Change proposals
for
Class E airspace
procedures - Consultation

14 September 2018

Executive Summary

Air Traffic Service (ATS) procedures introduced during 2014 as part of the Class F airspace replacement project are perceived to have contributed to an increase to controller workload. This increase in controller workload can be attributed to the requirement placed upon controllers to ensure the radar contact of an IFR flight does not merge with the radar contact of any unknown aircraft. The rationale behind this requirement was based on mitigating the risk associated with the uncertainty over the flight rules employed by the pilot of the unknown aircraft.

Where Class F airspace was replaced by Class E airspace it was not possible to fully amend Class E ATS procedures due to the negative impacts this would have on extant Class E airspace established elsewhere in the UK at that time. However, since then said airspace has been reclassified, thus providing an opportunity for Class E ATS procedures to be amended. The purpose of this paper is to briefly discuss ICAO and European requirements before offering options for amending current Class E ATS procedures, namely:

Option A: Do nothing

Option B: Return to pre-2014 Class E ATS procedures

Option C: Adopt ICAO Class E airspace ATS provision principles without modification and assume that all unknown traffic within Class E airspace are operating in accordance with VFR

Option D: Refine Class E ATS provision principles and implement VFR and IFR conspicuity codes

Option D is the CAA's preferred option, it offers the most appropriate balance between the safety concerns of the Class E airspace environment and controller workload. The latter is addressed by:

(i) enabling the controller to discriminate between aircraft inside and outside of Class E airspace; and

(ii) implementing ATS procedures with greater alignment to that prescribed by ICAO and SERA.

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1. Introduction

1.1 During the International Civil Aviation Organisation (ICAO) Universal Safety Oversight Audit Programme (USOAP) audit of the Civil Aviation Authority (CAA) conducted in 2009 a finding was made concerning the continued use of Class F airspace within the United Kingdom (UK). The finding highlighted that the UK's longstanding Class F route structure in some parts of the country was not compliant with the intended use of Class F airspace, which is temporary in nature[1]. Consequently, the CAA undertook to replace Class F airspace, mindful of the requirements in both ICAO Annex 11 and Regulation (EU) 923/2012 (Standardised European Rules of the Air (SERA))[2].

1.2 During 2014 the necessary airspace change was completed, which resulted in several Class F airspace structures being disestablished and others reclassified as Class E airspace[3] with a Transponder Mandatory Zone (TMZ)[4]. In addition to this airspace reclassification, extant Class E airspace ATS service provision principles documented within the Manual of Air Traffic Services Part 1 (MATS Pt 1) were also amended.

1.3 As part of the Class F airspace replacement project the CAA scheduled a Class E airspace post implementation review during 2017. Comments received from NATS highlighted that Class E procedure implemented during 2014 have generated inefficiencies. The purpose of this paper is to propose amendments to Class E procedures to address these inefficiencies.

Note: For ease of reference:

- Appendix A contains a table detailing ICAO Class E airspace and Air Traffic Service (ATS) requirements;
- Appendix B contains a table detailing SERA and ICAO Class E airspace and ATS requirements; and
- Appendix C contains a table detailing UK Class E airspace and ATS requirements.

References that are not contained within the Appendices A through C appear as footnotes within the document.

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[1] ICAO Annex 11 Air Traffic Services paragraph 2.6 Classification of airspaces. See also PANS-ATM (Doc 4444), Chapter 9.
[2] GM1 SERA.6001(h)
[3] (EU) 923 / 2012 – SERA.6001(e)
[4] (EU) 923 / 2012 – SERA.6005(b)

2. Consultation

2.1 Purpose of the Consultation

2.1.1 The CAA seeks to identify how best to amend Class E airspace procedures by the end of the March 2019. The purpose of this consultation is therefore to seek industry comment on the CAA's proposals to amend Class E airspace procedures.

2.1.2 The information contained within this document allows stakeholders to determine whether the proposed amendment and timeline afford sufficient time for them to safely and effectively adapt their procedures and operations to the proposed new procedures. With this in mind, it is requested that stakeholders provide assessments of the impacts of the proposed amendment to Class E airspace procedures.

2.1.3 A full list of consultees is listed at Appendix G.

2.2 Conduct of the Consultation

2.2.1 The CAA is required by Government to demonstrate that the best balance possible has been achieved between conflicting demands and objectives and that benefits will accrue as a consequence of a change in policy. The responses to this consultation will help to provide a better understanding of the likely impact of the proposed changes.

