



UK Airspace Modernisation

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Delivering a Sustainable Future for VFR Operations

Introduction

1. Part of the UK Airspace Modernisation Programme, this document sets out a plan for sustainable VFR operations in a modernised UKFIR and forms the basis for the FASVIG programme of work 2018/19. Developed from earlier work¹ to understand the causes of airspace infringement, the document examines why other European states do not appear to suffer the volume of infringements occurring in the UK FIR. It describes examples of the structural and operational differences between the segregated UK airspace model and the integrated model found elsewhere, and proposes change. Structural and procedural building blocks that make up an integrated model are reviewed for their potential to reduce infringement risk and to deliver increased operational efficiency for VFR traffic for the benefit of the whole UK aviation sector.

2. The document identifies inefficiencies and conflicts in priority in airspace policy, design and implementation, but it also proposes evidence-based change through utilising the accuracy of RNAV to increase VFR-accessible airspace. This would encourage low-level free-routing using electronic conspicuity to reduce the need to interact with ATS, so releasing resources for commercial operations and reducing infringements. The programme seeks to deliver policies to be implemented by the beginning of Reference Period 3 in 2020. This can only be achieved with the active participation of the CAA, with alignment to the FASIIG programme, and with support from the commercial air transport sector.

The Strategic Context

3. Within the UK Future Airspace Strategy (FAS), FASVIG is charged with delivering a sustainable future for VFR operations. This is part of the Government's and the CAA's drive to modernise airspace and increase the efficiency of air operations for the benefit of all airspace users and the national economy. The FASVIG contribution is key to the Government's General Aviation Strategy that "*the UK will be the best place in the World for GA and reverse the decline in the sector*"². Since the FAS was launched in 2011, the commercial air transport sector has made sustained progress towards its goal. However, the GA sector, which is the principal user of VFR, has seen its costs increased markedly, while available airspace and its associated services have decreased. Unlike other European states, the UK operates a segregated airspace structure using airspace classifications which exclude VFR flights or which demand interaction with ATS and clearances which may not be available. The steady increase in regulated airspace, and loss of services as air

¹ FASVIG Report and Recommendations Airspace Infringement Seminar 31/10/2016
FASVIG Data Analysis for Infringement Workshop 12/7/2016

² DfT General Aviation Strategy March 2015- Vision page 8



transport expands, is having unacceptable consequences for the segregated model as evidenced by dissent from VFR users and an increase in infringement rates.

4. Most VFR operations can be conducted efficiently in Class G airspace without the need to actively interact with ATS. However, the expansion of regulated airspace has reduced available Class G airspace and restrictions in available ATS no longer permit routine access to much regulated airspace. Airspace policies designed in the days of low-volume traffic and rudimentary navigation aids have not changed to match the investment made by airlines and airports in modern equipment and practices. Infringement levels have increased and represent a risk to the development of an efficient commercial air transport sector. Meanwhile, VFR operations become increasingly difficult to operate and the GA sector is unable to flourish in the way that Government intended in its 2015 strategy, the European Commission set out in its Agenda for a Sustainable Future³, and the European Parliament endorsed in its resolution of 3 February 2009⁴.

5. FASVIG has attempted to deal with legacy issues, aiming to improve the effectiveness of VFR operations, reduce airspace infringements and enable VFR operations to co-exist with an expanding commercial sector. Whilst FASVIG has had some success, airspace policy and its commercial application is reinforcing segregation which is working against the task. Further work on the present basis alone is likely to be of limited utility. European states which employ an integrated airspace model do not appear to suffer the level of infringement risk evident in the UK FIR, and their VFR activity appears to be flourishing. All airspace users appear to be able to use airspace in a balanced and operationally practicable manner without placing a load on the ATS system, and with no detriment to the operational effectiveness and safety of commercial air transport operations. The structure of UK airspace is substantially different to that in other European states and is not wholly aligned with ICAO. Although there is considerable variation within other states, they operate a more integrated model than the UK. Because of the significant differences, European VFR operators find it difficult to fly with assurance in UK airspace, as evidenced by their proportionately greater infringement record. Similarly, UK-trained pilots, versed in the singular UK airspace model, have difficulty understanding the integrated model used in other states.

