

LONDON STANSTED AIRPORT RNP1 (RF) SIDs

CAP 1547



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Chapter 1

Executive summary

Objective of the Proposal

1. To reduce the number of people directly over-flown by departing aircraft by improving aircraft navigational accuracy immediately after take-off.
2. Introduce Required Navigation Performance (RNP)1 Standard Instrument Departures (SIDs) in addition to the existing conventional SIDS already in use.

Summary of the decision made

3. Subject to the conditions set out in Annex A the CAA has decided to approve for implementation the following:
 - a. The introduction of RNP1 (RF) SID, designated CLN 1E.
 - b. The introduction of RNP1 (RF) SID, designated DET 1D.

Next steps

4. The CAA's Post Implementation Review (PIR) of the changes approved by the CAA in this decision will commence at least one year after implementation of those changes. The sponsor must provide the data required by the CAA throughout the year following implementation, to carry out that PIR. See Annex A. The PIR is the seventh stage of the CAA's airspace change proposal process (set out in [CAP 725](#), the Guidance on the Application of the Airspace Change Process¹) and will consider whether "*the anticipated impacts and benefits, set out in the Airspace Change Proposal, have actually been delivered*". The policy states that if those impacts and benefits have not been delivered then the review should "*ascertain why and ... determine the most*

¹ www.caa.co.uk/CAP725

appropriate course of action".² (See [Annex B] paragraph 22 for more information.)

² There are therefore a wide range of possibilities for the conclusions of a PIR; they include a rejection of the proposal, the imposition of further requirements on the proposal, and the making of wider recommendations, albeit that the success of the proposal is not dependent upon them.

Chapter 2

Decision Process and Analysis

CAA's Role in Airspace Change Decisions

5. The CAA's role in airspace change decisions, the associated legal framework, policy background and relevant UK international obligations is set out in annex B.

Aims and Objectives of the proposed change – CAA decision

6. The stated objectives of the proposal are to provide additional departure flight procedures, designed to support aircraft with RNP capable systems. Aircraft that follow routes supporting the RNP navigation specification will do so with improved navigational accuracy (in support of the UK's international obligations to move towards PBN). This will reduce the number of people affected by direct overflights, when compared against the current conventional routes that aircraft follow on departure from Stansted Airport.
7. A consequence is reduced reliance on ground based infrastructure in accordance with the CAA's Future Airspace Strategy (2011 - 2030, dated 30 June 2011).
8. The CAA endorses the aims and objectives of the proposal.

Chronology of Proposal Process

Framework Briefing

9. A Framework Briefing was held on 26 January 2015 and the CAA provided London Stansted Airport with detailed environmental and consultation requirements. It was agreed that the CAA would issue an updated AIP

Supplement to extend the current trial (see below) to gather as much data as possible prior for the formal ACP submission.

Trial

10. The new RNP departure route designs were the first in the UK to use multiple radius turns to accurately delineate a track across the ground that replicated existing departure procedures. The trial was developed through a partnership between aircraft operators and National Air Traffic Services (NATS), with input from the CAA Safety and Airspace Regulation Group (SARG) and supported by the Stansted Airport Consultative Committee (STACC). A trial of this nature is not a pre-requisite to support an airspace change decision, but due to the unique nature of the departure designs, it was judged to be necessary in this case. The trial involved simulator testing to ensure the designed procedures could be safely flown before live flying trials commenced on 7 May 2013. The trial continues to gather data on the accuracy with which the departure routes can be flown by various types of aircraft.
11. Since the Trial Report was produced (linked below), an extended trial has continued to capture data on the accuracy with which the departure routes can be flown by various types of aircraft. The trial results indicate that all participating aircraft types are capable of flying the new procedures demonstrating navigational accuracy within expected tolerances. Significantly, Ryanair Boeing aircraft have also participated in the trial since 19 June 2016 and have also demonstrated results consistent with the trial report.

Consultation

12. An extensive public consultation was conducted between 1 September and 27 November 2015. Three separate documents described the introduction of RNP1 SIDs: the Consultation Summary Document, the Full Consultation Document and the Trial Technical Report. Additional supporting material included a documented list of Frequently Asked Questions and an informative video to demonstrate how RNP1 technology was trialled.
13. The following link will take you to the [Consultation Document](#).

14. The following link will take you to the [Consultation Feedback Report](#).
15. The following link will take you to the [Trial Report](#).

Submission of Airspace Change Proposal

16. The formal ACP submission to the CAA was received from London Stansted Airport on 3 February 2016. The Trial Report was submitted to the CAA on 3 March 2015.

Documents considered by the CAA

17. In assessing the proposal and making this decision, the CAA has taken into account the following:
 - a. Introducing RNP1 (RF) SIDs Airspace Change Proposal London London Stansted Airport dated February 2016.
 - b. Performance Based Navigation Consultation Document London Stansted Airport 1 September 2015 – 27 November 2015.
 - c. Introducing RNP1 (RF) SIDs Consultation Feedback Report London London Stansted Airport dated January 2016.
 - d. RNP1 (RF) Trial London Stansted Airport dated May 2015.
 - e. Responses from London Stansted Airport to additional CAA clarification requests dated 9 February - 16 May 2016.
 - f. Ryanair track data received following trial participation between 4 July 2016 - 28 October 2016.