2.3 Consultation Period

2.3.1 The consultation period runs from **14 September 2018** to **9 November 2018**, an 8-week period.

2.4 Consultation Responses

2.4.1 Stakeholders are invited to comment on the proposals contained within this document. In doing so they are asked to consider whether the CAA's preferred option alleviates Air Traffic Management (ATM) inefficiencies identified within extant procedures and comment accordingly.

2.4.2 Respondents are requested to use the Consultation Response Form at Enclosure 1. Responses should indicate whether they support or object to the proposals and comment accordingly. Should a respondent object to the proposal, it is requested that the supporting evidence is included. Also, it is requested that any preference for an alternative solution (or solutions) be supported by appropriate justification.

2.4.3 In order to assist in fully determining the impact of the proposals, stakeholders are requested to provide assessments of the effect these may have on their operations. Assessments may be submitted in an appropriate format that provides a clear indication of the potential impact.

2.4.4 Comments are to be returned to the contact e-mail address overleaf. Early responses would be appreciated so that any issues arising may be addressed as soon as possible.

2.4.5 This consultation will be primarily managed by email as the preferred medium; however, postal responses will be accorded identical status and processed in the same way. Stakeholders requiring a hard copy of the consultation document should make their request to the Focal Point for the Consultation.

2.5 Considerations for Consultation Responses

2.5.1 Before responding to this consultation, stakeholders should first consider the following generic questions:

(i) Do you, or the organisation you represent, fly within Class E airspace in the UK?

(ii) If yes, how will the proposed changes to Class E procedures affect your operations?

(iii) Does your organisation provide an ATS within the London or Scottish FIRs?

(iv) If yes, how will the proposed change in Class E procedures affect your operation?

(v) Are there any consequences of the proposed changes not foreseen in the consultation material of which you feel the CAA should be made aware?

2.6 Conclusion of the Consultation Period

2.6.1 Following conclusion of the consultation, responses will be collated and analysed. The CAA will subsequently publish a Consultation Report summarising the responses along with its final proposals and the dates on which the proposed changes are planned to take effect.

2.6.2 The Consultation Report will be placed on the CAA website and consultees listed at Appendix G will be notified of publication. Wider industry will be notified of the outcomes of the consultation and of final change proposals by means of a CAA SkyWise / CAA Website.

2.6.3 The necessary Aeronautical Information Publication (AIP) amendments will be pre-notified by means of timely Aeronautical Information Circulars or AIP Supplement.

2.7 Confidentiality

2.7.1 All responses will be available for scrutiny under the Freedom of Information Act 2000 (FOI) or the Environmental Information Regulations 2004 (EIR), where relevant. Consultees are to note that requests for responses to be kept confidential will only be possible if these are consistent with the CAA's obligations under FOI, EIR and applicable European Union (EU) and UK data protection legislation.

2.8 Consultation Focal Point

2.8.1 Consultation responses and any queries on the technical aspects of the proposals should be addressed, preferably by e-mail, to the following:

Class E airspace procedures - Consultation
Airspace / ATM Policy Section
Future Safety, Safety and Airspace Regulation Group
Aviation House
South Area, Gatwick Airport
RH6 0YR

e-mail: ATCProceduresWorkingGroup@caa.co.uk

3. Post implementation operational issues

3.1 Following the replacement of Class F airspace, NATS undertook an internal post implementation review of this change during 2016. This review concluded that the revised ATS procedures for Class E airspace had increased controller workload, which is unsustainable and has an adverse impact on the efficiency of the ATM network.

3.2 To contextualise this conclusion, the differences in service provision principles applicable to Class E and Class F airspace need to be understood.

3.3 Prior to the introduction of Class E airspace, UK Flight Information Service (FIS)[5] was provided within Class F airspace, therefore ATS service provision principles were as follows:

Table 1 – Application of UK FIS to Class F airspace

Flight rules	Available to flights operating in accordance with	ATS provision principles
Instrument Flight Rules (IFR)	Procedural Service (PS) and Traffic Service (TS)	Deconfliction minima applied between participating IFR flights receiving the PS and traffic information provided on other known traffic. Note: Within Class F airspace PS is provided between participating IFR flights. Participating IFR flights also receive the TS on all other flights.
Visual Flight Rules (VFR)	Traffic Service (TS)	Traffic information provided on observed relevant traffic.
	or	
	Basic Service (BS)	Traffic information provided, as far as practicable, on known traffic and if the BS is enhanced with surveillance, observed relevant traffic.

