

All NATMAC Representatives
Environmental Consultees

20 February 2009

ERM/P600-IRISH SEA ACP/NATMAC

Dear Colleagues,

CAA DECISION LETTER

**INTRODUCTION OF A MODIFIED ATS ROUTE STRUCTURE LINKING THE
SCOTTISH AND BELFAST TMAs WITH THE DUBLIN TMA AS PART OF THE
UK/IRISH FAB DEVELOPMENT**

INTRODUCTION

- 1.1 On 30 May 2008, NATS issued a consultation document, outlining 2 Options, to support proposals for the development of the airspace interface between the Dublin Terminal Manoeuvring Area (TMA) and the Scottish TMA. Option 1 was a modification to the extant route structure, introducing two uni-directional routes incorporating R-NAV separation to allow autonomous radar monitoring¹ and a new Standard Arrival Route (STAR) for aircraft inbound to Edinburgh, whilst Option 2 additionally included the introduction of a more efficient air traffic services (ATS) northbound route for aircraft operating between Dublin and the Belfast TMA airfields. The project was titled the P600/Irish Sea Airspace Change and was submitted as part of a joint development involving NATS and the Irish Aviation Authority (IAA). On completion of the post-Consultation phase, NATS subsequently submitted a formal Airspace Change Proposal (ACP) to the Directorate of Airspace Policy (DAP).
- 1.2 Members of the National Air Traffic Management Advisory Committee (NATMAC) were informed on 8 April 2008 that Stage 1 (Framework Briefing) had been completed in accordance with CAP 725 – *Guidance on the Application of the Airspace Change Process*. The sponsor's 12-week consultation period ended on the 22 August 2008, and NATS then undertook a post-Consultation analysis. Upon

¹ R-NAV routes that have centre lines laterally separated by 12 miles allow for autonomous radar monitoring rather than the application of radar separation.

receipt of the ACP in September, my staff undertook a detailed analysis of the proposal, which included examination of the operational requirements and consultation process and the environmental assessments received from both the sponsor and stakeholder-sponsored independent assessors.

- 1.3 This proposal was progressed and co-ordinated as part of the UK-Ireland Functional Airspace Block (FAB) development and it constitutes the first airspace development proposal to be submitted regarding any FAB within Europe. The changes in UK airspace are to be introduced in support of changes being made by the IAA, whereby a fixed orientation structure for traffic arriving and departing the Dublin TMA will aid presentation of traffic between the UK and Ireland at the FIR boundary. The combined changes have been developed in unison. I am satisfied that the airspace arrangements are justified, have met the DAP regulatory requirements, and have been developed in accordance with the criteria laid out in the CAA Airspace Charter². The purpose of this letter is to advise you of my decision, which is made in compliance with my statutory duties, set out in the Transport Act 2000 and in Directions and Guidance from the Secretaries of State for Transport and Defence; my conclusions are set out in the following paragraphs.

STATUTORY DUTIES

2 Transport Act 2000

2.1 Safety

- 2.1.1 My primary duty is to maintain a high standard of safety in the provision of air traffic services and this takes priority over all other duties³. My staff, together with colleagues from the Safety Regulation Group of the CAA, have confirmed that the proposed airspace design and associated airspace management arrangements can be safely adopted. Although this proposal was not a Joint Future Airspace Development Team project, NATS sought to accommodate the requirements of both military and the Test and Evaluation Support Division (TESD), sponsors for West Freugh Range, and representatives from these organisations were involved in finalising the specific airspace arrangements contained in the proposal. Therefore, these potentially disparate user requirements will be managed safely.
- 2.1.2 The appropriate safety management processes will be completed prior to the introduction of any operational change and thus safety levels will be maintained.

2.2 Airspace Efficiency

- 2.2.1 I am required to secure the most efficient use of airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic⁴. The introduction of two unidirectional RNAV routes will replace the existing single route between Dublin and the Scottish TMA and the establishment of a northbound only route from Dublin to the Belfast TMA airfields is also to be introduced. This revised route structure recognises the need for efficient use of the airspace, enabling aircraft to fly higher for longer. The new airspace dimensions are the minimum required to overcome the complexity generated by the extant route structure. Coincident upper air routes (UAR) will also be introduced and the new UAR introduced to facilitate Dublin

² Civil Air Publication (CAP) 724 – Airspace Charter

³ Transport Act 2000, Section 70 (1)

⁴ Transport Act 2000, Section 70 (2)(a)

northerly departures to the North Atlantic, will continue beyond Belfast to link up with the northern oceanic tracks, thereby providing a significantly more efficient and environmentally beneficial routing.

- 2.2.2 Although the Scottish Area Control Centre (ScACC) Antrim Sector is not a significant generator of air traffic delays, the Dublin North Sector in the Irish FIR is. The IAA is making changes within the Dublin North Sector to address these delays and it is therefore necessary to modify the associated routings in the Antrim sector to harmonise with these changes. When considering the overall airspace strategy in the area, together with the IAA, it was considered appropriate to introduce a more efficient ATS route for aircraft inbound to the Belfast TMA airfields from the south. This new ATS route will further contribute to the reduction in complexity of the air traffic system and will help increase capacity.
- 2.2.3 A new Edinburgh STAR⁵ will be introduced for aircraft routing northbound on P600 above 13,000 feet, which will result in reduced track mileage and will enable controllers to segregate Glasgow and Edinburgh arrivals more easily and at an earlier stage in the procedure.
- 2.2.4 Consequently, I consider the introduction of these arrangements will represent a significant improvement in overall airspace efficiency, within both Irish and UK airspace.

2.3 Airspace Users

- 2.3.1 I am required to satisfy the requirements of operators and owners of all classes of aircraft⁶. NATS completed extensive consultation with all affected aviation stakeholder groups as part of the design process. The results of the NATS' consultation indicated that the aviation community supports the proposals. I am therefore satisfied that this proposal is designed to address traffic complexity issues in the UK and the interface with Irish airspace.

2.4 Interests of Other Parties

- 2.4.1 I am also required to take account of the interests of any other person (other than an operator or owner of an aircraft) in relation to the use of any particular airspace or the use of airspace generally⁷. The sponsor of an airspace change consults on this aspect during the formal consultation phase. In addition, my Aviation Related Environmental Complaints section provides a focal point for receiving and responding to enquiries and complaints from the general public about the operation of aircraft and aircraft noise, in accordance with the Air Navigation Directions. Correspondence was received from one member of the public who had raised concerns through their MP that, in November, there had been night overflights in the area of Banbridge, Co Down, and the suggestion was that changes to the airspace had already taken place. Banbridge does not currently sit beneath controlled airspace and it was pointed out that these flights were operating off-route in the quiet hours. The situation was exacerbated by Belfast Aldergrove airport operating on easterlies for the period in question. I am fully aware of the correspondence that has taken place with both NATS and my staff since the completion of the consultation, and I am content that the interests of others have been taken fully into account.

⁵ STAR – Standard Arrival Route is a formalised inbound procedure to an airfield

⁶ Transport Act 2000, Section 70 (2)(b)

⁷ Transport Act 2000, Section 70 (2)(c)

2.5 Environmental Objectives

- 2.5.1 I am also required to take account of any guidance on environmental objectives given to the CAA by the Secretary of State⁸, which has been provided in the detailed Guidance to the CAA on Environmental Objectives relating to the Exercise of its Air Navigation Functions⁹. My detailed considerations of the environmental aspects of the P600/Irish Sea proposals are covered later in this letter.

2.6 Integrated Operation of ATS

- 2.6.1 I am 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 services¹⁰. The MoD have supported the changes subject to certain conditions regarding appropriate airspace classification and satisfactory co-ordination procedures being maintained. Relevant Letters of Agreement have been drafted to cover these new arrangements which include, when West Freugh range is active, segregation requirements applied in accordance with the Safety Buffer Policy.

2.7 National Security

- 2.7.1 I am required to take account of the interests of national security¹¹. The P600/Irish Sea proposal, sponsored by NATS, has taken account of military training, operational and security requirements. I am satisfied, and the MoD has confirmed, that national security will not be impacted by this proposal.

2.8 International Obligations

- 2.8.1 I am required to take account of any international obligations entered into by the UK and notified by the Secretary of State (whatever the time or purpose of the notification)¹². As this airspace change has been developed in accordance with the international design requirements and principles associated with the introduction of a FAB and that the proposal has been fully co-ordinated with both the Irish Air Navigation Service Provider (ANSP) and airspace Regulator, I am satisfied that this is the case.

3. The Air Navigation Directions

3.1 Consultation with the MoD

- 3.1.1 Specific consultation requirements with the Secretary of State for Defence set out in the Air Navigation Directions (the Directions)¹³ have been discharged by correspondence with the MoD¹⁴ who have confirmed that they are content with the proposal.

⁸ Transport Act 2000, Section 70 (2)(d)

⁹ Issued by the then Department for Transport, Local Government and the Regions in January 2002.

