

Directorate of Airspace Policy

**Consultation on the Policy to Introduce a Harmonised Transition
Altitude of 18 000 ft in the London and Scottish Flight Information
Regions**

Aviation Stakeholder Consultation



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Purpose of the Consultation

1. This consultation relates to the policy to harmonise the Transition Altitude (TA) both inside and outside controlled airspace (CAS) in the London and Scottish Flight Information Regions (FIRs) at 18 000 ft¹. It also introduces the development of altimeter setting procedures for a TA of 18 000 ft and the review of altimeter setting regions to support the change. Consultees are invited to comment on the policy and contribute to the ongoing work on altimeter setting procedures and altimeter setting regions. A Glossary of Terms and a List of Definitions are at Appendices 1 and 2 respectively.

Harmonised TA of 18 000 ft

Objectives

2. The primary objectives of a harmonised TA of 18 000 ft are to enhance safety, both inside and outside controlled airspace through standardisation and simplification of airspace and altimeter setting procedures and to provide the foundation for future environmental and economic benefits. These future benefits will be realised through improvements to the vertical profiles of aircraft arrivals and departures in the London and Scottish FIRs. Such proposals for future developments will be addressed through separate Airspace Change Proposals.

3. The proposal also serves as a platform for future airspace and operating concepts through programmes such as Single European Sky (SES), SES Air Traffic Management Research (SESAR), Future Airspace Strategy (FAS), UK/Ireland Functional Airspace Block (FAB), the London Airspace Management Programme (LAMP) and the Northern Terminal Control Area (NTCA) Development Plan.

Background

4. It is recognised throughout Europe that the harmonisation of the TA and associated procedures brings safety benefit through simplification of airspace and procedures. This is in line with International Civil Aviation Organisation (ICAO) direction, advocating the implementation of a common TA for each ICAO Region. As early as 2004, the European Action Plan for Level Busts issued a recommendation to consider establishment of a common European TA in order to minimise the possibilities of level busts/altitude deviations in Europe. Harmonisation of the TA is a SES and SESAR objective and the European Commission is in the process of developing an Implementing Rule (IR) that will require a higher TA than currently exists in the UK FIRs. Harmonisation of the TA at 18 000 ft is a UK FAS Policy enabler and a common objective for the UK/Ireland FAB.

5. Although implementation of the proposal is planned to coincide with the aspirations of the Irish Aviation Authority (IAA) under the auspices of the UK/Ireland FAB, the IAA will follow their own processes to identify the implications for its airspace and airspace users. The EUROCONTROL Harmonised European Transition Altitude (HETA) Task Force has adopted much of the UK/Ireland FAB TA output in order to help define the SES II deliverable for a high TA. Nevertheless, the UK/Ireland FAB is committed to implement a common 18 000 ft TA by the declared target date and will ensure that appropriate interface procedures are in place with neighbouring States regardless of whether they change at the same time or not.

¹ Some possible exceptions, such as in Delegated Air Traffic Service Airspace where services are provided by another state.

6. Subject to satisfactory aviation stakeholder consultation and all requisite safety assessments, the UK/Ireland FAB are planning to make the change during Winter 2013/2014. The target date will be confirmed subsequent to this consultation.

Governance

7. The CAA has the lead for the development of policy on implementation of a common TA of 18 000 ft in the UK and has established a joint TA Project Team (TAPT)² to undertake the policy development of the change in the London and Scottish FIRs. The TAPT reports directly to a joint TA Steering Group (TASG)³.

8. The UK/Ireland FAB has established a joint UK/Ireland FAB TA Oversight Group (FABTAOG) which reports, via the CAA Communication, Navigation & Surveillance (CNS)/ATM Steering Group and the IAA Aeronautical Services Department, to the FAB Supervisory Committee. The TASG provides input into the FABTAOG⁴.

9. International development is being conducted through EUROCONTROL organisations including the HETA Task Force and Network Ops, engagement with adjacent FABs, and through bi-lateral agreements.

Consultation

Conduct of the Consultation

10. The primary purpose of this consultation is to allow stakeholders to consider the proposal and provide feedback. This consultation is being carried out in accordance with guidance provided in HM Government's Code of Practice on Consultation (see <http://webarchive.nationalarchives.gov.uk/http://www.berr.gov.uk/files/file47158.pdf> or abridged version at Appendix 3). This requires the CAA to demonstrate that the best balance possible has been achieved between conflicting demands and objectives and that as a consequence of a change in policy benefits will accrue. The responses provided to this consultation will help to provide a better understanding of the likely impact of the proposed changes.

Consultation Period

11. The period of consultation commences on **31 January 2012** and is due to close on **1 May 2012** which is 13 weeks to include the Easter holiday period.

12. Respondents are requested to use the Consultation Response Form at Appendix 4 to indicate whether they object or not to the proposal and comment accordingly. Respondents may provide comment in their own formats. In the event that a respondent objects to the proposal, it is requested that the supporting evidence is included.

13. Comments on the proposal to introduce a Harmonised TA of 18 000 ft in the London and Scottish FIRs should be sent to the Focal Point named below. Where possible an early response would be appreciated so that any issues arising may be addressed as soon as possible.

14. This consultation will be primarily managed by email as the preferred medium; however, postal responses will be accorded identical status and processed in the same way. Consultees

² Including representation from CAA, MOD and NATS.

³ Including representation from CAA, MOD and NATS.

⁴ Including representation from CAA, MOD and NATS.

that require a hard copy of the consultation document should make their request to the Focal Point for the Consultation.

Considerations for Consultation Response

15. Before responding to this consultation consultees may wish to consider the following generic questions.

- a. Do you fly within or outside CAS in the London and/or Scottish FIRs?
- b. If yes, how will the introduction of a harmonised TA of 18 000 ft affect your operation?
- c. Do you provide an Air Traffic Service (ATS) within the London or Scottish FIRs?
- d. If yes, how will the introduction of a harmonised TA of 18 000 ft affect your operation?
- e. Can you indicate what costs you or your organisation might anticipate through making the required implementation changes?
- f. Are there any unforeseen consequences of the proposed changes which you feel the CAA should be made aware?

