INTERNATIONAL CIVIL AVIATION ORGANIZATION

SEVENTH MEETING OF THE PERFORMANCE BASED NAVIGATION TASK FORCE (PBN/TF/7)

Bangkok, Thailand, 1 – 3 September 2010

Agenda Item 5: State / Industry Presentations

PROGRESS ON PBN IMPLEMENTATION IN THE MALDIVES

(Presented by Republic of Maldives)

SUMMARY

This paper provides update information on status of PBN implementation within Male' FIR.

This paper also highlights on the efforts by Maldives to establish efficient route structure within Male FIR in association with some of the major airlines and adjacent ANSPs

1. BACKGROUND

1.1 The 36 Session of the Assembly of ICAO in September 2007 adopted Resolution A 36-23 thereby setting global PBN implementation plan.

1.2 APANPIRG/ 18 meeting urged States to implement PBN in the region for the benefit of safety and efficiency.

2. INTRODUCTION

2.1 The Boxing Day Tsunami of 2004 had damaged or destroyed almost all the ground-based navigational facilities at the only international airport in the country— Male International. It took more than a year to recover from these damages. Pilots and ATC faced enormous challenges. Male ATC then had no radar. All the published procedures were based on conventional ground nav-aids

2.2 In 2005, the fist RNAV (GNSS) approach procedures were developed for Male. These procedures proved to be very useful.

2.3 PBN implementation in the Maldives is not only to abide by ICAO Assembly resolution. In fact it is for obvious safety, efficiency, financial and environmental benefits.

3. EN-ROUTE

3.1 As part of regional PBN implementation program, selected routes have been re-designated RNAV 10 since Nov 2009.

4. TERMINAL AREA & APPROACH

4.1 PBN SIDs and STARs and Approach procedures were designed for Male International airport. Navigational specifications were Basic RNP1 in the Terminal Area and APV (Baro-VNAV) to fly the approaches.

4.2 After a two-month flight trial, it was decided that additional amendments were required:

- Modify SIDs and STARs to give optimum track miles
- Avoid proliferation of SIDs and STARs and Approaches
- introduce RNAV1 (GNSS) in the Terminal Area instead of Basic-RNP1

5. IMPLEMENTATION OF SIDS AND STARS AND APPROACH PROCEDURES

5.1 PBN SIDs and STARs and Approaches have been introduced at Male International airport effective 29 July, 2010.

5.2 For RNAV **(GNSS)** SIDs and STARs operations, aircraft shall be GNSS equipped and the navigation systems shall meet ICAO RNAV1 standard of accuracy or equivalent.

5.3 For RNAV **(GNSS)** Approaches, aircraft shall be GNSS equipped and the navigation systems shall meet ICAO RNP 0.3 standard of accuracy or equivalent.

5.4 Operators/pilots who are not approved to fly the RNAV **(GNSS)** SIDs and STARs are to fly the existing VOR/DME SIDs and STARs or expect radar vectors.

5.5 Operators/pilots who are not approved to fly the RNAV **(GNSS)** approach procedures are to fly the existing VOR/DME, ILS/DME approaches.

6. EFFICIENT ROUTE STRUCTURE THROUGH FLEXIBLE USE OF MALE FIR

6.1 Aim is to remove the constraints imposed by the fixed route structure and through the optimized use of all the airspace obtains benefits of capacity, flexibility, flight efficiency, cost savings, and reduction of CO2 emission, while maintaining safety standards.

6.2 Connectors

In November 2009, Maldives introduced a set of direct routes within Male FIR for flights between Middle East and Australia.

Known as Connectors, these routes allow aircraft to fly between an entry point and an exit point without reference to the Air Traffic Services (ATS) route network.

Aircraft are subject to ATC. Connectors are available for RNAV 10 capable aircraft, at FL285 and above.

6.3 Free Route Airspace

Maldives decided to broaden the effort to provide flexible routes. At the Fifth Meeting of the Arabian Sea /Indian Ocean ATS Coordination Group (ASIOACG/5), Maldives presented a Working Paper, titled Free Route Airspace Concept (FRA).

Under this concept Maldives will introduce series of Waypoints around the FIR allowing free entry, exit and direct routing between boundary Fixes based on RNAV10 Separation Standards above FL285.

To implement FRA, ATS system requires the necessary support tools for surveillance and communication:

a) SSR or ADS-C
b) VHF or CPDLC

Maldives has recently finished installing SSR, ADS-C, CPDLC and Extended-VHF.

The concept received enormous support from the participants and is now working closely with adjacent ANSPs and partner airlines to make this a reality.

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