Design Principles

Leeds Bradford Airport FASI(N) Airspace Change Proposal

Leeds Bradford
Yorkshire's Airport

CYRRUS

Overview

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- Impact on LBA
- CAP 1616 Process
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- Arrivals
- Approaches
- Departures
- Noise Preferential Routes
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Another ACP…..Why?

- Airspace Modernisation Strategy (AMS)
    - Published in Dec 2018 and replaced Future Airspace Strategy (FAS);
    - Roadmap that sets out the 'Ways', 'Ends' and 'Means' of modernising UK airspace through 15 initiatives; and
    - One of these initiatives is the fundamental redesign of the Terminal Route Network using satellite navigation (Performance-Based Navigation (PBN)).
- Airspace Change Organising Group (ACOG)
    - Established in 2019 as a fully independent organisation (at the request of both the DfT and the CAA);
    - Responsible for coordinated delivery of key aspects of the AMS;
    - Delivery of two major national airspace change programmes known as Future Airspace Implementation South (FASI-S) and Future Airspace Implementation North (FASI-N);
    - FASI-N is a complete redesign of the existing airspace structure in Northern England and Scotland; and
    - LBA is one of nine airports included within this programme.

Another ACP…..Why?

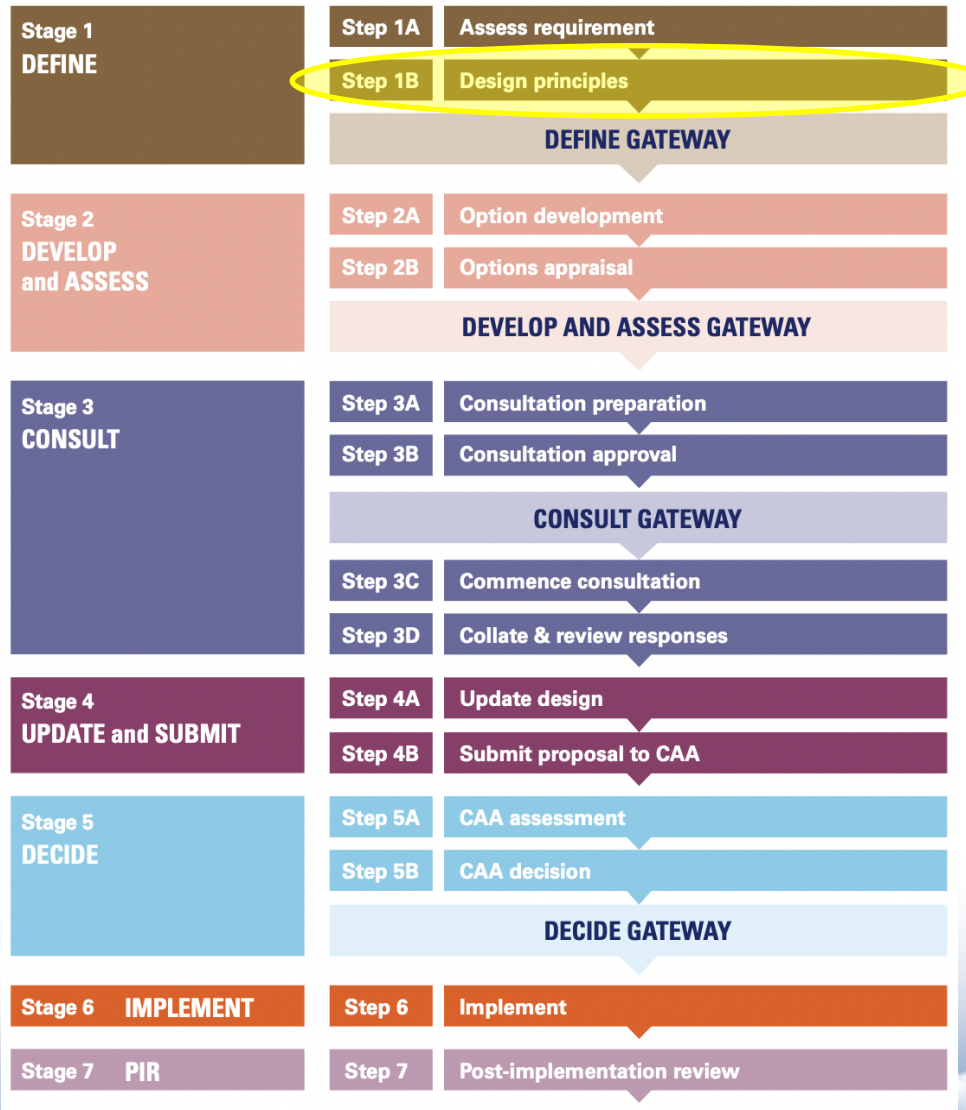
- Performance-Based Navigation (PBN)
    - One of the major aims of the AMS is to optimise future airspace designs to take account of modern aircraft performance and functional capabilities;
    - PBN is being adopted world-wide and States are expected to modernise their airspace;
    - In parallel, the UK navigation infrastructure is being optimised to take advantage of the lateral navigation accuracy from Global Navigation Satellite Systems (GNSS) while retaining adequate conventional ground-based navigation aids to ensure both resilience and contingency measures.

