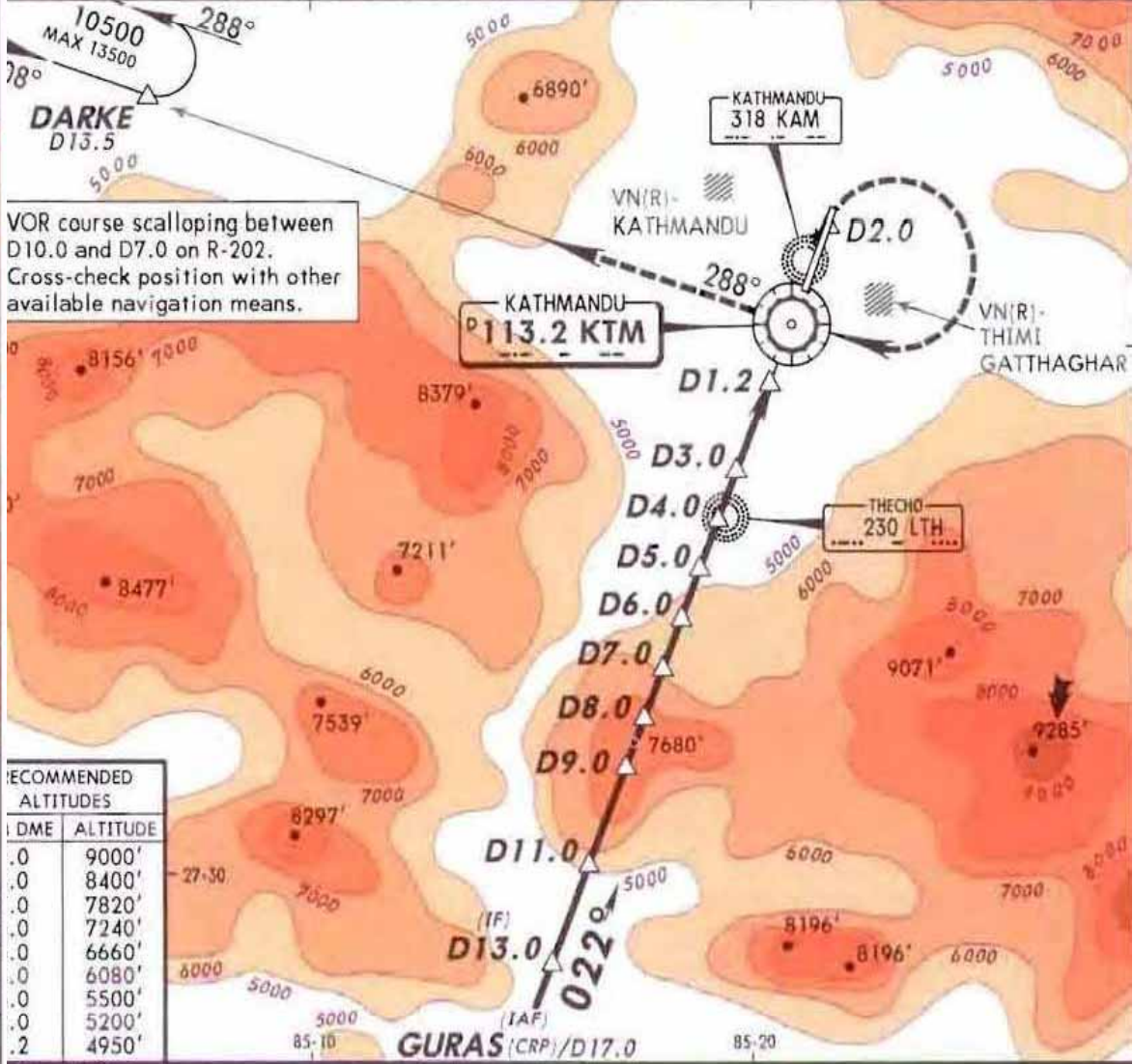Alt Set: hPa   Rwy Elev: 148 hPa   Trans level: FL 150   Trans alt: 13500'

DARKE D13.5

VOR course scalloping between D10.0 and D7.0 on R-202. Cross-check position with other available navigation means.