Conclusion of the Consultation Period

16. On conclusion of the consultation, responses to the consultation will be collated and analysed. A Feedback Report summarising the responses will be placed on the CAA website following the closure of the consultation – stakeholders listed at Annex A to the covering DAP Consultative Letter will be notified of publication. At the stage where it is considered that the issues raised during the consultation have been accommodated, as far as possible, the proposal will undergo Regulatory Impact Assessment (RIA)⁵. The results of this will be published in due course.

Focal Point

17. Comments or any queries you may have on the proposal to introduce a Harmonised TA of 18 000 ft in the London and Scottish FIRs should be directed to the Focal Point:

Dean Miller
Controlled Airspace Section
Directorate of Airspace Policy
K6
CAA House
45-59 Kingsway
London
WC2B 6TE

Tel: 020 7453 6554
FAX: 020 7453 6565
Email: dean.miller@caa.co.uk

⁵ RIA undertaken by Director of Airspace Policy.

Confidentiality Statement

18. All responses will be available under the Freedom of Information (FOI) Act 2000. If consultees request a response to be kept confidential this will only be possible if it is consistent with the CAA's obligations under the FOI Act and the Data Protection Act.

CAA Oversight

19. The CAA maintains oversight of the conduct of the consultation in accordance with Government's Guidance on Consultation at:

<http://webarchive.nationalarchives.gov.uk/http://www.berr.gov.uk/files/file47158.pdf> or abridged version at Appendix 3.

Any complaints regarding the consultation process should be referred to:

Hd of Airspace Policy, Coordination & Consultation
Directorate of Airspace Policy
CAA House
45 - 59 Kingsway
London WC2B 6TE

Tel: 020 7453 6520

FAX: 020 7453 6565

e-mail: businessmanagement@caa.co.uk

Proposal

Current Situation

20. The TA at most major airports in the UK is 6 000 ft amsl and in the Manchester Terminal Manoeuvring Area (TMA) area it is 5 000ft amsl. At most minor aerodromes and for most uncontrolled airspace the TA is 3 000 ft amsl. In Ireland the TA for major airports is 5 000 ft. The current situation is therefore confusing and has the potential to result in altimeter setting errors in terms of when the Standard Altimeter Setting (SAS) should be applied and by requiring a calculation for many aircrews to determine their vertical position in relation to CAS with a base defined as a FL when flying with a QNH set. For those aircraft that climb quickly the problem is exacerbated by creating a high workload for a relatively low TA and has the potential for continuing safety implications if not resolved.

Options

Option 1: Do Nothing

21. To do nothing will not address the current situation as described in para 20 and would be contrary to the primary objectives of enhancing safety, both inside and outside CAS through standardisation of airspace and altimeter setting procedures. Additionally, the 'Do Nothing' option will not provide the foundation for the required future environmental and economic benefits to be gained from improvements to aircraft vertical profiles. Raising of the UK TA is considered as a platform for future new airspace and operating concepts through programmes such as SESAR, FAS, LAMP and NTCA. If no action is taken to adapt the airspace arrangements, the opportunity to facilitate future safety, environmental and ATM capacity benefits potentially available through a common, higher, TA will be lost. Furthermore, harmonisation within the UK/Irish FAB is in line with the objectives of SES; the diversity of TAs across Europe being viewed as operationally inefficient.

It would therefore be inappropriate for the UK not to comply with the objective of harmonisation of TA in the London and Scottish FIRs.

Option 2: Raise TA to 18 000 ft

22. The raising of the UK TA is a fundamental change to aviation and the implications are widespread across the industry, affecting commercial and military operations, recreational flying and other airspace activities. It also impacts ATS provision, both inside and outside CAS, and in regard to FAB and bilateral cross-border interfaces with adjacent Air Navigation Service Providers (ANSPs).

23. Whilst the proposed change is technical in its application the impact is fundamental to the way UK aviation progresses in the developments of new systems, operating techniques and procedures, in particular when combined with challenges to deliver economic and environmental improvements. Core safety principles have to be maintained and enhanced entailing the design of new operating concepts for both users and providers within the ATM system. The change to a TA of 18 000 ft is seen as a key enabler in this process.

24. In determining the altitude for a higher TA, 10 000 ft, 14 000 ft and 18 000 ft were considered; a summary of the cases for and against each of these levels is at Appendix 5. It was concluded that 18 000 ft provided the most suitable solution for a harmonised TA in the London and Scottish FIRs for the following reasons:

- a. It offers maximum flexibility within TMA airspace for future developments and procedures. A lower value would be a compromise and may need to be raised again in the future.
- b. It results in no loss of levels in TMA airspace with pressure variations and thus new procedures/techniques can be standardised producing a relatively stable environment.
- c. The loss of a useable level in En-route Area Control Centre (ACC) sectors is considered a manageable issue.
- d. There is no impact on holding procedures in normal operating situations – higher holding in En-route sectors would be at FLs.
- e. The altitude is high enough to standardise interfaces between ACC and TMA sectors.
- f. Harmonisation across European Civil Aviation Conference (ECAC) states is viable.
- g. Current discussions indicate that a harmonised TA of 18 000 ft is consistent with the overarching objectives of EU policy and regulations.

Not included in the Consultation

25. There is no intention to introduce any new CAS/segregated airspace or routes as a result of the proposal. Nor is it intended to change the flight paths, vertical profiles or concentration of aircraft. Thus, it is not expected that people would experience any difference in the over-flying air traffic and therefore consultation with specific environmental groups beyond the National Air Traffic Management Advisory Committee (NATMAC) membership has not been undertaken. For this reason analysis at this stage of noise impact, tranquillity, visual intrusion, and local air quality is deemed unnecessary.

26. This consultation is unrelated to the continued development of proposals to replace Class F airspace within the UK FIRs.

27. This consultation is not directly related to future activity regarding development of the IR for Standardised European Rules of the Air (SERA). SERA requires replacement of quadrantal cruising levels in the UK FIRs (Rules of the Air Rule 34) with ICAO semicircular cruising levels. The current target implementation date for SERA is December 2012; it will be necessary to identify the impacts of the resultant EU law upon the TA project and in concert with the SERA project team develop the domestic plan for the introduction of semicircular cruising levels below a new, higher TA.