Why? The crux of it for LBA…

- Gamston DVOR
  - The conventional navigational aid known as a Doppler VHF Omni-Directional Range Finder (DVOR) upon which several LBA procedures are dependent on, is to be withdrawn;
  - Not at the request of LBA but part of a national rationalisation of outdated technology being run by NATS En-Route Ltd (NERL);
  - Out of service date currently - Dec 2022; and
  - LBA must now develop procedures that are not dependant upon it.

A nationwide programme of modernisation

CAP1616 Process



We are here

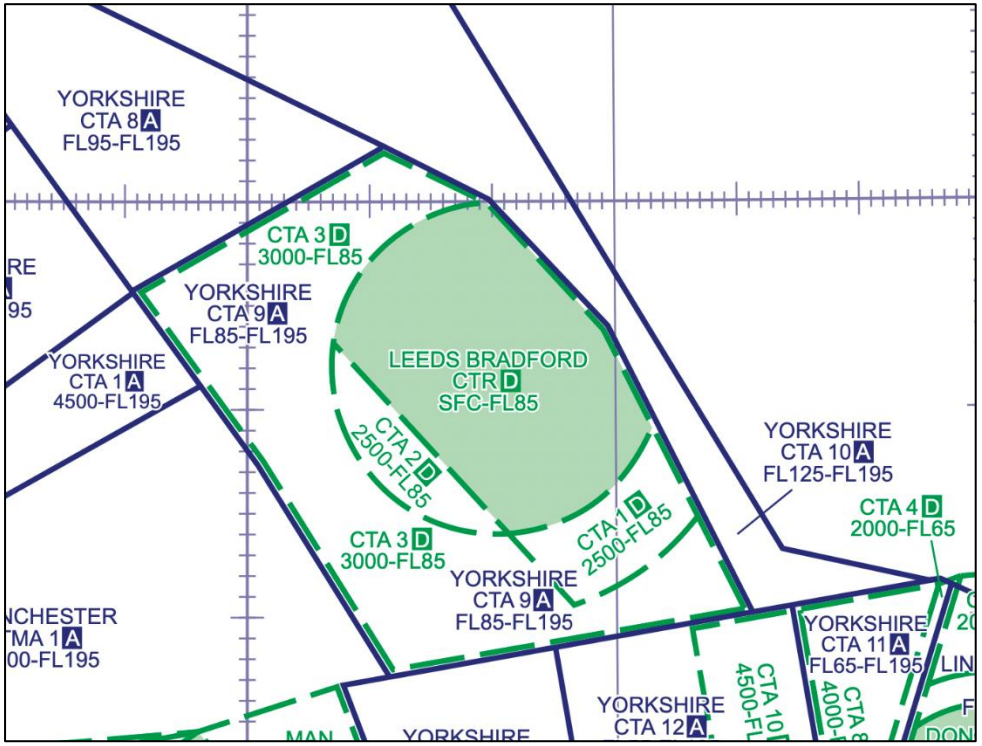
- 14 Steps;
- 7 Stages;
- 4 Gateways;
- 2 years minimum.