CAA Analysis of the Material provided

18. As a record of our analysis of this material the CAA has produced:
 - An **Operational Assessment** which is designed to brief Director SARG who is the decision maker, as to whether the proposal is fit for purpose. This assessment contains:

- The CAA's assessment of the airspace change proposal justification and options considered.
- The CAA's assessment of the proposed airspace design and its associated operational arrangements. An assessment of the design proposal to illustrate whether it meets CAA regulatory requirements regarding international and national airspace and procedure design requirements; whether any mitigations were required to overcome design issues.
- The CAA's assessment of whether adequate resource exists to deliver the change and whether adequate communications, navigation and surveillance infrastructure exists to enable the change to take place.
- The CAA's assessment of whether maps and diagrams explain clearly the nature of the proposal.
- The CAA's assessment of the operational impacts to all airspace users, airfields and traffic levels; whether potential impacts have been mitigated appropriately.
- The CAA's conclusions are arrived at after a CAA Case Study. An Operational Assessment is completed for all airspace change proposals and forms a key part in the CAA's decision-making process as to whether a proposal is approved or rejected. The Operational Assessment will also include any recommendations for implementation such as conditions that should be attached to an approval, if given.
- An **Environmental Assessment** which reviews the Environmental Assessment provided by the sponsor requesting the change. The review assesses whether the sponsor has provided the data and information that had been agreed at the Framework Briefing or in subsequent correspondence, and must be provided as part of the proposal. The requirements are based on the guidance in [CAP 725](#). Those requirements have been designed to facilitate the assessments that the CAA must make when considering the environmental impact of the change. The CAA reviews the assessments made by the sponsor as part of the proposal to determine if they have been undertaken properly and the conclusions are reasonable. The CAA will check a sample of the sponsor's results and may, in some cases, undertake its own analysis.

The CAA then prepares a report summarising the environmental impacts of the proposal, outlining the anticipated impacts of the change if it were to be implemented, for consideration along with all the other material by the CAA decision maker.

- A **Consultation Assessment** designed to brief the CAA decision maker on whether the proposal has been adequately consulted upon in accordance with the CAA's regulatory requirements, the Government's guidance principles for consultation and the Secretary of State for Transport's Air Navigation Guidance. The assessment will confirm whether the change sponsor has correctly identified the issues arising from the consultation and has responded to those issues appropriately. The assessment will rely, in part, on a comparison of the sponsor's consultation feedback report against the actual responses provided by consultees.

CAA assessment and decision in respect of Consultation

19. At the Framework Briefing, it was accepted by the CAA that the proposal fell within the criteria of the CAA's SID Replication Policy. As a consequence, it was initially agreed that the Stansted Airport Consultation Committee (STACC) constituted a suitable forum on which to base the required consultation. Following discussions with STACC, London Stansted Airport subsequently decided to conduct a full public consultation in excess of CAA requirements. The consultation ran from 1 September 2015 to 27 November 2015 (just over 12 weeks). The consultation was well publicised and the sponsor appeared receptive to the concerns of STACC in delaying the consultation to avoid holiday periods. A number of roadshows were held as part of the consultation process and invitations to attend council meetings were accepted by the sponsor. A comprehensive media coverage plan was put in place to publicise the consultation. The consultation activity met current best practice and government Consultation Principles (2016).
20. A comprehensive consultation Feedback Report was produced in January 2016. This document included responses by Stansted to the main issues

raised by consultees. All individual responses to the consultation have been read as part of this assessment.

21. The Consultation materials³ and the Feedback Report⁴ are available on the CAA website.
22. The CAA's full assessment of the consultation is contained in the CAA's Consultation Assessment referred to above and published on the CAA's website.⁵ The CAA has concluded that London Stansted Airport's consultation documentation was of a high standard, adequately represented the issues to the general public, clearly stated the anticipated impacts in appropriate language and was well supported by a comprehensible publicity campaign. The sponsor was receptive to all levels of feedback and responded well to the issues raised. The quality of the consultation exercise was sufficient to support the CAA airspace change decision process.

CAA Consideration of Factors affecting the Decision

Explanation of statutory duties

23. It is one of the CAA's air navigation functions given to it by the Secretary of State to consider, and if applicable, approve changes to the structure of UK airspace. The CAA's statutory duties and functions are explained at annex B and are set out in more detail in Chapter 3. In summary, the CAA's primary duty under Section 70(1) of the Transport Act requires that the CAA exercises its air navigation functions so as to maintain a high standard of safety in the provision of air traffic services. This duty takes priority over other considerations.
24. Where an airspace change proposal satisfies all of the considerations and where there is no conflict, the CAA will approve the airspace change proposal.