6. If UK airspace modernisation is to be successful and support the growth for all aviation sectors in a safe and sustainable manner, a change in airspace policies, structures, implementation and regulation is needed towards a 'Single Sky' for VFR operations; something which is notably absent for UK non-commercial operations.

The UK Airspace Model 2017

7. From the viewpoint of the commercial pilot there is no discernible difference in operating in the UK or in other European states, although the airspace structures

³ An Agenda for Sustainable Future in General and Business Aviation 11.1.2007 COM(2007) 869

⁴ European Parliament resolution of 3 February 2009 on an Agenda for Sustainable Future in General and Business Aviation (2008/2134(INI))

in terms of classification are very different. Clearances are seamless, and flights progress in a planned and predictable manner as one would expect for public transport operations. To facilitate those operations, states manage airspace and VFR activities in various ways but every arrangement in every state is provided for the ultimate benefit of the commercial air transport sector. For the UK, a critical success factor set out in the UK FAS deployment plan⁵ was “*Evidence of demonstrable benefits to the large majority of commercial stakeholders (airlines, airports and ANSPs) and manageable impacts on non-commercial operations...*”. This makes it clear that in the UKFIR too, the ultimate beneficiaries of FAS activity and services are the commercial stakeholders. Services are not for the direct benefit of non-commercial operations.

8. When regulated airspace developed in the UK FIR, the proportion of CAS was small, and most VFR operations could be conducted in Class G airspace without the need for ATS. Where such services were required or advised, they were provided, enabling equal access by all users. However, the development of a substantial air transport sector has applied commercial pressures to the airspace system and policies; services which are not for the direct benefit of commercial operations have been largely withdrawn in the UK. Because of UK airspace design policies, the proportions of regulated airspace used in the UK are substantially greater than required by ICAO and that in some other European states. Airspace classifications are also higher than in some other states, with Classes A, C and D extending to lower levels. As a result, a large area is now principally accessible only to commercial air transport, whilst services outside CAS are fractured and minimal. “Remain clear of CAS” is commonly used as a standard response to a request for VFR service, and there is no integrated ATC coordinating service that spans airspace categories within the FIR. This is a straightforward business proposition by airlines, airports, and ANSPs, which remains unchallenged by the regulator. The commercial air transport sector has little interest in VFR operations and would prefer it was further segregated, as suggested by the critical success factor of FAS noted in paragraph 7. However, accessible airspace and appropriate services are essential to manage the impact of VFR (non-commercial) operations on increased commercial operations, whilst satisfying the aims of the Government strategy for GA⁶. Resources for the provision of such services are part of the FAS and are set out in the Common Charging Regulations.⁷

9. Commercial Operations. From the pilot’s perspective, the operation of commercial IFR flight is simple and consistent across states. Pre-flight planning is generally automated, and routing is straightforward. Based on a standard flight plan, aircraft pass through ATC sectors seamlessly on a continuous clearance with coordinated handovers. They fly on track using modern flight management systems. Commercial pilots are not concerned with airspace classification, which is largely unknown to them. The transition between classifications and between

⁵ FAS Deployment Plan 2013 to 2020 dated August 2012 paragraph 38.2

⁶ DfT General Aviation Strategy March 2015

⁷ Commission Implementing Regulation (EU) No 391/2013 of 3 May 2013

sectors is invisible, save for simple frequency changes. Pilot workload resulting from airspace usage is insignificant.