Impact on LBA

- LBA is required to introduce the following procedures:
    - PBN approaches in the form of Required Navigation Performance (RNP) Instrument Approach Procedures (IAPs);
    - PBN departure routes (known as Standard Instrument Departures (SIDs) to link the Airport to the evolving airspace structure above 7,000ft; and
    - Arrival Transitions to enable aircraft to get established on an approach into the Airport.
- It is likely that in the development of options for new departure, arrival and approach profiles, that the airspace configuration may also require re-configuration.

Airspace

- Control Zone (CTR) SFC-FL85;
- Control Areas (CTA):
  - CTA 1&2 2,500ft-FL85;
  - CTA 3 3,000ft-FL85;



- Fairly complex airspace and not ideal for managing air traffic safely and efficiently;
- Affects traffic flow at the airport, increases planning time and reduces the capacity of the controllers;
- Aircraft are often not afforded continuous descent or climb - not optimal from an environmental perspective.

Arrivals

- LBA currently has no Standard Arrival Routes (STARs) or Arrival Routes
- This lack of predictability is unhelpful for ATC and aircraft operators alike.
- NERL has the responsibility for the development and introduction of the STARs. These will likely terminate at a holding pattern at or above 7,000ft;
- To modernise and systemise the airspace, the link between the STARs and the final approach can be designed or formalised. These links are known as 'Arrival Transitions'.

Approaches

- The IAPs take aircraft on approximately the last 10 nautical miles (NM) of their journey inbound to the Airport and provide a stable, straight track to fly and a steady descent rate for a safe landing;
- The current IAPs utilise ground-based navigation means
- LBA needs to introduce satellite-based GNSS IAPs known as Required Navigation Performance (RNP) approaches;
- These approach tracks are very unlikely to differ from those currently flown by aircraft on their last 10 NM before landing;
- The ILS still provides the most operationally effective means of completing an approach in inclement weather and will not be being withdrawn until RNP approaches can equal or better its effectiveness.

Departures

- LBA currently has Standard Instrument Departures (SIDs),
- However, these SIDs utilise conventional navigation that relies upon ground-based navigation aids.
- The current departure routes rely upon two ground-based aids, one of which will be withdrawn from use in December 2022 as part of a UK NAVAID Rationalisation Project;
- Each departure is managed tactically by the LBA Radar Controller, in co-ordination with the ATCC,
- To modernise and systemise the airspace, the link between the Airport and the 'Gateways' into the en-route system can be designed to PBN standards.