³http://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Commercial_industry/Airspace/Airspace_change/Stansted%20consultation%20document.pdf

⁴http://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Commercial_industry/Airspace/Airspace_change/Stansted%20Consultation%20Feedback%20Report.pdf

⁵<http://www.caa.co.uk/Commercial-industry/Airspace/Airspace-change/Decisions/Stansted-Airport-RNP1-RF-SIDs/>

25. Where an airspace change proposal satisfies some of the considerations but not others, this is referred to as a conflict.
26. In the event of a conflict, the CAA will apply the considerations in the manner it thinks is reasonable. The CAA will give greater weight to considerations that require it to “secure” something than to those that require it to “satisfy” or “facilitate”.

Conclusions in respect of safety

27. The CAA’s primary duty is to maintain a high standard of safety in the provision of air traffic services and this takes priority over all other duties.⁶ In this respect, the CAA is satisfied that the proposal maintains a high standard of safety for the following reasons:
 - a. There is an improvement in navigational accuracy that therefore requires less controller inputs.
 - b. Less controller interactions reduces workload and increases controller capacity.
 - c. There are no positive or negative safety impacts on any persons other than the positive impacts on the owner or operator of aircraft.
28. The CAA’s Safety and Airspace Regulation Group’s Instrument Flight Procedure (SARG IFP) regulators’ analysis reached the view that all designs, in the final form proposed, were compliant with extant regulations.

Conclusions in respect of securing the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic

29. The CAA is required to secure the most efficient use of the airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic.⁷
30. Generally, this means aircraft transiting through a specific volume of airspace over a period of time. It is therefore concerned with the operation of the

⁶ Transport Act 2000, Section 70(1).

⁷ Transport Act 2000, Section 70(2)(a).

airspace system as a whole. Expeditious flow of air traffic means each aircraft taking the shortest amount of time for its flight. It is concerned with individual flights.

31. It is the CAA's view that the introduction of RNP1 procedures and technology is necessary to secure the most efficient use of UK airspace. This is reflected in more detail in the CAA's Future Airspace Strategy⁸, including the UK's relevant international obligations in this area. These are set out in detail in [Annex C].

Conclusions in respect of taking into account the Secretary of State's guidance to the CAA on environmental objectives

32. As set out in more detail in [Annex C], the CAA has a duty to consider a number of factors when deciding whether or not to approve a change to the structure of UK airspace, including the anticipated impact of the change proposed on the environment. We do so for two reasons:
33. Firstly, we needed to form an opinion on whether the change will have any significant environmental impacts to decide whether the Secretary of State's consent would be needed to promulgate the change, or whether the decision was solely a matter for the CAA.
34. We have concluded that the proposed change is not anticipated to have any significant environmental impacts. This is because the overall exposure of any individual or community to noise on the ground is not anticipated to increase to a level that exceeds 57dB LA_{eq16 hour}, where the increase in the level of exposure to noise in itself exceeds 3dB as a result of the proposed change (The relevant CAA policy on this test is set out in paragraph C21 [Annex B]). As set out in the CAA's ERCD's Environmental Assessment, this is because it is anticipated that the proposed changes to departure routes will have no impact upon the airport's L_{eq} noise contours.⁹

⁸ <http://www.caa.co.uk/Commercial-industry/Airspace/Future-airspace-strategy/Future-airspace-strategy/>.

⁹ Noise contours are used to represent on a map the location of places affected by different average noise levels.

35. Secondly, we need to assess the anticipated environmental impact of the proposed change together with any other factors, such as making the most efficient use of airspace, the requirements of operators and owners or the interests of others in relation to the use of airspace and so on.
36. With regard to this second reason for an environmental assessment, the CAA sets out its analysis of the environmental impact of the proposed change below (and in more detail in the Environmental Assessment Report). The CAA has made the following assessment with respect to the anticipated environmental impact of the proposal:
 37. With regard to CO₂ emissions there will be no anticipated environmental impacts.
 38. With regard to Local Air Quality there will be no anticipated environmental impacts.
 39. With regard to Areas of Outstanding Natural Beauty (AONBs) and National Parks there will be no anticipated environmental impacts.

The CAA's ERCD has assessed the anticipated impact of aircraft noise that results from the changes proposed and in so doing had regard to the altitude-based priorities as given to the CAA by the Secretary of State in the 2014 Air Navigation Guidance to CAA on Environmental Objectives (set out in Annex B, C.18 to this decision) and also the guidance in respect of the environmental impact of new technology of the type that is the subject of this proposal.

