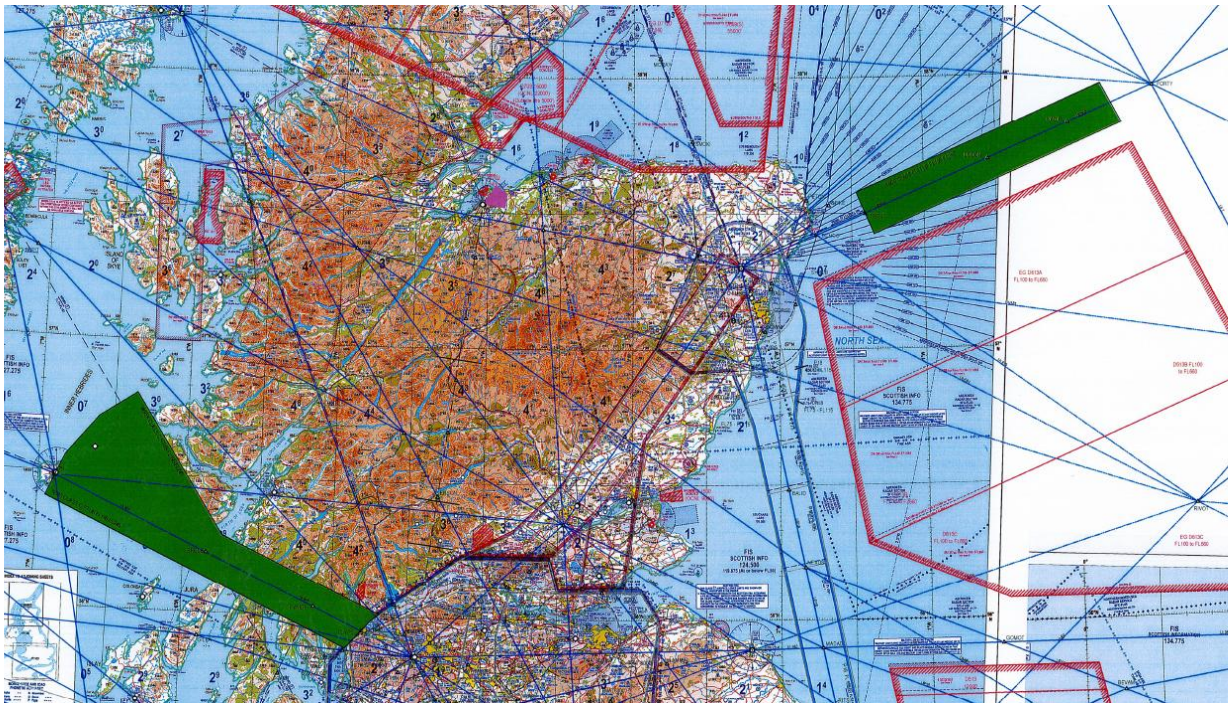
Airspace Change Proposal
Extending Class C Stubs

STAKEHOLDER CONSULTATION



Executive Summary

This document explains changes proposed by NATS to the Class C stubs of airspace in the Scottish AOR on P600 and N580. Class C stubs were originally introduced as a result of the DFL195 change in March 2007 in order to facilitate the connectivity of Class F Advisory routes to the upper air route structure through the military training areas designated as Temporary Reserved Areas (TRA). These Class C stubs provide a level of protection through the TRA as they are a known traffic environment within which all traffic is provided with a radar control service. Outside the Class C stubs, from FL195 to FL245 within an active TRA, services are provided under ATSOCAS.

This proposal seeks to extend the extant Class C stubs on P600 and N580 (introducing a new stub above W958D) such that the typical climb & descent profiles of flights using the airspace will remain within the protection of Class C airspace.

This document contains information from which stakeholders identified as consultees in this process can gain an understanding of the proposal and hence give informed feedback.

This consultation on the proposal follows a process agreed by the Civil Aviation Authority (CAA) which gives consideration to the nature of this proposed airspace change. In accordance with the guidance (Ref.1), NATS is consulting with aviation stakeholders including representatives of General Aviation, airlines and the Ministry of Defence.

Changes very similar to those enclosed herein were consulted upon in September – October 2009, however those changes were not implemented. Now in parallel with the SERA removal of Class F ADRs to be replaced with Class E routes, it is a logical opportunity to improve the Class C stubs.

Guidance has been provided from the CAA that consultation with non-aviation stakeholders is not required on the basis that the change involves no environmental disbenefit.

The period of consultation commences on **13th January 2014** and ends on **10th March 2014**, a period of eight weeks. If the proposal is approved by the CAA, implementation of the airspace change will occur at an appropriate opportunity but, in any event, not before September 18th 2014 (coordinated with the change of the Class F ADRs to Class E). Please send any comments on the airspace change proposal by email to:

AirspaceConsultation@nats.co.uk

Or by mail to:

Consultation Co-ordinator
NATS, Mailbox 10a
4000 Parkway,
Whiteley, Fareham,
Hampshire,
PO15 7FL

1. The purpose of consultation

The primary purpose of the consultation exercise is to allow stakeholders to consider the proposal and provide NATS with feedback. We ask that you consider the dimensions of the proposed Class C stubs, and what impact, if any, they would have on your operations.

At the end of the consultation NATS must demonstrate to the CAA that the best balance possible has been achieved between conflicting demands and objectives. The CAA requires that changes are made only "after consultation, when it is clear that an environmental benefit will accrue or where airspace management considerations and the overriding need for safety allow for no practical alternative" (Ref. 1). It is on this basis that the CAA will decide whether or not to approve the proposed change. Our first priority is safety and this proposed change in airspace classification seeks to provide a higher degree of safety assurance within this area of airspace.

This consultation has been carried out in accordance with guidance provided by the Government and the CAA. (See Ref. 1 & Appendix E: Cabinet Office Code of Practice on Consultation).

Any matters raised during the consultation period that are deemed not to have been adequately considered during the development of the proposed design may require NATS to make changes to the proposal. Any such changes may require further consultation.

2. The scope of consultation

The details of this consultation exercise have been agreed in principle with the CAA in accordance with the requirements of the CAP725 airspace change process (Ref 1). This includes the rationale for who should be involved in the consultation for this proposal.

A full list of all the stakeholders who have been identified as consultees for this proposal is contained in Appendix A.

Non Aviation Stakeholders

The guidance from the CAA has been provided (as referenced in CAP 724 and CAP 725) that consultation with non-aviation stakeholders is not required. This is on the basis that the changes are at high altitude (above FL195) and NATS advised the CAA at the framework briefing that there will be no detriment to the environmental if the proposal is implemented.

Aviation stakeholders

Groups representing airspace users such as the military, general aviation (such as recreational flyers) and commercial air transport are included in this consultation.

3. Description of Proposal

The existing Class C stubs are shown in Figure 1, 3 & 5 below. The stubs (existing and proposed) shown below all extend from FL195-245.