[5] CAP 774 - UK Flight Information Services (Second edition 24 July 2014)

3.4 In comparison to the application of UK FIS in Class F airspace, Class E ATS provision principles required controllers to provide an Air Traffic Control Service (ATCS) to IFR flights and UK FIS to participating VFR flights as follows:

Table 2 - Amended Class E airspace ATS principles

Type of ATS provided	Available to flights operating in accordance with	ATS provision principles
ATCS	IFR	(i) Advise pilots of IFR flights of the change of airspace classification when they enter and leave Class E airspace; (ii) Provide standard separation between IFR flights; (iii) Provide IFR flights with traffic information on all other flights as far as practicable and radar returns, however present are not allowed to merge.
Traffic Service (TS)	VFR	Traffic information provided on observed relevant traffic.
Basic Service (BS)	VFR	Traffic information provided, as far as practicable, on known traffic and if the BS is enhanced with surveillance, observed relevant traffic.

3.5 As the issues raised by NATS relate to the ATCS provision principles described in Table 2, the remainder of this paper will focus on the following two requirements:

(i) Advise pilots of IFR flights of the change of airspace classification when they enter and leave Class E airspace; and

(ii) Provide IFR flights with traffic information on all other flights as far as practicable and radar returns, however present are not allowed to merge.

4. Current UK Class E communication procedures

4.1 Perceived and actual issues with extant provisions

4.1.1 The first of the two requirements identified by NATS as increasing controller workload is the requirement to advise pilots of IFR flights of the change of airspace classification when they enter and leave Class E airspace using the following phraseology:

Table 3 - RT Phraseology associated with entering and leaving Class E airspace:

Event	Flight rule	ATS phraseology
Entering Class E airspace	IFR	ATC: "(Call-sign), entering Class E airspace" Pilot: "(Call-sign), roger"
Entering Class E airspace	VFR	ATC: "(Call-sign), entering Class E airspace, maintain VMC" Pilot: "(Call-sign), roger"
Leaving Class E airspace	IFR or VFR	ATC: "(Call-sign), leaving Class E airspace" Pilot: "(Call-sign), roger"

4.1.2 This requirement is detailed within the CONcept of OPeration (CONOP)[6] for the purposes of alerting pilots that they are entering an environment containing unknown VFR traffic[7]. This requirement replaces the practice previously used in connection with aircraft leaving controlled airspace to enter Class F airspace, required pilots to[8]:

> "… be advised if a service commences, terminates or changes when:
>
> 1. outside controlled airspace;
> 2. entering controlled airspace;
> 3. leaving controlled airspace, unless pilots are provided with advance notice …"

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6 Policy to Replace Class F Airspace with Class E Airspace and Associated Transponder Mandatory Zones - Concept of Operations for the Provision of Air Traffic Services (Version 5.1, February 2014), pages 5 & 6.

7 Policy to Replace Class F Airspace with Class E Airspace and Associated Transponder Mandatory Zones - Concept of Operations for the Provision of Air Traffic Services, note 32 (Version 5.1, February 2014), page 9.

8 CAP 493 - The Manual of Air Traffic Services Part 1 (Edition 5, incorporating amendment to 6 March 2014), Section 1, Chapter 6, paragraph 6.7.

4.1.3 These requirements are not specifically detailed within ICAO Annex 11, PANS-ATM or SERA. However, these requirements do comply with the 'Objectives of air traffic services' detailed within Annex 11, which are transposed into SERA.

4.1.4 Whilst there is no specific international requirement to alert a pilot when they enter and leave controlled airspace or alert a pilot when they enter or leave Class E airspace, these requirements have been determined to enhance the situational awareness of pilots. Therefore, the requirement to alert a pilot when they enter or leave controlled airspace or when they enter or leave Class E airspace is principally linked to the change in ATS service provision principles the pilot will experience, and consequently pilot responsibilities within each airspace classification.

4.2 Options for change

4.2.1 As there is no specific requirement within ICAO Annex 11, PANS-ATM or SERA to alert a pilot when their aircraft enters and leaves different airspace classifications in comparison to advise a pilot when their aircraft enters and leaves controlled airspace, such requirements must be considered as part of the Class E airspace ATS provision principles.

