

## Directorate of Airspace Policy



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### **MIDLANDS PHASE 2 (DTY Extension) AIRSPACE CHANGE REVIEW**

#### Introduction

Midlands Airspace Change Proposal (ACP) Phase 2 was introduced on 24 Nov 05. This report details the outcome of a review of the effectiveness of the ACP, 12 months after implementation.

#### Background

Under the terms of its operating licence for En-route operations, NATS is required by the Civil Aviation Authority (CAA) to provide a safe and expeditious air traffic service under strict economic regulation. The sponsor took account of the need to mitigate the environmental impact as far as was possible and the proposal was aimed at the development of the United Kingdom's en-route controlled airspace structure to improve Air Traffic Control (ATC) capacity in the region. The Midlands Phase 2 ACP represented an extension of airspace in the West Midlands, providing one additional track to accommodate air traffic travelling south through the Midlands region. The proposal was not connected to the Government White Paper proposals on 'The Future of Air Transport', and was therefore not related to any plans to expand runway capacity in the Midlands area. Any proposed future changes to the airspace structure would be detailed in separate proposals and would undergo separate consultation.

#### Key Objectives

The redesign and revised arrangements to the airspace both above and below Flight Level (FL) 245 (approx 24,500 feet) were based on a civil need to improve the southbound flow of traffic and increase capacity by 10 - 15%, thereby reducing delay experienced by aircraft in the region. From a Ministry of Defence (MoD) perspective, they agreed that the rationalisation of the Lichfield Radar Corridor (RC) to a single flight level would not compromise their aircraft transiting to and from the low level operating areas to the west.

#### Civil Air Traffic Management (ATM) Requirements

The Midlands region of the UK contains some of the most congested airspace in Europe, including major domestic and international traffic flows serving northern UK, Europe and North America, and is utilised by traffic arriving and departing from the Midlands airports of Birmingham, Nottingham East Midlands and Coventry and the London Terminal Manoeuvring Area (TMA). Prior to the airspace change, the Midlands region generated 16% of UK air traffic enroute delay. The proposal sought to introduce systemisation that would reduce controller workload associated with

each flight, which would, in turn, enable ATC to safely handle more aircraft and help to reduce flight delays. It was expected that the systemisation would enable an increase in the throughput of southbound traffic in the region.

From an economic perspective, the 'Do Nothing' option was calculated to result in a potential cost to airlines of around £214m Present Value (PV), from date of implementation to 2015. NATS estimated the cost of developing the airspace to be £2.3m, and therefore considered the proposal as cost effective

### Military ATM Requirements

While the main requirement of the Midlands Phase 2 ACP focused on civilian capacity and pre-departure delay issues, appropriate dialogue and negotiations took place with the relevant military operators and service providers to ensure that military requirements within the area were accommodated to the extent practicable.

From a Ministry of Defence (MoD) perspective, satisfactory co-ordination procedures with the Manchester Area Control Centre (MACC) were agreed and introduced, that complimented the removal of the need for the NITON slot as part of the West End development, whereby military crossing traffic would now transit through the Lichfield RC at a single level through the Daventry Control Area (CTA), at FL 160, with an option of a co-ordinated climb or descent if required.

### Key Elements

The key safety objective was to enable a reduction in the complexity of the ATC function in the region by segregating key traffic flows, minimising the interactions between climbing, descending and overflying aircraft. The complexity was further compounded by the disparate mix of aircraft types through the region, which led to catch-up situations involving aircraft travelling at different speeds along the same tracks.

Increased ATC capacity – adding one additional track to accommodate southbound traffic would provide controllers greater flexibility in separating aircraft and enable a systemised flow (traffic flows on parallel separated tracks).

Increased volume of Airspace - Proposals incorporated a 4.5nm extension to the west of the existing Daventry CTA and a lowering of the base of associated controlled airspace (CAS) FL145.

Whilst the main requirement for the proposed changes were focussed on civilian ATC needs, MoD operations were factored into the proposal so that their requirements and operational effectiveness were not compromised.