CLN 1E RNP1 SID

40. Our assessment of the noise impact of this change is based on a combination of the trial data and anticipated utilisation by aircraft of the RNP1 CLN 1E SID in substitution for the current and continuing conventional SID. The largest aircraft operator based at Stansted has not confirmed the extent to which its aircraft will use the proposed CLN 1E RNP1 SID. Accordingly, it is not possible to accurately predict the likely noise impact. If usage of the proposed CLN 1E RNP1 SID is in line with the sponsor's original estimate (namely 85%+ of flights

on that departure would use the CLN 1E RNP1 SID), we anticipate the environmental impacts of this proposed SID would be:

- An estimated total of 3,300 people to be directly overflowed less often by aircraft below an altitude of 4,000ft.
- An estimated total of 500 people to be directly overflowed more often by aircraft below an altitude of 4,000ft.
- In line with the Government's altitude based priorities, we anticipate that the change proposed will reduce the number of people directly overflowed by aircraft below 4000ft.
- Some locations (those beneath or close to the nominal track of the CLN 1E RNP1 SID) are likely to be directly overflowed more often by aircraft at altitudes between 4,000ft and 7,000ft, although other locations are likely to be directly overflowed less often by aircraft at these altitudes;

The Government's altitude based priorities in respect of the CAA's environmental duty as regards aircraft in the altitude band 4,000-7,000ft require us to give consideration to both the anticipated noise impact and the anticipated CO₂ emissions impact. As previously noted, no change in CO₂ output is anticipated. The trial did not provide data in respect of the impact of aircraft at this altitude. Based on our experience of introducing PBN technology (of which RNP1 is a type) at other airports, we have anticipated the impacts of this proposal. Once aircraft reach 4,000ft, the terms of the Noise Preferential Routes at Stansted mean air traffic control are permitted to vector (or direct) aircraft to leave the SID and take a more direct or expeditious routing. Experience shows that in fact a noticeable proportion of aircraft are not vectored off PBN SIDs and remain on them through the altitude band 4,000-7,000ft. Consequently we anticipate a greater degree of concentration of aircraft at this altitude band meaning a majority of people will be directly overflowed less often (as there will be less dispersion of aircraft tracks than before) but a minority will be directly overflowed more often.

- No other environmental impacts in respect of CO₂ emissions, Local Air Quality, tranquillity, visual intrusion or biodiversity are anticipated.

DET 1D RNP1 SID

41. The Rwy 04 conventional SID is currently used infrequently (estimated at an average of 6 flights per day) and this would also be the case if the proposed RNP1 SID on this route is implemented; it is estimated that only 2-3 flights per day would use the DET 1D RNP1 SID and therefore any environmental impacts, including changes to the frequency of direct overflight and associated noise impacts, are likely to be negligible. If usage of this proposed SID is in line with the sponsor's estimate we anticipate the environmental impacts of the proposed SID would be:

- An estimated total of 1,000 people to be directly overflown less often by aircraft below an altitude of 4,000ft.
- An estimated total of 200 people to be directly overflown more often by aircraft below an altitude of 4,000ft.
- In line with the Government's altitude based priorities in respect of the CAA's environmental duty, we anticipate therefore that the change proposed will reduce the number of people directly overflown by aircraft below 4,000ft, however due to the low number of flights that it is estimated would use this proposed RNP1 SID, any impacts arising from greater accuracy (concentration) are likely to be minimal.
- Some locations (those beneath or close to the nominal track of the DET 1D RNP1 SID) are likely to be directly overflown more often by aircraft at altitudes between 4,000ft and 7,000ft though other locations are likely to be directly overflown less often by aircraft at these altitudes.
- No other environmental impacts in respect of CO₂ emissions, Local Air Quality, tranquillity, visual intrusion or biodiversity are anticipated.

42. In line with the Air Navigation Guidance 2014, the CAA has considered the potential for 'respite' options¹⁰. The CAA is satisfied that respite options were

¹⁰Respite is planned and predictable alleviation from aircraft noise. One example of respite is having SIDs taking different routes to the same UK exit point which are used at different times. Respite can be designed into

not considered in this case because the proposal only seeks to replicate existing procedures to improve the accuracy with which they are flown in order to further minimise the numbers of people affected by noise.

43. It should be noted that dispersion (the opposite of concentration) is not a form of respite. Dispersion stems naturally from conventional navigational methods whilst concentration is the consequence of more accurate navigational technology. For the reasons set out in this decision, the CAA acknowledges the anticipated environmental impact of the proposed change and has taken this into account when weighing the factors that the CAA is required to consider when making its decision whether to agree to the change proposed.
44. A public consultation was conducted and the CAA recognises that there will be a reduction in the number of residents directly overflowed when these RNP1 procedures are fully implemented, than is currently the case with the conventional SIDs. However, it also recognises that a smaller number of residents will be directly overflowed more often than is currently the case with the conventional SIDs, even though the volume of traffic is not planned to change. As far as London Stansted Airport is concerned the introduction of these new SIDs will meet their stated objective to minimise the overall numbers of people that are overflowed.

Conclusions in respect of aircraft operators and owners

45. The CAA is required to satisfy the requirements of operators and owners of all classes of aircraft.¹¹
46. The procedures are in the interests of all aircraft operators that are suitably equipped to fly them as systemisation benefits result from less controller interactions and more expeditious routing. There is no anticipated detriment to those aircraft operators who are not equipped to fly these procedures as the existing conventional procedures will remain in place.

airspace structures more easily once aircraft tracks are predictably concentrated on to safely separated routings, enabling the use of them to be alternated or varied. There is currently no agreed minimum distance between routes such that alternating their use would result in acceptable respite. It is noted that one of the long term benefits of PBN technology is that greater aircraft track keeping accuracy may enable multiple routes to be designed and implemented in the future if it was Government policy to implement multiple routes.