4.2.2 The requirement to advise a pilot when their aircraft enters and leaves Class E airspace accompanied the following ATS provision principle introduced in 2014[9]:

> "Aircraft Under Radar Control Service. If the intentions of Mode C transponding aircraft are not known …. in Class E airspace radar returns, however present, are not allowed to merge unless the pilot in receipt of traffic information advises that he intends to avoid the other aircraft without ATC assistance."

4.2.3 Whereas the requirement to advise a pilot when their aircraft enters and leaves controlled airspace was associated with the following ATS provision principle[10]:

> "Aircraft Under Radar Control Service. If the intentions of Mode C transponding aircraft are not known, the minimum separation must be increased to 5000 feet. Unverified Mode C data may be used for separation purposes provided minimum vertical separation of 5000 feet is maintained and radar returns, however presented, are not allowed to merge."

4.2.4 Given the link between service provision principles and RTF phraseology requirements, the latter cannot be considered in isolation from the former. Therefore, RTF phraseology requirements must be considered in context of Class E airspace service provision principles and the ability of an ANSP to implement measures to

[9] CAP 493 - The Manual of Air Traffic Services Part 1 (Edition 6, Amendment 1 Corrigendum), Section 1, Chapter 6, paragraph 10A.4

[10] CAP 493 - The Manual of Air Traffic Services Part 1 (Edition 5, incorporating amendment to 14 November 2013), Section 1, Chapter 6, paragraph 6.63

negate the need for advising pilots of IFR flights when they enter and exit Class E airspace.

5. Current UK Class E gapping requirements

5.1 Perceived and actual issues with extant provisions

5.1.1 Operational feedback has highlighted that current Class E airspace ATS provision principles have increased controller workload compared to previous Class F airspace arrangements. When considering Table 1 against Table 2 there is one notable difference - Class E requires controllers to ensure that the radar returns of aircraft receiving Radar Control Service must not merge with unknown aircraft.

5.1.2 This is founded in the long-standing MATS Part 1 requirement for controllers to apply separation against unknown traffic in airspace Classes A-E. IFR flights operating within Class E airspace would therefore be provided with separation against unknown aircraft regardless of the flight rules employed by the pilot of said unknown aircraft.

5.1.3 Current Class E airspace ATS provision principles replaced the requirement to provide separation against unknown aircraft with "… radar returns, however present are not allowed to merge". This amended principle was considered by the CAA as an appropriate balance between two competing considerations. The first consideration was the need to protect controlled IFR flights from unknown IFR aircraft (such as aircraft infringing controlled airspace); the second was to avoid the application of separation against aircraft operating autonomously under VFR.

5.1.4 To reduce the workload associated with these Class E ATS provision principles, the combined requirements of ICAO and SERA need to be considered.

5.2 ICAO and SERA requirements

5.2.1 ICAO and SERA prescribe the following objectives for ATS:

(i) prevent collisions between aircraft;

(ii) expedite and maintain an orderly flow of air traffic;

(iii) provide advice and information useful for the safe and efficient conduct of flight; and

(iv) notify appropriate organisations regarding aircraft in need of search and rescue aid, and assist such organisations as required.

5.2.2 These objectives are delivered through ICAO's divisions of ATS, which are:

(i) Air Traffic Control Service (ATCS): to prevent collisions between aircraft; and expedite and maintain an orderly flow of air traffic.

(ii) Flight Information Service (FIS): to provide advice and information useful for the safe and efficient conduct of flight; and

(iii) Alerting Service (AS): to notify appropriate organisations regarding aircraft in need of search and rescue aid, and assist such organisations as required.

5.2.3 Furthermore, as part of the scope of FIS as defined in Annex 11 and SERA.7001 Flight Information Service provided to flights shall include, in addition to that outlined in (a), the provision of information concerning:

(1) weather conditions reported or forecast at departure, destination and alternate aerodromes;

(2) **collision hazards, to aircraft operating in airspace Classes C, D, E, F and G**;

(3) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area.

5.2.4 As for detail concerning collision hazard information when providing FIS, Guidance Material[11] to SERA.9005(b)(2), which is based on ICAO text[12] states that:

> Information relating to collision hazards includes only known activities that constitute risks to the aircraft concerned. The availability of such information to air traffic services may sometimes be incomplete (e.g. limitations in radar or radio coverage, optional radio contact by pilots, limitations in the accuracy of reported information by pilots, or unconfirmed level of information) and, therefore, air traffic services cannot assume responsibility for its issuance at all times or for its accuracy.