¹⁰ Transport Act 2000, Section 70 (2)(e)

¹¹ Transport Act 2000, Section 70 (2)(f)

¹² Transport Act 2000, Section 70 (2)(g)

¹³ The Civil Aviation Authority (Air Navigation) Directions 2001 as varied by the Civil Aviation Authority (Air Navigation) (Variation) Direction 2004.

¹⁴ MoD Directorate of Air Staff

3.2 Environmental Impact

- 3.2.1 In respect of the environmental impact of air operations, the Directions as varied, require that where changes to the airspace arrangements might have a significant detrimental effect on the environment, the Secretary of State for Transport is to be advised of the likely impact and of plans to keep that impact to a minimum. I have considered the environmental aspects of the proposed changes and, based on the Environmental Guidance to the CAA from the Secretary of State and an independent environmental assessment of the proposals by my expert Environmental Research and Consultancy Department (ERCD) I have concluded that there is no requirement to refer this proposal to the Secretary of State as there is an overall environmental benefit. The Aviation Environmental Division of the Department for Transport has been briefed on both the airspace change proposal and the environmental assessment.

ENVIRONMENTAL CONSIDERATIONS

4. Consultation

- 4.1 NATS undertook this consultation in accordance with the Airspace Change Process, the Environmental Guidance to CAA from the Secretary of State for Transport and the Cabinet Office Code of Practice on Consultation. The Environmental Guidance determines a requirement for widespread environmental consultation in two circumstances:
- a) Changes to airspace below 7,000 feet above ground level.
 - b) Where visual intrusion by aircraft above 7,000 feet may be a consideration in exceptional cases such as National Parks and Areas of Outstanding Natural beauty (AONB).
- 4.2 The lowest altitude of any new controlled airspace associated with the P600/Irish Sea Airspace Change Proposal is 5,500 feet. NATS consulted with organisations with an interest in the environmental impact of the changes proposed; specifically County Councils and Unitary Authorities, District and Borough Councils, Members of Parliament and the offices for Northern Ireland's AONBs. Within the Consultation Document, a stakeholder distribution list was included as was a request for stakeholders to cascade the consultation information to additional stakeholder groups. Overall, I am satisfied that those individuals and organisations covered by the Airspace Change Process have had an adequate opportunity to comment.
- 4.3.1 Post consultation, NATS produced a Stakeholder Consultation Feedback document that considered all stakeholders' responses and provided comment on the key themes and issues raised. It also clarified that their noise modelling was done for both worst case and typical case basis. This document was sent to all recipients of the sponsor's environmental consultation material. Two options for the airspace change, in addition to a 'Do Nothing' option, were consulted upon referred to as Option 1 and Option 2 in the consultation material. After considering the consultation responses, NATS' preferred option was Option 2, and this was the proposal that was presented to the CAA for consideration. I am content that adequate assessment of options was conducted by NATS during the pre-design consultations, that took place in the early stages of the development of the proposal, and that the development of the proposal and different options were discussed with key stakeholders. The option presented was safe and although it required additional

volumes of controlled airspace, it was designed to accommodate a very complex and formalised route structure, whilst introducing more efficient flight profiles.

- 4.3.2 The total number of stakeholder consultation responses was 30, of which two were identified as objecting for environmental reasons. NATS responded appropriately to these. The objections were based on the impact of the change upon tranquillity and/or visual intrusion on the AONBs, and in particular that the consultation had not attempted to quantify the impact. Notwithstanding their concerns, I consider that NATS correctly explained that there is no clear methodology for assessing either tranquillity or visual intrusion and, more specifically, the impact aviation has on each of them.
- 4.3.3 In the Northern Ireland Environment Agency's response to the NATS consultation, their Senior Scientific Officer from the Protecting Landscapes Team stated that they were not of the opinion that the proposed airspace changes would have any significant impact on any of their AONBs.
- 4.3.4 Detailed environmental issues, including the impact of the changes on each of the AONBs and the Galloway Forest Park, are included in the attached ERCD Environmental Report.
- 4.4 The independent ERCD Environmental Factors report, attached at Enclosure 1, concluded the following:
- a) Noise produced by commercial aircraft overflying the AONBs will fall well below the level marking the onset of significant community annoyance and is predicted to be below the level for sleep disturbance. However, it is likely that some aircraft noise, albeit at relatively low noise levels, will be experienced.
 - b) The widening of P600 will result in fewer flights over land using this airway because the southbound P20 traffic will route over the sea. Northbound P600 traffic will be routed further inland than currently.
 - c) At typical heights, noise from aircraft using P600/P620 is unlikely to be an issue for locations beneath the airway. Noise levels from the aircraft using the N34 airway are likely to be more audible simply because they will typically be flying at lower heights than those using P600/P620.
 - d) Worst-case noise levels have been used to illustrate a theoretical situation but in reality they illustrate an impact that is unlikely to occur. In many cases, typical L_{max} ¹⁵ noise levels are expected to be below 55 dBA¹⁶.
 - e) Those areas not currently beneath controlled airspace or likely to experience an increase of flights as a result of widening P600, are likely to experience an increase in noise levels, even though these will typically be below 55 dBA L_{max} . Based upon population count estimates, the number of residents that will be beneath new controlled airspace is approximately 157,000, whilst those that would experience fewer overflights is approximately 73,000.
 - f) The likely noise levels of occasional traffic departing southbound from the Belfast TMA through N34 towards Dublin were not portrayed in the

¹⁵ L_{max} - Maximum sound level.

¹⁶ dBA – dB means 'decibel' and the A suffix means A-weighted, which matches the frequency response of the human ear

consultation material. However, the frequency and mix of traffic operating in this way is not expected to differ from current traffic through what is currently uncontrolled airspace. Therefore, even though not portrayed, this noise impact is not expected to change if the proposal is implemented.

- g) The airspace change is expected to result in a reduction in CO₂ emissions on a system-wide basis. Whilst the majority of flights will achieve an emissions benefit if they use the airspace to the extent assumed in the proposal, there are also some flights that will generate an increase in CO₂ emissions.
- h) Tranquillity is a subjective quality for which there is no agreed method of measurement, nor an agreed method for assessing the specific impact of aircraft. However, research to date would suggest that the AONBs that will be overflowed if this airspace change is implemented could reasonably be judged to be relatively tranquil. It is also reasonable to conclude that whilst the extent of the impact upon tranquillity cannot be predicted, there will nonetheless be an impact. This impact should take account of a number of factors relevant to this proposal such as the height of aircraft, their frequency, their timing and their predicted noise levels.
- i) There will be different noise impacts for each of the four AONBs and this in turn would result in different impacts upon tranquillity. There are a number of factors that affect the impact, notably any change in typical height of aircraft, and/or any change in frequency or distribution of aircraft. Whilst the impacts upon Lecale Coast AONB suggest a possible improvement in tranquillity, the impacts upon Ring of Gullion AONB suggest a possible deterioration in tranquillity. The impacts upon Strangford Lough AONB and Mourne AONB are less clear, with some areas of each AONB potentially benefiting whilst other areas may experience a reduction in tranquillity.
- j) There is no expected direct impact upon biodiversity or local air quality as a result of this proposed airspace change.
- k) It is possible that aircraft will be the subject of visual sightings from locations within the AONBs. Whilst the degree of visual intrusion and noise is likely to be reduced in those areas that already experience overflights, it is likely to be a new feature for the areas which are not overflowed by commercial aircraft currently.
- l) There are a number of environmental impacts that will result from implementing this airspace change. Some environmental factors show a potential negative impact (e.g. noise from commercial aircraft may be audible in areas that do not currently experience aircraft noise), whilst others show a positive impact (e.g. the predicted reduction in CO₂ emissions), and others cannot be objectively assessed but it is probable that they will have some impact (e.g. aircraft over-flying areas that are not currently over-flown may be a source of visual intrusion and may have a negative impact upon tranquillity).
- m) With no objective means of comparing the impacts from different environmental factors, it is a matter of professional judgement whether or not an overall environmental benefit will accrue from this airspace change if it were implemented because some factors show a positive impact (i.e. CO₂ emissions) whilst others show a possible negative impact (i.e. noise). In the case of this proposal and its anticipated impacts, because the noise

assessment predicts that noise levels will be unlikely to cause additional annoyance or sleep disturbance, it is reasonable to conclude that the emissions benefits outweigh the noise and tranquillity impacts thereby resulting in an overall environmental benefit.