¹¹Transport Act 2000, Section 70(2)(b).

Conclusions in respect of the interests of any other person

47. The CAA considers the words “any person (other than an operator or owner of an aircraft)” to include airport operators, air navigation service providers, members of the public on the ground, owners of cargo being transported by air, and anyone else potentially affected by an airspace change proposal.
48. There is a clear positive benefit to Stansted Airport who seek to improve an ongoing good relationship with its local consultative committee and members of the general public though taking steps to reduce the impact of noise wherever possible.
49. For the Air Navigation Service Provider (ANSP) a benefit accrues because the improved navigation performance of departing aircraft results in less controller interaction and improved controller capacity.
50. The CAA is required to take account of the interests of any person (other than an owner or operator of an aircraft) in relation to the use of any particular airspace or the use of airspace generally. The CAA examined a number of anticipated impacts, some of which attracted feedback during the consultation process outlined above.

Integrated operation of ATS

51. The CAA is required to facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces of the Crown and other air traffic services.¹²

Interests of national security

52. The CAA is required to take into account the impact any airspace change may have upon matters of national security.¹³ There are no impacts for national security.

¹²Transport Act 2000, Section 70(2)(e).

¹³ Transport Act 2000, Section 70(2)(f).

International obligations

53. The CAA is required to take into account any international obligations entered into by the UK and notified by the Secretary of State.¹⁴ The UK's international obligations that relate to the introduction of RNP1 or performance-based navigation are set out in Annex D. With regard to replication procedures, all foreign operators will be able to fly the new procedures providing the crews and aircraft are certified and approved to fly RNP1 procedures in accordance with their own States' national regulations.

¹⁴ Transport Act 2000, Section 70(2)(g).

Chapter 3

CAA's Regulatory Decision

54. We have decided to approve the introduction of the CLN 1E and DET 1D RNP1 SIDs because their introduction, when fully utilised, should achieve the stated London Stansted Airport aim of implementing RNP1 technology and minimising the numbers of people directly overflowed.
55. In making this decision, the CAA is required to take account of any guidance on environmental objectives given by the Secretary of State. In this regard, the CAA acknowledges that if the RNP1 SIDs are fully utilised, a large number of people will be directly overflowed less often once these procedures are introduced, than is currently the case with the published conventional SIDs, but also that a smaller number of people will be directly overflowed more often. Overall, it is our view that this proposal meets the terms of the Government's guidance to the CAA in respect of our environmental duty and in particular the altitude based priorities with respect to the noise impact. The introduction of these procedures will improve navigation accuracy, increase resilience and reduce reliance on ground-based infrastructure in accordance with FAS and international obligations. Combined, these elements may also allow more aircraft to use a given volume of airspace in a given time period making the most efficient use of Stansted assigned airspace, commensurate with the CAA's Future Airspace Strategy and efficient use of airspace.
56. Improved navigational accuracy and a reduced number of controller interactions will, we anticipate, ensure the expeditious flow of air traffic.
57. The introduction of the RNP1 procedures will satisfy the requirements of applicable equipped operators and owners of all classes of aircraft, as all those aircraft suitably equipped will be able to use the procedures and for those who are not suitably equipped, the conventional SIDs will remain in place.
58. We have made this decision having fully assessed the operational need and objectives, analysed the environmental impacts if the change was implemented

and assessed the consultation process, the responses received and the London Stansted Airport comment on those responses. The decision is made with the conditions specified below at Annex A.

59. The PIR will commence 12 months or more after the date of implementation. Please see Annex A for details of some of the PIR requirements.

Civil Aviation Authority

3 May 2017

Annex A

PIR Requirements

The following is a non-exhaustive list of PIR requirements to be met by the sponsor in the timescales specified (unless otherwise agreed with the CAA):

1. Make available to CAA, Safety and Airspace Regulation Group, Airspace Regulation, track diagrams that enable a comparison between pre-implementation and post-implementation traffic patterns for aircraft up to 7,000ft. The diagrams should portray both traffic dispersion and extent of any concentration (i.e. a density plot of traffic). Data to be available by Post Implementation Report (PIR) commencement date, planned for 18th January 2018.
2. Make available to CAA, Safety and Airspace Regulation Group, Airspace Regulation figures for usage of both RNP1 SIDs, and comparison to the usage of the remaining conventional SIDs. Data to be available by Post Implementation Report (PIR) commencement date, planned for 18th January 2018.

