International Civil Aviation Organization

THE FOURTH MEETING OF THE ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE (APAC GBAS/SBAS ITF/4)

(Video conference, 11- 12 May 2022)

Agenda Item 3: Updates from States/Administrations about GBAS/SBAS Implementation

IMPLEMENTATION OF LPV (GAGAN) APPROACHES IN INDIA

(INDIA)

SUMMARY

This paper presents status of Implementation of GAGAN based LPV approaches in India with emphasis on implementation at smaller airports in India to improve access, regularity and efficiency of aircraft operations to provide reliable connectivity to relatively remote places in India.

1. INTRODUCTION

1.1 Under UDAN-"Regional Connectivity Scheme" (RCS) a lot of regional airports are being developed by Government of India, with the objective of making air travel affordable and to provide widespread connectivity, also to boost inclusive national economic development. Normally these airports have limited/no ground based navigation infrastructure. In order to improve the safety and regularity of flight operations at these airports in a cost-effective manner, a decision was taken to develop and implement GAGAN based LPV approaches at such airports to improve access, regularity and efficiency of aircraft operations to provide reliable connectivity to relatively remote places in India.

2. DISCUSSION

2.1 Approximately 66 LPV approaches are designed by AAI, which are in various phases of implementation. Kishangarh is one such airport in Rajasthan, India. It is only served by VOR as navigation aid. It encounters extreme temperature conditions (hot summers~45^0C and cold winters). It has a runway length of 2000m.The aircrafts operating at this airport (Q400/ATR 72 -600) are capable of conducting LPV approaches.

2.2 Normally such airports have short runways and are served by aircrafts such as Q400/ATR 72, which are capable of conducting LPV approaches. Implementation of LPV approaches at such airports will result in an improved access(equivalent to ILS) , with OCH of 253 ft., in a

cost effective manner, by making full utilization of the navigation capabilities of fleets operating there. It will result in huge reduction in operating costs for aerodrome operators.

2.3 With the implementation of LPV approaches , ILS is not required any anymore and it will result in huge savings of costs associated with ILS – such as equipment, calibration, maintenance, CNS personnel ILS training /rating allowance costs , cost of land required for installation of ILS. Furthermore, ILS also puts restrictions in the development of airport infrastructure. These type of approaches can also help in providing improved access to terrain challenged airports, where ILS cannot be installed due sitting issues. The vertical guidance provided is just like that of ILS glide slope and is not affected by temperature and pressure variations. LPV approaches can be developed for all the runways of the airport and thus negating the need for installation and maintenance of ILS equipment's for multiple runways surveying that particular airport. Further LPV approaches will also reduce the carbon emission, reduce the cockpit workload and provides pilots with more stable vertical guidance. This will allow pilots to land seamlessly in unfavorable weather conditions, reducing the risk of delays, diversions or cancellations.

2.4 Implementation of LPV approaches in India was a challenging task. Though the GAGAN was certified in 21 April 2015, but it could not be utilized due non availabilities of IFPs, lack of flight validation infrastructure and fleet/crew capability issues. The most challenging parts in LPV implementation were the flight validation of IFP and OPS approval. For the conduct of simulator trials , certified simulators capable of conducting LPV approaches were not available in India and fleet/crew were also not approved for conducting such approaches. Only with the active participation and concerted efforts of all the stakeholders i.e. DGCA, AAI and the partner airline, successful simulator trials of LPV approaches for runway 05 and runway 23 of Kishangarh airport were carried out on 23.04.2022 by Indigo airlines at FSTC Hyderabad ATR 72/600 simulator. Thereafter successful flight trials of the LPV approaches were conducted by M/s Indigo aircraft ATR 72-600 on 28.04.2022. After the flight trail at Kishangarh airport, pilots stated that they will anytime prefer LPV approaches over ILS. It is planned to promulgate the LPV approaches of Kishangarh w.e.f. 16.06.2022.With the implementation of LPV approaches and by developing in-house capability for design/validation of LPV IFPs, India has achieved an important milestone in PBN implementation.

2.5 **OPS approval process: - 5 PHASE PROCESS**

Documents used:-
ICAO Documentation – ICAO Annex 6, Part 1 and PBN Manual ICAO Docs 9613
DGCA Documentation – Civil Aviation Requirement Section 8, Series S, Part IV, CAP 8300, Ops Circular 03/2016 and job aid in CAP 8200 Annex 40.
Brief expansion of 5 phase process for LPV.
On receipt of request from operator project team formulated for 5 phase process which includes type-rated FOI(s) and Airworthiness Inspector/s and headed by Project manager.

Pre-Application Phase: Operator intending to undertake LPV operation, approached flight standard directorate and FSD studies operator need and provide advice/guidance on implementation strategies.

a. Initial application letter from the Operator.
b. Acceptance letter from DGCA
c. Pre-Application meeting planned & executed

Formal Application Meeting: When the feasibility is established the operator submits the formal application with required documentation in phase 2
Documents submitted by operator includes:

a. Operating procedures/SOPs/Checklist
b. Initial and recurrent training details (OM-D) – Flight Crew/Dispatch/Maintenance
c. Procedures for information and database management.
d. Other documentation such as dispatch procedures, abnormal/emergency procedures etc.
e. Minimum Equipment List (MEL).
f. AFM
g. And lastly a statement verifying para wise compliance with our national regulations.
h. Formal meeting planned & executed with implementation plan.

Phase 3 (Evaluation Phase) –

a. Submitted documents are scrutinized by DGCA team.
b. And all procedures proposed by operator are evaluated to ensure safe operation.
c. Job Aid for Ops circular and CAR compliance are scrutinized by the FOI.
d. At this stage operator may be required to amend procedures and documentation to comply with any gaps that may be identify by DGCA team.

Phase 4 (Demonstration Phase)

a. In this phase normal, abnormal and emergency operational procedures are simulated and tested in table top exercises and simulators. This is to ensure that the procedures evolved by the operator are comprehensive and safe.
b. Complex procedures like LPV is also tested in live environment in proving flights at this stage any new risk identified during the exercises will be mitigated.
c. First LPV GAGAN proving flight on ATR 72-600 was conducted at VIKG- Kishangarh airport on 28th April 2022 for RWY 05/23. The outcome of the flight trials was successful.

Phase 5 (Approval Phase)

a. After successful outcome of phase 4, the relevant documents are put up for approval.
b. Letter of approval is issued by DGCA for LPV.

Note:-

- M/s Indigo (ATR-72 600) is in the process of being granted LPV approval after successful completion of 5 phase process.
- AAI is also in the process of getting LPV approval in India on B-350 aircraft.
- M/s Spicejet (Q-400) has also submitted the documents which will be done as per the 5 phase process for LPV approval in due course.

3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to: amend as appropriate

a) note the information contained in this papers; and
b) Discuss any relevant matters as appropriate.