4.4.1 I have concluded that the P600/Irish Sea ACP will deliver an overall environmental benefit.

REGULATORY DECISION

- 5.1 This proposal was submitted as part of the UK/Irish FAB development and it constitutes the first airspace development proposal to be submitted regarding any FAB within Europe. The proposed airspace arrangements are safe, which satisfies my principal statutory duty. Thereafter, when considering the competing demands of my remaining duties together with the Directions and Guidance, I am satisfied that the P600/Irish Sea airspace arrangements will deliver greater airspace efficiency by reducing complexity and delay by improving the flow of traffic in the region, which will meet the needs of the principal users whilst not disadvantaging others. I support the NATS view that post-consultation, no changes to the design were necessary and I am satisfied that the chosen option delivers the most environmental benefit and provides the most efficient routing. Whilst there will be an increased environmental impact for some, others will enjoy benefits from reduced emissions and overflights. I therefore consider the environmental impact has been mitigated to the greatest extent possible consistent with the safe operation of aircraft and the most efficient use of the airspace as a whole and that there are overall environmental benefits, which should be realised. From a consultation perspective, the proposal was widely notified and every reasonable attempt was made to make people aware.
- 5.2 I have therefore decided to approve the P600/Irish Sea airspace changes. The revised airspace will become effective from 7 May 2009. My staff will review the effectiveness of the arrangements not before 12 months after introduction and the results of this review will be published.



J R D Arscott
Director

Enclosure:

1. P600/Irish Sea – Environmental Report, dated 26 January 2009
2. P600/Irish Sea Airspace Change map

P600 Irish Sea Airspace Change Proposal - Environmental Report For DAP

Introduction

1. This paper describes the environmental considerations relevant to the proposed widening of the P600 Airway. The Airspace Change Proposal has been jointly submitted by NATS and the Irish Aviation Authority (IAA) as part of the UK/Irish Functional Airspace Block (FAB) development.

Guidance to DAP

2. Guidance issued to the Civil Aviation Authority¹ sets out a framework within which DAP operates in discharging air navigation functions. This guidance states that changes to airspace arrangements should be made after consultation, only where it is clear that an overall environmental benefit will accrue or where airspace management considerations and the overriding need for safety allow for no practical alternative.

3. It confirms that Government policy continues to focus on minimising over-flight of more densely populated areas with aircraft operating below 7,000 feet. However, when it is possible to avoid over-flight of National Parks and AONBs below this altitude without adding to environmental burdens on more densely populated areas, it clearly makes sense to do so. The Government's aim is to give stronger protection to the most valued landscapes in designated National Parks and AONBs. However, Government policy² does not preclude over-flight of National Parks or AONBs, as it is often impractical to do so.

Airspace Design

Rationale for the Airspace Change

4. The consultation document (paragraph 5.1) advises that the reasons for proposing the airspace change are enhanced safety, delay reduction and improved environmental performance.

5. The proposal document reiterates these reasons, explaining how extra capacity will result from a reduction in complexity. However, Section 1 of the proposal also seems to suggest that in order to meet future predicted traffic growth at Dublin Airport, the IAA are planning airspace changes, and that this change proposal is part of that larger plan. This is covered in more detail later in this report (Traffic Forecasts, paragraphs 58-63).

Nature of the Airspace Change

6. Two options for the airspace change, in addition to a "Do Nothing" option, were consulted upon (referred to as Option 1 and Option 2 in the consultation material). After considering the consultation responses, the proposers' preferred option is Option 2, and this is the one that has been presented to the CAA for consideration.

¹ DTLR, Guidance to the Civil Aviation Authority on Environmental Objectives relating to its Air Navigation Functions, January 2002

² National Parks and Access to the Countryside Act 1949, Planning Policy Guidance (PPG) 7 – The Countryside and the Economy and PPG 24 – Planning and Noise

7. In broad terms, the two options that were presented in the consultation were:

- Option 1 - widening of the existing P600 airway and generally raising the base level of the airway. Widening of the airway would allow two airways, one for southbound traffic (over the sea) and one for northbound traffic (over the land). Whilst this widening would reduce the number of flights over land (because southbound traffic will be over the sea), it would result in a wider portion of the airway over land.
- Option 2 – in addition to the elements of Option1, the further creation of new controlled airspace (N34), primarily for flights from Dublin to Belfast, and transatlantic flights from Dublin.

8. Whilst this new airspace between Dublin and Belfast (N34) would be used predominantly for traffic from the Dublin VOR to the Belfast TMA, the proposal also states that “This does not however preclude the possibility that occasionally, during quiet periods, departing flights may use this airspace when tactically co-ordinated.” NATS has subsequently clarified that such flights will be subject to individual co-ordination and approval from Dublin ACC but it is likely to be initiated during late evening and quiet weekend periods. NATS has estimated, based on current traffic, that late evening flights in the weekdays would be few (1 or 2 a day) whilst weekend flights would be greater (approximately 6 flights a day).

Noise

9. As there are no proposed changes to arrival or departure routes below 4,000 ft, L_{eq} contours are not required by CAP 725.

10. CAP 725 states that SEL footprints must be provided when airspace changes are proposed below 7,000ft and within 25km of a runway. In the case of this proposal, under Option 2 there will be a change that is below 7,000ft (i.e. at FL55) and within 25km (i.e. 24.1km) of Belfast International Airport. However, the proposal includes a further statement from the expert noise analysts (ERCD) that prepared the assessment on behalf of NATS:

“Having reviewed SEL data held within the ANCON 2 database, it is ERCD's view that the airspace proposed as 'option 2' to facilitate the direct routing of aircraft between Belfast and Dublin would have no effect on the 80 or 90dBA SEL footprints and thus the production of SEL footprints is not required in this instance.”

11. We agree that if the proposal would have no effect of the 80 or 90dBA SEL footprints at either of Belfast’s airports, then footprints are unnecessary as they will not illustrate any change in impact.

12. As neither contours nor footprints were required, NATS opted to portray the anticipated noise impact using L_{max} spot point measurements, and a noise assessment was prepared on a consultancy basis by ERCD using data derived from the ANCON 2.3 model databases. The full ERCD report was available to consultees. The results gave consultees an indication of the likely noise levels from aircraft flying within the proposed airspace. Terrain levels were taken account of in the assessment.

13. In determining a worst-case impact, aircraft were modelled on the assumption of using departure thrust settings as this will generate more noise than either arriving aircraft or cruising aircraft. However, it should be stressed this is to illustrate a worst case, as in most instances aircraft will not be using departure thrust settings and are more likely to be in level flight or descending whilst flying through the proposed airspace.

14. Any noise levels that were modelled as being below 55dBA³ have simply been stated as “<55dBA”. The noise assessment report notes the rationale for this as:

“Whilst the noise calculation process will generate results for almost any noise level, reported levels below 55 dBA L_{max} are not provided for two reasons. Firstly, little or no measurement validation has been undertaken below such levels. Secondly, levels below 55 dBA L_{max} correspond to long propagation distances (typically greater than 10,000ft) and thus will be subject to significant uncertainty due to varying atmospheric conditions. Together, both effects imply such great uncertainty that the absolute L_{max} levels are no longer meaningful.”

We are satisfied that this rationale is reasonable. The noise assessment goes on to advise that the results shown as “<55 dBA” ranged from 20-50 dBA L_{max}.

15. The noise assessment produced four sets of modelled results for the proposal:

- Noisiest aircraft at both the proposed and current worst-case height
- Typical aircraft at both the proposed and current worst-case height
- Noisiest aircraft at both the proposed and current typical height
- Typical aircraft at both the proposed and current typical height

16. The noise assessment uses a set of references (A-E) to describe each sector of the proposed airspace. We have used the same references in our report.

- *Sector A* – base level of FL75, an increase from the current base of FL55. Represents an area at the southern end of P600, adjacent to the Irish airspace boundary. The widening of P600 increases the area of airspace that is over land. It is above a large part of the Mourne AONB.
- *Sector B* – base level of FL95, an increase from the current base of FL55. The sector is north of Sector A. The existing P600 airway was already above Lecale AONB and much of Strangford Lough AONB, but the widening would increase the area so that all of Strangford Lough AONB would be beneath the airway.
- *Sector C* – base level of FL55, no change from the current base level. The sector is north of Sector B. The widening of P600 would increase the area of the airspace over a small portion of the Northern Irish coast.
- *Sector D* – entirely new controlled airspace with a base level of FL75, facilitating flights between Dublin airspace and Belfast. The airspace is entirely over land and would sit above much of the remainder of the Mourne AONB and part of the Ring of Gullion AONB.
- *Sector E* – entirely new controlled airspace with a base level of FL55, part of the new airway facilitating flights between Dublin airspace and Belfast. The airspace is entirely over land and sits above a relatively small area of the Mourne AONB.

17. The assessment only takes account of traffic that will be using the new airspace. It does not take account of traffic that may already be using other existing airways or airspace that is already below P600, as NATS has advised that none of that traffic will be affected by the proposed change.

18. In general terms, it will be true that despite the widening of P600 such that it will sit above a wider land area, those areas that currently sit beneath P600 will experience a reduction in flight numbers upon implementation. This is because the wider airway will enable northbound traffic to use the west side of the airway (over

³ Unless otherwise indicated in the text, “dBA” refers to dBA L_{max} rather than L_{eq} or SEL. Further detail about these three metrics is included in Appendix A of this report.

land) whilst the southbound traffic will use the east side of the airway (over sea). Currently, those areas already beneath P600 would have experienced both north and southbound traffic. The frequency of flights should always be considered when interpreting L_{max} levels as this will provide a clearer picture of the anticipated effect.