Annex B

The CAA's role in airspace change decisions, the legal framework, the policy background and relevant UK international obligations

1. The Secretary of State has given the CAA functions that relate to the structure and design of airspace in the Air Navigation Directions dated 2001 (amended in 2004).¹⁵ In particular these Directions require the CAA to develop and enforce a policy for the sustainable use of UK airspace. By virtue of this function the CAA has developed its Future Airspace Strategy (known as FAS)¹⁶ which is an initiative started by the CAA to create a joined-up UK airspace and air traffic management (ATM) modernisation programme across the many different stakeholder groups involved. The goal of FAS is to modernise the UK airspace and ATM infrastructure through significant technological improvements by 2030, to make a more efficient use of airspace (thereby providing airspace capacity benefits), as well as secure environmental (noise and emissions) and safety benefits.
2. One means by which the CAA delivers the aims of FAS is via its statutory air navigation function to consider proposals from air navigation service providers and/or airports to change the structure of UK airspace (including the published instrument flight procedures) published in the UK's Aeronautical Information Publication (AIP).
3. By Section 70 of the Transport Act 2000 (the Transport Act), the CAA is under a general duty in relation to air navigation to exercise its functions so as to maintain a high standard of safety in the provision of air traffic services. That duty is to have priority over the CAA's other duties in this area of work.

¹⁵ The Civil Aviation Authority (Air Navigation) Directions 2001 (incorporating Variation Direction 2004).

¹⁶ <http://www.caa.co.uk/Commercial-Industry/Airspace/Future-airspace-strategy/Future-airspace-strategy>.

4. Noting that priority, the CAA's duties in relation to air navigation is to exercise its functions in the manner it thinks best so that:
 - It secures the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic.
 - It satisfies the requirements of operators and owners of all classes of aircraft.
 - It takes account of the interests of any person (other than an operator or owner) in relation to the use of any particular airspace or airspace generally.
 - It takes account of any guidance on environmental objectives given to the CAA by the Secretary of State.
 - It facilitates the integrated operation of air traffic services provided by or on behalf of the armed forces and other air traffic services.
 - It takes account of the interests of national security.
 - It takes account of any international obligations of the UK notified to the CAA by the Secretary of State.
5. Where there is a conflict of these material considerations (other than safety, which must always take priority), the CAA must apply them as it thinks reasonable having regard to them as a whole.
6. The CAA must exercise its functions in this area so as to impose on providers of air traffic services the minimum restrictions consistent with the exercise of those functions.
7. The CAA will approve an airspace change proposal that best satisfies all of the material considerations (where safety is not in issue), or all the material considerations that are engaged. Where a change would satisfy some of the material considerations, but would be contrary to the fulfilment of others, then there is a conflict within the meaning of Section 70 of the Transport Act. In reaching a decision in such circumstances, the CAA will apply its expertise to all the relevant information before it and use its judgement to strike a fair balance between the material considerations.

8. In striking that balance the CAA relies on the wording of Section 70 which indicates the relative importance of any given factor.
9. In the instance of conflict, the CAA will usually offer suggestions to the sponsor of a proposal as to how the conflict might be mitigated or resolved, including encouraging the sponsor to engage with affected stakeholders in determining how the desired outcome might be achieved.
10. The CAA considers the most efficient use of airspace to be that use of airspace that secures the greatest number of movements of aircraft through a specific volume of airspace over a period of time so that the best use is made of the limited resource of UK airspace. It is therefore concerned with the operation of the airspace system as a whole.
11. The CAA considers the expeditious flow of air traffic to involve each aircraft taking the shortest amount of time for its flight. It is concerned with individual flights.
12. The CAA considers the words “any person (other than an operator or owner of an aircraft)” to include airport operators, air navigation service providers, members of the public on the ground, owners of cargo being transported by air, and anyone else potentially affected by an airspace proposal.
13. The Secretary of State has given the CAA specific guidance on environmental objectives within the meaning of Section 70 of the Transport Act.¹⁷
14. The 2014 Guidance includes the following:
 1. *The CAA's primary objective is to develop a “safe, efficient airspace that has the capacity to meet reasonable demand, balances the needs of all users and mitigates the impact of aviation on the environment”.*
 2. *In December 2012, the industry-led FAS Industry Implementation Group launched its plan for delivering Phase 1 of the FAS up to c2025. A considerable component of the plan is the need to redesign UK's terminal airspace to make it more efficient by using new procedures such as*

¹⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/269527/air-navigation-guidance.pdf.

Performance-Based Navigation (PBN)¹⁸ and better queue management techniques.

15. The 2014 Guidance states the need to balance environmental factors against other factors:

3. The purpose of the Guidance is to provide the CAA and the aviation community with additional clarity on the Government's environmental objectives relating to air navigation in the UK. However, when considering airspace changes, there may be other legitimate operational objectives, such as the overriding need to maintain an acceptable level of air safety, the desire for sustainable development, or to enhance the overall efficiency of the UK airspace network, which need to be considered alongside these environmental objectives. We look to the CAA to determine the most appropriate balance between these competing characteristics.

16. The need to strike a balance specifically in relation to noise is stated as follows:

4. The Government has made it clear therefore that it wants to strike a fair balance between the negative impacts of noise and the economic benefits derived from the aviation industry.

17. The 2014 Guidance also states the Government's overall policy to limit the number of people significantly affected by aircraft noise.

