



International Civil Aviation Organization

**THE NINTH MEETING OF PERFORMANCE BASED NAVIGATION
IMPLEMENTATION COORDINATION GROUP (PBNICG/9)**

Video Conference, 22 - 24 March 2022

CHOOSE FROM THE FOLLOWING PROVISIONAL AGENDA ITEMS

Agenda Item 4: States' PBN Implementation Progress

**RNP/RNP-XLS APPROACHES FACILITATING AUTOPILOT COUPLING/SMOOTH
INTERCEPTION OF FINAL APPROACH TRACK**

(Presented by India)

SUMMARY

Most of the RNP/RNP-XLS approaches are designed with conventional T-bar/Y-bar initial approach segments, having final approach track interception at angle of 90⁰ and 70⁰ respectively, this limits their operational benefit in high traffic density environment, also these designs do not permit guidance to the autopilot approaches in non-surveillance environment as they require maximum interception angle of 30⁰. In order to improve the efficiency of these approaches, initial approach segment facilitating 30⁰ interception to FAT/LLZ were designed and successfully implemented at various airports in India.

1. INTRODUCTION

- 1.1 During implementation of RNP/RNP-XLS approaches in India, it was observed that conventional T-bar/Y-bar limits their operational benefit/efficiency in high traffic density environment. Such design also does not permit guidance to the autopilot approaches which require final approach track interception at 30⁰ or less. In order to improve the efficiency/operational benefit of RNP/RNP-XLS approaches, designs were made to replicate the radar vectoring pattern. Initial approach segments of these approaches were modified to facilitate a course change of 30⁰ at the IF and 30⁰ interception of final approach/localizer track in addition to the guidance provided for T-bar/Y-bar concept in DOC 8168 Vol II, thus allowing autopilot approaches. Such modified initial approach segment were successfully implemented at few airports in India. Furthermore in line with RNP AR established, relevance of this design in facilitating independent parallel approaches may be explored.
- 1.2 These approaches were successfully implemented at KIA Bengaluru airport for runway 27R and 09L effective from 27th Jan and 24th Feb 2022 respectively in India. The efficacy of these procedures were validated by simulator trials, then followed by flight trials before implementation.

2. DISCUSSION

RNP/RNP-XLS approaches with modified initial approach segments have been developed for KIA Bengaluru , RGI Shamshabad, Vijayawada and upcoming new Goa Airport. Such procedures are successfully implemented at Bengaluru international airport. At other airports such procedures are in different phases of implementation.