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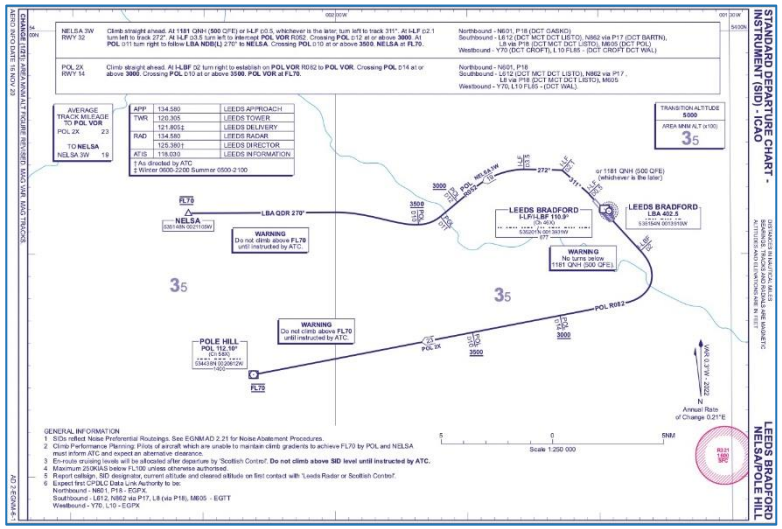
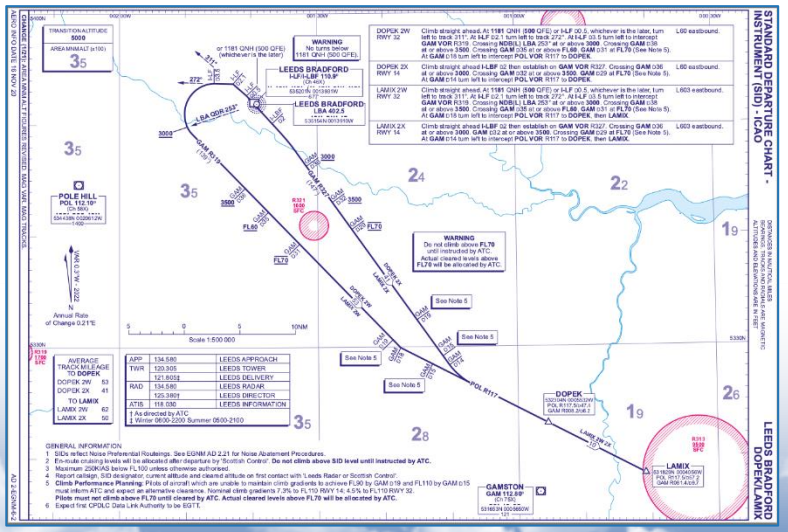
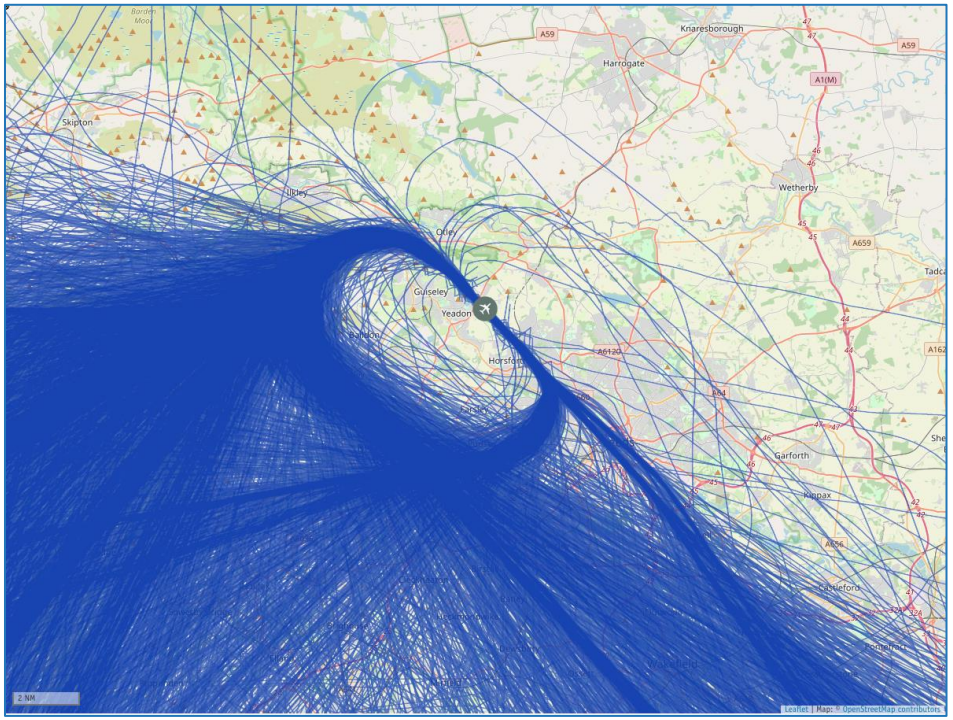
Departures