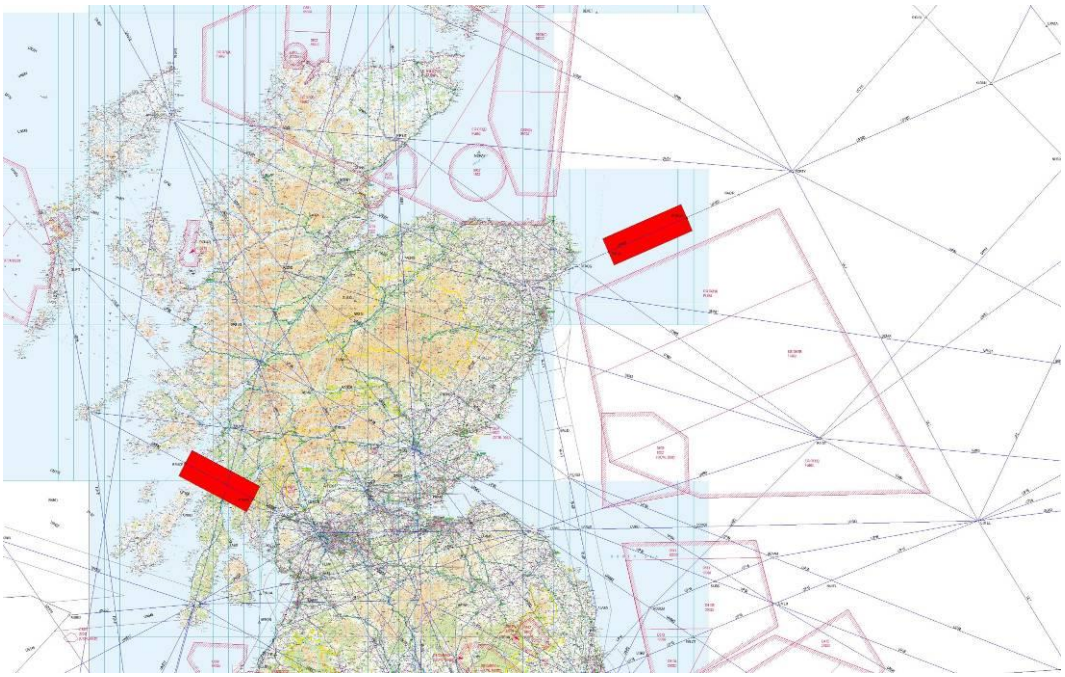


Figure 1 the Existing Class C Stubs

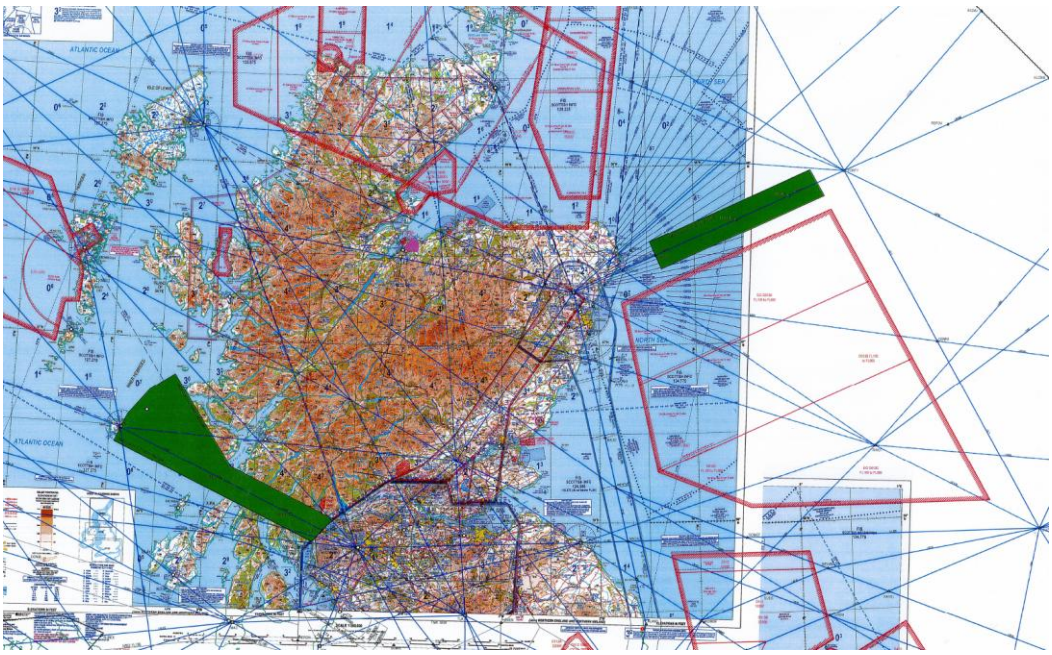


Figure 2 Proposed Class C

The Class C stubs shown in Figure 1 were created as part of the DFL195 project, and introduced in March 2007. They were intended to provide connectivity from the Class F advisory routes, through Temporary Reserved Areas (TRAs), and onto the upper air routes. Where aircraft's climb and descent profiles are contained within the class C stubs, a greater degree of protection is provided to aircraft. This also allows appropriate flight planning for the flights. The stubs are used primarily for traffic transiting to and from the upper airspace to/from Scottish airfields.

Since March 2007 when DFL195 was implemented it has become apparent that the stubs do not fit with current procedures and flight profiles. If a flight profile is not contained within the Class C stub, this can result in numerous changes in the service provided to aircraft.

The proposed Class C stubs are more extensive in order to more-effectively capture the flight profiles. The proposed new stubs are shown in Figure 2, 4 & 6.