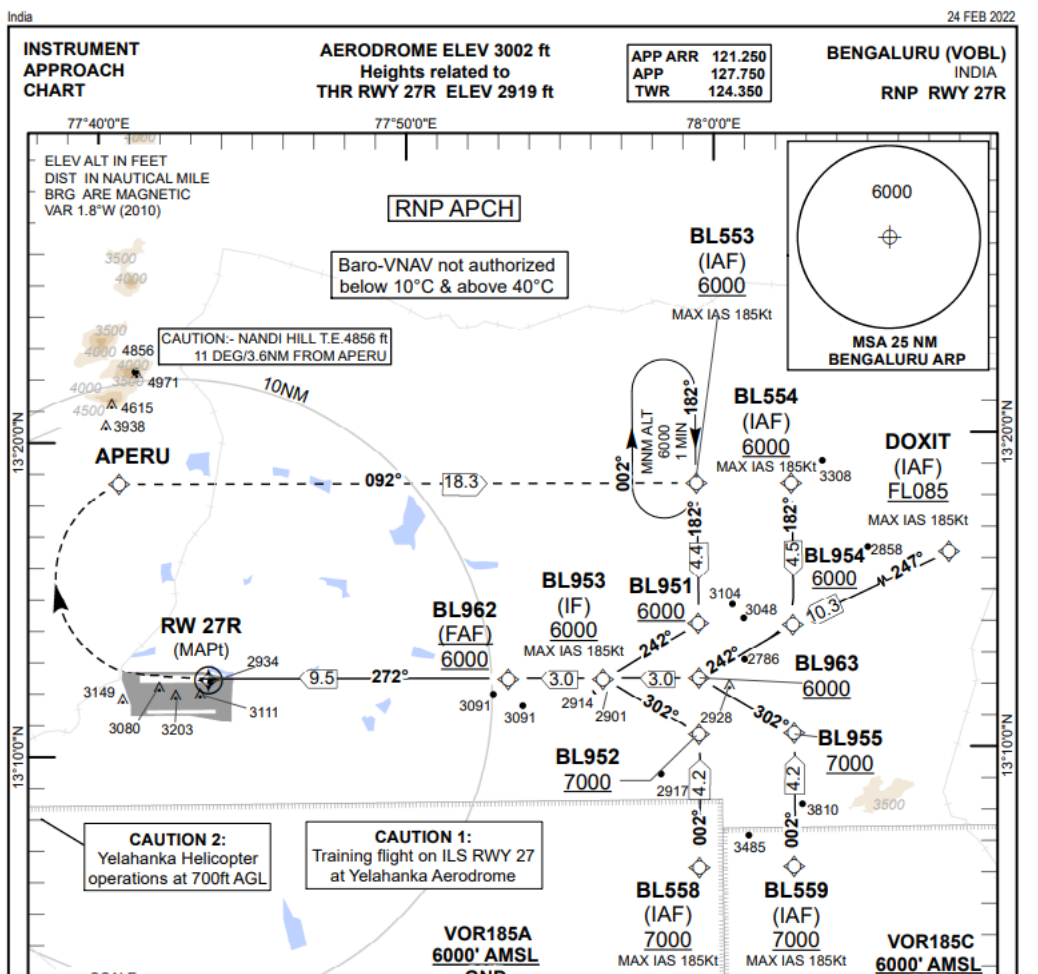


Figure 1: RNP RWY 27 R, Bengaluru Airport

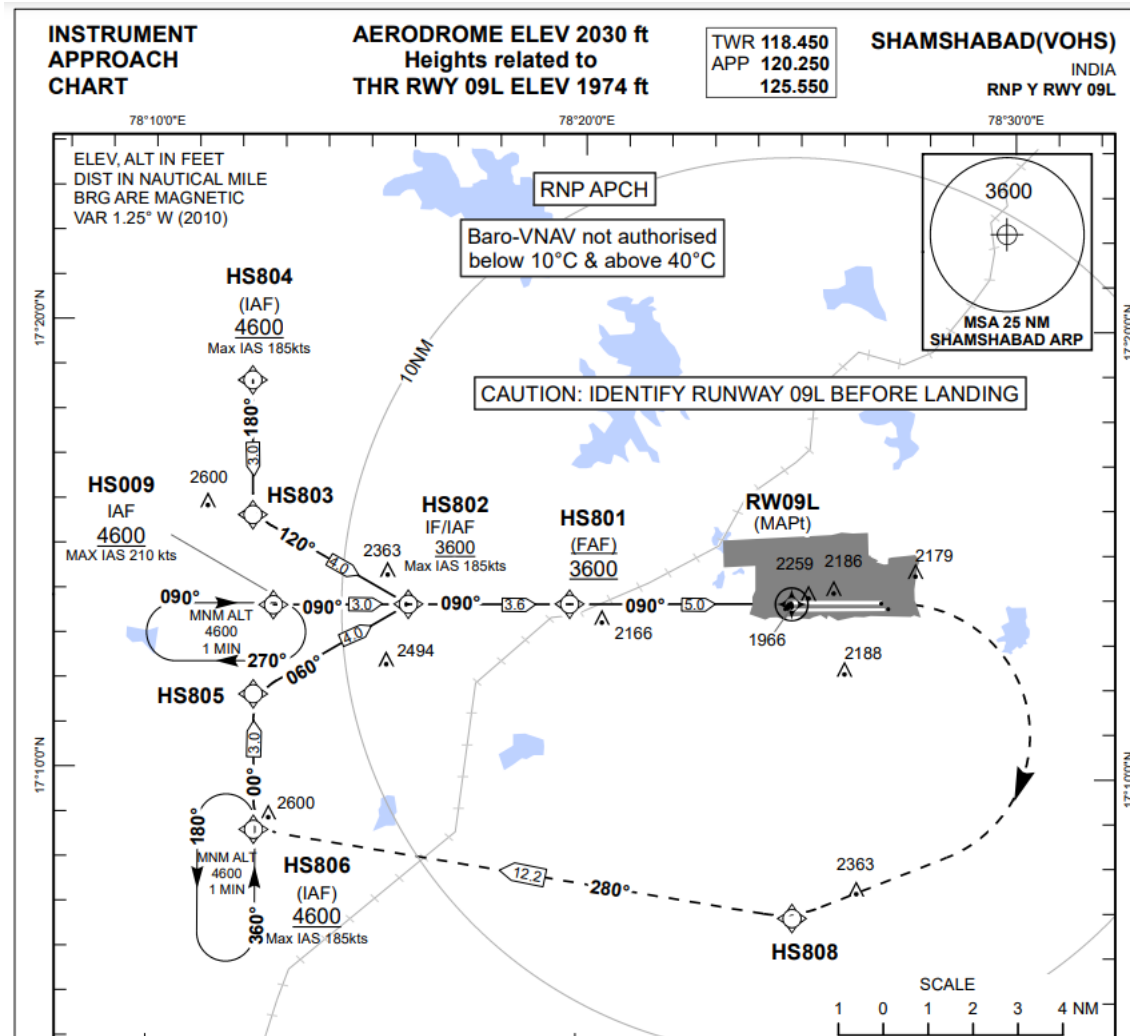


Figure 4: RNP Y RWY 09L, Shamshabad Airport

This type of procedure design has following benefits: -

- Improved efficiency of RNP approaches in high density traffic environment, as it replicates Radar vectoring pattern (e.g. Bengaluru/Shamshabad/New Goa airports),
- Permits autopilot coupled ILS approaches by allowing 30° angle of interception of localizer (e.g. Vijayawada/New Goa airport) and this concept is more beneficial in non-surveillance environment.
- Better track keeping due to smaller angle of turn, and smooth interception of final approach track,
- Avoiding obstacles in turn area.
- Reduced pilot and controller workload,
- Track shortening by taking the advantage of higher descend gradient permitted in initial approach segment.
- Furthermore in line with RNP AR established SOIR concept, relevance of this design in facilitating independent parallel approaches needs to be explored.

3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to: amend as appropriate

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.