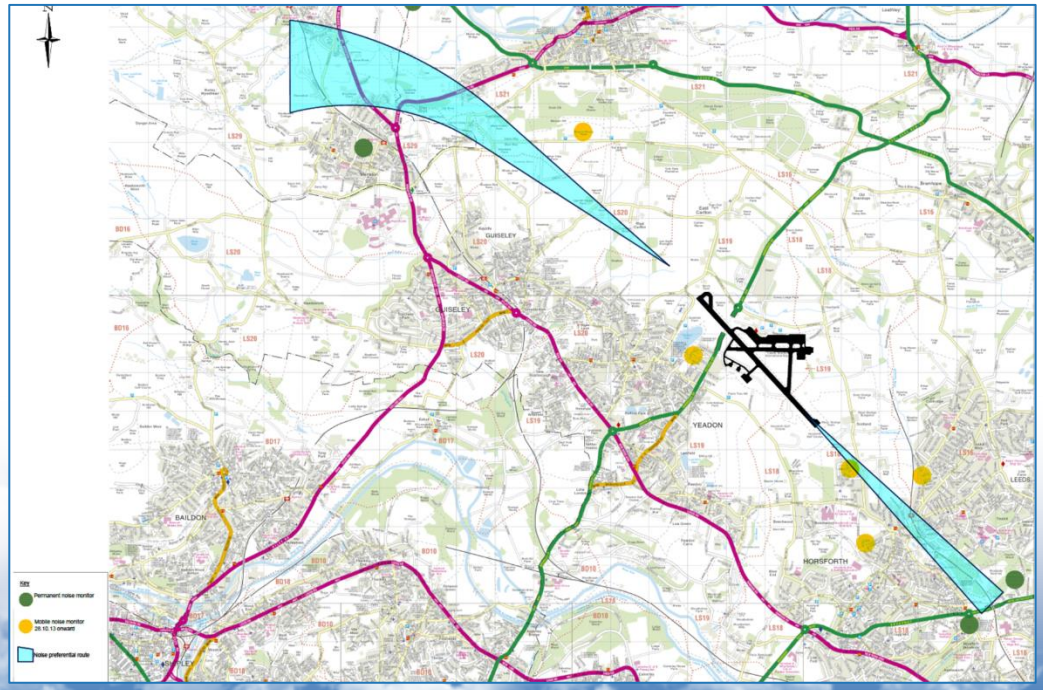




Noise Track Monitoring System (NTMS) data - The traffic data presented represents three months from the busier, summer period of 2019 (pre-pandemic).

Noise Preferential Routes (NPRs)

- Noise Preferential Routes (NPRs) are in force to ensure that, wherever possible, departing jet aircraft fly over the least populated areas. All departing jet aircraft are required to follow the NPRs, the only exceptions being for safety or operational reasons, such as the avoidance of adverse weather;
- No established NPRs for arriving aircraft and turboprop aircraft are exempt.



Noise Preferential Routes (NPRs)

- In the case of LBA, the NPRs are defined by the Local Authority under a Section 106 planning agreement;
- The NPR swathe illustrates a containment area within which all departing jet aircraft should remain, until the end is reached (at 3.5 DME);
- NPRs are published in the Aeronautical Information Publication (AIP), however, their ownership and enforcement is the responsibility of the Local Authority and not the DfT or the CAA;
- The introduction of PBN will improve the accuracy and compliance with the NPR;
- NPRs might evolve by mutual agreement should an improvement be possible.

Lessons Identified from previous ACP

- **Local Resident Feedback** – The main emphasis of the concerns from residents can be summarised as follows:
    - The introduction of new procedures would lead to an increase in noise and pollution; and
    - The expansion would benefit airlines at the detriment to residents.

Lessons Identified from previous ACP

- **General Aviation (GA) Community Feedback** – The main emphasis of the concerns from the GA community can be summarised as follows:
    - The dimensions of the suggested CAS construct were considered disproportionate to the requirements of LBA, and the forecast growth predictions was questioned;
    - The base of the proposed CAS was too low to facilitate soaring and cross- country flights;
    - The new CAS design would produce a funnelling effect as aircraft avoid and go around CAS rather than transit through which has safety implications including an increased risk of mid-air collision (MAC);
    - The new CAS design was too complicated and would lead to more airspace infringements; and
    - The impact on the sustainability of local gliding clubs was unacceptable and would specifically impact upon Burn Gliding Club's ability to continue to operate.

Draft Design Principles

SAFETY

DP1 – Importance of Safety

ENVIRONMENTAL

DP2 – Overflight

DP3 – Noise Footprint

DP4 – Tranquillity

DP5 – Emissions and Air Quality

OPERATIONAL

DP6 – Operational Requirements

DP7 – Airspace Dimensions

DP8 – Airspace Availability

DP9 – Airspace Complexity

TECHNICAL

DP10 – Compliance

DP11 – Aircraft Category

DP12 – Equipage and Approval

DP13 – Arrival Transitions

DP14 – Departure Procedures

DP15 – Approach Procedures

DP16 – Coordination

ECONOMIC

DP17 – Cost of Change

DP18 – Operational Cost

STRATEGIC POLICY

DP19 – AMS Realisation

DP20 – PBN

Safety

DP1 – Importance of Safety – The airspace design and its operation must be as safe or safer than today.