N580/W958D

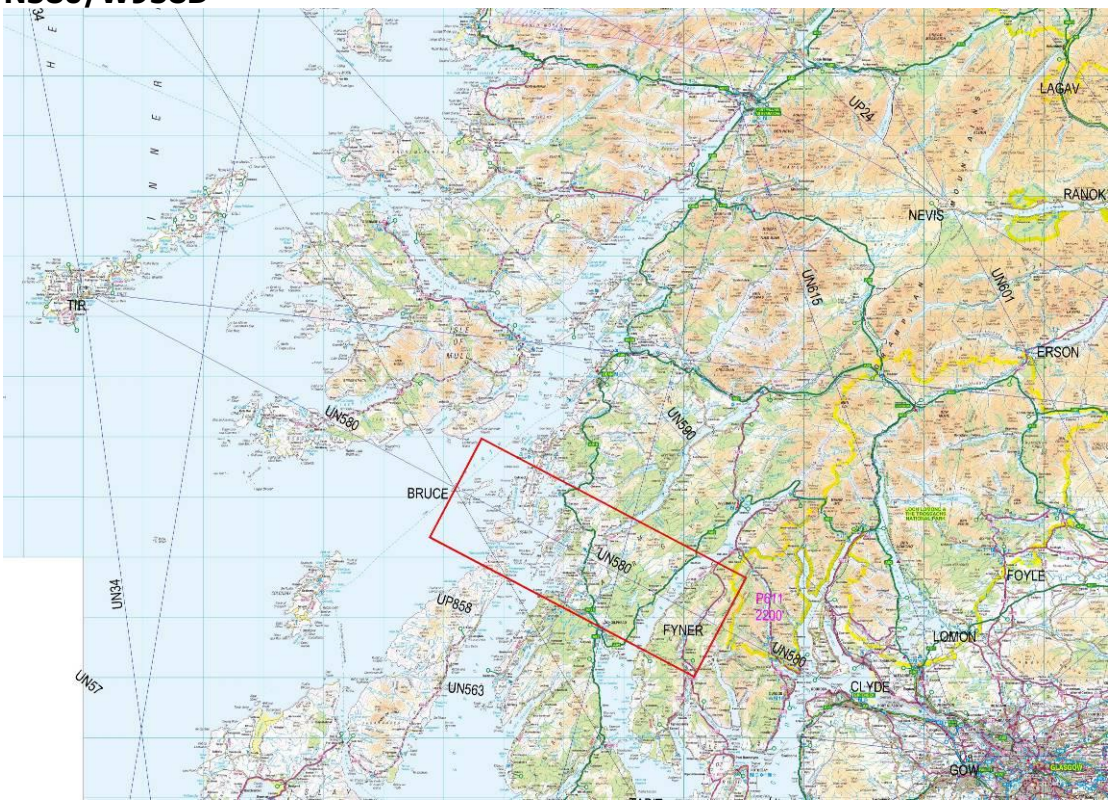


Figure 3 Existing N580 Class C Stub

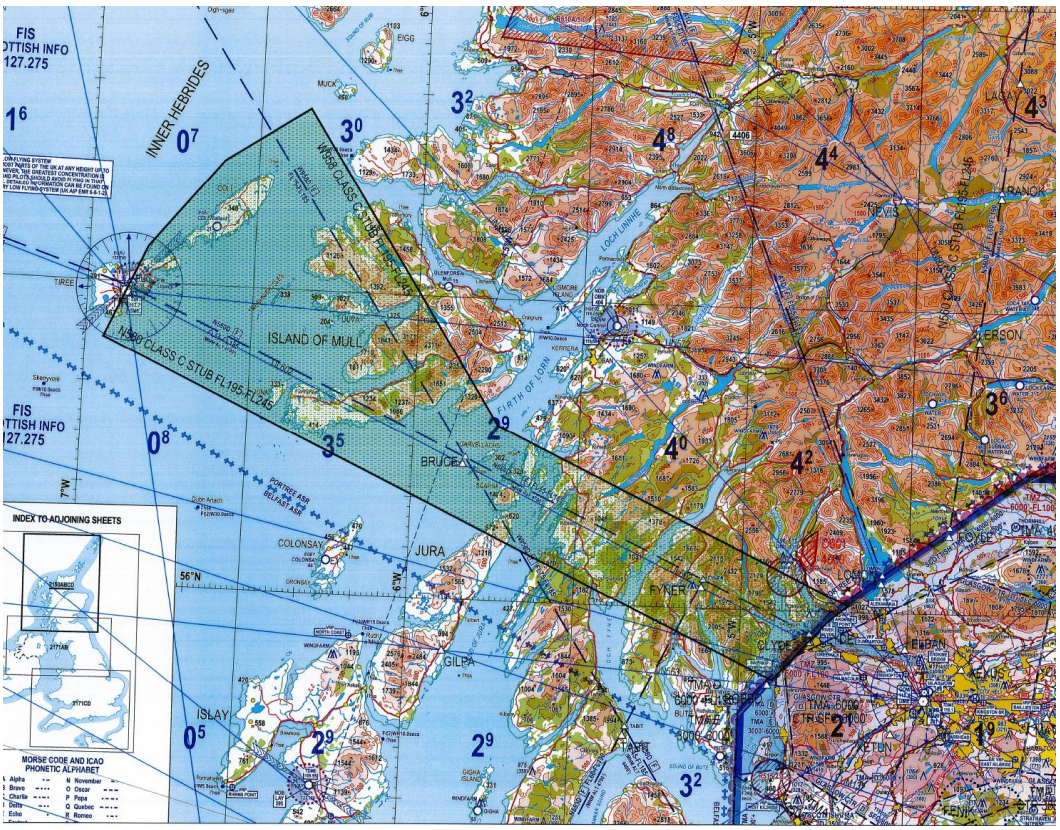


Figure 4 Proposed N580/W958D Class C Stub

Aircraft transiting to and from the Scottish TMA to the upper airspace should ideally make the transition within a Class C environment. ATC procedures state that aircraft descending on UN580 into Glasgow (EGPF) must be at minimum stack level (typically FL70/FL80) by FYNER. In order to meet this restriction a proportion of aircraft miss the existing N580 Class C stub. This causes changes in service provision and does not afford aircraft the protection of the class C stub as was intended.

The proposal is to extend the N580 Class C stub airspace (FL195-FL245) as follows:

- Extend east to abut the Scottish TMA (i.e. extend from FYNER to CLYDE)
- Extend west by 37.5 nm from BRUCE to the TIR VOR,
- Create a new stub from BRUCE 37.5 nm northwest above W958D as shown in Figure 4.
- Fill in the gap between the two spurs of N580 & W958.
- N.B. For flight plan connectivity, N580 AIP definition will start from GOW

This will facilitate an improved service to traffic between the Scottish TMA and the oceanic entry points GOMUP, ERAKA and BALIX when TRA008C is active. (See section 7 for analysis of the potential track mileage savings.)

P600:

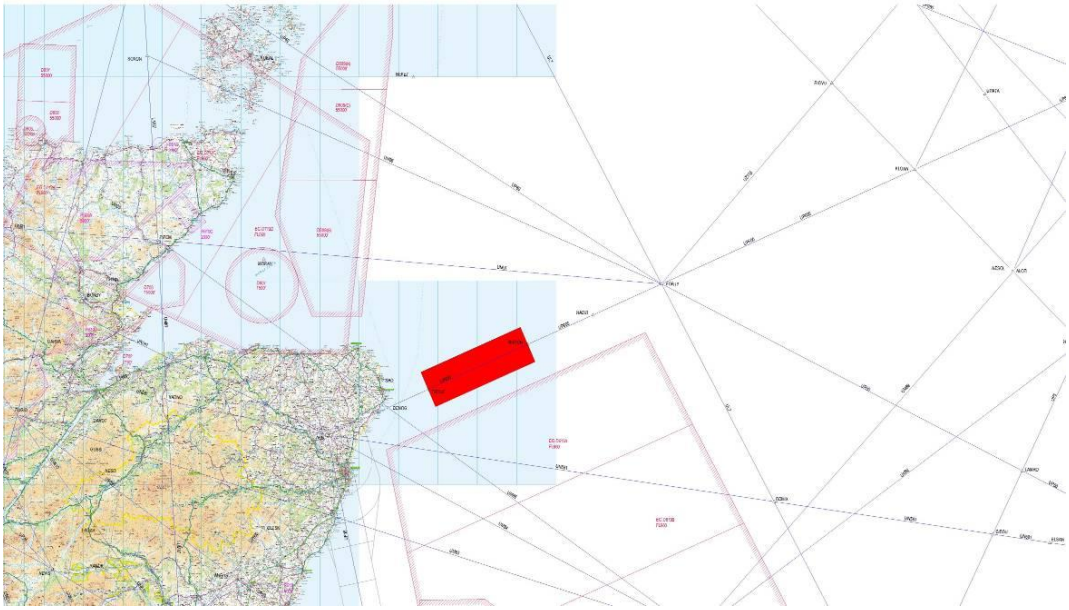


Figure 5 Existing P600 Class C Stub

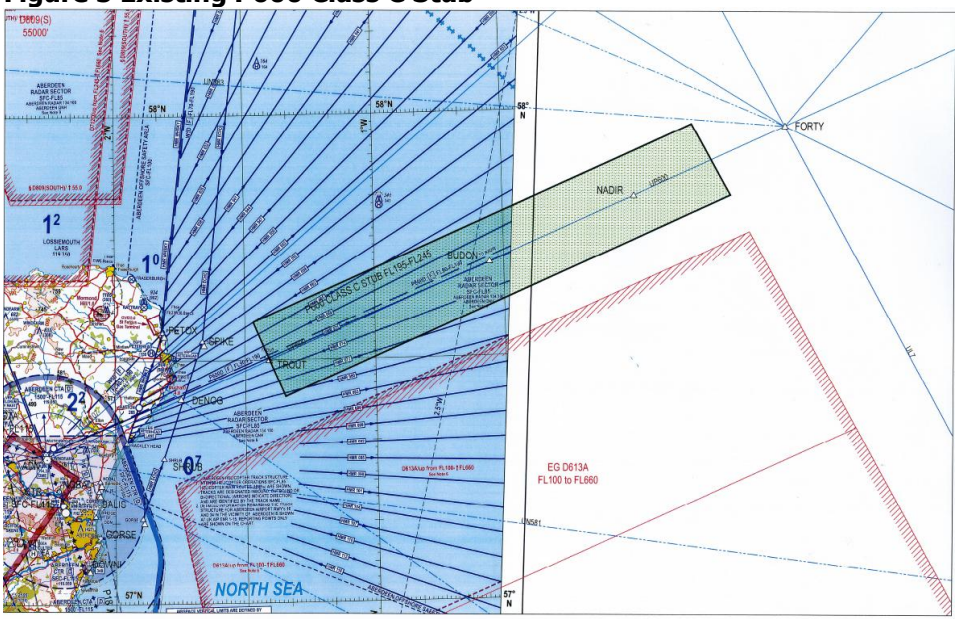


Figure 6 Proposed P600 Class C Stub

Aberdeen traffic: Traffic climbing into and descending from the upper airspace to land at Aberdeen frequently misses the Class C stub due to the climb and descent profile of the aircraft on the route. This results in changes to the level of service and the airspace classification within which the aircraft is flying. The following examples apply to outbounds from Aberdeen, and the reciprocal applies for inbounds

Flights which are captured within the class C stub will be provided a continuous radar control service as follows:

- Class E ADR (P600D - radar control service)
- Class C stub (P600 - radar control service)
- Class C upper air route (UP600 - radar control service).

Flights which miss the Class C stub will be provided with a service as follows:

- Class E ADR (P600D - radar control service)
- TRA (TRA008-ATSOCAS)
- Class C upper air route (UP600 - radar control service).

For flights which are transiting the airspace on P600 the following scenario can also apply above FL195:

GABCD, FL210, BA41, EGPF to ENSV. Route P600/P600D.

The aircraft will receive a Radar Control Service (RCS) until ADN VOR. If TRA008 is active after ADN the aircraft will receive service under ATSOCAS until it reaches the Class C stub at which point it becomes a RCS. When the aircraft leaves the stub the service reverts to ATSOCAS until the aircraft reaches the eastern edge of TRA008 at which point it becomes a RCS again.

The proposed change is to extend the P600 Class C airspace west to align with the eastern edge of the TRA boundary (see Figure 6).

4. Justification

Safety

Safety is the primary driver for this proposal. The Class C stubs proposed herein, provide a level of protection for flights climbing/descending through the TRA. Class C airspace provides a known traffic environment within which all traffic is provided with a radar control service. Outside the Class C stubs, from FL195 to FL245 within an active TRA, services are provided under ATSOCAS, however in the unknown traffic environment of Class E this does not provide the same assurance of separation.