Noisiest aircraft at worst-case height

19. The noisiest aircraft, based on traffic records and therefore used for the modelling, was the Airbus A330. NATS believes that this will still be the noisiest aircraft using this airspace in 2009 and 2014.

20. *Sector A* – the results show several locations would experience an expected increase in noise levels, despite an increase in the base level, because the airway is being widened and aircraft will be heard in locations previously unused to aircraft noise from P600 traffic. The greatest noise levels are anticipated at Slieve Donard (68-73 dBA) but the majority of locations show a range of 62-67 dBA. Those areas already beneath P600 (e.g. Annalong, George's Quay) should experience a reduction in the noise effect, due jointly to an increase in the base level and a reduction in the number of flights.

21. *Sector B* – A similar outcome to Sector A noted above, in that those areas newly beneath P600 are likely to experience an increase in noise levels, whilst those already beneath should experience a significant reduction. The greatest noise levels are expected at Castlewellen (59-64 dBA) but this is only slightly greater than the range for most other locations beneath the new airspace (58-63 dBA). Those locations that are already beneath P600 will show a reduction from their current range of 67-72 dBA.

22. *Sector C* – the small area beneath the newly widened airway will experience an increase in noise levels (e.g. Bangor, Donaghadee) from <55 dBA to 67-72 dBA whilst the small area beneath this sector in Scotland will not experience any change (Portapatrack).

23. *Sector D* – all of the locations modelled beneath this sector are anticipated to experience an increase in noise levels, because it is new controlled airspace, with a base level of FL75. The results show that currently, noise levels based on modelling are below 55dBA, but after implementation, the noise levels increase for most locations to 55-60 dBA, and the greatest anticipated noise levels are 58-63 dBA (at Anglesey Mountain and Clermont Cairn).

24. *Sector E* – as for sector D, all of the locations modelled beneath this sector are anticipated to experience an increase in noise levels, because it is new controlled airspace, with a base level of FL55. The results show that currently, noise levels based on modelling are below 55dBA, but after implementation, the noise levels increase for most locations to 60-65 dBA.

25. It should be noted that the noise assessment has assumed no current commercial traffic through this proposed airspace (sectors D & E). However, Figure 7 in the consultation document shows that traffic currently does use this airspace, and NATS has confirmed that the frequency of southbound traffic through N34 is not expected to change if controlled airspace is established.

26. On reviewing the noise assessment for Sectors D & E, it was noted that despite the intention of modelling a worst-case impact, the ERCD report has only utilised arrival thrust settings for sectors D & E as the noise consultants employed by NATS had assumed that this new airspace would only be used for flights arriving into the Belfast TMA. As noted earlier in this report (Paragraph 8), there are likely to be some instances when traffic departing from the Belfast TMA to the Dublin VOR is

routed through this new controlled airspace. Using departure thrust settings will generate a greater noise level, all other factors being equal.

27. As an example, we have modelled a few illustrative scenarios in the table below to show the difference between the arriving traffic noise levels as shown in the published noise assessment for Sectors D & E and departing traffic noise levels.

| | | | | |
|--------------------|--|-------------|----------------|----------------------|
| Waringstown | Worst-case (noisiest aircraft, lowest FL) | CAA result | 66-71 dBA Lmax | FL60 for departures |
| | | NATS result | 60-65 dBA Lmax | FL60 for arrivals |
| | Typical (noisiest aircraft, typical FL) | CAA result | 65-70 dBA Lmax | FL65 for departures |
| | | NATS result | 60-65 dBA Lmax | FL60 for arrivals |
| Milltown | Typical (noisiest aircraft, typical level) | CAA result | 57-62 dBA Lmax | FL105 for departures |
| | | NATS result | 55-59 dBA Lmax | FL90 for arrivals |

28. This table shows that if departing traffic had been modelled in the original noise assessment as presented in the consultation, the anticipated noise levels would probably have been greater. However, as this airspace is already being used by departing traffic to a similar extent as expected after implementation, noise levels from departing traffic flying southbound are not expected to change if the proposal is implemented for N34.

Typical aircraft at worst-case height

29. The most typical aircraft, based on traffic records and therefore used for the modelling, was the Boeing 737-800. NATS believes that this will still be most typical aircraft using this airspace in 2009 and 2014.

30. The effects noted above for the noisiest aircraft will be similar (in terms of locations affected) to those for typical aircraft except that the noise levels will be less than those modelled for the noisiest aircraft.

31. *Sector A* – most locations are expected to experience noise levels of 55-59 dBA, with the highest levels of 61-66 dBA (at Slieve Donard) and the lowest of <55 dBA.

32. *Sector B* – all locations beneath the widened airspace are expected to experience noise levels of 55-59 dBA. This compares with those locations which are currently beneath the existing airway (a reduction from 64-69 dBA) and those that will be newly beneath the airway (an increase from <55 dBA).

33. *Sector C* - the small area beneath the newly widened airway will experience an increase in noise levels (e.g. Bangor, Donaghadee) from <55 dBA to 64-69 dBA whilst the small area beneath this sector in Scotland will not experience any change (Portpatrick).

34. *Sector D* - the results show that currently, noise levels based on modelling are below 55dBA, but after implementation, the noise levels increase for most locations to 55-59 dBA, and the greatest anticipated noises levels are 58-63 dBA (at Clermont Cairn).

35. *Sector E* - the results show that currently, noise levels based on modelling are below 55dBA, but after implementation, the noise levels increase for most locations to 59-64 dBA.

Noisiest aircraft at typical height

36. Typical heights are more representative of the likely noise impact if the airspace change were implemented. In most cases, the typical heights are well above the minimum levels used for the worst-case assessment.

37. *Sectors A, B & C* – when typical heights are modelled, all of the selected locations within these sectors are expected to experience noise levels of <55 dBA if the airspace change is implemented.

38. *Sector D* – under current airspace arrangements, all locations have noise levels of <55 dBA. If the new airspace is implemented, most locations would still be <55 dBA, with three locations identified as expecting noise levels of 55-59 dBA (Ballyrone, Milltown, Ballyward).

39. *Sector E* - under current airspace arrangements, all locations have noise levels of <55 dBA. If the new airspace is implemented, a few locations would still have levels <55 dBA, but in general locations would experience an increase in levels, with the greatest being 60-65 dBA (at Waringstown, Donaghdone and Dromore).

Typical aircraft at typical height

40. *Sectors A, B & C* – when typical heights are modelled, all of the selected locations within these sectors are expected to experience noise levels of <55 dBA.

41. *Sector D* - under current airspace arrangements, all locations have noise levels of <55 dBA. If the new airspace is implemented, most locations would still be <55 dBA, with two locations identified as expecting noise levels of 55-59 dBA (Milltown, Ballyward).

42. *Sector E* - under current airspace arrangements, all locations have noise levels of <55 dBA. If the new airspace is implemented, several locations would still have levels <55 dBA, but in general locations would experience an increase in levels, with the greatest being 59-64 dBA (at Waringstown, Donaghclon and Dromore).

43. Whilst sectors A, B & C are expected to have noise levels of <55 dBA when typical heights are modelled, it is worth highlighting paragraphs 4.19 and 4.20 from the noise assessment report:

“It should be considered that whilst aircraft noise event levels may be below 55dBA Lmax, dependent upon local ambient background conditions NATS airspace change proposals might still result in aircraft noise becoming more apparent at many locations. This conclusion is made purely on the basis that aircraft would be positioned closer to certain ground locations when compared to the aircraft within the current provision of airspace. Therefore, even in the absence of noise data general conclusions can be drawn; for areas not previously overflown there are expected to be increases in peak noise level. In locations currently overflown, or close to the existing airway, it is expected that noise event levels will, in general decrease due to increases in minimum permitted base levels of aircraft. Whether these aircraft noise levels are audible on the ground will often depend upon local ambient conditions. Aircraft noise events may be more noticeable when and where background noise levels are lower for example at night, or in areas away from main roads. It is worth noting that peak noise levels are likely to fluctuate on a day-to-day basis, certain atmospheric conditions may serve to amplify or attenuate noise. This is particularly the case in instances where there are large noise source-to-receiver distances, and is therefore relevant for this ACP where aircraft are typically at considerable altitude.

If people notice significantly more aircraft than previously, some might be annoyed, regardless of noise level and especially if they perceive any concentration of flight paths overhead.”

44. We accept that the general conclusions made in the extract above are reasonable. The extract serves to highlight a number of points about noise levels.

- When comparing noise levels, two results of “<55 dBA” does not mean that both results are the same.
- Annoyance due to aircraft noise is a personal experience and the noise levels that annoy one person may not annoy another, for a number of reasons.

Noise Conclusions

45. The proposed change will have no impact on L_{eq} contours around any UK airport, and therefore we would conclude that the change is unlikely to cause any increase in significant community annoyance.

46. The proposed change will have no impact upon SEL footprints around any UK airport and therefore we would conclude that the change is unlikely to cause any increase in the number of awakenings from sleep due to aircraft noise.