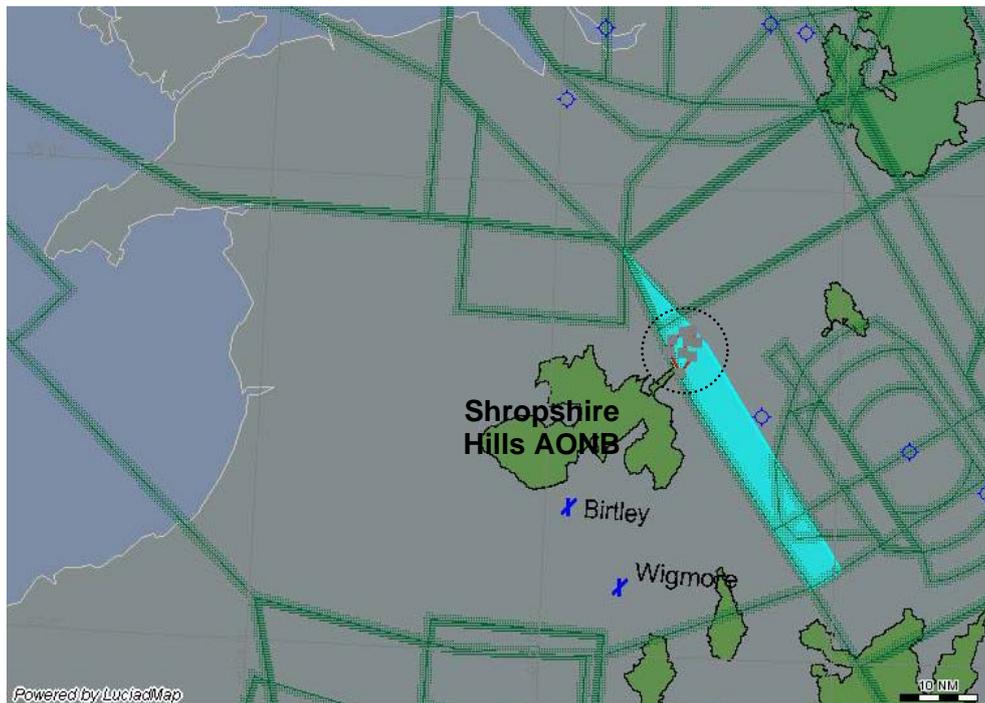
### Areas of Contention

#### Environmental

Although this proposal would not affect airspace below FL145, NATS undertook an extensive environmental consultation exercise in October 2004, which included two individual Areas of Outstanding Natural Beauty (AONBs), Shropshire Hills and The Cotswolds. In the initial consultation document, sent out on 22 Oct 2004, the

airspace changes adjacent to the AONBs were not clearly stated. The sponsor identified that the original information could be misinterpreted, as a result the consultation exercise was repeated in March 2006 and the documents re-issued to clarify the proposed changes.

The new airspace base FL145, overlies a portion of the Shropshire Hills (the Wrekin), which was not over-flown prior to the change. This area is shown circled in Figure 1. NATS believed that the proposal took due account of the required environmental issues whilst also enabling an **efficient** enhancement to the airspace structure. By introducing systemisation of traffic, the airspace structure was designed to deconflict traffic flows; this results in less controller intervention, increasing capacity and helping to ensure more aircraft attain their optimum climb/descent profiles.



**Figure 1: New A34 extension with respect to the Shropshire Hills AONB**

NATS were asked to provide post-implementation data to show the usage of the new airspace. Figure 2, shows the total number of aircraft using the A34 extension on a busy summer day (averaged from the week of 17-23 Jul 2006), broken down by hourly intervals and flight level bands (1000 feet intervals). The actual traffic figures are less than the forecast figures, which predicted that up to 15 aircraft an hour would use the airspace - these figures were not initially projected beyond 2006. It should be noted that the traffic operating below FL145 is made up of military and recreational flights in uncontrolled airspace underneath the A34 extension. These flights existed before the airspace changed and are included for information only. The daily average total number of flights using the new A34 CAS extension was 72 flights per day.