This change to the Class C stubs is linked[1] to the change of Class F ADRs to Class E (scheduled for AIRAC 2014/10 - Sept 18th 2014). As part of that change N580D will be upgraded to CAS (Class E). If the Class C Stubs are not also changed, then the resulting airspace for aircraft as they climb to the upper airspace would be disjointed and potentially confusing. The service provision would yoyo between RCS & ATSOCAS as follows:

- **RCS** in N580,
- to **ATSOCAS** through the active TRA,
- to **RCS** through the Class C Stub,
- to **ATSOCAS** when they come out of the TRA below FL245
- to **RCS** when they climb above FL245.

If the Class C Stubs are changed as proposed, traffic will be under RCS all the way.

Capacity

The capacity of the airspace is not constrained by the existing Class C stubs. Controller workload should be reduced as they will not need to deal with several changes of service

[1] Note: The reason the change to the stubs was not progressed in 2009 was that NATS was waiting for resolution to the Class F airspace issue. The Class F proposals currently being progressed will enable a joined up approach to be implemented, where the Class F and the Class C Stubs are linked, and radar control service can be provided continuously to climbing aircraft.

provision per flight i.e. changes from RCS to ATSAOCAS back to RCS. However the changes proposed will not influence or change the capacity of the airspace.

Environment
The proposed changes will result in a reduction of CO_2 emissions. Most aircraft currently using these routes will continue to do so, flying the same routes and the same profiles. However the N580 stub extension will enable departures from Prestwick and Glasgow to the west, to take shorter routes (see section 7 below). This will save up to 48nm track miles per flight. This will result in a reduction in CO_2 emissions (see section 7).

5. Impact on other Airspace Users.

The change to the controlled airspace structure being sought by this airspace development is described in Table 1 below.

Description of change	NATS justification	Impact on airspace users not controlled by NATS
Lateral extension of P600 Class C sub (FL195-245).	Enable the P600 Class C stub to capture the climb and descent profiles of aircraft departing from/arriving to Aberdeen airport. This will provide a better service to these aircraft and will reduce the safety risks associated with aircraft transiting to/from the upper airways through active TRA and Class E airspace.	Due to the altitude, GA traffic is not impacted by these changes. Subject to agreement of the dimensions of the stubs Military activity will not be adversely affected.
Lateral extension of N580/W958D Class C sub (FL195-245).	Enable the N580/W958D Class C stub to capture the climb and descent profiles of aircraft departing from/arriving to the Scottish TMA airfields. This will provide a better service to these aircraft and will reduce the safety risks associated with aircraft transiting to/from the upper airways through active TRA and Class E airspace.	Due to the altitude, GA traffic is not impacted by these changes. Subject to agreement of the dimensions of the stubs Military activity will not be adversely affected.

TABLE 1: Summary of proposed changes

6. Design options

Since the proposed change is simply a lateral extension of the existing Class C airspace, no alternative new design options are presented. Hence there are only three options:

- "Do nothing" - keep the Class C stub as extant,
- Consider different changes to the lateral dimensions of the controlled airspace.
- Adopt the extended Class C stubs as proposed.

The "do nothing" option was considered and rejected since extending the stubs will bring a real and worthwhile improvement in safety, (for the reasons given in sections 3 and 4).

The dimensions of the stubs as proposed have been optimised for operational acceptability, and have been agreed with the MoD.

7. Environmental effects

This change is primarily motivated by safety. Most aircraft will continue to fly the same routes with the same climb/descent profiles, but with the additional protection of Class C airspace. All flight profiles and routes using the P600 stub will be unchanged by the proposal. In a few specific cases the introduction of the extended N580/W985D stub will allow some flights to be given a shorter routing when TRA008 is active[2]. This will reduce fuel burn and CO_2 emissions. The flights thus affected are detailed below.

Exhaust emissions and fuel burn

For the majority of aircraft, the extension of the Class C stubs will not change the usual trajectories of flights using the airspace. All flights will continue to fly on existing airways.

For a small number of flights a change in routing will be possible as described below. Currently these flights route via the shorter (the proposed route) at present when the TRA is not active. The new stubs will enable them to continue to route by the shorter route when the TRA is active.

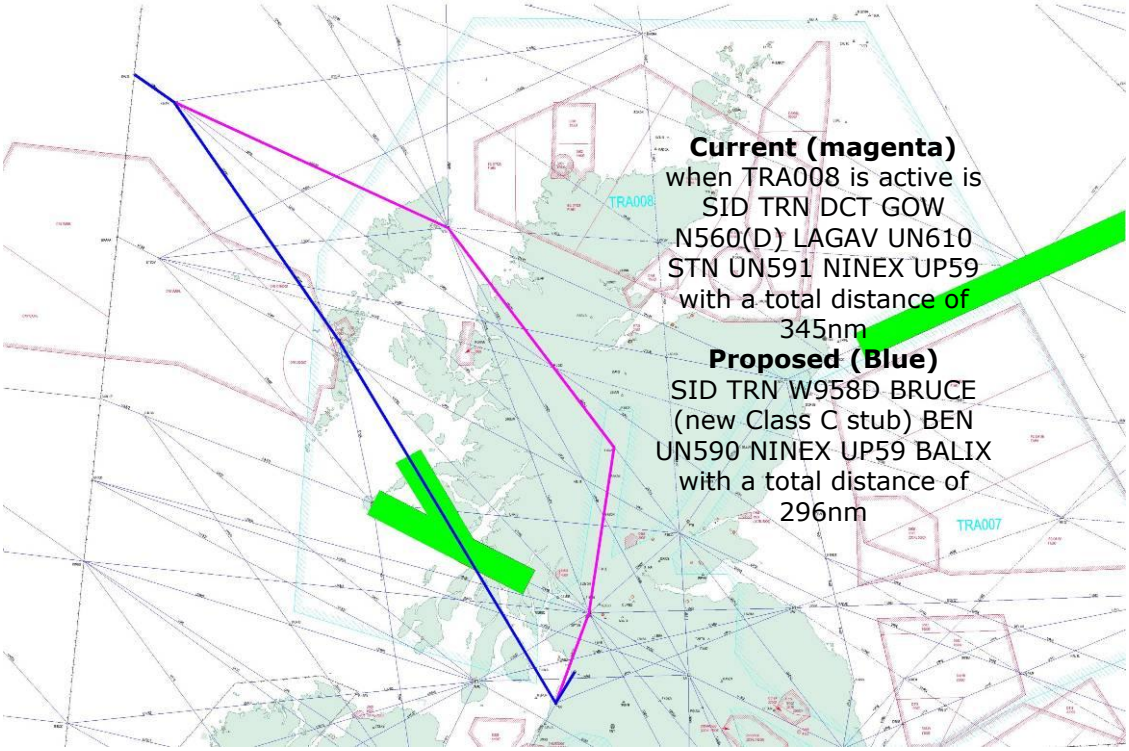


Figure 7 Prestwick (EGPK) – BALIX

[2] TRA008 is typically active Mon-Fri 0730-1700UTC Summer and 0830-1700UTC Winter.