Benefits of the Change

28. The establishment of a harmonised high TA is viewed as a key enabler for future changes such as improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) and further environmental, service and capacity benefits through more efficient airspace design. The difficulties encountered with the design of new arrival and departure procedures that climb or descend through the TA will be reduced with an 18 000ft TA. In particular, the benefits that are envisaged as a direct consequence of the change are as follows:

- a. A single policy applicable at all aerodromes and to airspace structures which will simplify airspace definition and standardise procedures.
- b. A reduced risk arising from the need for aircrews to only make smaller adjustments in altimeter settings, leading to more opportunities to detect incorrect settings rather than under the current infrequent and potentially large changes between different altitude settings (eg not uncommon to have 12-15 hPa changes).
- c. Rationalisation of Standard Operating Procedures (SOPs) related to altimeter setting procedures.
- d. Mitigation against vertical infringements by standardising procedures for traffic in Class G airspace below CAS where almost all bases will be defined as altitudes. Reduction in the requirement to re-calculate vertical position by aircrew to ensure both terrain clearance and CAS avoidance.
- e. Reduced complexity in ATS route definitions and subsequent flight planning issues where route bases are defined by FLs but with minimum cruising altitude restrictions.
- f. Aircrews would benefit by having the change from altitude to FL and *vice versa* at a higher level where there is a reduced flight deck workload compared with that at the current lower TA.
- g. A Harmonised TA of 18 000 ft supports capacity enhancing TMA procedures and a potential to improve airspace design and transitions between airspace.
- h. Potential improvement to the use of CDOs and CCOs could realise environmental benefits of less fuel burn, less CO₂ emissions, and less noise.
- i. Efficiency of aircraft operations in TMAs has the potential to increase through the availability of more levels (through the removal of the TA/Minimum Flight Level (MFL) interaction at lower levels of the TMA).
- j. ANSPs would accrue a more predictable and, in some cases, a simplified ATM operational environment.

- k. For most GA operations a significant reduction in complexity through the use of, on most occasions, only one pressure setting (QNH).
- l. Anticipated Europe-wide harmonisation to a common high TA which would amplify all of the above benefits.

Challenges

29. The following challenges to the Harmonised TA of 18 000 ft have been identified:
- a. It is anticipated that there would be increases in more general workload due to a greater requirement to pass QNH values.
 - b. More altimeter adjustments would give the potential for more mistakes to be made by aircrews in setting of the correct pressure, although the potential error value is lower.
 - c. Aircrews would be required to undertake new training and changes to SOPs in the short term.
 - d. There would be an initial resource and cost requirement for some ANSPs and other stakeholders to implement the harmonised TA, including the need for training, safety cases, and changes to systems, airspace design and publications.
 - e. The necessary system and documentation changes could introduce safety risks.
 - f. A loss of preferred cruising level for some airspace users; the proposal is to remove FL190 as a flight planned cruising level in all pressure situations.
 - g. The loss of FLs, on low pressure days, is moved out of the TMA environment to the En-Route environment in the vicinity of FL 190.
 - h. Appropriate interface agreements will need to be put in place with adjacent ANSPs in order to minimise any potential reduction in capacity.
 - i. Developing a system and processes which are sufficiently robust to deal with steep pressure gradients.
 - j. There may be capacity penalties within some controlled airspace sectors.
 - k. Implementation of a new semicircular altitude based cruising level system outside CAS will introduce transitional training issues.

Implementation & Delivery Plan

30. The target date for implementation of the Harmonised TA is Winter 2013/2014. Introduction of the changes to Rules of the Air and aeronautical publications and charts will follow the existing UK Regulatory Change Process.
31. The implementation date may be affected by the following:
- a. The need for any revision of the proposal identified by the consultation process and any further period of consultation required for such revisions.
 - b. The length of time taken by the CAA in reaching its regulatory decision.
-

- c. Operational constraints.

Safety Management

32. The adoption of a Harmonised TA of 18 000 ft will provide the benefits previously highlighted. However, the change will introduce short term risk. Mitigation can be achieved through publicity, aircrew and ATC briefing and training. Introduction of the new airspace arrangements and associated ATS procedures will be subject to the established safety management process.

Aeronautical Information Publications (AIPs) & Charting

33. It is proposed that introduction of the new arrangements will follow a minimum of a double Aeronautical Information Regulation & Control (AIRAC) period of notification for amendment of appropriate AIPs, will involve extensive publicity, both within the UK and internationally, and the publication in advance of the change of suitably revised publications including the topographic AERONAUTICAL CHART ICAO 1:500 000 chart series.

Costs

34. As a consequence of the change, there may be additional costs to ANSPs and other stakeholders through, for example, the requirement to modify existing equipment and systems, upgrade software and to train staff in order to continue to provide services to at least equal the current standard. Respondents are therefore requested to provide cost estimates of compliance with the proposed change.

Communication, Navigation & Surveillance (CNS)

35. It is considered there are no direct CNS implications associated with the change to a Harmonised TA of 18 000 ft; however, radar display systems would require modification.

Environment

36. There are unlikely to be changes to where aircraft physically fly as a result of the proposed change, ie, no change to routes, flight paths, vertical profiles or concentrations of aircraft. Flight patterns within CAS would be unchanged. For this reason, it is not expected that people living and working beneath and around the airspace would experience any difference in the over flying air traffic as a result of this change. The proposed TA Harmonisation will not change the current trajectories of flights using the airspace, nor have any anticipated impact upon flight patterns within uncontrolled airspace. Hence analyses of noise impact, CO₂ emissions, tranquillity, visual intrusion, and local air quality have not been undertaken.

Agreements

37. All appropriate operating agreements and arrangements between ANSPs, airspace users and other interested parties, including Letters of Agreements (LoAs) and Memoranda of Understanding (MoUs), will need to be reviewed prior to implementation of the Harmonised TA and possibly amended.

Post Implementation Review

38. A review of the effectiveness of the proposed arrangement will be carried out within 1 and 3 years following implementation.