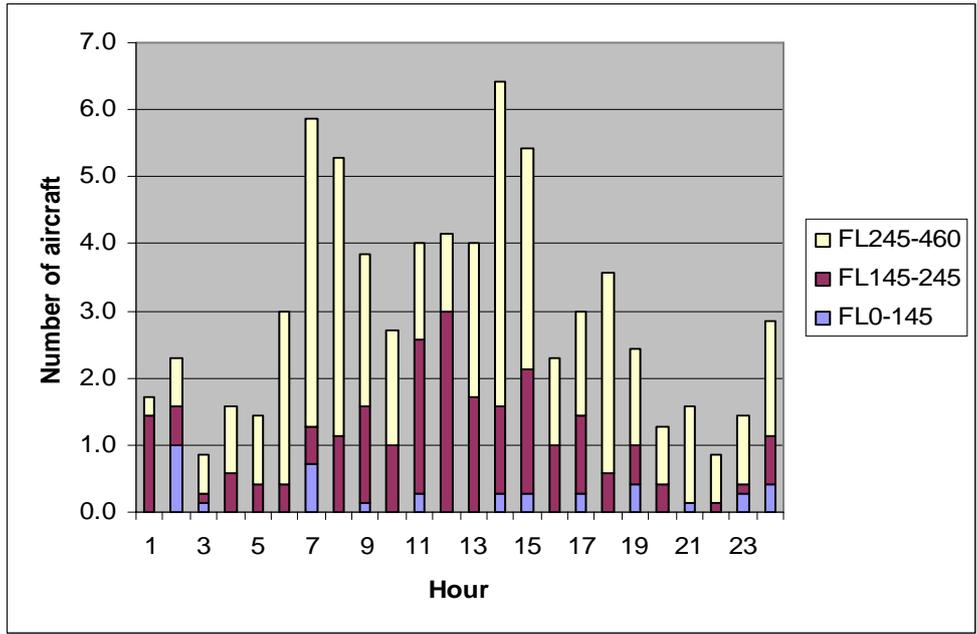


Figure 2: Average number of aircraft per hour using the new A34 extension

Figure 3 is similar to Figure 2, but only includes those flights that passed over the north eastern extremity of the Shropshire Hills AONB in the new airspace. Other than military and recreational general aviation (GA) flights, there were no recorded civil air traffic flights in uncontrolled airspace below FL145 over this area. The average total number of flights per busy summer day using the new airspace and crossing the AONB, for the period examined, was 11.1 flights per day.