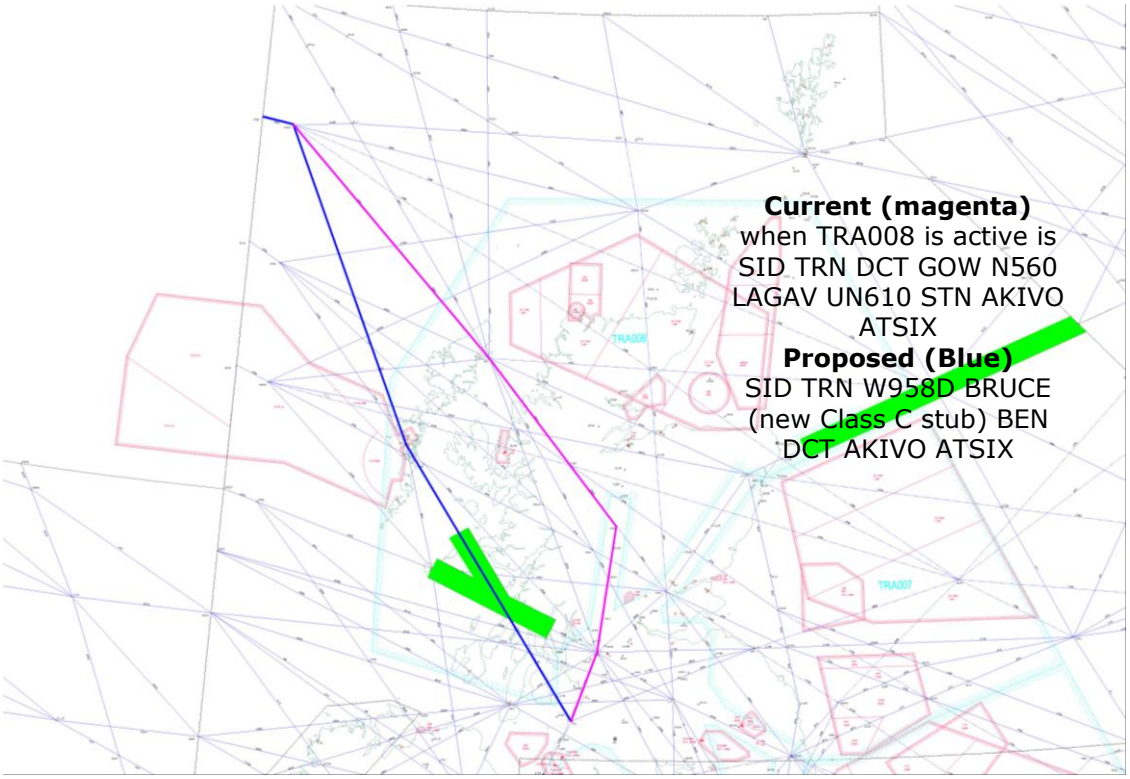


Figure 8 Prestwick (EGPK) – ATSIX

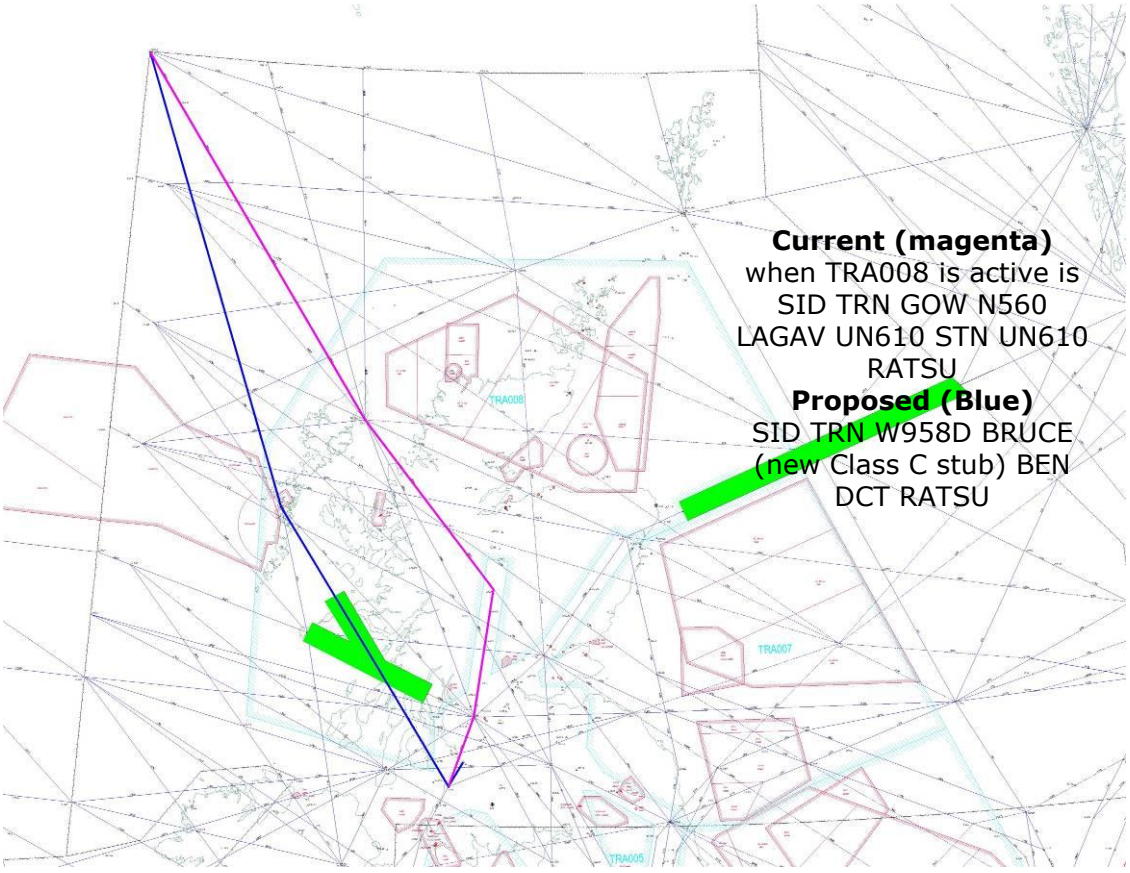


Figure 9 Prestwick (EGPK) - RATSU

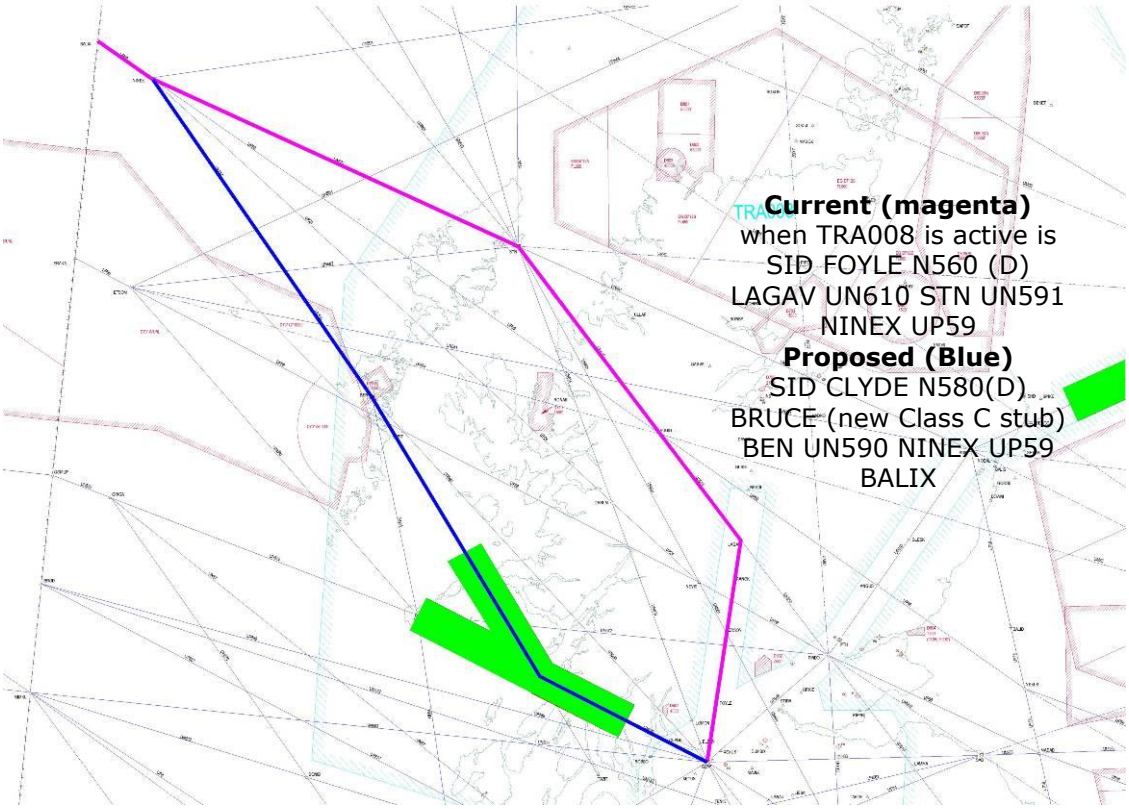


Figure 10 Glasgow (EGPF) - BALIX

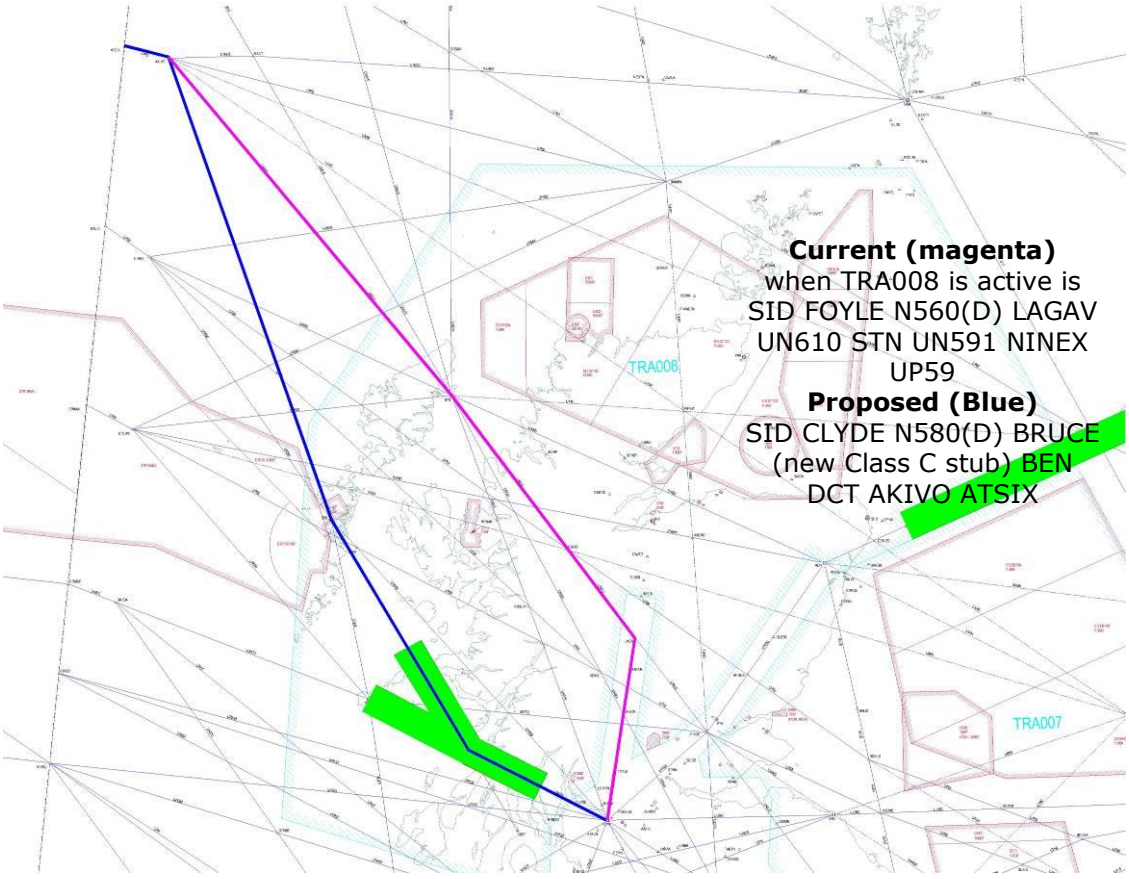


Figure 11 Glasgow (EGPF) - ATSIX

	Ave. no. of flights affected per week	Mileage	Δ Route mileage per flight	Δ Fuel burn per week (Kg) (all flights)	Δ CO2 emissions per week (Kg) (all flights)
Departures					
Prestwick EGPK - BALIX	1	Curr 328 Prop 280	48	1,818.6	5,783.3
Prestwick EGPK – ATSIX	0 (no flights met the criteria)	Curr 361 Prop 334	27	-	-
Prestwick EGPK – RATSU	2.5	Curr 403 Prop 382	21	460.8	1,465.5
Glasgow EGPF - BALIX	0.5	Curr 292 Prop 266	26	179.5	570.8
Glasgow EGPF - ATSIX	0.5	Curr 326 Prop 320	6	39.5	125.7
Arrivals					
Prestwick BALIX - EGPK	0.5	Curr 328 Prop 280	48	99.5	316.6
Prestwick ATSIX - EGPK	0 (no flights met the criteria)	Curr 361 Prop 334	27	-	-
Prestwick RATSU - EGPK	1	Curr 403 Prop 382	21	32.2	102.4
Glasgow BALIX - EGPF	0 (no flights met the criteria)	Curr 292 Prop 266	26	-	-
Glasgow ATSIX - EGPF	0 (no flights met the criteria)	Curr 326 Prop 320	6	-	-

TABLE 2: Summary of route mileage and emissions changes

Table 2 above shows the changes in route mileage and emissions which would result from the implementation of the proposed Class C stubs. It is estimated that the total reduction of CO_2 emissions would be approximately 8,364kg per week (~418 tonnes per year). The CO_2 emissions were calculated using performance data for the aircraft types operating on each route in question (typically B744/B752/B763/DH8A/JS32).

Noise, Tranquillity, Visual Intrusion, Local Air Quality

The proposed new Class C airspace is all above FL195. It is associated with existing airways, which are used routinely every day. For the few flights which would take a different route due to the introduction of the stubs, these routes would using established routes, for the most part, over the sea, avoiding the long legs over the Scottish mainland.

For these reasons and as agreed with the CAA (ref 3) analyses of Noise, Tranquillity, Visual Intrusion and Local Air Quality have not been undertaken.

8. Next Steps

The period of consultation commences on 13th January 2014 and closes on 10th March 2014 which is a period of 8 weeks. Due to the altitude and nature of the proposed changes, consultation is limited to NATMAC members plus specific aviation stakeholders. Wider consultation was not deemed necessary as agreed with the CAA.

We request that stakeholders consider the proposal and provide a written response to us. We request that you reply to this consultation even if you have no objection to the proposal.

When responding, please specify the grounds for supporting or objecting to the proposal.

Details of the consultation exercise will form part of the airspace change proposal that NATS will submit to the CAA for its consideration. Copies of all responses will be provided to the CAA, including any personal information contained in them, except where the respondent requests otherwise. If the proposal is approved by the CAA, implementation of the airspace change will take place at an appropriate opportunity but, in any event, not before Sept 18th 2014.

This implementation date may be affected by the following:

- the length of time taken by the CAA in reaching its decision;
- the need for any revision of the airspace change proposal identified by the consultation process and any further period of consultation required for such revisions and;
- operational constraints.