47. At typical heights, noise from aircraft using P600 is unlikely to be an issue for locations beneath the airway. Noise levels from aircraft using the N34 airway are likely to be more audible simply because they will typically be flying at lower heights than those using P600.

48. Worst-case noise levels have been used to illustrate a theoretical situation but in reality they illustrate an impact that is unlikely to occur. In many cases, typical L_{max} noise levels are expected to be below 55 dBA.

49. Traffic using P600 will be distributed across a larger area of land. However, the frequency of traffic using P600 over land will be less than current numbers as southbound traffic will be routed over sea rather than possibly over land.

50. Those areas not currently beneath controlled airspace (N34) or likely to experience an increase of flights as a result of the widening of P600 enabling a wider distribution of northbound traffic, are likely to experience an increase in noise levels.

Population Counts

51. The population counts were not presented in the consultation document as there was no requirement under CAP 725 for the proposer to do this, but population counts were included in the proposal received by the CAA. Population numbers are based upon 2007 data. Simple population counts do not take account of the noise impact experienced by those populations; in order to do this, noise data needs to be coupled with population data. The naming convention and boundaries used to describe the areas included in the population count are not the same as those used in the noise assessment and so it is difficult to make a direct comparison between the noise impact assessment and the population counts but the following paragraphs attempt to do this as best as possible. (Reference may need to be made to Figure 17 in Appendix E of the proposal document to fully understand the areas defined for the population counts.)

52. Based upon the summary table in Appendix B of this report, some broad conclusions can be drawn:

53. *Area A* (population approximately 73,000) – will experience fewer overflights of traffic using P600 as a result of separating north and southbound traffic. Typical noise levels will remain below 55 dBA (and may even be improved as the expected typical profiles will be higher than current day profiles) and worst-case noise levels will generally be improved because the base levels of P600 will be raised.

54. *Area B* (population approximately 152,000) – will newly experience overflights from northbound traffic using the widened P600. However, this population is already beneath existing, lower controlled airspace. Typical noise levels will remain below 55

dBA but the population may experience an increase in aircraft noise from P600 traffic simply because they will be newly overflown by this traffic. Worst-case noise levels from P600 traffic would represent a noticeable increase for this population.

55. *Areas C1 & C2* (population approximately 9,000) – this population will be under new controlled airspace as a result of widening P600. Whilst this population will be currently overflown on an occasional basis by aircraft transiting uncontrolled airspace, the frequency of aircraft is likely to increase if the proposal is implemented and new controlled airspace is created. For the population in Northern Ireland, typical noise levels will remain below 55 dBA but the population may experience an increase in aircraft noise from P600 traffic because they will be more frequently overflown by this traffic. Worst-case noise levels would represent a noticeable increase for this population. For the small population in Scotland, typical noise levels will remain below 55 dBA but the population may experience an increase in aircraft noise from P600 traffic simply because they will be newly overflown by this traffic. Worst-case noise levels could be up to 58 dBA, but only for the noisiest aircraft at the base of the airspace.

56. *Area C3* (population approximately 148,000) – this is the population beneath the new controlled airspace, N34. Whilst this population will be currently overflown on an occasional basis by aircraft transiting uncontrolled airspace, the frequency of northbound aircraft is likely to increase if the proposal is implemented and new controlled airspace is created. Consisting of two sectors (as illustrated in the noise assessment), one to the north with a base level of FL55 and the other to the south with a base level of FL75, this airspace will be used by flights primarily from Dublin to Belfast, but occasionally in the opposite direction. It is not clear at what heights existing northbound traffic crosses this airspace, but for the purposes of the noise modelling, a height of 14,000ft was used for current operations to provide a comparison to post-implementation. Based on this assumption, typical noise levels for the current day were assessed as below 55 dBA. Following implementation, based on typical flight profiles, locations beneath this airspace will experience an increase in noise levels. In most cases, the noise modelling still shows L_{max} levels of <55 dBA, but some locations show an increase to 55-59 dBA, and others closest to the Belfast TMA show an increase to 60-65 dBA. (As noted in paragraphs 8 & 26-28, noise levels for this population were based on arriving aircraft, which will be the most typical users of this airspace. Some departing aircraft will also use this airspace, and noise levels from departing flights would be higher than the levels stated here.)

57. In summary, the forecast UK population under new controlled airspace is approximately 157,000, the majority of which is beneath N34 (Areas C1, C2 & C3). This can be compared with approximately 152,000 that are already beneath controlled airspace but are likely to be overflown more frequently (Area B) and approximately 73,000 (Area A) which are likely to experience less P600 overflights.

Traffic Forecasts

58. UK base case traffic forecasts were stated in both the consultation document and the proposal document. NATS contends that these forecasts represent the expected traffic growth on the routes affected by this proposed change, regardless of whether or not the change is implemented. It believes that if the change is not implemented, traffic will still grow at the same rate, but that delays will increase.

59. However, there are possible reasons why these forecasts may not be the best current estimate of future growth.

60. Within the Introduction to the change proposal, it states “To meet future predicted traffic growth the IAA are planning airspace and sector changes for their Dublin Area Control Centre (Dublin ACC) that will see capacity within their ‘North Sector’ airspace

rise by approximately 40%.” This could be interpreted as meaning that the proposed airspace change is part of a larger programme that will enable future traffic growth, and by implication, if it is not implemented, traffic growth will not be met. Whilst NATS rightly asserts that its licence requirement is to make the most efficient use of airspace and be capable of meeting reasonable levels of demand, it does not agree with the interpretation suggested above. Instead, NATS believes that the rate of growth will remain the same regardless of whether or not the airspace change is implemented, but that if the airspace change is not implemented, this will cause an increase in delays.

61. In an email response to Aer Lingus as part of the consultation, NATS advised that expected traffic growth for Dublin airport (arrivals and departures) and Belfast TMA (arrival, departures and overflights) from 2006 to 2010 is 20%. This is at odds with the NATS base case traffic forecasts which show traffic growth of 14% for the same period. NATS has subsequently advised that those forecasts were provided by the IAA for growth for Dublin Airport (not P600 specifically) and that they do not conflict with the NATS forecasts which are for UK growth. NATS confirms that its forecasts do incorporate intelligence from regional airports and airlines. However, it does not address the fact that the IAA is a joint-sponsor of this proposal, nor explain the implication that, if NATS view is accepted, traffic growth out of Dublin is expected to be 20%, whilst the traffic on routes that then enter UK airspace is only expected to be 14%.

62. In an email response to Regeneration of South Armagh (RoSA) as part of the consultation, NATS confirmed that the traffic forecasts used in the consultation (and also provided subsequently in the formal proposal) are base case forecasts prepared in November 2007 and also advised that “the current rate of growth is closer to the low case, and since the figures published in the consultation document were prepared, forecasts have been revised downward.” NATS has subsequently clarified this statement, explaining that forecasts are produced annually and during the consultation and ACP production (Spring-Summer 2008) the most up-to-date forecasts were being used, i.e. those produced in November 2007. Updated forecasts will not be available until at least November 2008. (At the time of writing, the updated forecasts are not available.) The comment made to RoSA was based on the UK-wide traffic throughput figures that are produced monthly by NATS and from these it was apparent that recent traffic growth had been below the base case forecast. The statement in the RoSA letter that: “forecasts have been revised downwards”, would have been more accurate if it had said “traffic growth during the early part of the forecast period has been below the base case forecast. It is likely that this will result in the next set of forecasts being revised downwards.” Accepting this clarification, it still implies that the traffic figures for 2008 and the forecasts from 2009 onwards are expected to be below the rates presented in the consultation and proposal.

63. Accepting that traffic forecasts are unlikely to ever be 100% accurate, we would still expect that the best available information has been used to make assumptions and that therefore the forecasts reflect a proposer’s best estimate of future traffic volumes. The comments highlighted above could raise doubts as to the appropriateness of the forecasts provided in the proposal, though equally they could be validated by actual traffic growth. As a result, we would recommend that actual post-implementation traffic volumes are measured (if the proposal is approved) and are assessed in conjunction with updated forecasts at the post-implementation review.

Emissions

64. NATS has used its own in-house emissions model (KERMIT) to assess the impact on both fuel burn and CO₂ emissions. A factor of 3.18 has been used to convert the volume of fuel burned to the volume of CO₂ emitted. KERMIT derives performance data from BADA 3.6, and models flight profiles designed by NATS' ATC experts. Due to the likely variability in flight profiles, "typical" profiles were designed for use in the model.

65. Rather than model every aircraft that may use a route affected by the new airspace, a limited number of aircraft types were selected to represent all aircraft of a similar weight, performance and fuel burn characteristics. The proportion of each representative group was based on the fleet mix observed for actual flights that used the affected routes in 2007. The concept of using typical profiles and representative aircraft types to determine a broad estimate of the impact upon CO₂ emissions is reasonable.

66. The emissions assessment only considers the portion of a flight profile that will be affected by the proposed change (i.e. not the entire flight from gate to gate), and therefore any percentage changes should be viewed in that context.