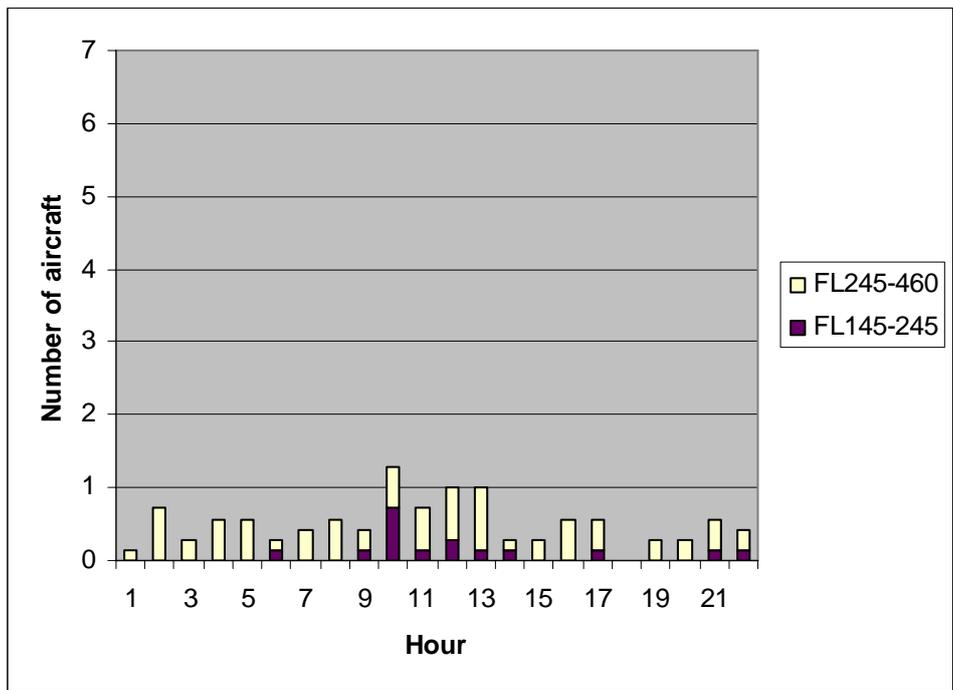


Figure 3: Average number of aircraft per hour over-flying the Shropshire Hills AONB (the Wrekin)

NATS' environmental requirements for the change, laid down in their Airspace Change submission, stated that 'Where possible, routes, particularly those accommodating aircraft at lower levels, should avoid the Shropshire Hills Area of Outstanding Natural Beauty (AONB) and larger populated areas'.

Figure 1, on page 3, shows that only a small extremity of the Shropshire Hills is over-flown by aircraft using the A34 extension and the majority of the AONB is avoided by the A34 extension. Data provided also indicates that above FL145 there is an average of less than one aircraft per hour over-flying the area.

NATS' consultation list was drawn up in accordance with the Airspace Change process, detailed in Civil Air Publication (CAP) 725, and in accordance with guidance from the Secretary of State to the Civil Aviation Authority on Environmental Objectives relating to the exercise of its Air Navigation Functions, under Section 70(2)(d) of the Transport Act 2000. Although the changes did not affect airspace below 7000ft, NATS underwent a process of consultation with relevant County, District and Town councils, as well as the offices of the 2 AONBs, the Countryside Agency and local MPs.

Of the 36 representative bodies consulted, NATS received 23 responses, 18 for the Shropshire Hills AONB and 5 for the Cotswold AONB. 13 objections were received, which fell into the following categories.

- Threat to tranquillity over The Wrekin
- Concerns over the growth in air traffic and the link to the Air Transport White Paper
- The belief that the changes would support the expansion of Wolverhampton airport and/or Cosford airfield
- Objection to NATS presenting its own case and traffic figures
- Objection to the consultation process in that it failed to cascade down to the Parish Councils and pressure groups

Although some objections raised came from groups and members of the public not included in the consultation list, DAP accepted that the consultation had been undertaken in accordance with extant guidance.

A number of those who had originally raised objections to the airspace change continued to register complaints, post implementation, with the CAA and NATS. A small number of additional complaints continued up to Summer 2006, although requests for information on the post-implementation review have been received up to June 2007.

Trying to assess environmental damage from en-route traffic at these flight levels is difficult and although there are guidelines for assessing visual intrusion, there is no methodology in place to accurately predict the degree of intrusion. Indeed, there are certain issues that would mitigate or enhance the impact, such as cloud cover. Noise could also predicate visual intrusion, as could repetition. Implementing tactical vectoring would help mitigate the impact, as would the lack of contrails, not normally evident below 20,000ft. It is therefore considered that the visual impact of the

airspace changes would be greater over the Shropshire Hills AONB because over-flying airways traffic would be lower than those over that area of the Cotswold AONB affected by the changes.

Aircraft noise must also be considered but it is difficult to measure during the en-route phase of flight, as data is not readily available and is normally only measured up to 10,000ft. Above this altitude, figures have to be extrapolated and the spread of information between aircraft and ground receivers is highly variable and is dependant on weather conditions. Notwithstanding the problems obtaining en-route flight data, noise must nevertheless be considered.

Annoyance is an extension of noise issues, and the Government guidelines state that a mean figure of 57 decibels over a 16-hour period should not be exceeded. All measurements connected to this airspace change are well within this limit. There are also concerns that individuals that live in rural areas could be more susceptible to noise than those that live in urban conurbations. However, research undertaken by NASA does not support the view that the degree of annoyance from noise is greater in areas where there is low ambient noise.

### General Aviation

The General Aviation community were consulted via NATMAC, and post-implementation responses from both the PFA and BGA indicate that as the changes occurred at FL145 and above, their activities have not been affected by the change.

