Performance Based Navigation Literature Review
HCNF

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Glen Smith
Overview

• Introduction and Objective of the study
• Overview of documents that formed the study
• Summary of key themes and areas derived from the study
Introduction and Objective

• In support of the Heathrow Community Noise Forum (CNF), a literature review has been conducted on a global body of Performance Based Navigation (PBN) Documentation
  • PBN: Airport arrival and departure procedures based on satellite navigation

• The review highlights the impacts that PBN Implementation may have on local communities of major airport hubs and complex airspace.

• The review identifies the documented issues, risks and opportunities associated with PBN implementations, based on
  • UK, US and other regional experiences of PBN implementations
  • ICAO and UK CAA guidelines on PBN implementations, design process and community engagement

• Draw conclusions applicable to Heathrow environment based on key themes
Reviewed Documents

The following industry documents were selected for the review based on industry experiences:

• Actual implementations of PBN
  • Consolidation of NavCanada presentation slides (2016)

• Community and stakeholder outreach and engagement recommendations in the context of the US federal system
  • Report of the NextGen Advisory Committee in Response to a Tasking from the US Federal Aviation Administration [PBN Blueprint Community Outreach Task Group, Approved by the NextGen Advisory Committee, June 2016]
  • Understanding the Airport’s role in Performance-based Navigation: Resource Guide [NextGen for Airports, Volume 1, National Academy of Sciences]

• Tools to demonstrate track noise
  • Best practices and tools to provide noise information to communities [JDA Aviation Technology Solutions, 3 June 2015]
Reviewed Documents

The following industry documents were selected for the review based on industry experiences (continued):

- Strategies for PBN implementation in the wider national and international strategies

- Airspace complexities and technical considerations for airline operators
  - **Implementation of Performance-based Navigation in the UK** [Airports Commission’s Senior Delivery Group – Technical Report Number 01]
Reviewed Documents

The following industry documents have been selected for the review based on guidance and specifications:

- Key factors for successful planning, design and integration of stakeholders, including the local community

- Technical considerations of PBN types, including track-keeping performance

- UK guidance for implementation of PBN at complex airports
Key Themes/Areas

Conclusions have been drawn in the following key themes/areas:

**Appropriate environmental planning and design process and guidance** for the assessment of emissions, fuel consumption and noise
- Defined national or local criteria should go beyond simply meeting levels of impact
- Account for parallel projects in same timeframe or geographical area

**Need to define a baseline to measure against**
- Form the basis for predictive modelling and determining net impact of changes
- Will aid planning, such as proactively designing to avoid noise-sensitive area(s)
- Future reference for design comparisons, including for the benefit of public viewing

**Community outreach and engagement on noise issues and improvements**
- Potential community impacts should be evaluated from the outset of planning
- Prior to design through to post implementation
- Aircraft operators can participate with airport operators to provide accurate operational information

**Addressing appropriate government legislation on noise**
- Government guidance should make distinction of those that are newly exposed to noise rather than simply total numbers
- CAA required a count of ‘newly overflown’ population to be included
Key Themes/Areas
Conclusions have been drawn in the following key themes/areas:

**Appropriate tools are necessary to demonstrate noise baseline and changes**
- Quality/quantity of noise info is key to productive dialogue with communities
- Mapping the location of complaints relative to flight paths demonstrates actual noise impact (can be used to fine-tune PBN or adapt other mitigation strategies)

**Benefits and challenges should be considered in the context of national airspace strategies**
- There are complexities of interacting routes and populations affected by noise and emissions around a major hub
- National strategies need to support more challenging PBN procedures

**Practicalities in designing noise respite and reduction for certain populations**
- The greater concentration of traffic around the route centreline may result in disturbance more regularly for those areas
- Potential to introduce alternative flight paths that can be switched on/off to provide some respite from overflights
- Routeing aircraft away from noise sensitive areas assumes that there is an adjacent area that is less sensitive to noise

**Engagement with airspace users to understand/develop aircraft capabilities**
- Aircraft operators can contribute site-specific information fundamental to the procedure design (including climb profiles and PBN capability levels of their fleet)
- Operators should carefully consider including RNP-related features in their ongoing fleet additions/modifications