KATHMANDU 318 KAM

VN(R)-KATHMANDU

113.2 KTM

VN(R)-THIMI GATTHAGHAR

D2.0
D1.2
D3.0
D4.0
D5.0
D6.0
D7.0
D8.0
D9.0
D11.0
D13.0

THECHO 230 LTH

RECOMMENDED ALTITUDES

KTM DME	ALTITUDE
9.0	9000'
8.0	8400'
7.0	7820'
6.0	7240'
5.0	6660'
4.0	6080'
3.0	5500'
2.0	5200'
1.2	4950'

GURAS (CRP)/D17.0

Gnd speed-Kts

	70	90	100	120	140	160
Descent Angle D9.0-D3.0 5.50°	683	878	975	1170	1365	1560
Descent Angle D1.0-THR 3.00°	372	478	531	637	743	849

MAP at VOR

HIALS FAP

5500'

MAX 185 KT RT

KTM 112.3

STRAIGHT-IN LANDING RWY 02
Missed apch climb gradient min 5.0%
MDA(H) 4950' (635')
ALS out

CIRCLE-TO-LAND
DAY   NIGHT

	ALS out		MDA(H)	vis	
A	1600m	2000m	A	4950' (635')	2000m
B			B		NOT AUTHORIZED
C	2800m	3200m	C	5780' (1465') 3700m	
D	3200m	3600m	D	NOT AUTHORIZED	

Circling height based on rwy 02 thresh elev of 4315'.

CHANGES: Communications. Procedure. Minimums.

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Rwy 02

DARKE D13.5
288°
10500 MAX 13500

VOR course scalloping between D10.0 and D7.0 on R-202. Cross-check position with other available navigation means.

KATHMANDU 318 KAM

VN(R)-KATHMANDU
288°
113.2 KTM

VN(R)-THIMI GATTHAGHAR

D2.0
D1.2
D3.0
D4.0
D5.0
D6.0
D7.0
D8.0
D9.0
D11.0
D13.0

THECHO 230 LTH

RECOMMENDED ALTITUDES

DME	ALTITUDE
.0	9000'
.0	8400'
.0	7820'
.0	7240'
.0	6660'
.0	6080'
.0	5500'
.0	5200'
.2	4950'