## **Effectiveness of Change**

### Safety

An analysis of incident counts and rates (Mandatory Occurrence Reports (MORs) and all reported events) showed that incidents at London Area Control Centre (LACC) have not increased specifically as a result of the Midlands Phase 2 A34 airspace change.

Comparison of reported incidents and MORs showed an increase in reports over all sectors between the periods before and after the resectorisation. This, however, is as a result of increased reporting across the whole organisation and not directly due to the resectorisation. The increase in MORs and incident rates of LACC sectors shows that DTY S experienced no greater increases than other sectors; in fact a smaller increase is evident when compared to the comparable Sector 17, where no airspace change was made.

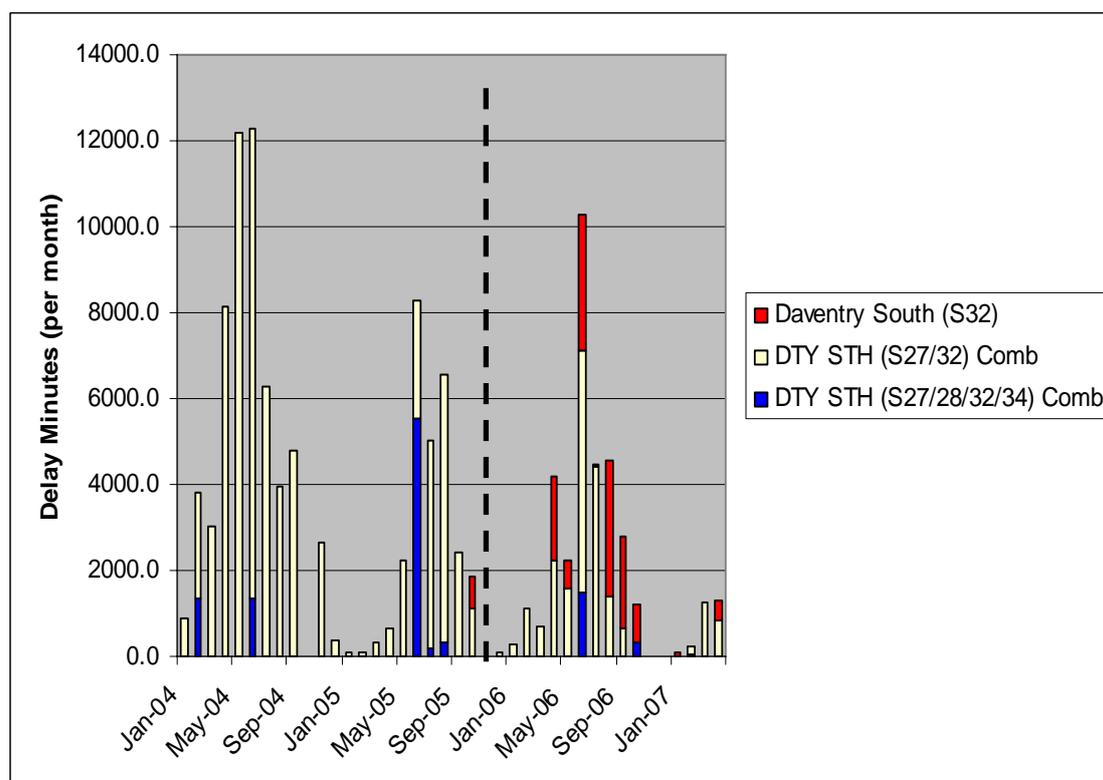
Incident analysis has demonstrated that there is no evidence to suggest incidents have increased as a result of the A34 airspace change at LACC.

Additionally, NATS performed an analysis of the 'structural risk' of the airspace design by analysing radar data to assess the likelihood of aircraft being on converging trajectories whilst in the airspace. Comparing the new airspace structure with the old using this methodology, it was shown that in the new design aircraft are less likely to be on converging trajectories, and the new design gives more time for controller intervention.





passengers on board may have a resulting financial penalty as a result of the delay (missed onward connection, contractual issues etc).