5.2.5 Whilst information relating to collision hazards might be incomplete and/or inaccurate, ICAO and SERA prescribe additional requirements concerning the provision of ‘collision hazard information’ to ‘controlled flights’ when an ATS specifically uses surveillance. When an identified controlled flight is observed to be on a conflicting path with an unknown aircraft, deemed to constitute a collision hazard, the pilot of the controlled flight shall, ***whenever practicable***:

(1) be informed of the unknown aircraft, and, if the pilot so requests, or if the situation so warrants in the opinion of the controller, avoiding action shall be suggested; and

(2) be notified when the conflict no longer exists.

A controlled flight is defined by ICAO[13] and SERA[14] as “… any flight which is subject to an air traffic control clearance” and is thus applicable to IFR flights in Class E airspace. PANS-ATM[15] additionally states “The information presented on a situation

[11] GM1 SERA.9005(b)(2) - Information related to collision hazards
[12] ICAO Annex 11 (14th Edition, July 2016), Chapter 4, Paragraph 4.2.2 Note 1
[13] ICAO Annex 11 (14th Edition, July 2016), Chapter 1
[14] SERA - Article 2
[15] ICAO PANS-ATM (16th Edition, November 2016), Chapter 8, Paragraph 8.11.1(a)

display ***may*** be used to provide identified aircraft with…information regarding any aircraft observed to be on a conflicting path with the identified aircraft and suggestions or advice regarding avoiding action".

5.2.6 When comparing the intent of "**shall, *whenever practicable***", which applies to a 'identified controlled flight' with the intent of "***may***", which applies to a non-controlled identified flight, the former is an obligation placed upon the controller albeit with a caveat, whereas the latter permits a controller to use their judgment.

5.2.7 Therefore, when considering all applicable ICAO and SERA requirements, the following form the foundation for determining the ATS provision principles for Class E airspace as follows:

Table 4: Summary ICAO and SERA requirements for Class E airspace

Type of flight	Nature of flight	Type of ATS	Purpose of ATS
IFR flights	Controlled flight	ATCS	To provide separation between IFR flights.
		FIS	To provide IFR flights with traffic information / collision hazard information on VFR flights as far as practical.
		FIS supplemented by surveillance	To provide IFR flights with suggested avoiding action on VFR flights ***whenever practicable***.
		AS	To notify appropriate organisations regarding aircraft in need of search and rescue aid.
Participating VFR flights	Uncontrolled flight	FIS	To provide VFR flights with traffic information on all flights as far as practical.
		FIS supplemented by surveillance	Controllers ***may*** provide VFR flights with traffic avoidance advice.
		AS	To notify appropriate organisations regarding aircraft in need of search and rescue aid.

5.3 Options for change

5.3.1 The following options for change outline potential solutions that effectively balance ICAO obligations, European requirements, historic safety concerns and controller workload issues.

5.3.2 Option A: Do nothing, i.e. continue with extant Class E airspace ATS arrangements

5.3.2.1 This accepts the balance between historic safety concerns and controller workload even though extant Class E ATS provision principles exceeds international obligations and European requirements.

5.3.2.2 This option was rejected by the CAA because the inefficiencies associated with these procedures prevents Class E airspace being considered as a viable solution.

5.3.3 Option B: Return to pre-2014 Class E ATS provision principles

5.3.3.1 This option requires providing separation between IFR flights and all unknown aircraft within Class E airspace regardless of the flight rules employed by those aircraft.

5.3.3.2 The benefit of this option is that the service provision principle of Class E airspace is consistent with other classes of controlled airspace, therefore there is no need to advise pilots that they are entering Class E airspace. In addition, as IFR aircraft are

being provided with separation under a Radar Control Service, it could be argued that there is no need to provide traffic information on any unknown aircraft, which assists to reduce RT workload.

5.3.3.3 The most significant disadvantage is the requirement to provide separation to IFR flights against VFR flights, which depending on the dimensions of the Class E airspace and the volume of unknown traffic within, it might not be possible to provide separation on every occasion. For this option to have utility, it is best suited to large expanses of Class E airspace that can accommodate the vectoring necessary to achieve separation.

5.3.3.4 This option exceeds international obligations and European requirements, but it can be considered a benefit because the requirements mitigate the significant concern about unknown IFR aircraft infringing Class E airspace.