18. The 2014 Guidance states that the CAA should keep in mind the following altitude-based priorities:

- In the airspace from the ground to 4000ft AMSL the Government's environmental priority is to minimise the noise impact of aircraft and the number of people on the ground significantly affected by it;
- where options for route design below 4000ft AMSL are similar in terms of impact on densely populated areas the value of maintaining legacy arrangements should be taken into consideration;
- in the airspace from 4000ft AMSL to 7000ft AMSL, the focus should continue to be minimising the impact of aviation noise on densely

¹⁸ Of which RNAV-1 is a type.

populated areas, but the CAA may also balance this requirement by taking into account the need for an efficient and expeditious flow of traffic that minimises emissions;

- in the airspace above 7000ft AMSL, the CAA should promote the most efficient use of airspace with a view to minimising aircraft emissions and mitigating the impact of noise is no longer a priority;
- where practicable, and without a significant detrimental impact on efficient aircraft operations or noise impact on populated areas, airspace routes below 7000ft AMSL should, where possible, be avoided over Areas of Outstanding Natural Beauty and National Parks as per Chapter 8.1 of the 2014 Guidance; and
- all changes below 7000ft AMSL should take into account local circumstances in the development of airspace structures:

5. The concept of altitude-based priorities reflects the Government's desire that only significant environmental impacts should be taken into account when considering the overall environmental impact of airspace changes. Any environmental impacts that are not priorities based on the above altitude-based criteria do not need to be assessed since the assumption is that they would not be significant.

19. Subject to Section 70 of the Transport Act, the CAA is directed by the Secretary of State to perform its air navigation functions in the manner that it thinks best calculated to take into account the following:

- The Secretary of State's guidance on the Government's policies on sustainable development and on reducing, controlling and mitigating the impacts of civil aviation on the environment and the planning policy guidance it has given to local planning authorities.
- The need to reduce, control and mitigate as far as possible the environmental impacts of civil aircraft operations, and in particular the annoyance and disturbance caused to the general public arising from aircraft noise and vibration, and emissions from aircraft engines.
- At the local, national and international levels, the need for environmental impacts to be considered from the earliest possible

stages of planning and designing, and revising, airspace procedures and arrangements.

20. The CAA is also specifically directed, where changes are proposed to the design or the provision of airspace arrangements, or to the use made of them, to:

- Where the changes might have a significantly detrimental effect on the environment, advise the Secretary of State of the likely impact and of plans to keep it to a minimum.
- Where such changes might have a significant effect on the level or distribution of noise and emissions in the vicinity of an airport, ensure that the manager of the airport, users of it, any local authority and any organisation representing the interests of person in the locality have been consulted.
- Where such changes might have a significant effect on the level or distribution of noise and emissions under the arrival tracks and departure routes followed by aircraft using an airport but not in its immediate vicinity, or under a holding area set aside for aircraft waiting to land at an airport, ensure the manager of the airport and each local authority in the areas likely to be significantly affected by the changes have been consulted.

21. Further, the CAA is specifically directed where such changes might have one or more of these effects the CAA shall refrain from promulgating a change without first securing the approval of the Secretary of State. The Secretary of State has given no further direction nor guidance on the interpretation of these directions. Therefore the CAA proceeds on the basis that (a) the overall exposure to noise must increase to a level that exceeds 57dB LA_{eq}16 hour as a result of the changes proposed; and (b) the increase in the level of exposure to noise must in itself exceed 3dB. The 57dB figure is drawn from the Government's own Aviation Policy Framework¹⁹ (paragraphs 3.12 to 3.19 of the APF), in which it is stated that the Secretary of State would continue to treat the 57dB LA_{eq}

¹⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf.

16 hour contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance. The 3dB figure is one that has been used in the Government's APF in relation noise policy (i.e. as a trigger for acoustic insulation).

22. Any airspace change that a sponsor asks the CAA to approve follows a seven stage process known as the CAA's airspace change process.²⁰ A summary of that process is available on the CAA's website²¹ and is also shown here.

The seven-stage process of an airspace change

Stage 1 – framework briefing

We meet with the organisation that is considering proposing an airspace change to discuss their plans, the operational, environmental and consultation requirements for proposing a change and set out the how the CAA process will run.

Stage 2 – proposal development

The organisation that is considering proposing the airspace change begins to develop design options and researches who needs to be consulted. They will also conduct an initial environmental assessment of the proposals which will need to be more detailed if, and by the time, the organisation proceeds with its proposal and prepares for consultation. It is recommended that the organisation invites a cross-section of parties who may be affected by the change to form a Focus Group to help with the development of the design options.

Stage 3 – preparing for consultation

The organisation that is considering proposing the airspace change decides on the most appropriate consultation method needed to reach all consultees. This could include a written consultation, questionnaires or surveys, using representative groups and open/public meetings. We will provide advice to the organisation on the scope and conduct of the consultation but it remains their responsibility to ensure that the appropriate level of consultation is undertaken. Consultations should normally last for at least 12 weeks with consideration given to longer timescales

²⁰ Published in CAP 724 <https://www.caa.co.uk/CAP724> and CAP 725

<https://www.caa.co.uk/CAP725>

²¹ <http://www.caa.co.uk/Commercial-industry/Airspace/Airspace-change/Airspace-Change/>.

where feasible and sensible. Consultation documents should be clear about the objectives of the proposal, what is being proposed, how the change would affect various stakeholders, the expected advantages and disadvantages of the proposals to all stakeholders, the consultation process and the scope to influence. If a single design option is being consulted upon, the document should state what other options were considered and why these were discarded.