10. Non-Commercial Operations. In some other European states, regulated airspace structures are smaller than in the UK, use a lower classification, have flexible use and transit corridors. Together, these systems enable VFR operations to be conducted largely without interaction with ATS, increasing operational effectiveness and reducing demand on the system. Where access through regulated airspace is required, airspace structures and classifications encourage VFR flights, which are provided with flight following and onward clearances as a matter of course using flight information services. This structure is safe, effective, cheap and is provided without impact on commercial operations. However, VFR flying in the UK is complex. There is a large volume of controlled airspace, much of it unused or underused, reducing the opportunity for free routing. Airspace operated by different ANSPs is not connected or coordinated, so pilots must file flight plans using RTF prior to every CAS boundary and must expect to be refused access at short notice, requiring re-planning in the air. This process is time-consuming for pilots and controllers, prone to error, and blocks approach frequencies which are used for commercial air transport. Unlike other states, unused CAS in the UK is not released for open access, and access corridors for VFR flights are not provided. Much CAS which is theoretically accessible to VFR flights is inaccessible as a matter of local ATS policy which goes unchallenged by the regulator. The UK does not provide a Flight Information Service, which is at the core of services provided in other states. Whilst flight plans are easily filed automatically by VFR navigation software, the Swanwick control centre does not allow individual controllers access to VFR flight plans. With the increased cost of AFPEX, most GA airfields withdrew and cannot now activate a flight plan for departing aircraft. As a result, 'known intention' data, which could be widely available to the ATS system, is blocked. Radar or flight-following services are not generally available to VFR aircraft in the UKFIR, and the continual interaction with ATS consumes pilot and controller capacity and time, making VFR flights unwelcome and a threat to other operations. The situation is exacerbated by the lack of handovers between ATS units. In this airspace environment, navigation, collision avoidance and ATS management are complex tasks and pilot workload is high; the room for error is significant. Meanwhile, rather than maintaining on track flight using GPS in a similar manner to commercial air transport, the VFR pilot is trained in and is expected to use DR navigation techniques which rely on track errors being identified in the navigation work cycle. In many places in the UK it is not acceptable to be off track but that is part of the DR technique. The overall result is reflected in the high airspace infringement rate⁸.

11. In the UK, the balance between commercial and non-commercial operations is biased entirely towards commercial requirements, although most non-commercial operational requirements could be met without detriment to overall efficiency, given changes to policy and practice. Improvements to VFR operations would bring safety

⁸ FASVIG Data Analysis for Infringement Workshop 12/7/2016



and efficiency benefits to the commercial sector by reducing the impact of VFR operations, thus contributing to the overall vision of the Future Airspace Strategy.

Airspace for VFR Operations – Modernisation and Best Practice

12. European states structure and manage their airspace in different ways, but most achieve balance for all aviation sectors. Whilst some practices may not be relevant to the UK, there is much to be learnt; but there is a culture within UK aviation and regulation that its airspace is superior, that more regulated airspace and more regulation is better, and there is strong corporate resistance to change. Modernisation of airspace for the commercial sector is now high on the regulatory agenda, but support for VFR and non-commercial airspace modernisation and system improvement has not enjoyed the same priority or resource. However, modernisation of airspace and procedures for VFR operations is essential if the benefits to commercial sector are to be realised. The activity would align with its objectives, and be necessary for the overall success of the UK aviation industry.

13. Airspace in other European states provides a useful initial example because there are both sparsely-used and complex areas as in the UK, there are main and regional airports, and significant, flourishing, VFR sectors. Class E is widely used, and some states have traffic-based guidelines for the allocation of terminal airspace, which may range from a TMZ, to Class D CTR, to Class E or D CTA. In some states the dimensions of CAS are notably smaller than their UK equivalent, suggesting a different design and containment policy. FUA is widely deployed and VFR corridors permit traffic, particularly gliders, to pass with little need for ATS interaction. In some states access to CAS is provided on request and the application of classifications provides more access than in the UK. En route VFR traffic is generally able to access a continuous flight information service which provides flight following, traffic information and clearances through airspace structures in much the same way as commercial air transport and without interfering with the ATS system. A more detailed review of the structure of terminal and en route airspace and services is proposed to provide appropriate balance between airspace users.