5.3.3.5 This option is rejected because the ATS procedures are a significant departure from international obligations and European requirements. These ATS procedures require the establishment of large expanses of Class E airspace to facilitate the provision of separation. However, without introducing measures to limit the volume of VFR traffic, it might not be possible to provide separation to IFR flights on every occasion.

5.3.4 Option C: Adopt ICAO Class E airspace ATS provision principles without modification and assume that all unknown traffic within Class E airspace are operating in accordance with VFR

5.3.4.1 This option assumes that all unknown traffic operating within Class E airspace are operating in accordance with VFR.

5.3.4.2 The associated MATS Part 1[16] text would therefore be amended to the following:

10A.4 Aircraft Under Radar Control Service. If the intentions of Mode C transponding aircraft are not known the minimum separation for:

(1) IFR flights within Class A-D airspace, must be increased to 5000 feet, or alternative approved minima within MATS Part 2;

(2) VFR flights within Class B and C airspace, must be increased to 5000 feet, or alternative approved minima within MATS Part 2;

10A.5 Unverified Mode C data may be used for separation purposes within controlled airspace provided a minimum vertical separation of 5,000 feet, or alternative approved minima within MATS Part 2, is maintained. With exception of IFR flights within Class E airspace, radar returns, however presented, are not allowed to merge.

[16] CAP 493 - The Manual of Air Traffic Services Part 1 (Edition 5, incorporating amendment to 6 March 2014), Section 1, Chapter 6

10A.6 Aircraft Under Deconfliction Service. If the intentions of the Mode C transponding aircraft are not known, the vertical deconfliction minima must be increased to 3000 ft, and unless the SSR Mode 3A indicates that the Mode C data has been verified, the surveillance returns, however presented, should not merge.

5.3.4.3 The benefit of this option is that the requirement within extant Class E airspace ATS provision principles to ensure "… radar returns, however presented are not allowed to merge" is removed. Therefore, controllers are only required to pass traffic information whenever practicable and provide suggested avoiding action when requested, or provide traffic information and provide suggested avoiding action whenever practical.

5.3.4.4 The disadvantage of this option is that the assumption that all unknown aircraft entering Class E airspace are operating in accordance with VFR, which might not be correct on every occasion. This assumption generates a mid-air collision risk when an IFR aircraft infringes Class E airspace in IMC and traffic information is not passed to the pilot of a conflicting controlled IFR flight. For this reason, this option is not the preferred option.

5.3.5 Option D: Redefine Class E ATS provision principles and implement VFR and IFR conspicuity codes

5.3.5.1 The most significant change from extant Class E airspace provision principles to those that most accurately reflect ICAO and SERA Class E airspace provision principles is concerned with resolving the 'gapping issue' described in paragraphs 5.1.2 and 5.1.3 above. For this issue to be resolved, a suitable methodology for detecting and responding appropriately to unknown aircraft according to the flight rules they employ is required and to achieve this objective, the following provisions are considered appropriate:

(i) Class E airspace should also be further notified as TMZ. The associated TMZ requirement in which the autonomous VFR flights must display a VFR conspicuity code with altitude reporting enables pilots of ACAS equipped aircraft to benefit from the enhanced situational awareness this safety net provides;

(ii) the conspicuity transponder code A7000 would need to be redefined as 'general VFR conspicuity', see Appendix D and F;

(iii) establish a 'general IFR conspicuity code' by redefining the transponder code A2000 for this purpose, see Appendix D and F;

(iv) redefine appropriate 'Frequency Monitoring Codes' for the purpose of 'VFR conspicuity' where necessary, see Appendix D and F; and

(v) amend the Special Purpose Code A0024 (Radar Flight Evaluation / Calibration) for the purpose of VFR conspicuity when it is used within Class E airspace. If pilots of such flights wish to operate in accordance with IFR, the pilot must be operating on or have obtained an IFR clearance prior to entry of Class E airspace. Amending the purpose of this special purpose code to include VFR conspicuity when used within Class E airspace enables pilots of such flights to operate autonomous VFR within Class E airspace when the meteorological conditions facilitate VFR and autonomous operation is requireD. See Appendix D and F.

5.3.5.2 These measures would enable a controller to detect infringements of Class E airspace by IFR aircraft, thus enabling controllers to provide IFR flights under their control with appropriate separation. In addition, controllers would have certainty that aircraft displaying the VFR conspicuity code would be operating in accordance with VFR and could therefore:

(i) pass traffic information whenever practicable and suggest avoiding action whenever requested by the pilot; or

(ii) pass traffic information and suggested avoiding action whenever practicable.