Proposed Concept of Operations (CONOPS)

39. A CONOPS will describe the characteristics for the proposed harmonised TA of 18 000 ft in the London and Scottish FIRs. However, as the work on both altimeter setting procedures and ASR changes has yet to be fully completed, the CONOPS cannot be fully incorporated into this document at present. As already indicated, stakeholders will be requested to comment on the completed CONOPS in due course either as part of a possible additional consultation or within an Airspace Change Proposal. Stakeholder views on the CONOPS, along with comments received from this initial consultation, will be reflected in the final RIA.

CONOPS Aims

40. The aims of the CONOPS are as follows:

- a. Detail Rules and Requirements for a Harmonised TA of 18 000 ft in the London and Scottish FIRs.
- b. Define the Altimeter Setting Procedures to be employed both inside and outside CAS in the London and Scottish FIRs.
- c. Identify changes to the UK's Altimeter Setting Regions.

CONOPS Development

41. Outlined below are some initial considerations for the Harmonised 18 000 ft TA CONOPS. Stakeholders are also invited to contribute to the ongoing work by commenting on both the development of altimeter setting procedures and the review of altimeter setting areas.

42. **Assumptions.** In undertaking the initial scoping assessment of the change, a number of planning assumptions were adopted concerning the operational environment and the airspace structure that would be in place at the time of implementation – see Appendix 6. These assumptions have been adopted by the FABTAOG and will inform the CONOPS development process.

43. **The effect upon Airspace Structures.** In addition to the impact on airspace structures identified in Appendix 6, additional considerations of the change on airspace structures are as follows:

- a. **Airspace Classification.** There will be no changes to airspace classification as a direct result of the proposed change to airspace policy.
- b. **Controlled & Segregated Airspace.** No new controlled airspace will be created. Danger Areas would be reviewed by the MOD to ensure that the activity will be safely contained within it at a simple equivalent change of level.
- c. **Divisional Flight Level (DFL) 195.** Where Class G airspace abuts the DFL, aircraft could, as today, operate up to FL 195 either autonomously or under the control of an ATS Provider. It will remain the responsibility of operators in Class G airspace to ensure that they do not enter Class C airspace above FL195 without a clearance. When the area QNH is below 980 hPa the opportunity to use a Transition Layer will effectively be lost due to the 33 hPa difference between this and 1013.2hPa, which is approximately equivalent to 1 000 ft. At a local QNH of 964 hPa FL195 is coincident with 18 000 ft.

Active Temporary Restricted Areas (TRAs) with bases at the DFL would remain contiguous with underlying Class G airspace, thereby not creating a barrier to operations (aircrews being aware that the background airspace in the TRA is Class C).

The current calculation of Transition Level (TL) will remain extant, based on an Area QNH and ATS providers will need to be aware of the minimum useable FL. Inside CAS, FL190 will not be available for flight planning purposes or between sectors and across boundaries except on a tactical basis. FL200 may also, on occasion (typically less than 4% of the time), be unavailable with an 18 000 ft TA in extreme low pressure situations.

44. **Effect upon Airspace Users.** Procedures for when a pilot changes from Aerodrome to Area QNH on departure from an aerodrome and changes from Area to Aerodrome QNH/QFE on approach to an aerodrome are being reviewed. Within CAS ATS providers will be required to make changes to their procedures for operations:

- a. Near to aerodromes.
- b. En-route when cruising at altitudes.
- c. At the boundaries with adjacent FIRs.

Airspace users outside CAS will be required to adjust their practices to accommodate the revised TA where appropriate. However, this proposed change will simplify the overall airspace definition in order to make flights beneath complex areas of CAS easier, and will reduce the risk of confusion or infringement by standardising procedures.

45. **Effect upon MOD.** The MOD has been consulted and has no objections in principle to the raising of the TA to a harmonised level in the London and Scottish FIRs. The military is used to operating in other regions of the world with different TA values and the impact on its operations will be minimal.

46. **Buffer Zones/Transition Areas.** There are currently differing TA arrangements with the UK's various neighbouring States which operate adequately. Notwithstanding ongoing efforts by the EU, at present it can be assumed that, with the exception of Ireland, there would be different TA values at the boundaries with adjacent ANSPs. In the interim, where there is a difference, current agreed cross-border procedures would be reviewed and changes to the respective LoAs introduced. This could involve aircraft climbing to/descending from a FL to enter/exit UK airspace prior to handover. Buffer zones or transition areas may be required along the boundary between adjacent ANSPs where there is a difference between TAs.

47. **Delegated ATS Areas.** The applicable procedures for current areas in which the delegation of the responsibility for the provision of ATS occurs are being reviewed to reflect the requirement for change in TA.

48. **ATS Providers.** ATS Providers will be required to undertake appropriate system upgrades for the display of various pressure related information, such as Area QNHs and Aerodrome QNH/QFE taking regard of data display, data assurance, accuracy and source. ATS providers should anticipate more requests for QNH data from aircrew.

Altimeter Setting Regions

49. It is accepted that the map of the UK Altimeter Setting Regions (ASRs) is likely to change as a consequence of the change to the TA. Extensive work has already been undertaken by the TAPT and the UK Met Office to determine the issues associated with revising the ASRs. This work will continue during the initial consultation period to ensure that the eventual shape of the new

ASRs balances the needs of all airspace users to the greatest extent possible. Once complete, findings will be distributed to stakeholders for comment.

Altimeter Setting Procedures

50. Above the new TA, altimeter setting procedures will remain unchanged from present operations both inside and outside of CAS.

51. Other considerations for determining altimeter setting procedures are as follows:

- a. The system may utilise revised altimeter setting areas using forecast QNH data, with actual QNH data being used in the vicinity of certain aerodromes as appropriate. It is anticipated that the lowest forecast QNH value will continue to be utilised to provide the best margin for terrain clearance, in much the same manner as the present ASR procedures⁶. The areas would be managed on a one hour validity period applied throughout an area as with extant procedures.
- b. An altimeter setting area may contain different classification of airspace.
- c. While the surface pressure in the UK generally changes by only a few hPa a day the procedures would have to manage occasional low and high values with occasional steep pressure gradients.
- d. When aircrews are flying at an altitude determined by the semi-circular system they will need to obtain the appropriate area QNH prior to, or upon entry to an area to ensure separation.
- f. Aerodromes without TMAs would be designated as part of an applicable QNH area. When an ATS is being provided to aircraft using RT there will be an appropriate point at which to change to the aerodrome/runway QNH with associated R/T procedures. Non-radio procedures would apply as today.
- g. The altimeter setting for runway approaches would be the appropriate aerodrome/runway QNH.
- h. A review of QNH data assurance and accuracy of QNH forecasts across the airspace network environment would be conducted.
- i. Existing coordination procedures between ATS Providers for flights at or below the TA will require review.
- j. New cross-border TA arrangements would be incorporated into appropriate agreements with neighbour states. Cross-border procedures between adjacent ANSPs requiring access to the QNH data in an adjacent FIR would require review.
- k. Aircrew and ATS providers' responsibilities and access to QNH data would require review.
- l. The transmission of the QNH values to aircrews by methods other than RT is being investigated.