67. A number of broad assumptions have been made in modelling the CO₂ emissions (e.g. source data, typical profiles, representative aircraft), and this creates a degree of uncertainty in the results, particularly when stating absolute figures for the volume of fuel and CO₂. This should always be borne in mind when considering the results of the sponsor's emissions assessment and the figures stated in this report.

68. The Emissions Assessment from NATS illustrates the anticipated impact separately within UK and Irish airspace, and also the combined impact.

69. The full Emissions Assessment (V2.0) was available as part of the consultation material, though this has been modified slightly in the light of questions raised by the CAA (latest version is V2.2).

70. The consultation document made a number of statements about the emissions impact:

- That the route showing the largest emissions benefit was a reduction of 3,350kg of CO₂ per flight, whilst the route showing the largest emissions increase was 362kg of CO₂ per flight.
- Based on data from 2007, Dublin airport operates using runway 28 approximately 75% of the time.
- Overall, the modelling shows that for Option 1 there is a reduction in emissions of 3.7% (average 184Kg of CO₂ per flight, or 5,813 tonnes per annum), and for Option 2 there is a reduction in emissions of 4.4% (average 219Kg of CO₂ per flight, or 6,924 tonnes per annum). This is the combined result for UK and Irish airspace.
- Both proposed options will reduce CO₂ emissions. Option 2 gives greater benefit in reducing emissions than Option 1.

71. Addressing each of these statements in turn:

- Based upon V2.2 of the Emissions Assessment, we are content that the largest emissions benefit is as stated (3,350kg per flight), and this occurs for the A332 on Dublin departures via TIR from runway 28. However, there are three routes showing the largest emissions increase of approximately 432kg per flight, and these routes are all for an A332 departing from Dublin runway 10, heading via either BEN, or TIR, or ASTIX. All of these routes are under Option 1; the largest

increase under Option 2 is 203Kg per flight (for a MD82 departing Belfast for the south).

- Of the modelled routes for Option 2, it is the ones departing from Belfast to the south (either to Dublin airport or beyond) that show increases in CO₂ emissions, plus departures from Dublin to Edinburgh from Runway 10. Based on 2007 traffic figures, these routes accounted for 6.8% and 1.1% respectively of affected traffic. All other routes affected by this airspace change show an emissions reduction.
- In general, the transatlantic routes from Dublin that become possible if N34 is implemented show by far the largest potential for reducing emissions on a per-flight basis. However, as a percentage of the total traffic likely to be using this airspace, they are a minority. (Based on the traffic figures provided in the proposal, these flights represent 7% of traffic affected by N34.)
- The Emissions Assessment had originally been performed using the assumption of an 80/20 runway usage split rather than a 75/25 split as implied above by the consultation document. NATS has re-assessed the emissions impact using a 75/25 split and concluded that the impact is insignificant; having reviewed this, we are content that the revision is not significant. The revision produces a result that shows a small improvement for both Option 1 & 2 when considering the combined airspace, and an almost negligible impact for both Option 1 & 2 when considering UK airspace only.
- Based upon V2.2 of the Emissions Assessment, we are satisfied that the figures for the percentage reduction in total annual CO₂ emissions and the reduction in total annual CO₂ tonnage (for 2007) as stated in the consultation is reasonable for the combined airspace. However, it should be borne in mind that all percentage changes in CO₂ emissions are expressed in relation to that part of each route that is affected by the airspace change, and not as a percentage of the entire flight.

The table below summarises the CO₂ volumes per annum calculated by NATS and the anticipated impact under both Option 1 and Option 2.

| | | No Implementation (tonnes) | Option 1 (tonnes) | Decrease (tonnes) | % change | Option 2 (tonnes) | Decrease (tonnes) | % change |
|------|-------------------|----------------------------|-------------------|-------------------|----------|-------------------|-------------------|----------|
| 2007 | Combined Airspace | 157,614 | 151,742 | 5,872 | -3.7 | 150,631 | 6,983 | -4.4 |
| | UK Airspace | 87,751 | 86,706 | 1,045 | -1.2 | 85,787 | 1,963 | -2.2 |
| 2009 | Combined Airspace | 168,513* | 162,235 | 6,278* | -3.7 | 161,048 | 7,465* | -4.4 |
| | UK Airspace | 93,819* | 92,702* | 1,117* | -1.2 | 91,720* | 2,099* | -2.2 |
| 2014 | Combined Airspace | 193,452* | 186,245 | 7,207* | -3.7 | 184,881 | 8,571* | -4.4 |
| | UK Airspace | 107,704* | 106,421* | 1,283* | -1.2 | 105,293* | 2,411* | -2.2 |

* = calculated by ERCD based upon the growth rates used by NATS to produce the combined airspace CO₂ figures for 2009 and 2014.

To arrive at a fuel burn figure based upon the CO₂ volumes in the above table, divide by 3.18.

- On a per flight basis, we are content that both Option 1 and Option 2 result in CO₂ reductions, and that Option 2 offers a greater reduction than Option 1.

72. However, as noted earlier in this report, it is only Option 2 that is being presented as a proposal for consideration by the CAA. Therefore, the broad conclusion is that, on a system wide basis, Option 2 offers an emissions benefit when compared with “no change”. For that part of the amended flight profile that is within UK airspace, this is a reduction of 2.2%. If the entire portion of the amended flight path is considered (i.e. the portion across both UK and Irish airspace) the per-flight reduction is 4.4%.

73. This is an average that takes account of all the affected routes. On an individual basis, some routes show greater benefits than others, and some even show an emissions increase.

Continuous Descent Approaches (CDAs)

74. The potential for Continuous Descent Approaches to be introduced as a result of the proposed airspace change briefly commented upon; it is described in the proposal document as “not applicable”.

Tranquillity

75. The means of measuring tranquillity are still being developed. The white paper on the countryside⁴ notes that ‘it is not just its physical features which give the countryside its unique character: there are less tangible features such as tranquillity and lack of noise and visual intrusion, dark skies and remoteness from the visible impact of civilisation’. It goes on to state that there will always be sources of noise in the countryside and many of these are representative of activities which have long been central to the rural way of life. However, it states that protecting the countryside from further intrusion is not a luxury and cites the need to preserve and promote a feature that is genuinely valued by residents and visitors alike. The white paper admits that there is no agreed method to measure whether the quality of the countryside is being maintained.

76. Two recently published studies by CPRE have produced relative tranquillity maps. The first of these was for a national park⁵ and the second for all of England⁶. In the first study, the methodology employed applied a negative weighting factor of 1.5% for aircraft noise. (This can be compared with the leading negative factor – “The presence of other people” – which had a weighting of 60%.) The second study did not identify weightings, but instead drew up a list from survey responses of the top eight factors that lessen tranquillity; within this list “seeing low flying aircraft” and “hearing low flying aircraft” were ranked as 6 and 7 respectively. (The highest ranked negative factor was “Hearing constant noise from cars, lorries and/or motorbikes”.) The study did not provide a definition of “low flying”.

77. Further work will be required to refine the methodology to the point where it can be constructively used on a consistent basis for assessing the impact of aviation upon tranquillity, but based upon the two studies to date it would appear that aircraft flying at the heights associated with this Airspace Change Proposal are unlikely to have a significant impact upon tranquillity.

78. Based on the noise modelling results, “typical” L_{max} noise levels caused by aircraft overflying the AONBs are anticipated to be <55 dBA for each AONB. Worst-

⁴ DETR, Our countryside: the future: A fair deal for rural England, November 2000

⁵ CPRE/Countryside Agency, Mapping Tranquillity – Northumberland National Park and West Durham Coalfield, March 2005

⁶ CPRE, Saving Tranquil Places – How to Protect and Promote a Vital Asset, October 2006

case noise levels within each AONB, which whilst being theoretically possible yet unlikely, are varied depending on the location. The table below illustrates this.

Summary of Maximum Worst-Case Noise Levels Within AONBs

| AONB | Spot Point Locations | L _{max} Noise Level (current) | L _{max} Noise Level (proposed) |
|------------------|---|--|---|
| Strangford Lough | Ballywalter/Greyabbey, Cloghey, Portaferry, Shrigley/Killyleagh | 67-72 | 58-63 |
| | Comber, Killinchy | <55 | 58-63 |
| Lecale Coast | Ballykinler, Chapletown, Kilough | 67-72 | 58-63 |
| Mourne | Annalong | 67-72 | 62-67 |
| | Slieve Donard | <55 | 68-73 |
| Ring of Gullion* | Anglesey Mountain, Clermont Cairn | <55** | 58-63** |

*There were no spot point locations within Ring of Gullion AONB. The identified locations in the table are immediately outside the AONB.

** As noted in paragraphs 8 & 26-28, noise levels at these locations have been modelled using arriving thrust settings. If departure settings had been used instead, it is likely that these worst-case levels would be higher.