GURAS (CRP)/D17.0

022°

Plan and Profile Views

D9.0 to 3.0 Descent:
Angle 5.48 °
Gradient 9.6%
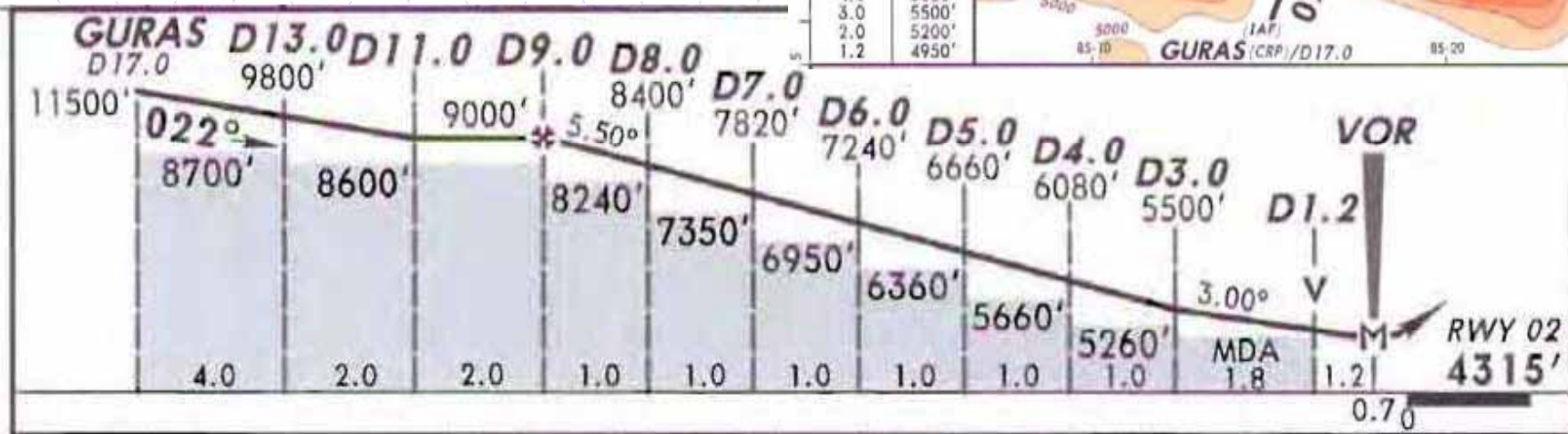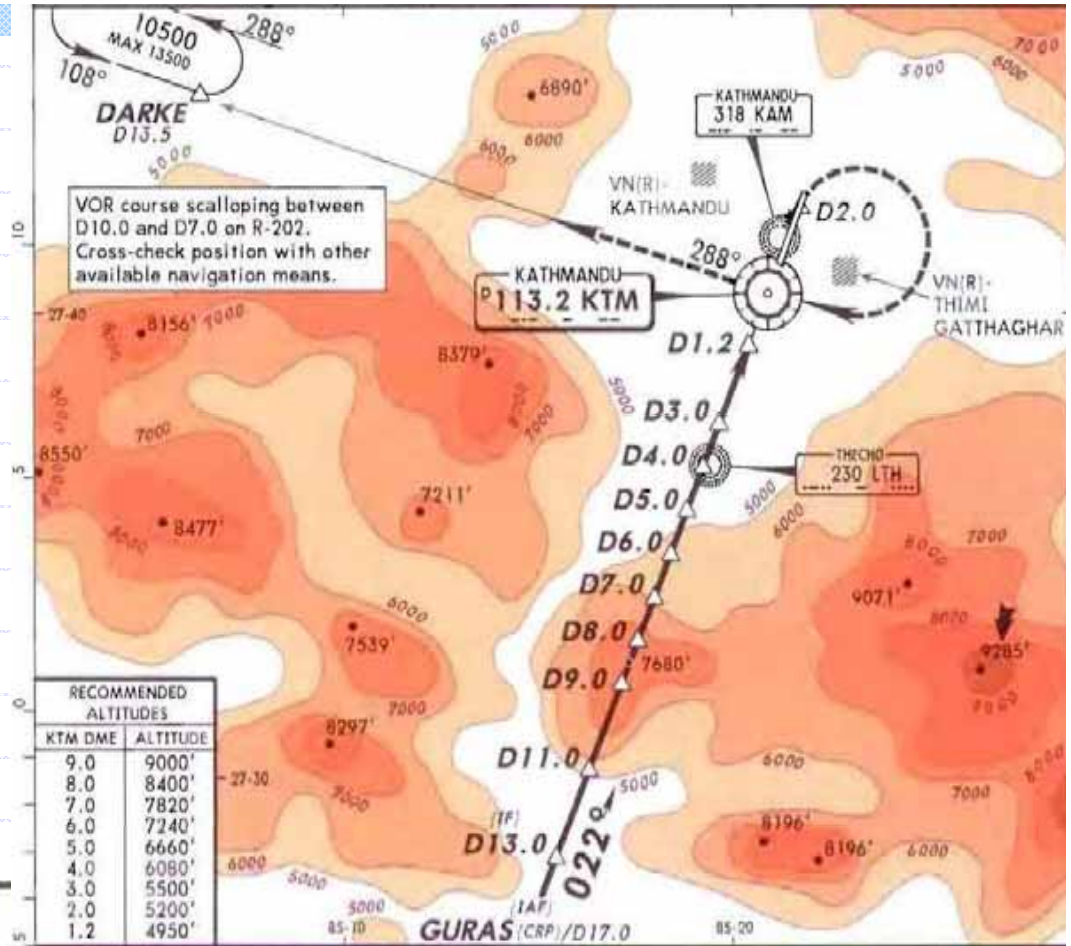
Missed Approach Procedure

