

General Requirements and Guidance Material for the use of RNAV Substitution

CAP 1926

Published by the Civil Aviation Authority, 2022

Civil Aviation Authority
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First published 2022

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Chapter 1

Introduction

Methods of navigating in UK airspace, like that in Europe and elsewhere, is changing. The means of navigation within the airspace is moving from a network of ground-based radio navigation aids such as Doppler VOR (DVOR), DME and NDB, to one defined by Performance-based Navigation (PBN) whereby reliance is made on use of area navigation techniques requiring a certified airborne navigation capability. In many respects, the global standards and requirements for both airborne equipment and flight crew qualification have evolved to the point of PBN fast becoming the everyday norm, whereas UK airspace still contains routes and procedures predicated on traditional ground-based radio navigation aids. Some airspace has already transitioned to PBN e.g., ATS routes, but a number of UK airports are still heavily dependent on ground-based radio navigation aids, especially for Standard Instrument Departures (SIDs).

As part of the modernisation of the UK airspace design, the UK ground-based radio navigation infrastructure is also in transition, with the optimisation and decommissioning of the conventional nav aids to 'right-size' the navigation infrastructure and create an 'exclusive use of PBN' environment.

Whilst PBN exploits the performance available from Global Navigation Satellite Systems (GNSS) and their augmentations, certain ground-based radio navigation aids will continue to play a significant part in the UK navigation infrastructure. In the event of loss of GNSS, DME/DME/IRU radio navigation positioning provides RNAV 1 performance in terminal airspace, ILS provides Precision Approach and a DVOR Minimum Operational Network (MON) will provide a means of supporting tactical contingency procedures.

As we move towards the 'exclusive use of PBN', during this transition period there will inevitably be a continued dependency on conventionally defined procedures and procedure segments.

Given that the introduction of new airspace procedures lags behind the aircraft capability, the use of Flight Management Systems (FMS) / Area navigation systems, provides a means for applying an alternate means of primary navigation on conventionally defined routes, procedures and path segments, pending the introduction of permanent PBN procedures. These systems rely upon use of either a "fix" or an FMS Coded Overlay to apply a technique referred to as RNAV substitution.

RNAV Substitution can have significant operational benefits, derived from the following:

- Failure of the conventional radio navigation aid does not automatically impose an operational limitation;
- Flight crew workload is reduced in part due to not having to interpret both conventional radio navigation aids and FMS navigational displays;