79. Aircraft overflying the AONBs may be audible but whether or not this impacts upon tranquillity is a subjective and individual perception. This will be less likely if they are flying at the heights that NATS expects to be typical (more likely) than at worst-case heights (unlikely). Based upon the combination of factors that will play a part in this airspace change (e.g. a general increase in base levels, southbound P600 traffic re-routed over the sea, northbound P600 traffic re-routed further inland, the creation of new controlled airspace for N34), it can be argued that there will be the following impacts upon tranquillity within the AONBs:

- Strangford Lough – an increase in typical heights and a reduction in traffic should lead to a general increase in tranquillity, though some areas of the AONB will be beneath the P600 airway for the first time, and this may be perceived as a reduction in tranquillity in those areas.
- Lecale Coast - an increase in typical heights and a reduction in P600 traffic directly over this AONB should lead to a general increase in tranquillity.
- Mourne – the impact upon tranquillity for this AONB is likely to be mixed. With the widening of P600 and the introduction of N34, much more of the AONB will be beneath controlled airspace. Traffic numbers over the AONB are likely to increase despite repositioning southbound P600 traffic over the sea because of the increase in traffic resulting from N34. The area of the AONB closest to the coast is likely to benefit from fewer aircraft and an increase in aircraft heights. However, aircraft are likely to be distributed across a much wider area of the AONB than before with the result that tranquillity may deteriorate in any area that is newly overflown or experiences an increase in traffic.
- Ring of Gullion – the impact upon this AONB in terms of tranquillity is likely to be detrimental. The creation of the N34 airway over the eastern part of the AONB is likely to result in an increase in traffic over that area. Accepting that typical noise levels are expected to be below 55 dBA L_{max}, aircraft are still likely to be audible, and for some individuals using the AONB, this may mean either a reduction in tranquillity and/or annoyance.

80. The impacts upon each AONB are discussed in more detail at paragraphs 89 to 104.

Visual Intrusion

81. There would seem to be no agreed definition of visual intrusion but, for the purposes of this report, it is assumed that the ability to detect the presence of aircraft

visually will suffice. Alternative definitions might consider the impact of visual sighting such as to cause annoyance or spoil the intrinsic quality of the countryside but alternative definitions are beyond the scope of this report.

82. It may be possible to detect aircraft visually at the expected altitudes outlined in the proposal but whether someone enjoying the benefits of an AONB makes a visual sighting of an aircraft will depend on a number of factors – slant range of the aircraft, visibility and cloud cover, contrast against background and time of day are some examples. It will also depend on the type of activity in which the observer is engaged and whether the sighting is cued, either by detection of previous aircraft flying the same route or by aircraft noise. The probability of visual sighting will be increased if an aircraft forms a persistent contrail but it should be noted that meteorological conditions necessary for contrail formation (cold and humid air) rarely occur below 20,000 feet.

83. A recent report published on behalf of CPRE⁷ sought to update “Intrusion Maps” produced in the mid-1990s for England. To produce these maps, the distances from a number of visual and audible intrusions were considered. These sources of intrusion tend to be static infrastructure, and include airports. However, there is little mention of aircraft being a factor for intrusion, and where they are mentioned it is as a source of audible intrusion and not visual intrusion. The report uses a distance of 3km from the flight path of a low flying aircraft to mark “partial intrusion” and 2km to mark “absolute intrusion” but there is no explanation for the basis of these distances or a definition of “low flying”.

84. The lowest possible altitude for aircraft over any of the AONBs affected by this proposal is FL80 (i.e. 500ft above the base level of FL75). This is theoretically possible above Ring of Gullion AONB and Mourne AONB. This distance could be reduced further if the aircraft is directly above any elevated locations within either AONB. However, it is not expected that this would be typical for any aircraft to be flying at the base level of controlled airspace as a result of the proposed changes.

Local Air Quality

85. As this proposed airspace change does not have any impact on traffic or flight paths below 3,000ft, it was agreed with NATS that no assessment of Local Air Quality was required.

Biodiversity

86. It is not considered likely that there will be any direct effect on biodiversity as the result of this airspace change. However, this does not exclude the possible impact upon biodiversity as a result of global climate change that may be contributed to by growth in aviation; consideration of these second order effects is beyond the scope of this report.

Impacts Upon Areas of Outstanding Natural Beauty (AONBs) and National Parks

87. NATS has estimated a “busy hour average” figure to illustrate 2009 traffic levels (i.e. post-implementation traffic levels) over each AONB. These figures are derived from 2007 traffic levels, increased to 2009 levels using traffic forecasts. They represent expected peak traffic flow (typically in the hours 0700-0800 and 1600-1700); average traffic levels at other times are expected to be less. These 2009 figures have been subsequently increased by the CAA, using NATS traffic forecasts, to provide an illustration of the busy hour average for 2014 for this report.

⁷ Developing an Intrusion Map of England (August 2007)

88. L_{max} spot points noise levels were modelled for a range of locations within the AONBs, all of which took account of the respective ground level height at each location.

Strangford Lough AONB

89. The coastal area of the AONB should experience fewer flights as northbound traffic will route further inland, over the northwesterly region of the AONB, which is not currently overflown by P600 traffic.

90. Busy hour average traffic levels estimated by NATS are 7.0 aircraft per hour. This is a decrease from the current average of 9.0 per hour. For 2014, this rate is forecast to increase to 8.0.

91. Typical (i.e. typical aircraft at a typical height) L_{max} noise levels post-implementation are expected to be <55 dBA. Aircraft using P600 to overfly this AONB are expected to be at greater heights than currently.

Lecale Coast AONB

92. The entire AONB is currently beneath P600. The widening of the airway is likely to improve the distribution of flights, even to the extent that the AONB may not be directly overflown by P600 traffic at all because it will be routed further inland than currently.

93. Busy hour average traffic levels estimated by NATS are 5.2 aircraft per hour. This is a decrease from the current average of 9.0 per hour. For 2014, this rate is forecast to increase to 6.0.

94. Typical (i.e. typical aircraft at a typical height) L_{max} noise levels post-implementation are expected to be <55 dBA. Aircraft using P600 to overfly this AONB are expected to be at greater heights than currently.

Mourne AONB

95. Mourne AONB is likely to experience a greater frequency of flights. Currently flights are more likely to overfly the coastal part of the AONB, if at all. Once P600 is widened, it is likely that a greater frequency of traffic will overfly the AONB, even though this will only be northbound P600 traffic. The new N34 airspace will also sit above the western region of the AONB.

96. Busy hour average traffic levels estimated by NATS are 6.8 aircraft per hour. This represents traffic using either P600 or N34. This is an increase from the current average of 5.0 per hour. For 2014, this rate is forecast to increase to 7.8.

97. Typical (i.e. typical aircraft at a typical height) L_{max} noise levels post-implementation are expected to be <55 dBA. Aircraft using P600 to overfly this AONB are expected to be at greater heights than currently, but the creation of N34 is new controlled airspace with a base level of FL75.

Ring of Gullion AONB

98. The eastern region of the AONB would sit below N34. Whilst occasional flights are currently routed through uncontrolled airspace and therefore potentially over this AONB, the frequency of northbound traffic will increase if N34 is implemented.

99. The noise assessment undertaken for the proposal did not include any spot points specifically within Ring of Gullion AONB, though a number of points just outside of the AONB were modelled. The highest point within this AONB is Slieve Gullion at approximately 1,900ft, though this is not located beneath the proposed new airspace. Using data derived from the ANCON 2.3 model databases, we have

estimated that the anticipated L_{max} noise level at Slieve Gullion for the noisiest aircraft at the lowest height (8,000ft) is <55 dBA.

100. Busy hour average traffic levels estimated by NATS are 1.7 aircraft per hour. This is an increase from the current average of 1.4 per hour. For 2014, this rate is forecast to increase to 2.0.

101. Typical (i.e. typical aircraft at a typical height) L_{max} noise levels post-implementation are expected to be <55 dBA. Aircraft using N34 above this AONB are typically expected to be at levels of FL115 and above.

Galloway Forest Park

102. This is neither an AONB nor a National Park but can still reasonably be considered a tranquil area. A small additional triangle of airspace with a base level of FL125 is proposed which would be partly above the western edge of the Park, though this area is already overflowed by traffic above 13,000ft.

103. Busy hour average traffic levels estimated by NATS are 2.0 aircraft per hour. This is no change from the current average. For 2014, this rate is forecast to increase to 2.3.

104. Typical (i.e. typical aircraft at a typical height) L_{max} noise levels post-implementation are expected to be <55 dBA.

Consultation Responses

105. Total responses numbered 30 and of these, two were identified as objecting for environmental reasons, and two others raised further questions on environmental aspects. NATS responded appropriately to these.

106. The key environmental issue raised by respondents was the impact of the change upon tranquillity and/or visual intrusion for the AONBs, and in particular that the consultation had not attempted to quantify the impact.

107. In its replies, NATS correctly explained that there is no clear and generally accepted methodology for assessing either tranquillity or visual intrusion and, more specifically, for assessing the impact of aircraft on either. For this reason, NATS, quite rightly, could not provide any assurance that the proposed changes would not adversely impact upon either the tranquillity or visual amenity of the AONBs because both tranquillity and visual intrusion are subjective qualities.