Responses should be sent by email to:

airspaceconsultation@nats.co.uk (please include "Class C stubs" in the subject)

Or by mail to:

Consultation Co-ordinator
NATS, Mailbox 10a
4000 Parkway,
Whiteley, Fareham,
Hampshire, PO15 7FL

Having considered the consultation responses, once NATS is satisfied that the proposal achieves the appropriate balance between all the stakeholder requirements, a formal airspace change proposal will be submitted to the CAA for consideration as per the airspace change process (Ref 1). This will include a full record of all feedback from this consultation.

Comments regarding NATS' compliance with the consultation process as set out in the CAA's guidelines for airspace change process (Ref 1) should be directed to the CAA at:

Head of Business Management
Directorate of Airspace Policy
CAA House
45-59 Kingsway
London, WC2B 6TE
E-mail: businessmanagement@dap.caa.co.uk

9. References

1. CAP 725, CAA Guidance On The Application Of The Airspace Change Process, March 2007, CAA Directorate of Airspace Policy
   http://www.caa.co.uk/docs/33/CAP725.PDF

2. CAP 724, CAA Airspace Charter which defines the authorities, responsibilities and principles by which the CAA Director of Airspace policy conducts the planning or airspace and related arrangements in the UK.
   http://www.caa.co.uk/docs/33/CAP724.PDF

10. Glossary

ATC	Air Traffic Control
ATS	Air Traffic Control service
ATSOCAS	Air Traffic Control service outside controlled airspace
CAA	Civil Aviation Authority
CTA	Control Area
CTR	Control Zone
FIR	Flight Information Region
IFR	Instrument Flight Rules
NATMAC	National Air Traffic Management Advisory Committee
RCS	Radar Control Service
SARG	Safety and Airspace Regulation Group (the department of the CAA responsible for airspace matters)
SID	Standard Instrument Departure
Squawk	Transponder code
TMA	Terminal Manoeuvring Area
TRA	Temporary Reserved Area (used for military training)
VFR	Visual Flight Rules

Appendix A: List of Stakeholders

NATMAC (National Air Traffic Management Advisory Committee)
Light Aircraft Association (LAA)
MOD Directorate of Aviation Regulation & Safety (DARS)
British Parachute Association (BPA)
CAA Safety Regulation Group (SRG)
European UAV Systems Centre Ltd
Light Airlines
British Gliding Association (BGA)
PPL/IR Europe
UK Airprox Board
British Airline Pilot's Association (BALPA)
CAA Safety Regulations Group (SRG)
Guild of Air Pilots & Air Navigators (GAPAN)
Guild of Air Traffic Control Officers (GATCO)
General Aviation Safety Council (GASCo)
British Hang Gliding & Paragliding Association (BHPA)
British Airports Authority (BAA)
HQ Director of Defence Airspace and Air Traffic Management (DAATM)
Helicopter Club of Great Britain (HCGB)
Aviation Environment Federation
UK Flight Safety Committee
British Business & General Aviation Association (BBGA)
Airport Operators Association (AOA)
British Model Flying Association (BMFA)
Ministry of Defence
British Helicopter Association (BHA)
United States Air Force (USAF) 3 AF-UK/A3
Aircraft Owners and Pilots Association (AOPA)
MOD Flight Test Regulator
National Air Traffic Services (NATS)
British Airway
Civil Aviation Authority (SRG)
MOD HQ Director Army Aviation (DAAvn)
British Balloon & Airship Club (BBAC)
British Microlight Aircraft Association (BMAA)
BAE Systems
British Air Transport Association (BATA)
Heavy Airlines

Airlines (Current EGPF/PK transatlantic operators & EGPD Scandanavian)
BMI
Continental Airways
Eurojet
First Choice
Flybe
Globespan
Loganair
Ryanair
Thomas Cook
US Airways
Virgin Airways
Eastern Airways.
Wideroe Airlines.
SAS
Delta Airlines.
SAS Braathens (Scanor).