⁶ UK Civil AIP ENR 1.7.

Potential Implementation Options

Background

52. There are 20 ASRs in the UK. For the ASRs, the Met Office provides an hourly forecast of the lowest pressure in each region, these Regional Pressure Settings (RPSs) are disseminated to ATS providers. However, airspace within all Control Zones (CTRs), and within and below all Terminal Manoeuvring Areas (TMAs) and Control Areas (CTAs) except airways (or routes) in the Worthing, Cotswold, North Sea (HMRs), Strangford and Clacton Control Areas require the pilot to use an actual aerodrome QNH as the altimeter setting. Therefore Aberdeen, Belfast, Birmingham, Bristol, Cardiff, Daventry, Newcastle, Doncaster/Sheffield, East Midlands, Edinburgh, Leeds Bradford, Newcastle, Solent and Sumburgh CTAs and the London, Scottish and Manchester TMAs (containing a number of aerodromes) all utilise an aerodrome QNH as the altimeter setting when below the TA. Hence, in addition to the 20 ASRs there are an additional 18 regions where other altimeter setting procedures apply. The CTAs mainly operate using a single aerodrome QNH, (others like the Birmingham CTA contain a number of aerodromes).

53. The UK AIP notes that 'when flying in Airspace below TMAs and CTAs detailed above, pilots should use the QNH of an adjacent aerodrome when flying at or below the TA'. It may be assumed that for aerodromes located beneath such areas, the differences in the QNH values are insignificant. When flying beneath airways whose base levels are expressed as altitudes pilots are recommended to use the QNH of an adjacent aerodrome in order to avoid penetrating the base of CAS'. Outside CAS pilots may set any desired pressure setting; however those on an Advisory Route (ADR) should set the RPS. The latest and most appropriate lowest forecast RPS value should be used for checking terrain clearance.

54. Discussions in development workshops indicate that a value above 4 to 5 hPa is considered significant. The TAPT have been working with the Met Office to understand the pressure differences that occur within CTAs and TCAs that contain a number of aerodromes. Additionally the Met Office has provided a frequency analysis detailing the number of occasions when there are significant pressure differences within ASRs.

55. At a specific time, the pressure difference across the UK is largely a function of distance, therefore the larger the geographic area that is chosen as a pressure setting area then potentially the larger the pressure difference across the area maybe and the likelihood of a larger pressure difference with neighbouring regions. Smaller areas reduce the differences but increase the workload of ATS providers (presently with regard to R/T), since they will be required to provide the RPS setting every time an aircraft crosses into a new ASR and for aircrews who will need to be aware of the location of the boundaries of each the regions and that will be required to change altimeter setting when crossing each ASR below the TA.

56. Some generic implementation options have been identified below. It is anticipated that these could be used as a basis for development of future altimeter setting procedures. Stakeholders are invited to comment on these and asked to put forward further options for consideration.

Options

Option 1: Altimeter Setting Areas (ASAs)⁷ utilising forecast QNH

57. **Description.** The existing model of using forecast QNH within defined areas would be applied in both the London and Scottish FIRs (inside and outside CAS) up to the new TA of 18 000 ft. The current ASRs will be reviewed and modified to provide the most appropriate size and shape to meet today's aviation operational and airspace structure demands. Aircraft will be required to select the appropriate 'Regional QNH' for the area in which they are operating; aircrews receiving an ATS will be provided with this information. Aircraft would select Aerodrome QNH or Aerodrome/Runway QFE for departure and change to Regional QNH at an appropriate stage. Arrivals would select the appropriate Regional QNH beneath the TL and carry out approaches to the aerodrome on the Aerodrome QNH or Aerodrome/Runway QFE. Aircraft transiting through ASRs below the TA would need to change altimeter setting as they move between areas.

58. **Advantages.** Advantages of this option include:

- a. A development of the current model, which is well-proven and understood.
- b. Provides a consistent picture of pressure settings for all users inside or outside CAS.
- c. Updated regularly; forecasts issued in advance enabling planning.
- d. Provides appropriate terrain clearance information as the lowest QNH in each region is available every hour.

59. **Disadvantages.** Disadvantages of this option include:

- a. Every aircraft operating to or from an aerodrome would utilise the Aerodrome QNH, Regional QNH and then SAS. Thus, in some cases (eg Heathrow) this would entail an additional pressure setting requirement between aerodrome QNH and the SAS.
- b. Additional workload and potential safety issues on some occasions when considering the requirement for ATS providers to ensure the correct QNH is passed to aircrews.
- c. ATS system upgrades may be required to introduce a Regional QNH setting.

Option 2: ASAs utilising forecast QNH with a separate value derived for use inside CAS.

60. **Description.** As Option 1, the current ASRs would be remodelled. However, in order to minimise some of the disadvantages of Option 1, pressure setting values will be derived for use over larger areas and to be more closely aligned with certain CAS structures (CTA/Rs and TMAs).

61. **Advantage.** The advantage of this option is the potential to reduce some of the ATCO workload, particularly inside CAS, associated with Option 1.

62. **Disadvantages.** Disadvantages of this option include:

⁷ For the purpose of this document and to distinguish from current ASRs, an ASA is considered an airspace of defined dimensions below the 18 000 ft TA.

- a. The impact of Option 1, Disadvantage a, would be reduced; workload and consequent safety issues would not be eliminated. Option 1, Disadvantages b and c would remain.
- b. Potential confusion over the altimeter pressure setting required in order to avoid the base of the CAS structure.
- c. The risk of pressure variations greater than 4/5 hPa across an area increases as the size of the areas increase.