VOR course scalloping between D10.0 and D7.0 on R-202. Cross-check position with other available navigation means.
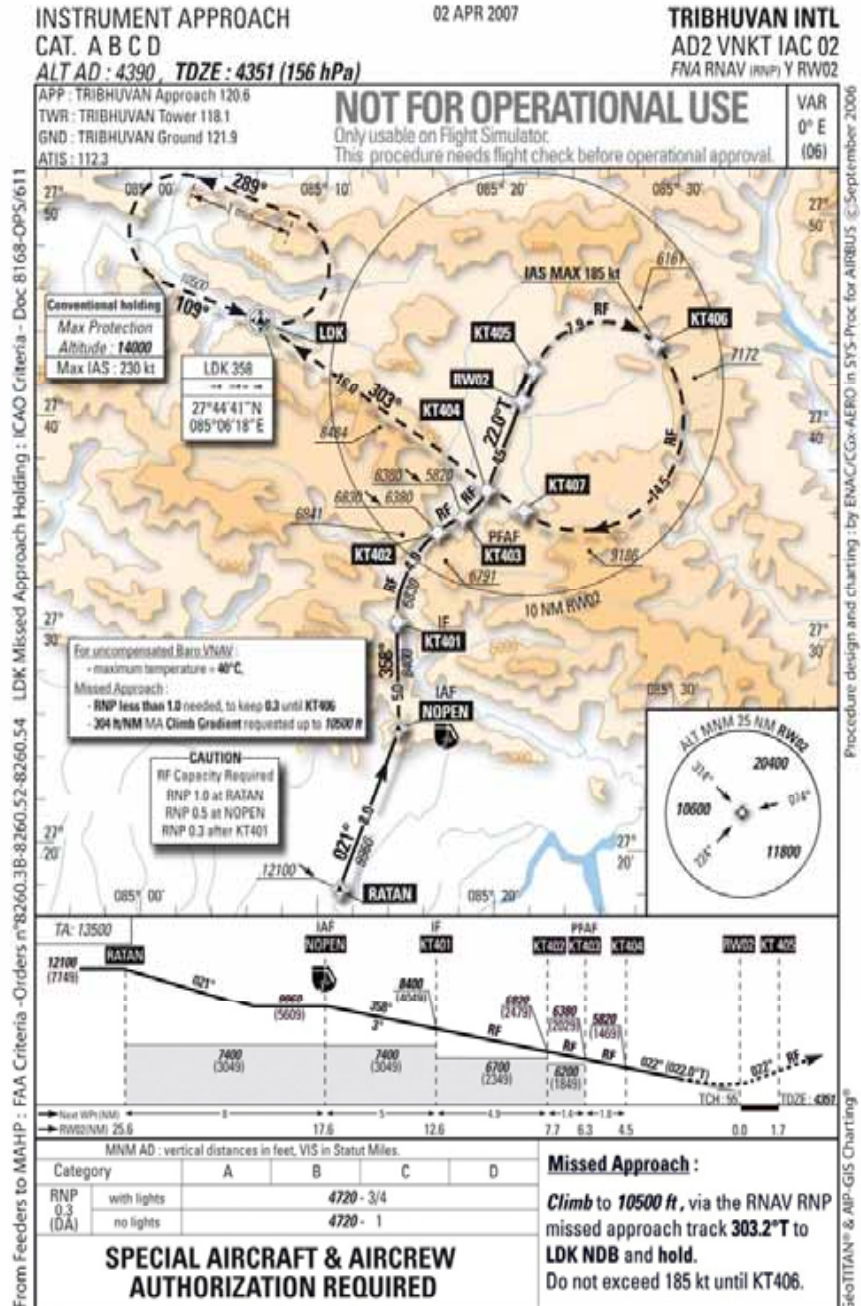
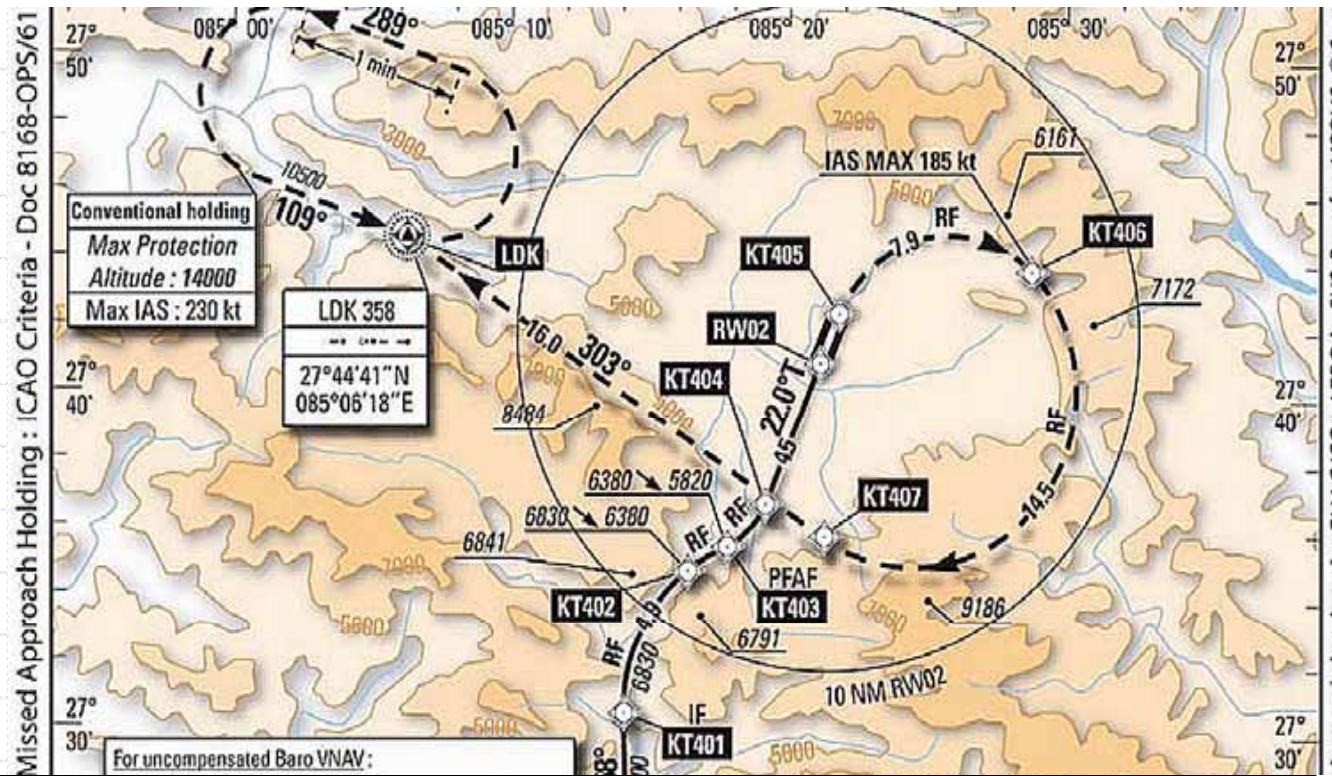**Ground VOR facility does