Recommendations for Post-Implementation Review

108. Based upon the anticipated environmental impacts of the proposed change, if implemented the following are recommendations for inclusion in the post-implementation review:

- Assess evidence of the frequency of usage of the airspace, and distribution across the airspace. This should include details of southbound flights through N34.
- Determine typical profiles for each affected route based upon actual flights, and assess the difference in impact if these differ from either the profiles used to assess the emissions benefit in the proposal, or the profiles used in the noise assessment modelling.
- Determine the worst-case height that was flown after implementation.
- A re-assessment of the traffic forecasts and comparison to the forecasts used to support the proposal.

109. In addition, it is recommended that future airspace change consultations and proposals could be improved by providing high and low case traffic forecasts, in addition to base case forecasts, if this information is available.

Conclusions

110. There is no legislation or guidance that precludes overflights of National Parks or AONBs by civil aircraft. However, DAP is guided to pursue policies that will help to preserve the tranquillity of the countryside where this does not increase significantly the environmental burdens on congested areas.

111. Noise produced by commercial aircraft flying above the AONBs will fall well below the level marking the onset of significant community annoyance and is predicted to be below the level for sleep disturbance. However, it is likely that some aircraft noise, albeit at low noise levels, will be experienced.

112. The widening of P600 will result in fewer flights over land using this airway because southbound P600 traffic will route over the sea. Northbound P600 traffic will be routed further inland than currently.

113. At typical heights, noise from aircraft using P600 is unlikely to be an issue for locations beneath the airway. Noise levels from aircraft using the N34 airway are likely to be more audible simply because they will typically be flying at lower heights than those using P600.

114. Worst-case noise levels have been used to illustrate a theoretical situation but in reality they illustrate an impact that is unlikely to occur. In many cases, typical L_{max} noise levels are expected to be below 55 dBA.

115. Those areas not currently beneath controlled airspace (e.g. N34) or likely to experience an increase of flights as a result of widening P600 (thereby enabling a wider distribution of northbound traffic), are likely to experience an increase in noise levels, even though these will typically be below 55 dBA L_{max} . Based upon population count estimates, the number of residents that will be beneath new controlled airspace if the change is implemented is approximately 157,000, whilst those that would experience fewer overflights is approximately 73,000.

116. The likely noise levels of occasional traffic departing southbound from the Belfast TMA through N34 towards Dublin were not portrayed in the consultation material. However, the frequency and mix of traffic operating in this way is not expected to differ from current traffic through what is currently uncontrolled airspace. Therefore, even though not portrayed, this noise impact is not expected to change if the proposal is implemented.

117. The airspace change is expected to result in a reduction in CO₂ emissions on a system-wide basis. Whilst the majority of flights will achieve an emissions benefit if they use the airspace to the extent assumed in the proposal, there are also some flights that will generate an increase in CO₂ emissions (refer to Paragraph 71, second bullet of this report).

118. Tranquillity is a subjective quality for which there is no agreed method of measurement, nor an agreed method for assessing the specific impact of aircraft. However, research to date would suggest that the AONBs that will be overflowed if this airspace change is implemented could reasonably be judged to be relatively tranquil. It is also reasonable to conclude that whilst the extent of the impact upon tranquillity cannot be predicted, there will nonetheless be an impact. This impact should take account of a number of factors relevant to this proposal such as the height of aircraft, their frequency, their timing and their predicted noise levels.

119. There will be different noise impacts for each of the four AONBs and this in turn would result in different impacts upon tranquillity. There are a number of factors that affect the impact, notably any change in typical height of aircraft, and/or any change in frequency or distribution of aircraft. Whilst the impacts upon Lecale Coast AONB suggest a possible improvement in tranquillity, the impacts upon Ring of Gullion suggest a possible deterioration in tranquillity. The impacts upon Strangford Lough AONB and Mourne AONB are less clear, with some areas of each AONB potentially benefiting whilst other areas may experience a reduction in tranquillity.

120. There is no expected direct impact upon biodiversity or local air quality as a result of this proposed airspace change.

121. It is possible that aircraft will be the subject of visual sightings from locations within the AONBs. Whilst the degree of visual intrusion and noise is likely to be reduced in those areas that already experience overflights, it is likely to be a new feature for the areas which are not overflown by commercial aircraft currently.

122. There are a number of environmental impacts that will result from implementing this airspace change. Some environmental factors show a potential negative impact (e.g. noise from commercial aircraft may be audible in areas that do not currently experience aircraft noise), whilst others show a positive impact (e.g. the predicted reduction in CO₂ emissions), and others cannot be objectively assessed but it is probable that they will have some impact (e.g. aircraft over-flying areas that are not currently over-flown may be a source of visual intrusion and may have a negative impact upon tranquillity).

123. With no objective means of comparing the impacts from different environmental factors, it is a matter of professional judgement whether or not an overall environmental benefit will accrue from this airspace change if it were implemented because some factors show a positive impact (i.e. CO₂ emissions) whilst others show a possible negative impact (i.e. noise). In the case of this proposal and its anticipated impacts, because the noise assessment predicts that noise levels will be unlikely to cause additional annoyance or sleep disturbance, it is reasonable to conclude that the emissions benefits outweigh the noise and tranquillity impacts thereby resulting in an overall environmental benefit.

Andrew Green

5 December 2008

Post-script

Further to paragraph 62 regarding the availability of 2008 traffic forecasts from NATS, as at today's date, approved forecasts are still not available.

Andrew Green

26 January 2009

Appendix A

Noise Metrics – additional information extracted from CAP 725.

L_{eq} (Equivalent continuous sound level)

In order to assess environmental noise exposure, it is necessary to consider and take into account the impact of many events over longer periods – days, months, years – living near an airport. These events will generally differ in magnitude; there will be different numbers in each hour or day; and they will occur at different times of day. Most indices for these assessments are L_{eq} – based. Equivalent continuous sound level or L_{eq} is defined as the level of hypothetical steady sound which, over the measurement period, would contain the same (frequency-weighted) sound energy as the actual variable sound.

The most commonly used method of portraying aircraft noise impact in the UK is the L_{eq} noise exposure contour. Noise exposure contours show a set of closed curves on a map. Each contour shows places where people get the same amounts of noise energy – L_{eq} – from aircraft (the 'eq' subscript is an abbreviation of the word equivalent i.e. L_{eq} is the equivalent continuous sound level). They are analogous to the contours on an ordinary map showing places at the same height. Noise exposure is generally used to indicate the noise environment averaged over some time interval.

Research has indicated that L_{eq} is a good predictor of a community's disturbance from aircraft noise. L_{eq} is measured in a unit called dBA, where dB means 'decibel' and the A suffix means A-weighted (which matches the frequency response of the human ear).

L_{max} (Maximum sound level)

The simplest measure of a noise event such as the overflight of an aircraft is L_{max} , the maximum sound level recorded. Diagrams portraying L_{max} for specific aircraft types at a number of locations at ground level beneath the airspace under consideration may be helpful in describing the impact on individuals.

SEL (Sound Exposure Level)

The sound exposure level (SEL) of an aircraft noise event is the sound level, in dBA, of a one second burst of steady noise that contains the same total A-weighted sound energy as the whole event. In other words, it is the dBA value that would be measured if the entire event energy were compressed into a constant sound level for one second.

SEL footprints show the extent of noise energy generated from a single aircraft event, for example, an aircraft either taking off or landing (in contrast to the summing of events in noise exposure). This footprint shows a contour of equal SEL values. Thus, a 90 dBA SEL footprint shows the area in which SEL values are greater than (or equal to) 90 dBA. These footprints are useful in evaluating options by identifying the relative contribution of different aircraft types, routes and operating procedures on the total noise impact.

Footprints are particularly useful in portraying the impact of aircraft movements at night on sleep disturbance. Research has shown that residents tend to be awoken by the noise levels in a single noise event, as measured by SEL, rather than by an aggregation of noise events, as measured by L_{eq} .

Appendix B

Summary of UK Population Counts Provided by NATS

| | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 |
|---|--------------------------------|--|---|----------------------|--|---|
| Cross-reference to Figure 17 in proposal document | Area A | Area B | Areas C1 + C2 | Area C3 | Areas C1 + C2 + C3 | Areas B + C1 + C2 + C3 |
| | Population under existing P600 | Additional population under proposed widened P600 (but which are already beneath other existing CAS) | Additional population under proposed widened P600 (and which are <u>not</u> already beneath other existing CAS) | Population under N34 | Total increase in population beneath new CAS | Total increase in population beneath widened P600 & new N34 |
| | | | | | (Columns 3 + 4) | (Columns 2 + 3 + 4) |
| Scotland | 15,099 | 66 | 365 | 0 | 365 | 431 |
| Northern Ireland | 58,034 | 152,389 | 8,707 | 148,042 | 156,749 | 309,138 |
| Total | 73,133 | 152,455 | 9,072 | 148,042 | 157,114 | 309,569 |