Option 3: ASAs utilising forecast QNH outside CAS. Within CAS structures an actual QNH from a nominated aerodrome would be used.

63. **Description.** Current ASRs would be remodelled outside CAS. Separate areas would be defined as required to encompass existing CAS structures (CTA/Rs and TMAs). Within these structures actual aerodrome QNHs would be used for aircraft arriving and departing from aerodromes within the structure. Transiting aircraft would use the nominated QNH, from the selected aerodrome within the CAS structure.

(Note – this option is based on the assumption that within TMAs and other CAS structures the pressure differences will be sufficiently small).

64. **Advantage.** Advantages of this option include:

- a. This is an extension of extant operations within the TMA environment.
- b. Inside CAS arriving and departing aircraft from the nominated aerodrome would utilise the aerodrome QNH and then the SAS without the need for an additional pressure setting; however those aircraft that are not operating to or from the nominated aerodrome will have to select the nominated aerodrome QNH on entering the CAS structure prior to landing or after take-off.
- c. Local transiting traffic under the control of an aerodrome within a CTA would be provided with a pressure setting verified by the ATS provider for the nominated aerodrome.

65. **Disadvantages.** Many of the disadvantages identified against previous options would remain.

Option 4: Use actual QNH values in the Scottish and London FIRs.

66. **Description.** Aircraft within CAS would be provided with an operating actual QNH. Outside CAS aircrews would use an actual QNH from a nominated aerodrome within 100 nm of its present location.

67. **Advantages.** The advantage of this option is that it is a relatively simple operational procedure.

68. **Disadvantages.** Disadvantages of this option include:

- a. Need to ensure that pilots and ATS providers are able to access latest pressure information for an aerodrome.
- b. The actual QNH pressure availability across UK is not extensive. At night there are large gaps in coverage especially in the SW of the British Isles, Wales and parts of Scotland. Also, there are few QNH reporting stations over the sea.

- c. Need to ensure that where there is a significant pressure gradient between adjacent aerodromes as well as rapid changes of pressure that the aircrews and ATS providers are kept aware.

Summary

69. Although aircraft performance has changed significantly during the last 40 years, TA arrangements have not. Harmonisation of the TA in the London and Scottish FIRs at 18 000 ft would redress this imbalance and subsequently enhance safety through standardisation and simplification of airspace and altimeter setting procedures. It will also support SERA, provide the foundation for future environmental and economic benefits and also serve as a platform for future airspace and operating concepts through programmes such as SES, SESAR, FAS, the UK/Ireland FAB, LAMP and the NTCA Development Plan.

70. A harmonised TA of 18 000 ft is consistent with the current overarching objectives of EU policy and regulations and is viable as a harmonised level across ECAC states. In addition it offers maximum flexibility within TMA airspace for future developments and procedures without impacting on holding procedures in normal operating situations. There would be no loss of levels in TMA airspace with pressure variations and thus new procedures/techniques could be standardised and the altitude is high enough to standardise interfaces between ACC and TMA sectors.

71. Stakeholders are invited to consider the merits of the proposal for a harmonised TA of 18 000 ft and provide comment. Views on the development of altimeter setting procedures and revised ASRs would also be welcome.

Appendices

1. Glossary of Terms.
2. Definitions.
3. HM Government's Code of Practice on Consultation – Abridged Version.
4. Consultation Response Form.
5. Summary assessment of 10 000 ft, 14 000 ft and 18 000 ft as options for a higher TA in the London and Scottish FIRs.
6. Planning Assumptions.

GLOSSARY OF TERMS

ACC	Area Control Centre
ADR	Advisory Route
AIRAC	Aeronautical Information Regulation & Control
AEA	Association of European Airlines
AIP	Aeronautical Information Publication
AIC	Aeronautical Information Circular
ANSP	Air Navigation Service Provider
ASR	Altimeter Setting Region
ATC	Air Traffic Control
ATS	Air Traffic Service
ATM	Air Traffic Management
ATSU	Air Traffic Service Unit
AWY	Airway
BOTA	Brest Operational Transition Area
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CAT	Commercial Air Transport
CCO	Continuous Climbout Operations
CDO	Continuous Descent Operations
CNS	Communication, Navigation & Surveillance
CONOPS	Concept of Operations
DFL	Divisional Flight Level
EU	European Union
ECAC	European Civil Aviation Conference
ENR	En-route
FAB	Functional Airspace Blocks
FABTAOG	FAB Transition Altitude Oversight Group
FAS	Future Airspace Strategy
FIR	Flight Information Region
FOI	Freedom of Information
HETA	Harmonised European Transition Altitude
HPD	High Performance Departures
GAT	General Air Traffic
IAA	Irish Aviation Authority
IAOPA	International Council of Aircraft Owner and Pilot Associations
ICAO	International Civil Aviation Organisation
IATA	International Air Transport Association
IFR	Instrument Flight Rules
IR	Implementing Rules
LAMP	London Airspace Management Programme
MFL	Minimum Flight Level
MOD	Ministry of Defence
NATMAC	National Air Traffic Management Advisory Committee
NOTA	Northern Operational Transition Area
NTCA	Northern Terminal Control Area
OAT	Operational Air Traffic
RIA	Regulatory Impact Assessment

RNAV	Area Navigation
RPS	Regional pressure Settings
SAS	Standard Altimeter Setting
SES	Single European Sky
SESAR	Single European Sky ATM Research
SERA	Standardised European Rules of the Air
SOP	Standard Operating Procedure
SOTA	Southern Operational Transition Area
TA	Transition Altitude
TAPT	Transition Altitude Project Team
TL	Transition Level
TMA	Terminal Manoeuvring Area
TRA	Temporary Restricted Area
VFR	Visual Flight Rules