not provide reliable navigation guidance on final approach (±16° azimuth movement)**
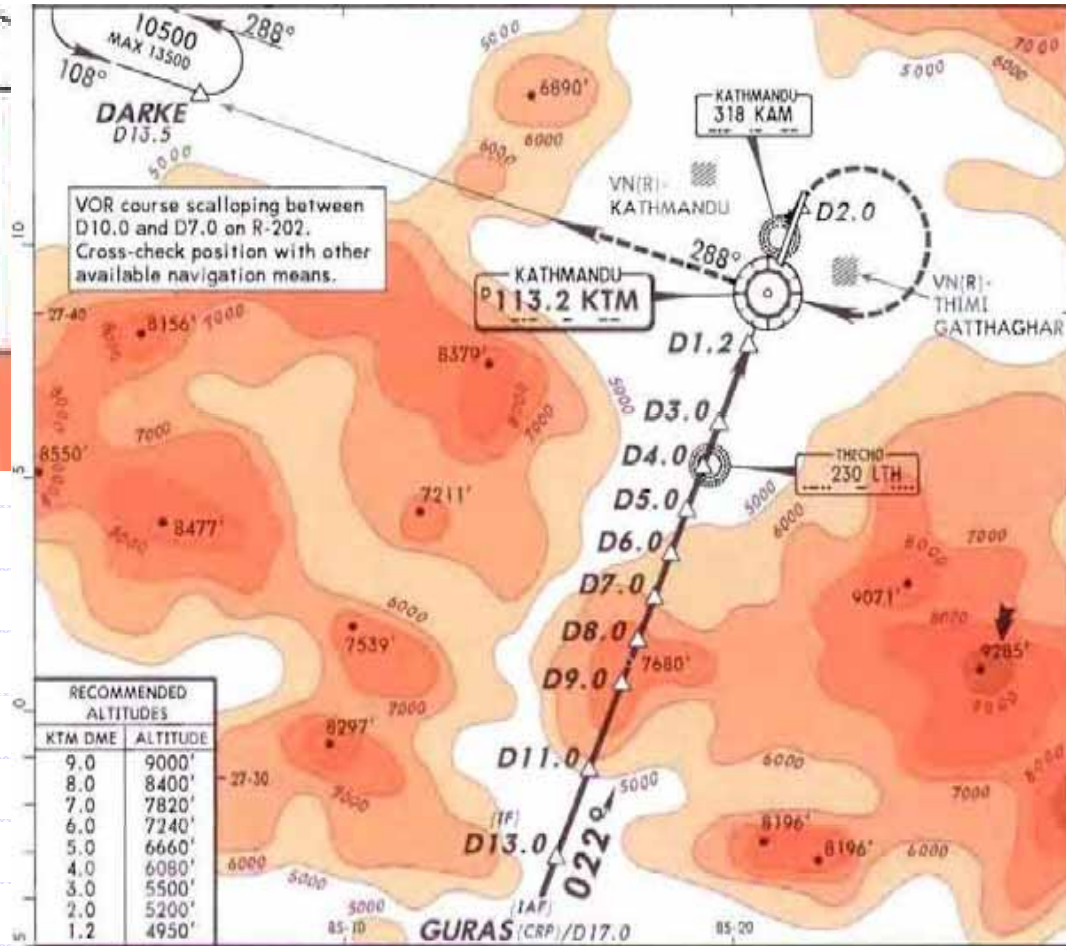