Appendix B: Overview of Structure and Operation of UK Airspace[3]

The airspace over the UK is a national asset and finite resource. The safe and efficient utilisation of our airspace is vital to both the UK economy and national defence. Accordingly, it is essential that UK airspace be provided, as far as possible, for the benefit of all users.

In simple terms, UK airspace, from ground level to approximately 66,000ft, is categorised as being either 'Controlled Airspace' or 'Uncontrolled Airspace':

Controlled airspace is established for the protection of aircraft during the various phases of flight and to facilitate a safe and expeditious flow of air traffic. Any aircraft operating within controlled airspace require an air traffic control (ATC) clearance and must comply with the instructions issued. Controlled airspace is therefore, in most cases, a 'known environment', i.e. all traffic is known to the ATC system.

Commercial, passenger-carrying aircraft operate almost exclusively inside controlled airspace. Controlled airspace can be divided into 5 main types:

- Control Zones, which extend from ground level and surrounding major airports
- Control Areas, which do not extend down to the ground but have base levels above the ground
- Airways, which are corridors of controlled airspace that form the main routes connecting major airports and are a form of Control Area
- Terminal Control Areas, which are larger Control Areas established around groups of airports where several airways converge
- Upper Airspace that comprises all UK airspace from FL245 (24,500ft) upwards.

Whilst within controlled airspace standard routes are published as a template for planning purposes, air traffic controllers may use the full lateral and vertical extent of this protective airspace. In fact, the ability for controllers to tactically position aircraft is essential in ensuring the most effective flow of traffic, placing the safe separation and sequencing of aircraft above all other considerations. Consequently, aircraft will not necessarily follow exactly the same flight paths. However, the closer aircraft are to the airport of arrival or departure the less flexibility exists to adapt their flight profiles. For example, an aircraft five miles from touchdown needs to be aligned with the runway and therefore is likely to be in exactly the same piece of sky that the aircraft ahead occupied. The further from touchdown, the more variation in positioning is likely to exist because of the requirement to achieve the safe separation in the sequencing of arriving aircraft.

Only the controlled airspace established in the immediate vicinity of major airports extends down to the ground. As indicated previously, most areas of controlled airspace have base levels of several thousand feet above the surface.

Detailed maps and charts depicting the UK's airspace structure can be purchased from several commercial outlets.

Uncontrolled airspace: the airspace outside controlled airspace extends from ground level to 19,500ft or to the base of controlled airspace where this is lower.

Although 'uncontrolled', pilots can request a range of Air Traffic Services (ATS) within such airspace from a variety of civil and military ATS providers. These services range from the mere provision of information to a radar service in which controllers provide sequencing and separation instructions.

Uncontrolled airspace is airspace within which receipt of an ATS, whilst often available, is not an absolute requirement. Pilots can operate without talking to ATC and without a specific air traffic clearance. They

[3] Text from Directorate of Airspace Policy Environmental Information Sheet – Number 3
web address - www.caa.co.uk/default.aspx?catid=7&pagetype=68&gid=295

therefore fly on a 'see and avoid' basis such that they can determine their routes according to their own requirements. Such activity is subject to compliance with the basic Rules of the Air Regulations and any weather, airspace, pilot or aircraft licensing limitation. The majority of military, instructional and recreational flying takes place in uncontrolled airspace.

ATC Organisation: Responsibility for the provision of ATC services in the UK lies with both civil and military service providers that provide a service to both civil and military aircraft within their areas of responsibilities. For the most part and in very general terms, activity inside controlled airspace is managed by NATS (Enroute) plc, whose operation is regulated by the Civil Aviation Authority. Much of NATS' activity is conducted from three control centres:

- **NATS Swanwick (Area Control and Terminal Control):** from where the flow of traffic in UK airspace south of 55 degrees North (over England and Wales) in the Upper Airspace, along the Airways system and within the high levels of Control Areas is managed; also from where the flow of traffic inbound to and outbound from the major airports in the South East of England is managed.
- **NATS Prestwick (Scottish and Oceanic Area Control Centre ScOACC):** from where the flow of traffic in UK airspace bound to and outbound from the major airports in the Manchester region; north of 55 degrees North; in the Upper Airspace; along the Airways system and within the high levels of Control Areas is managed.

Appendix C: A Brief Outline of Air Traffic Control Principles

Introduction

The UK contains many large airports each of which generates significant volumes of air traffic. As a result the UK is recognised as having some of the most complex airspace structures and procedures in order to ensure the safe passage of aircraft flying through its airspace.

Air Traffic Control (ATC) is a service provided to afford a safe, orderly and expeditious flow of air traffic. The vast majority of commercial airliners and other large aircraft plan their routes along Air Traffic Service (ATS) routes. These routes are protected by volumes of controlled airspace in which the position, height and intentions of aircraft are both known and controlled by ATC.

The details of each flight's proposed route form an individual "Flight Plan" that is used by aircraft operators to advise ATC of the proposed route to be flown between departure and destination airports.

Controlled Airspace and ATS Routes

Further out from an airfield aircraft are generally at higher altitudes or levels whilst they climb to, or descend from, their cruising flight levels. This permits the controlled airspace to be arranged in steps thereby allowing other (typically non-commercial) aircraft that are not in receipt of an ATC service to operate freely in uncontrolled airspace below or laterally clear of the ATS route.

ATS routes are themselves surrounded by volumes of controlled airspace which must extend a minimum of 5 nautical miles either side of the route centreline. These are established to protect aircraft during the en-route phase of flight. Large Control Areas are established in certain areas that contain many ATS routes.

Aircraft wishing to operate within controlled airspace must submit a flight plan and gain a clearance to enter from an ATC unit. On entering controlled airspace aircraft must obey all ATC instructions and maintain radio contact.

An aircraft flying within controlled airspace will therefore be operating within a known environment in which the Air Traffic Controller can safely separate it from all other aircraft operating within the controlled airspace. So long as an aircraft is flying within controlled airspace, it will also remain safely separated from aircraft flying freely outside of the controlled airspace environment.

Uncontrolled Airspace

Controlled airspace is delineated by a specified boundary and outside of this boundary the airspace is known as uncontrolled airspace. Within uncontrolled airspace aircraft operate with relative freedom without being in receipt of any Air Traffic Control Service and therefore are operating in what is sometimes referred to as an "Unknown" environment, i.e. the intended flight profile of aircraft is unknown. Aircraft routinely operating within uncontrolled airspace include light general aviation aircraft, military aircraft, helicopters, hot air balloons and gliders. Wherever possible, commercial passenger aircraft operate within the confines of controlled airspace for the protection that this environment affords compared to operating within an uncontrolled and unknown environment. However, some airports, due to the small volumes of commercial air traffic operating from them, are not protected by controlled airspace.

Route Centrelines and 'Vectoring'

The centreline of an ATS route is generally defined by navigational beacons or known positions called fixes. Aircraft navigate between these beacons and fixes when following ATS routes (see Figure C1 depicting an example of a simplified airspace structure).

