International Civil Aviation Organization

EIGHTH MEETING OF THE ASIA PACIFIC REGIONAL AVIATION SAFETY TEAM (APRAST/8)

(Bangkok, Thailand, 31 October to 4 November 2016)

Agenda Item 6: Presentations – State / Industry / ICAO

CHALLENGES FACED BY NEPAL IN IMPLEMENTING MSAW IN ITS AIRSPACE

(Presented by Nepal)

SUMMARY

In Nepal, the replacement of the Kathmandu terminal radar and the installation of an e-route MSSR is currently underway and the facilities await commissioning flight inspections. The installation of MSAW feature, much needed in context of the extensive mountainous terrain and past several CFIT accidents, as recommended by the ICAO and the APRAST/3 meeting is proving to the rather challenging and this paper discusses the challenges encountered.

1. INTRODUCTION

1.1 Straddling a major portion of the Himalayas, Nepal, has about two-thirds of its area covered by mountains. Tribhuvan International Airport, Kathmandu (VNKT) is situated in a valley and the instrument approach as well as departures passes over hazardous terrain.

1.2 In the last twenty-three years, unfortunately, Nepal not only witnessed three CFIT accidents involving transport jetliners on IFR flights but also other CFIT accidents involving smaller aircraft like DHC-6/Do-228 on VFR flights. The recent one, this year, involved a DHC-6/400 aircraft equipped with Class A TAWs.

1.3 The terminal radar at TIA, installed under Japanese assistance in 1993, in the aftermath of the Thai Airways International crash of 1992, is nearing the end of its useful life and under Japanese assistance has been replaced by a new MSSR as well as augmented with another en-route MSSR located at the mountain top south of Kathmandu valley and presently awaits commissioning flight inspections.

1.4 The combined coverage of the two new radars covers two-thirds of the high altitude Nepali airspace. The data-processing system of the new installation supplied by NEC is capable of providing essential ground-based safety nets including the minimum safe altitude warning system-MSAW.

1.5 The MSAW is intended to provide automated alerts to the controllers, when the possibility of infringement of minimum safe altitude by an aircraft is detected and contribute in preventing CFIT accidents.

1.6 The APRAST under Decision 3/9 has mandated the installation of MSAW in ground-based radar facilities so as to provide necessary level of terrain avoidance protection to aircraft apart from identifying areas where the feature is unavailable.

1.7 Despite floating tenders repeatedly for the commissioning flight inspection of the MSSR/MSAW facilities, strangely, no interested commercial flight inspection services provider (CFISP) has formally responded to the tender.

2. DISCUSSION

2.1 Though the ICAO incorporated the term MSAW in Annex 11 in 1999 and has since referred it in Annex 15 and the PANS-ATM (DOC. 4444), it has not provided a formal definition for it, yet. Besides, Annex 10, Vol. 4 (Surveillance and Collision Avoidance Systems) as well as Doc. 8071, Vol.3 (Testing of Surveillance Radar Systems) also remain silent on the intent and characteristics of MSAW.

2.2 The Annex 11 provisions under Para 3.9 "Provision of radar and ADS-B" recommend display of safety-alerts and warnings including MSAW.

2.3 Further, En-route or E-MSAW referred to in aviation literature has not been adequately explained either, leading to confusion in interpretation. (AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT- AIR NIPPON CO., LTD., JA55AN, January 27, 2012, Japan Transport Safety Board)

2.4 The next available documentation on MSAW is the FAA order 8200.1D (US Standard Flight Inspection Manual). Besides explaining the approach path monitor and general terrain monitor aspects of the function, the manual also provides for the method of flight inspection (Para. 14.5t). There are requirements for both commissioning as well as periodic flight inspections of the MSAW.

2.5 On the other hand, curiously, the EUROCONTROL documents are silent on the flight inspection aspects of MSAW.

2.6 In the absence of ICAO guidance or some sort of international uniformity on the interpretation of MSAW, its characteristics and its flight inspection, the commercial flight inspection services providers (CFISPs) are naturally reluctant to embark on something potentially hazardous in unknown terrain like Nepal.

2.7 Perhaps, had the ICAO standardized the MSAW in the manner of ACAS in a technical manual (Doc 9863, AN/461), states like Nepal would have found it much easier to procure the flight inspection services for a well-defined safety net.

2.8 Despite floating tenders repeatedly for the commissioning flight inspection of the MSAW facilities in 2015 and 2016, no interested CFISP has responded formally to the tender.

2.9 Though the CFISPs have had queries on the quality and integrity of terrain and obstacle data available with CAA Nepal, but, interestingly, they themselves do not spell out their own requirements.

2.10 Besides, data available from the APAC website on the member states' progress in implementing Phase 2 (especially steps P13 and P14) of Roadmap for AIM Transition Plan, is not encouraging when viewed with the possibility of implementing MSAW effectively.

2.11 What is remarkable though is airborne safety nets like TSO'ed E-GPWS/TAWS equipment manufacturers have been employing e-TOD data in a manner transparent to the user, even in states that have not made significant success in implementing the Phase 2 of the AIM Transition plan.

2.12 Interestingly, the FAA TS0-C151 (TAWS) has listed the Kathmandu RWY 02 VOR Approach as one of the approaches to test nuisance alerts for horizontal and vertical flight technical errors!

2.13 In this scenario, despite sincere attempts by Nepal to implement key ICAO safety-net related recommendations as well as the 3/9 APRAST decision, the commissioning of the MSAW function remains incomplete.

2.14 Non-responsiveness of the CFISPs to CAA Nepal's call for tenders is unexpected and rather puzzling despite being listed in the APAC website directory.

2.15 If the member states that have successfully implemented the MSAW in their respective air spaces are willing to share their experience, Nepal would be benefit immensely.

3. ACTION BY THE MEETING

3.1 Member states are requested to share their experiences, if they have recently implemented MSAW, in line with APRAST stipulations.

3.2 Request the ICAO to refer the issues raised to the appropriate panel(s).

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