14. To support the continued expansion and modernisation of the UK Commercial Air Transport sector and its associated airspace and systems, modernisation should be extended to encompass all airspace users to make the impact of growth manageable. The present segregation policy is becoming impracticable and, although it might once have been the cheapest option, it is becoming expensive, is breaking down, and would not deliver government policy related to GA. To function effectively as a whole, the FIR should adopt an integrated airspace system, balancing and coordinating the activities of all types of aviation. Modernisation would involve changes in policies, airspace design, procedures, attitudes and funding. It would see VFR flights being more conspicuous, having appropriate free routing but with less ATS interaction; characteristics which are very similar to those planned for commercial flights. To enable that, CAS would need to be redesigned to modern standards using alternative classifications and



dimensions, and FUA would need to be widely deployed, with airspace access improved through specific provisions and resources.

15. The key building blocks of such an integrated and balanced airspace system are set out in Annexes A to C. Development and delivery of these elements forms the foundation for the FASVIG programme of work up to the end of 2019 and support the FASVIG Year 3 funding proposal.

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Annexes:

- A. Modernising Airspace Structures
- B. Access to Airspace - Provision of Services
- C. VFR Efficiency Enablers - Operational Procedures



Annex A

Modernising Airspace Structures.

1. Most UK airports with Class D CTRs and CTAs are unable to offer routine access to VFR aircraft, and are unwilling to fund an ATS service to provide that. In any case, some 35% of all UK registered aircraft are not suitably equipped to accept a clearance in CAS. As a result, aircraft interfere with commercial flights by attempting to obtain a clearance or route around CAS, with an increased risk of infringement and interaction with other aircraft in the remaining airspace. Few airports are willing, or have the resources to offer a radar service to all traffic. Changing classifications and reducing the size of CTRs and CTAs, some of which are enormous, would significantly improve VFR efficiency and reduce interference with commercial flights.

Identifying Best Practice

2. Other states have developed airspace models which appear to function better for all users and do not exhibit the high rate of airspace infringement suffered by the UK. Generally, these states operate an integrated airspace system rather than a segregated system, and VFR users report that navigation through seemingly complex or crowded airspace is simple and well managed. FASVIG would collect data on other states' airspace systems and document their various components, analysing them for potential applicability to a future UK airspace system.

Containment Policy.

3. UK CAS Containment Policy⁹ does not specify the dimensions of a Class D CTR, save that it should be sufficient to meet the requirements of the IFP and provide sufficient airspace protection for aircraft using them. Whilst CAS for conventional SIDs and STARs is specified at ± 5 nm from the nominal track, that for RNAV procedures is specified as ± 3 nm. This suggests that the total width of CTRs at single runway aerodromes with RNAV procedures could be reduced from 10 nm to 6 nm, given that non-RNAV aircraft are normally radar vectored to ILS or radar monitored on departure. It is unreasonable to assume that aircraft on an ILS or even visual approach could be up to 5 nm off track on final approach. 6 nm is already the standard width for most airports in Germany and this appears to be entirely satisfactory for international air transport flights. Such a change applied in the UK would release 40% of low level controlled airspace, assuming CTRs are a standard width; many are much greater. ICAO¹⁰ specifies a CTR length as being 5 nm in the direction of approach, whereas UK CTR is typically 8 nm. Reducing UK CTRs to the ICAO specification and a ± 3 nm width would reduce low level CAS by a total of 62%. A critical review of containment policy and application is due now to match the change to RNAV procedures.

⁹ SARG Controlled Airspace Containment Policy 17 Jan 2014

¹⁰ ICAO Annex 11 2.10.5



Flexible Use Airspace Policy.

4. Whilst CAP 725 requires airspace sponsors to consider FUA, no FUA policy exists between commercial air transport and VFR or general aviation, so the requirement is ignored. FUA would support the FAS by enabling VFR flights to proceed without interacting with the ATS system, reducing controller and frequency demand. The lack of a policy prevents routine access to CAS across the country and needs to be resolved as a matter of priority. In some other states, regulated airspace is returned to Class G on a tactical basis which provides significantly more VFR access and releases controllers; we understand that such an arrangement is available in the UK airspace toolbox. It is proposed that FASVIG works in conjunction with the CAA, MOD and FASIIG to develop FUA policy to be adopted and applied retrospectively to all appropriate areas of regulated airspace.

Class E Airspace.