DEFINITIONS

1. The following definitions are extracts drawn from the CAP 493 Manual of Air Traffic Services Part 1 Section 1 Chapter 6 Page 2 dated 17 November 2011.
 - a. Units of Pressure - Hectopascals are the notified units for the measurements of pressure for flying within UK airspace. Pilots are normally expected to carry out their own conversion from Hectopascals to inches of mercury if this is necessary and controllers will only provide pressure settings in inches of mercury when specifically requested by an individual aircraft.
 - b. Altitude - The vertical distance of a level, a point or object considered as a point, measured from mean sea level.
 - c. Transition Altitude - Transition altitude is the altitude at or below which the vertical position of an aircraft is normally controlled by reference to altitude.
 - d. Transition Level - Transition level is the lowest Flight Level available for use above the transition altitude.
 - e. Transition Layer - Transition layer is the airspace between the transition altitude and the transition level.
 - f. Determination of the Lowest Cruising Levels - Cruising levels on airways and ADRs are notified in the UK AIP. Due to variations of atmospheric pressure the lower Flight Levels will not always be available. The lowest cruising level available for assignment shall be determined at the Area Control Centre.
 - g. Regional Pressure Setting - The Regional Pressure Setting is a forecast of the lowest QNH value within an ASRs. The values which are made available hourly for the period H + 1 to H + 2, are given in whole Hectopascals. Air Traffic Service Units are to have available the Regional Pressure Setting for the ASR in which they are situated and appropriate adjacent regions. These values are to be passed to pilots when requested or at the discretion of the controller. However, a pressure setting shall not be volunteered if a controller is uncertain that it is appropriate to the flight. Airspace below TMAs and CTAs listed in the UK AIP at ENR 1-7-2 does not form part of the ASR Regional Pressure Setting system. Instead, the QNH of an adjacent aerodrome should be used for aircraft at or below the Transition Altitude.

HM GOVERNMENT'S CODE OF PRACTICE ON CONSULTATION – 7 CONSULTATION CRITERIA

The seven consultation criteria are:

1. **When to consult.** Formal consultation should take place at a stage when there is scope to influence the policy outcome.
2. **Duration of consultation exercises.** Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.
3. **Clarity of scope and impact.** Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.
4. **Accessibility of consultation exercises.** Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.
5. **The burden of consultation.** Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.
6. **Responsiveness of consultation exercises.** Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.
7. **Capacity to consult.** Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.

CONSULTATION RESPONSE FORM

INTRODUCTION OF A HARMONISED TRANSITION ALTITUDE OF 18 000 FT IN THE LONDON AND SCOTTISH FLIGHT INFORMATION REGIONS

Respondent Details	
Name	
Organisation Represented	
Contact Address	
Email	
Contact Telephone Number	
Date	
Do you fly within or outside CAS in the London and/or Scottish FIRs?	
If yes, how will the introduction of a harmonised TA of 18 000 ft affect your operation?	
Do you provide an ATS within the London or Scottish FIRs?	
If yes, how will the introduction of a harmonised TA of 18 000 ft affect your operation?	
Can you indicate what costs you or your organisation might anticipate through making the required implementation	

changes?	
Are there any unforeseen consequences of the proposed changes of which you feel the CAA should be made aware?	
Further Comments	

Respondents are requested to indicate whether they object or not to the proposal for a revised TA Inside and outside CAS at 18 000 ft and comment accordingly. Respondents may provide comment in their own formats. In the event that a respondent objects to the proposal, it is asked that the supporting evidence is included.

Respondents are also requested to express their views in respect to the options for a new regional QNH system.

Comments on the proposal to introduce a Harmonised TA of 18 000 ft in the London and Scottish FIRs should be sent to the DAP Focal Point:

Dean Miller
Controlled Airspace Section
Directorate of Airspace Policy
K6
CAA House
45-59 Kingway
London
WC2B 6TE

Tel: 020 7453 6554
FAX: 020 7453 6565
Email: dean.miller@caa.co.uk

To arrive no later than 1 May 2012

SUMMARY ASSESSMENT OF 10 000ft, 14 000 ft & 18 000 ft AS OPTIONS FOR A HIGHER TA IN THE LONDON & SCOTTISH FIRs⁸.

The case for and against a TA value of 10 000 ft

For:

- Less impact on ACC sectors

This will result in the majority of changes being restricted to TMA/Airfield Operations and of minimal impact to ACC sectors.

- Less of an issue at boundaries with adjacent ANSPs.

There are very few flights cruising at 10 000 ft and below and therefore the cross-border issues are less critical.

- Flight deck compatibility with current airline SOPs.

Some operators use 10 000 ft (FL100) as a 'Systems Check' point whilst others use it as the end of the sterile cockpit phase – procedures and checks are aimed at technical and environmental issues rather than operational. Since the TA differs so widely the issue of including the TA check at 10 000 ft is also not universally applied - airlines have varying opinions on this.

Against:

- Not significantly higher for High Performance Departures (HPD).

Current work on HPDs indicate that in order to utilise aircraft performance and the advantages for improved vertical separation from adjacent airfields that 10,000 ft is not significantly high enough to maximise the benefit of their introduction.

- Within Point Merge and CDA procedures

Work with Point Merge and improved Continuous Descent Approaches (CDAs) again suggest that 10 000ft is not sufficiently high enough to gain maximum advantage. Pilot Associations and safety comments indicate that a change in pressure datum within an Approach procedure is not desirable. Several countries (e.g. Norway and Ireland) have stated that where Point Merge procedures are about to be introduced operationally that 10 000 ft is not a viable option.

- Within Holding Stacks.

As with Point Merge and CDAs, the idea of a TA value potentially within a holding stack

⁸ Extract from NATS 'Raising the TA within UK Airspace' dated Apr 11.

is not operationally acceptable. Whilst commencing an Approach from higher altitudes is operationally desirable, the interaction between altitudes and FLs is still an issue.

- Below ideal harmonisation for ECAC states.

If Europe-wide harmonisation is the desired aim then 10 000ft will not be viable and for this reason alone several countries are discarding 10 000ft as an option.

The case for and against a TA value of 14 000 ft

For:

- Improved profiles for HPDs.

14 000 ft will give significant advantages for HPDs over the 10 000ft option.

- No significant increase in traffic cruising 14 000 ft and below, particularly at ANSP boundaries.

Whilst there are more aircraft cruising at 14 000 ft and below than at 10 000ft, the impact at the ANSP boundaries is not considered a significant issue.

Against:

- More impact on ACC sectors and interfaces with TMA sectors.