Stage 4 – consultation and formal proposal submission

When the consultation is launched the organisation that is considering proposing the airspace change should make every effort to bring it to the attention of all interested parties. The organisation must ensure that accurate and complete records of all responses are kept. Following the consultation, the organisation collates and analyses all responses to identify the key issues and themes. There may be airspace design modifications in light of the consultation responses which results in the need for further consultation. The organisation is required to publish feedback to consultees. If the organisation decides it will submit a formal airspace change proposal to us to then its feedback document must include information on how the final decision on the option selected was reached. In addition to publishing the feedback report the organisation sends all the consultation responses to the CAA within its formal proposal submission.

Stage 5 – our decision

We undertake a detailed assessment of the proposal and may ask for clarification or supplementary information from the organisation requesting the change. Our assessment covers:

1. the operational need for, objectives and feasibility of the changes proposed;
2. our analysis of the anticipated environmental benefits and impacts if the change were made; and
3. an assessment of the consultation carried out by the organisation proposing the change and of the responses received to that consultation.

Our conclusions in these three areas inform our decision whether to approve or reject the proposal. When making our decision the law requires us to give priority to safety but then to balance the need for the most efficient use of airspace with the

needs of operators of aircraft and the environmental effect of aviation (including noise and CO₂ emissions). The means by which we assess and balance the environmental impact within our decision making process is set out in government policy which we implement. We normally aim to make our decision within 16 weeks of having all the information we need.

Stage 6 – implementation

If a change is approved then changes to airspace procedures and structures are timed to start on internationally specified dates which occur every 28 days on so called AIRAC-dates.²² This ensures that the aviation community, as a whole, is aware of the changes and can prepare. In addition, the organisation that proposed the change should publicise the airspace change to members of the local community and other stakeholder groups who were consulted earlier in the process.

Stage 7 – operational review

Around 12 months after a change is implemented we will start a review of the change to assess whether the anticipated impacts and benefits, set out in the original airspace change proposal and decision, have been delivered and if not to ascertain why and to determine the most appropriate course of action. Once complete we will publish the review on our website.

²² An internationally agreed system for the regulated co-ordination of aeronautical information updates and publication that occurs every 28-days on specified dates which apply globally.

Annex C

UK's International Obligations relating to Performance-Based Navigation

1. In 2010, the International Civil Aviation Organisation (ICAO) Assembly agreed Resolution A37-11 on PBN Global Goals. The Assembly Resolution requires States to complete a PBN implementation plan to achieve:
 - the implementation of RNAV-1 and RNP operations (where required) for en-route and terminal areas according to established timelines and intermediate milestones; and
 - the implementation of approach procedures with vertical guidance for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016.
2. The Assembly Resolution is not a mandate and the UK has agreed with the ICAO that whilst making every effort to meet the 2016 date, the implementation of approach procedures at all instrument runway ends may take longer.
3. The European Commission Implementing Regulation (EU) No 716/2014 on the Establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan sets out six air traffic management functionalities to be deployed in pursuance of the Single European Air Traffic Management Research programme. In the UK, the RNP 1 PBN specification is mandated for terminal airspace and the RNP APCH PBN specification for approaches at Heathrow, Gatwick, Stansted and Manchester Airports from 1 January 2024. This implementation must be co-ordinated and synchronised to ensure that the international performance objectives are met.
4. The European Commission, through the European Aviation Safety Agency (EASA), is also proposing PBN-related legislation for much earlier implementation. EASA Notice of Proposed Amendment 2015-01 (consulted on from January to February 2015) proposes implementation of PBN across the European Air Traffic Management Network with application in terminal airspace and en-route airspace from December 2018 and in approach operations by

January 2024. The specification of PBN to be applied is RNP 1 in terminal airspace and Advanced RNP in the en-route. Any application is conditional on there being a performance objective. The instrument approach requirement is effectively a mandate for implementing the RNP APCH on all Instrument Flight Rules (IFR) runways. Publication of the Opinion from EASA is anticipated by early 2016.

5. In order to encourage PBN equipage and use, the CAA published Aeronautical Information Circular (AIC) Y092/2014 in December 2014 requiring mandatory equipage to an RNAV-1 PBN specification by November 2017 for all aircraft operating in to and out of the five major London airports plus Southend, Farnborough and Biggin Hill.
6. In summary, the UK is under an obligation to ICAO, the European Commission and EASA to transition to PBN-based procedures in all flight phases. Whilst the European mandate is some years away, RNAV-1 is seen as a transitory step to achieve this objective.

Annex D

Glossary

CAA	Civil Aviation Authority
CLN 1E	Clacton 1 Echo – Clacton Trial Departure SID
DET 1D	Detling 1 Delta – Detling Trial Departure SID
PBN	Performance Based Navigation
RNP1	Required Navigational Performance of 1nm
SID	Standard Instrument Departure