Environmental

DP2 – Overflight – The new procedures should not increase the number of people overflown by aircraft (below 7,000 feet) using the Airport.

DP3 – Noise Footprint – The new procedures should not increase the noise footprint of the existing airport operation, i.e. it should not increase the number of people affected within the 51dBA LAeq 16 hour contour.

DP4 – Tranquillity – Implementation should minimise disturbance to the adjacent National Parks and the nearby Areas of Outstanding National Beauty (AONB) by aircraft below 7,000 feet.

DP5 – Emissions and Air Quality – The new design should seek to minimise the growth in aircraft emissions, the further degradation in local air quality and adverse ecological impacts to address growing concerns about the impact of aviation on climate change.

Operational

DP6 – Operational Requirements – The new procedures should address the needs of most operators at LBA.

DP7 – Airspace Dimensions – The airspace design should afford only the appropriate volume of controlled airspace to contain and support Continuous Climb Operations and Continuous Descent Operations by Commercial Air Transport whilst enabling safe, efficient access for other types of flying operation.

DP8 – Airspace Availability – Sufficient controlled airspace should be available to support LBA operations independently.

DP9 – Airspace Complexity – The airspace design should seek to reduce complexity and bottlenecks in controlled and uncontrolled airspace and contribute to a reduction in airspace infringements.

Technical

DP10 – Compliance – The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS), acceptable to the CAA and, the implementation shall follow all applicable legislation and regulations.

DP11 – Aircraft Category – The new procedures shall be technically flyable by all aircraft types in approach Speed Categories A through D.

DP12 – Equipage and Approval – The new procedures shall be flyable by the majority of LBA commercial aircraft operators.

DP13 – Arrival Transitions – The arrival transition designs shall seamlessly integrate with new RNP Instrument Approach Procedures at LBA and if possible, the existing ILS approach procedures.

DP14 – Departure Procedures – The Standard Instrument Departures (SIDs) shall terminate at the agreed 'Gateways' into the route network and should be deconflicted from the arrival transitions.

DP15 – Approach Procedures – The Instrument Approach Procedures (IAPs) shall replicate the existing conventional approach procedures as closely as possible.

DP16 – Coordination – The new procedures should result in a reduction in the amount of tactical coordination required by ATCOs.

Economic

DP17 – Cost of Change – The new procedures shall be implemented in a cost-effective manner.

DP18 – Operational Cost – Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.

Strategic Policy

DP19 – AMS Realisation – This ACP must serve to further, and not conflict with, the realisation of the AMS.

Note: It is accepted by the CAA that adherence to this DP, in what is a coordinated modernisation programme, may impact upon the development of 'Options'.

DP20 – PBN – The new procedures should benefit from as many of the potential benefits of PBN implementation as are practicable. This includes predictability, efficiency, continuous climb and descent operations with the intention of reducing carbon emissions.

Survey Engagement

A document titled 'LBA FASI(N) ACP: '**An Introduction to Design Principles**' was issued to the stakeholders. Contained within this document was an explanation of what was being asked along with a link to an online survey.

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Stakeholders were provided with 30 days to respond and contribute to the Design Principles.

However, this period has been extended to 24 December 2021 to allow for further comment from some stakeholders who were not notified initially.

What do we need from you?

- CAP1616 requires that a discussion with affected stakeholders takes place. Local stakeholders normally include local authority elected representatives, local community groups, the Airport Consultative Committee (ACC) and representatives of local General Aviation (GA) organisations or clubs;
- We need your views on the Draft Design Principles;
- Remember, this isn't procedure designs or volumes of airspace at this stage – it is conceptual principles that will inform the development of design options;
- Please populate the survey. The feedback received will influence the Final Design Principles.

Questions?