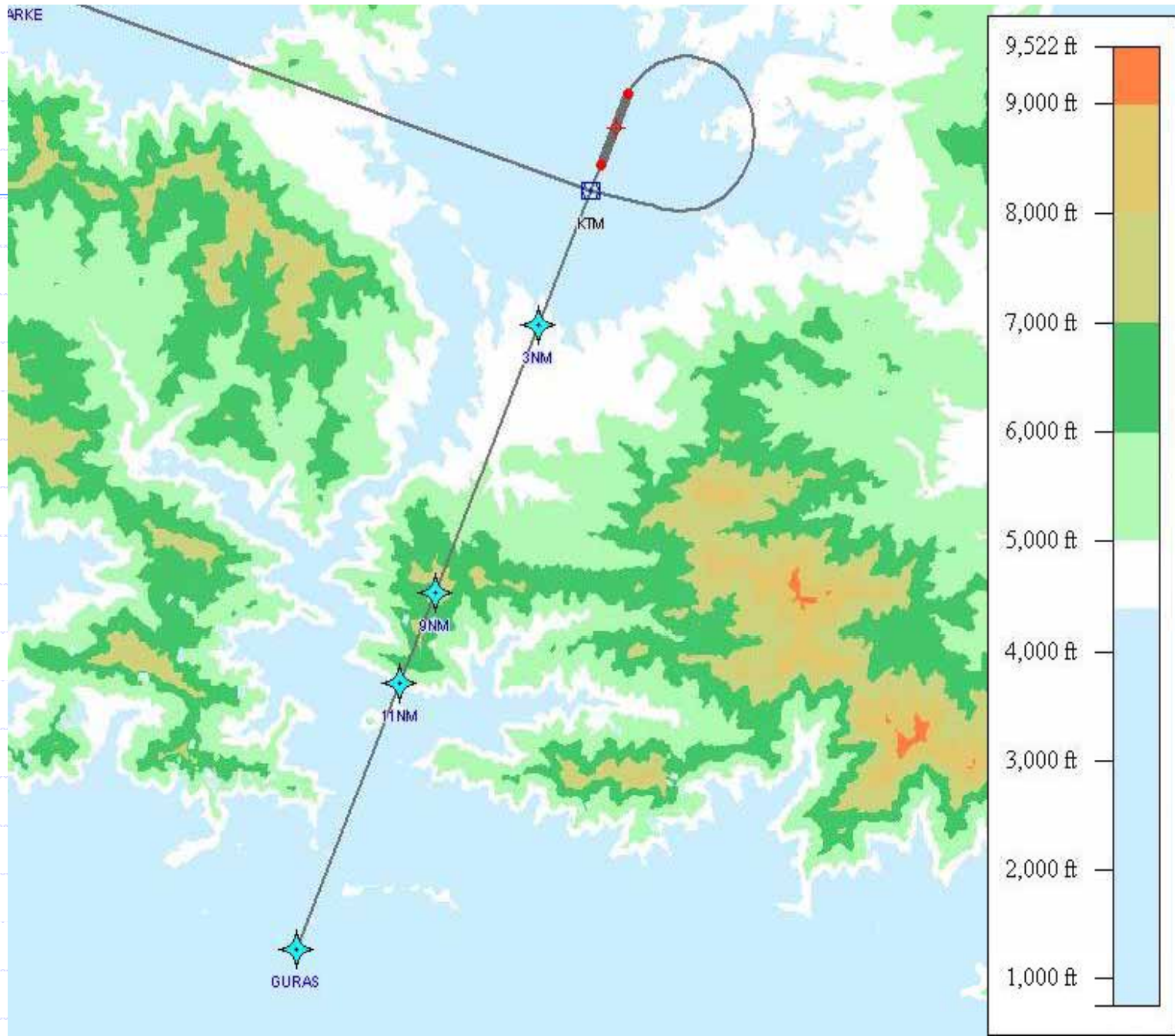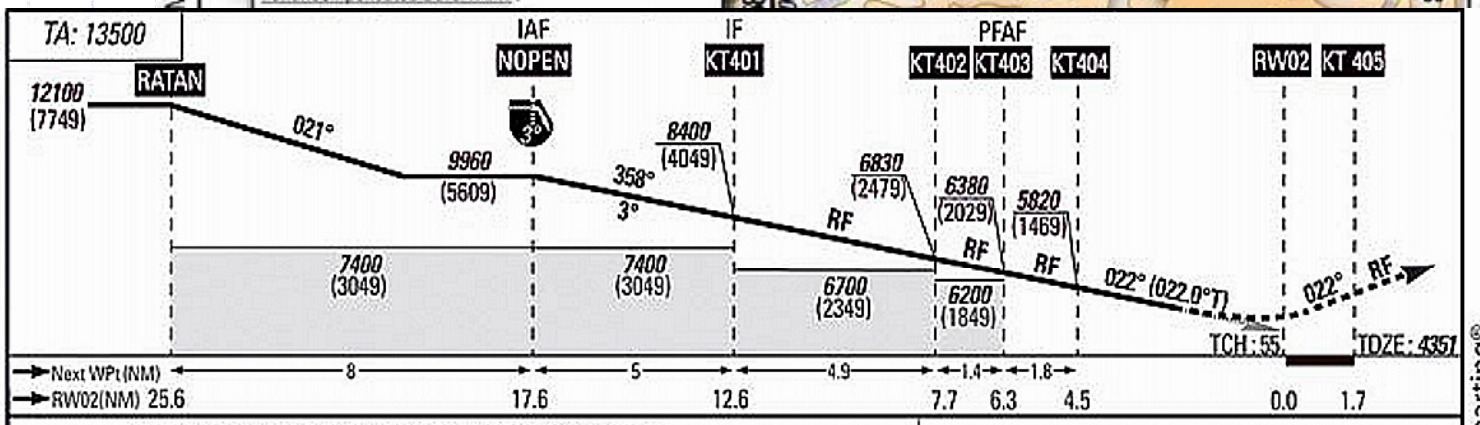
RNP __AR__ APCH