5. Class E airspace has been largely eliminated in the UK, but it is common and popular in other states because it allows VFR aircraft to operate without consuming ATS resources. It is a necessary component of modern airspace structure, particularly for CTAs at regional airports with low volume or intermittent commercial traffic. Class E is sometimes deployed alone and sometimes overlaid with a TMZ or RMZ, depending on circumstances. Class E airspace would be a key building block for modernisation, but it is widely opposed by ANSPs and controllers who regard higher classifications as more appropriate. FASVIG would work with the CAA to bring forward specific proposals to reintroduced and deploy Class E airspace in the UK FIR.

Introduction of Higher Climb Rate Departures.

6. The introduction of RNAV procedures was said to presage higher climb rates and raised stop altitudes which would result in raised CAS bases, but this has not occurred even though it is fundamental to the FAS. There is no incentive for airports to implement such changes, which are discouraged by the CAA's replication policy. The CAA also avers that it does not presently have the legal authority to force such a change. Raised departures at main airports are also enablers for access by minor airports, which in turn reduces the demand for additional CAS. In addition, higher and continuous climbs improve local air quality and appear to mitigate noise. FASVIG would work with the CAA to identify significant priority airspace for change.

Removal of Underused CAS.

7. There is no incentive for airports or ANSPs to remove unused or underutilised CAS. There is no benefit to the unit and the process is costly, resulting in hoarding of regulated airspace. This has a major impact on national airspace availability and blocks free routing for VFR flight, contributing to infringements and other risks. Moreover, where infringements do occur, the ANSP is required to maintain a separation of 5nm and 5000ft. This may have an impact laterally into the core part of the CAS with the vertical separation requirement blocking overlying airspace to FL70 or beyond. This can have a significant impact on commercial operations.



FASVIG proposes to work with the CAA to identify candidate airspace and develop a mechanism for implementation.

Rationalisation of CTR and CTA Sizes.

8. Notwithstanding the proposals on containment policy and CAS design criteria above, many CTRS and CTAs are unnecessarily large even by current standards. This results in inefficiencies, higher ANSP costs and exclusion as well as increased risk and infringement. FASVIG would work with the CAA to identify such airspace and propose change.

CAA Legal Powers to Manage Airspace.

9. Much of the FASVIG programme in support of FAS modernisation depends on the ability of the CAA to implement changes to policy and direct subsequent airspace change. Such powers are critical to the modernisation programme and are a dependency.



Annex B

Access to Airspace

Provision of Services to VFR aircraft in CAS - Airports

1. Most ANSPs with CAS have not been resourced to accept VFR flights except on an 'as available' basis. However, in recent years the lack of resources has become significant with some airspace being closed to non-scheduled traffic for extended periods. Commonly, airports with little commercial traffic provide VFR access but refuse access whenever any commercial aircraft is due. Others refuse access as a matter of course. This situation has developed in the last 10 years and the earlier CAA position, that ANSPs must provide a service to all airspace users or have their licence withdrawn, appears no longer valid. Options are to fund such services by the ANSP, through the en-route charge, or to reduce the volume of CAS to that which is necessary and sufficient for its task. The former options are judged unsupportable, but reducing the volume of CAS to that necessary for the task is practicable. Reducing the volume and classification of terminal airspace would do much to resolve this problem and with less airspace and fewer aircraft to manage, ANSPs would be able to deliver on the earlier policy. FASVIG is in a position to identify and propose change, provided the CAA has the legal power to implement it.

Management of Services Outside CAS.

2. Services to VFR flights outside CAS are not commonly available when most needed and are uncoordinated across the FIR. The provision of funding for such services is vested in the CAA but the VFR community has no input to or influence on the provision and there is no consumer feedback or audit mechanism. This may be because the services are provided solely for the benefit of airports or the commercial air transport sector generally, so the VFR operator and consumer is deemed to have no valid input. This is not an appropriate management process for modern airspace and should be changed. The services are not coordinated between ANSPs so VFR aircraft have to file flight plans using RTF prior to every CAS boundary blocking frequencies and consuming controller resource. The resulting inefficient or inadequate operational procedures are disruptive to commercial operations and do not benefit VFR operators. The UK does not provide an ICAO flight information service with the service elements that are widely available in European states. There is no 'Single Sky' in this regard. Following its review of the practices of other states, FASVIG would analyse their applicability to the UK FIR and recommend changes.