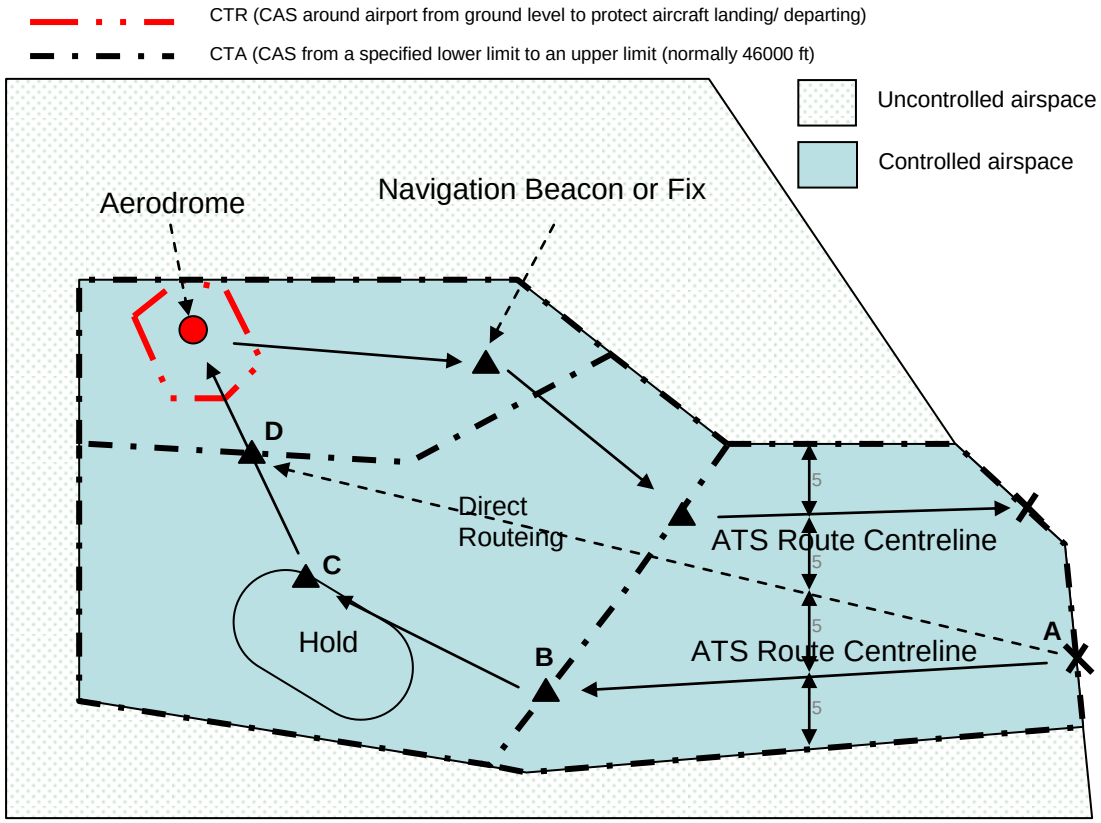


Figure C1 Simplified example of airspace structure.

Although aircraft flight-plan their routes by reference to these ATS Route centrelines, aircraft are still deemed to be on the route as long as they remain within 5 nautical miles of its centreline. The controlled airspace associated with an ATS route extends a minimum 5 nautical miles either side of the promulgated route centreline. This is to allow for any navigation inaccuracies by the aeroplane and to provide space for ATC to separate any conflicting traffic using radar (i.e. by directing aircraft onto separated tracks within the boundaries of controlled airspace). Each aircraft files a flight plan setting out the route it plans to follow (such as shown in Figure D1 from point A to B to C to D). However, in order to provide a safe and efficient service, ATC may direct aircraft to take a more direct route anywhere within controlled airspace e.g. straight from A to D. This may reduce the distance that has to be flown to reach the destination. ATC may also direct aircraft off a route to ensure separation is maintained from other traffic, by instructing them to fly a magnetic heading (referred to as "vectoring").

ATC separate aircraft both vertically and horizontally. The vertical separation applied between aircraft in controlled airspace is a minimum of 1000ft. The minimum horizontal separation between aircraft separated by less than 1000ft vertically is 3 nautical miles. Within a large portion of UK airspace this 3nm minimum lateral radar separation is increased to 5 nautical miles due to the radar systems we employ.

Although Airspace Change Proposals define new and revised ATS routes by their centrelines it should be noted that these must be supported by a minimum of 5 nautical miles of controlled airspace either side of the centreline and between specific lower and upper limits. This is because aircraft can be directed anywhere within the full extent of established controlled airspace, and not just along the promulgated ATS route centreline.

Airspace Definitions (Altitudes and Flight Levels)

Volumes of controlled airspace are generally defined by specifying a lateral boundary and vertical extent.

Vertical boundaries may be defined in either altitude (in feet) or Flight Levels (FLs). Note that one FL relates to 1000ft, i.e. FL70 equates to 7000ft. Altitudes are generally used to define the height of an aircraft in the lower volumes of airspace (generally operating below 6000ft in controlled airspace in the UK) as it is the most effective unit to use to determine aircraft position relative to the ground, therefore enabling an aircraft to avoid high ground etc. Flight Levels are generally used in higher volumes of airspace (generally operating above 6000ft in controlled airspace in the UK) where the vertical separation of one aircraft relative to another aircraft is more important compared to their heights above ground.

The difference in the units is because altitudes (in feet) are affected by variations in local atmospheric pressure, whereas FLs are based upon a universal unit of pressure (1013 Millibars) that is unrelated to local atmospheric conditions. This means that all aircraft equipment should agree on where FL100 is, as all aircraft flying at Flight Levels will set a common datum of 1013Mbs on their barometric altimeter. This common view of aircraft level enables more efficient and consistent vertical separation.

It should be noted that as Flight Levels do not take into account local atmospheric pressure, they do not represent a fixed reference point above the ground, therefore depending on the actual local pressure in any area an aircraft at a given Flight Level may seem to be slightly higher or lower in the sky (although such variation would not usually be noticeable to an observer viewing from the ground).

Appendix D: ICAO Airspace Classification

The International Civil Aviation Organization (ICAO) airspace classes are fundamentally defined in terms of flight rules and interactions between aircraft and Air Traffic Control (ATC). Some key concepts are:

- Separation: Maintaining a specific minimum distance between an aircraft and another aircraft or terrain to avoid collisions, normally by requiring aircraft to fly at set levels or level bands, on set routes or in certain directions, or by controlling an aircraft's speed.
- Clearance: Permission given by ATC for an aircraft to proceed under certain conditions contained within the clearance.
- Traffic Information: Information given by ATC on the position and, if known, intentions of other aircraft likely to pose a hazard to flight.

The classifications adopted by ICAO are:

Class A: All operations must be conducted under Instrument Flight Rules (IFR) or Special visual flight rules (SVFR) and are subject to ATC clearance. All flights are separated from each other by ATC.

Class B: Operations may be conducted under IFR, SVFR, or Visual flight rules (VFR). All aircraft are subject to ATC clearance. All flights are separated from each other by ATC.

Class C: Operations may be conducted under IFR, SVFR, or VFR. All flights are subject to ATC clearance. Aircraft operating under IFR and SVFR are separated from each other and from flights operating under VFR. Flights operating under VFR are given traffic information in respect of other VFR flights.

Class D: Operations may be conducted under IFR, SVFR, or VFR. All flights are subject to ATC clearance. Aircraft operating under IFR and SVFR are separated from each other, and are given traffic information in respect of VFR flights. Flights operating under VFR are given traffic information in respect of all other flights.

Class E: Operations may be conducted under IFR, SVFR, or VFR. Aircraft operating under IFR and SVFR are separated from each other, and are subject to ATC clearance. Flights under VFR are not subject to ATC clearance. As far as is practical, traffic information is given to all flights in respect of VFR flights.

Class F: Operations may be conducted under IFR or VFR. ATC separation will be provided, so far as practical, to aircraft operating under IFR. Traffic Information may be given as far as is practical in respect of other flights.

Class G: Operations may be conducted under IFR or VFR. ATC separation is not provided. Traffic Information may be given as far as is practical in respect of other flights.

Classes A-E are referred to as controlled airspace. Classes F and G are uncontrolled airspace.

Appendix E: Cabinet Office Code of Practice on Consultation

Text from Cabinet Office Code of Practice on Consultation
web address - www.berr.gov.uk/files/file47158.pdf

The seven consultation criteria are:

1. When to consult
Formal consultation should take place at a stage when there is scope to influence the policy outcome.

2. Duration of consultation exercises
Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.

3. Clarity of scope and impact
Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.

4. Accessibility of consultation exercises
Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.

5. The burden of consultation
Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.

6. Responsiveness of consultation exercises
Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation
.

7. Capacity to consult
Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.