This is draft chart of KTM RNP AR Approach

Draft KTM RNP AR Approach

Plan view annotations:

27° 50' | 085° 00' | 085° 10' | 085° 20' | 085° 30' | 27° 50'

289°

1 min

289°

10500 109°

IAS MAX 185 kt

6161

RF

KT406

7172

Conventional holding
Max Protection
Altitude : 14000
Max IAS : 230 kt

LDK

KT405

RF
7.9

27° 40'

LDK 358

27°44'41"N
085°06'18"E

16.0 303°
45 22.0°T

RW02

KT404

RF

27° 40'

8484

6380 → 5820

RF RF

KT407

14.5

6830 → 6380

6841

RF

PFAF
KT403

9186

KT402

KT401

10 NM RW02

27° 30'

IF

27° 30'

Profile view:

For uncompensated Baro VNAV :

TA: 13500

IAF NOPEN | IF KT401 | PFAF KT402 KT403 KT404 | RW02 KT405

12100 (7749) RATAN

021°

9960 (5609)

358° 3°

8400 (4049)

6830 (2479)

6380 (2029)

5820 (1469)

022° (022.0°T)

022° RF

7400 (3049)

7400 (3049)

6700 (2349)

6200 (1849)

RF RF RF

TCH: 55

TDZE: 4351

Next WPt (NM)	8	5	4.9	1.4	1.8	
RW02 (NM) 25.6	17.6	12.6	7.7	6.3	4.5	0.0 1.7

MNM AD : vertical distances in feet, VIS in Statut Miles.

Category		A	B	C	D
RNP 0.3 (DA)	with lights	4720 - 3/4			
	no lights	4720 - 1			

Missed Approach :

Climb to **10500 ft**, via the RNAV RNP missed approach track **303.2°T** to **LDK NDB** and **hold**.

Do not exceed 185 kt until KT406

SPECIAL AIRCRAFT & AIRCREW AUTHORIZATION REQUIRED

Missed Approach Holding : ICAO Criteria - Doc 8168-OPS/61

Design and charting : by ENAC/CGx-AERO in SYS-Proc for AIRBUS ©Sep

um Feeders to MAHP : FAA Criteria - Orders n°8

TITAN® & AIP-GIS Charting®

Example of PBN Implementation Workshop - Kathmandu, Nepal

- **Kathmandu is a terrain challenged airport and requires the development of an RNP AR APCH in order to effectively implement PBN requirements.**

- **VOR does not provide reliable guidance and there were several CFIT due to terrain. RNP AR Approach procedure can improve safety.**

- **65 participants were at the Workshop and almost all of the 29 air operators flying to/from Kathmandu participated.**

Example of PBN Implementation Workshop - Kathmandu, Nepal

- **RNP AR Approach to be published by December 2011**

- **15 of air operators have RNP AR APCH capable aircraft, and are operating into Kathmandu on 161 flights per week (67%)**

- **Another 7 air operators are operating into Kathmandu on aircraft that can be readily upgraded to be capable of RNP AR approaches (45 flights, 19%)**

- **Within 2 years, 86% of the international flights into Kathmandu could be utilizing the RNP AR APCH.**

Example 2: Typical PBN Implementation Workshop Outcomes – Ulaan Baatar, Mongolia

- MCAA to adapt COSCAP PBN Operational Approval Manual to MCAA requirements and adopt as Mongolia guidance by June 30.

- Incorporate enabling PBN regulations in the Mongolia Civil Aviation Regulations, based on the COSCAP PBN Model Regulation, by December 31, 2011….

- Implement RNP approach (LNAV and LNAV/VNAV) and RNP 1 STAR(s) to ZMUB Rwy 14 and RNP 1 SID(s) from Rwy 32, by 12 January 2012:

- MCAA to send flight operations inspector personnel to COSCAP PBN Operational Approval Course in Bangkok, 15-19 August 2011.

- MIAT to apply for RNP 1 and RNP APCH (LNAV and LNAV/VNAV) operational approval by 31 August 2011.

Conclusion

- **For many states, early stages of PBN implementation will require support from COSCAP, FPP, IATA**

- **Boeing has provided substantial funding for the FPP and COSCAP PBN efforts**

- **Airbus is providing the procedure design for the KTM RNP AR Approach**

Action by the meeting

- **The meeting is invited to review and consider the information provided, as they develop plans for implementation of PBN in their State.**

- **States are encouraged to seek the support of the FPP and Asia COSCAPs as required to support the development, amendment, or implementation of their PBN Plan.**

Questions?

ICAO Asia-Pacific FPP & COSCAP Asia

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