Annex C

VFR Efficiency Enablers

Separation of VFR flights.

1. Although separation is not provided between VFR flights in Class D airspace, it is commonly applied by UK controllers as if the airspace was Class C. This is inappropriate to the airspace classification, removes free routing, and applies a significant restriction on VFR activity. It also consumes ANSP resources to the disadvantage of commercial operations. A policy to change this practice would be proposed.

VFR Flight Plans.

2. VFR flight plans are now able to be filed automatically by GA navigation software. This could provide ATS units with aircraft's known intentions, which would be invaluable in the coordination and safety of flight as well as removing the need for long and difficult RTF exchanges. But VFR flight plans are not available to controllers at the NATS control centres, preventing their use in certain en-route CAS, excluding the FIS system and preventing access by controllers providing an ATS at certain airports. Moreover, the use of such flight plans has been curtailed by the inability of pilots to activate their flight plan following the large price increase for AFPEX; most GA airfields no longer subscribe and, although GA pilots can file and close VFR flight plans using their navigation devices, finding a unit willing to activate a third-party flight plan is problematic. FASVIG would propose changes to the handling of VFR flight plans by NATS and other ANSPs.

Simplification of VFR RTF.

3. FASVIG has already proposed changes to UK RTF procedures. These changes would reduce the load presented by VFR aircraft filing flight plans by RTF in order to access regulated airspace or to obtain a service outside CAS. The current procedure is too complicated, cumbersome and time consuming for pilots and controllers. However, the CAA RTF Phraseology Working Group appears resistant to change or modernisation. FASVIG will continue to pursue this modernisation but needs support from CAA management.

Modernise AIM policy.

4. The management of Aeronautical Information by the CAA focusses on convenience and efficiency for the regulator, and largely disregards the needs of the consumer or the practicability of implementation. Whilst FASVIG has brought proposals to the CAA AIM working group, it seems resistant to change or to recognising the need for customer service. The instances are too numerous to list but for example:



4.1 Important chart amendments are issued with the AIRAC cycle, ignoring the fact that it is impossible to amend VFR charts which are plastic covered. (Germany allows such changes only in phase with the chart issue cycle which is common to all charts).

4.2 Frequency cards, paid for by the user as part of the chart purchase cost, were withdrawn to "improve availability of data". Online availability of cards is not widely understood by users or notified; many, if not most VFR pilots do not have a frequency card. FASVIG has costed these cards at 9 pence each.

4.3 Omnibus NOTAMS are published to reduce the workload on the CAA and AIS service, resulting in false activities being presented to users on navigation software. The user is expected to ignore these displayed NOTAMS, inviting other NOTAMS to be ignored too. The CAA has said that this is an issue for the software providers to solve but it is insoluble at that level.

FASVIG will seek senior CAA support to address the AIM issues.

Integration of VFR Flight.

5. ATS services inside and outside of CAS do not support coordinated VFR flights, so pilots must transmit long flight plan messages to each unit on route. This is beyond the skill of many non-professional pilots and blocks frequencies, making the process untenable. FASVIG would investigate the flight following and clearance procedures used by other states, and propose a solution.

VFR flight on Class C routes.

6. VFR flight along Class C airspace routes is prohibited by the UK ANO¹¹ although it is allowed by the ICAO definition of that class of airspace, and the UK does not seem to have filed a difference with ICAO. The establishment of Class C routes across the Irish Sea was made at the request of FASVIG in order to permit VFR flights at a higher level in the modernised airspace. The ANO prevents that; FASVIG would propose a change.

Introduce Flight Information Service.

7. ATSOCAS categories are not ICAO standard, not understood by many UK pilots and very rarely understood by pilots from other states. FASVIG would study the procedures used in other states and make recommendations.

¹¹ The Rules of the Air Regulations 2015 Schedule 1 Section 6 para 23