With a TA set at 14 000 ft the interface procedures between TMA and En-route sectors are more difficult to resolve i.e. it is not sufficiently high enough to standardise and thus could increase coordination with a mixed selection of aircraft profiles.

- Below ideal harmonisation altitude for ECAC states.

As with 10 000ft, this is not high enough to support harmonisation across all ECAC states.

- More issues at the boundaries with adjacent ANSPs if they do not change at the same time.

The issues at the boundaries where differing TAs are in operation will require significant changes to procedures.

- Still potential issues in the upper levels of holds, Point Merge and CDA procedures.

As with 10 000 ft the issue of a TA at a boundary between En-route/TMA levels and published procedures is not operationally desirable. It is for this reason that some countries e.g. The Netherlands have stated that a minimum of 15 000 ft is required – they conclude that 18 000 ft for these reasons and for full harmonisation is their preferred option.

The case for and against a TA value of 18 000 ft

For:

- More vertical airspace available for improved climb profiles without built in pressure changes.

A high TA permits the introduction of HPDs and sufficient vertical airspace to incorporate new segregated procedures between adjacent airports in order to improve departure sequencing. It also satisfies the 'one datum' environment supported by pilots.

- Above normal holding levels, Point Merge and CDA procedures.

18 000 ft will encompass normal operations with holding, Point Merge and CDAs without compromising the 'one datum' environment. With the future introduction of Arrival and Departure management tools, the requirement to hold at a fix within TMA airspace will be reduced and thus in normal operations 18 000 ft will be sufficiently high enough to capture all the TMA traffic.

- Easier to harmonise across ECAC states.

18 000 ft has been widely quoted across Europe as the lowest altitude to satisfy the desire for full harmonisation.

- Sufficiently high enough to standardise TMA/En-route sector interfaces.

18 000 ft is sufficiently high enough to standardise procedures between inbound and outbound TMA traffic and the adjacent TMA/En-route sectors. Whilst this may require some sector boundary changes the overall advantages will permit a more 'standard' operation in most situations.

- Standardisation of procedures irrespective of QNH.

There is significant operational advantage in respect of a common operating platform in all conditions, irrespective of high or low pressure values.

Against:

- Potential increase in interface issues between ACC and TMA sectors – could involve some re-sectorisation but preferable to 14 000 ft.

This could involve some re-sectorisation but this is considered less of an issue than at 14 000ft i.e. the higher TA is easier to design and manage.

- More traffic cruising at 18 000ft and below – not significantly different than 14,000 ft
Although there is more traffic cruising at and below 18 000ft, this is still a very low percentage of the overall traffic numbers (generally less than 5% on most En-route sectors).

- More of an issue at the interfaces if not all adjacent ANSPs change at the same time.

This is potentially the most difficult issue to be resolved and that is why harmonisation is being actively discussed throughout Europe.

- Loss of cruising levels at FL 190 (FI 200 in some circumstances) used by a small number of aircraft types.

PLANNING ASSUMPTIONS

AIRSPACE STRUCTURE

Controlled/Segregated Areas

- No new controlled airspace/segregated areas will be created as a direct result of this initiative.
- Where airspace bases are currently defined as flight levels they will be re-defined at the equivalent altitude (e.g. FL145 will become 14 5000 ft, FL120 will become 12 000 ft).
- Any subsequent proposals for changes to airspace structures will be subject to separate airspace change activities.

SIDs and STARS

- There will be no changes to SID or STAR profiles as a direct result of this initiative. Wherever possible, changes will be limited to replacing Flight Levels with equivalent altitudes (e.g. FL55 will become 5 500 ft, FL90 will become 9 000 ft).
- Any subsequent proposals for changes to airspace structures will be subject to separate airspace change activities.

Class F removal/replacement

- It is planned that the current initiative to remove/replace Class F airspace in the UK FIRs will be complete ahead of the proposed TA implementation date.

Transition Altitude in the Northern Operational Transition Area (NOTA), Brest Operational Transition Area (BOTA) and Southern Operational Transition Area (SOTA)

- The TA and altimeter setting procedures over the High Seas in the NOTA, BOTA and SOTA will not be changed.

Isle of Man

- The aviation authorities for the Isle of Man have been fully engaged during the development of this proposal, are supportive and intend to change at the same time as the rest of the UK.

Channel Islands

- The aviation authorities for the Channel Isles have been fully engaged during the development of this proposal, are supportive in principle and will consider changing their TA at a time that best fits with their commitment to achieve their own airspace change proposal for the Channel Islands Control Zone (already underway) and subject to their own operational assessment.

OPERATIONS

Quadrantal Rule

- The SERA Regulation requires replacement of quadrantal cruising levels in the UK FIRs (Rules of the Air Rule 34) with ICAO semicircular cruising levels. The current target implementation date for SERA is December 2012; it will be necessary to identify the impacts of the resultant EU law upon the TA project and in concert with the SERA project team develop the domestic plan for the introduction of semicircular cruising levels below a new, higher TA.

North Sea Helicopter Operations

- The altimeter setting procedures applicable to helicopter operations in the North Sea will remain unchanged as far as practicable.
- This assumption is predicated upon the notion that the extant arrangements have been developed to safeguard complex operations (including operators from a number of adjacent States) in a difficult, and at times challenging, operating environment.

Neighbour States

- UK/Irish FAB will implement the TA change regardless whether the UK's neighbour States change at the same time or not.
- This UK/Irish FAB initiative is being developed cognisant of similar considerations by other ECAC member States; the UK initiative is already influencing thinking in Europe. However the key message is that the UK/Irish FAB is committed to implement a common, high TA by the declared target date and will ensure that interface procedures are in place if our neighbouring States do not change at the same time.

Consultation

Consultation will be limited to aviation stakeholders.

PROJECT CONSIDERATIONS

Funding and Resourcing

- It is assumed that cost considerations for affected parties would not be prohibitive; nonetheless, to prove the assumption, stakeholders are invited to comment on the anticipated financial impact of the implementation of the proposal.
- Subject to the above assumption, any costs and resourcing issues incurred by stakeholders and others as a consequence of the Harmonised TA change are expected to be met where they lie.

Target Implementation Date

- The target implementation date of Winter 2013/2014 is feasible.