**Figure 5: Delays generated by Daventry sectors Jan 2004 – Apr 2007 (new airspace introduced Nov 2005)**

Following implementation, TC Cowly did not generate any delays up to and including April 2007; the delays for S27/32 (DTY STH) and S27/28/32/34 (DTY) decreased. However, S32 on its own has shown a subsequent rise in delays experienced; two key issues have been identified as the causal factors:

- A significant increase in traffic, particularly Low Cost Carriers operating out of Liverpool, Blackpool, Doncaster and Nottingham East Midlands airfields.
- Since December 2006, the traffic flow manager (Network Manager), in conjunction with the Local Area Supervisors concerned, will work out the least penalising regulation that can be used to manage the spine of the UK. Experience has shown that often, a S32 regulation can control the demand in Lakes, Manchester S29, DTY S, TC Cowly, LUS, LMS and S18. As a result, S32 has been used increasingly as the 'control valve' to regulate a large part of the ATC system.

The introduction of the extension to the Daventry CTA has supported the implementation of outbound speed control procedures for aircraft departing Manchester and Liverpool Airports. This has permitted better integration of the various traffic flows and as a consequence, has led to a reduction in the use of MDIs to regulate the flow of traffic through the UK spine.

## Operational Impact

The 3 units affected by the implementation of the A34 extension were LTCC, LACC and MACC; these units were asked to provide operational feedback on the efficacy of the new design and procedures.

The unanimous response from operational controllers at the 3 units is positive and is highlighted by the following points:

- Introduces systemisation of southbound traffic flows, thereby improving presentation of traffic to TC; this reduces the requirement for controller intervention, minimising workload and coordination.
- The additional controlled airspace allows a greater degree of manoeuvring flexibility and results in aircraft climbing above TC Midlands on a more consistent basis.
- The additional controlled airspace helps to reduce the complexity of traffic on S32; this leads to the Monitor Values<sup>1</sup> being regularly exceeded, allowing a higher throughput of traffic. They are reviewed periodically by ATFM with Watch Supervisory staff and changed accordingly.

## MoD Operations

Feedback received from MoD advises that the changes to the Daventry CTA have had no impact on Military Operations.

## Conclusions

In conclusion, the Midlands Phase 2 (A34) airspace changes have entirely eliminated delay on some sectors, whilst an increase on S32 delays can be attributed to several acceptable, causal factors. NATS' increased capacity of only 1.8% on the Daventry South sectors can be mitigated to a certain extent as staff resource issues have constrained their traffic throughput.

Initial extrapolated traffic figures provided by NATS were based on short-term predictions and did not contain sufficient detail on long-term growth beyond 2006. However, this initial oversight was picked up in the Case Study and NATS were able to provide the required data to satisfy the regulatory requirement.

From a safety perspective, NATS' analysis of the 'structural' risk' model based on the new traffic flows has shown that aircraft are less likely to be on converging trajectories, and the new design gives more time for controller intervention. Incident analysis has demonstrated that there is no evidence to suggest incidents have increased as a result of the A34 airspace change.

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<sup>1</sup> Monitor Values are used by Air Traffic Flow Managers as a guideline, to regulate the numbers of aircraft a controller can expect to work in a given time period, above which regulations are often imposed.

The Consultation process had to be conducted twice by the sponsor due to lack of clarity in the initial documentation, which, potentially, could have led to a degree of ambiguity. Any minor issues raised as a consequence of the operational consultation have been satisfactorily resolved and no other airspace user groups have been affected by the changes. However, from an environmental perspective, NATS carried out their obligations directly in accordance with government guidelines. This proposal was not linked in any way with the Government's 'Future of Air Transport' White Paper, and was therefore not designed or developed to provide increased runway capacity at any Midlands airports. Any outstanding environmental concerns that were raised, particularly with regard to overflight of the Shropshire Hills (Wrekin) AONB, have been compensated for by the operational improvements. Overall, the reduction in flight delays and less complex routeings, combined with increased capacity and a better integration of traffic flows has resulted in a more efficient use of the airspace structure in the region. Following the implementation of the airspace changes, the number of complaints and requests for information has decreased considerably since Summer 2006.

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