5.3.5.3 The establishment of Class E airspace with TMZ status would also provide consistency in the provision of ATS within control areas regardless of the classification of the controlled airspace because non-transponding unknown aircraft would be deemed to be operating beneath those control areas. The amended Class E ATS provision principles are contained within Appendix E.

5.3.5.4 The disadvantages of this option are associated with the risk of pilots of IFR flights not being aware that their aircraft is flying within Class E airspace and the associated changes of their responsibilities, unless appropriate mitigations are implemented:

(i) ANSPs should consider the following as a non-exhausted potential list of mitigating strategies for reducing the need to inform pilots of when they enter or exit Class E airspace:

- Suitable entries within the UK AIP;
- Incorporating into Prior Permission Required (PPR) procedure; and
- Pilot briefing material, etc.

(ii) Aircraft Operators and Pilots should ensure the ATS provision principles for Class E airspace and pilot responsibilities are fully understood. Aircraft Operators and pilots should be aware that the provision of traffic information / collision hazard information / suggested avoiding action might not be practicable on every occasion. Furthermore, Aircraft Operators and pilots should also be aware of the possibility of non-transponder equipped aircraft operating in accordance with VFR within Class E airspace; and

(iii) Flight Training Organisations and Aircraft Operators should consider any additional training that might be necessary for flight within Class E airspace.

5.4 Preferred option

5.4.1 Option D is preferred as it is that which is closest aligned with international obligations and European regulations. The introduction of transponder codes for autonomous VFR and autonomous IFR flight provides certainty concerning the flight rules of aircraft within Class E airspace. In addition, this provision enables the detection of infringements of Class E airspace by IFR flights.

5.4.2 Whilst the implementation of refined Class E airspace ATS provision principles will assist in the reduction of controller workload issues, unless appropriate mitigations are implemented, pilots of IFR flights entering Class E airspace will still need to be alerted when their aircraft enters and leaves Class E airspace.

6. Next steps

6.1 Project Milestones

6.1.1 The following project milestones have been identified:

(i) Consultation: 14 September 2018 – 9 November 2018

(ii) Consultation feedback report: 30 November 2018

(iii) Develop implementation plan: 7 December 2018

(iv) Submit amendments for the AIP and the MATS Part 1 (CAP 493) to achieve the target implementation date, see below.

(v) Support implementation awareness campaigning e.g. AIC, SkyWise and Magazine articles etc.

6.2 Target Implementation Date

6.2.1 Amended Class E procedures are planned to be implemented on **28 March 2019** (AIRAC 04/2019).

6.3 Aeronautical Information Change

6.3.1 Introduction of the new arrangements by means of a single AIRAC period of notification for AIP amendments (i.e. 28-days' notice) is proposed. In addition, it is proposed that the Manual of Air Traffic Services Part 1 (CAP 493) will be amended with a Supplementary Instruction that will provide 60 days' notice.

6.4 Implementation Awareness Activities

6.4.1 The introduction of the new arrangements will require comprehensive awareness activity. This will primarily be targeted at UK airspace users; the nature and content of awareness material, and the media by which it will be disseminated, has yet to be decided.

6.4.2 In addition to the above, the resultant changes will be also pre-notified to industry by means of either an Aeronautical Information Circular or an AIP Supplement.

6.5 Post Implementation Review

6.5.1 A post-implementation review of the effectiveness of the proposed arrangement will be carried out within 3 years following implementation.

7. Conclusion

7.1 Given the service provision principles prescribed by ICAO for Class E airspace, Option D provides the most appropriate balance between the safety concerns associated with this environment and controller workload. For these service provision principles to be implemented the introduction of VFR and IFR conspicuity transponder codes are required, which provides controllers with certainty regarding the flight rule those flights are operating.

7.2 For Class E airspace that is additionally notified as TMZ, pilots of aircraft that cannot comply with the TMZ requirements either because their aircraft that are not fitted with a transponder, or have an inoperative transponder, or have a transponder that cannot provide an altitude report, may gain access to such airspace by obtaining an approval to enter issued by the designated ATS authority via RTF. Pilots of such flights should be aware that they might experience a delay in receiving their approval because of controller workload.

7.3 Pilots of IFR flights will continue to gain access to Class E airspace by means of obtaining an ATS clearance.

7.4 With respect to pilots of IFR flights and pilots of VFR flights receiving an ATS, the ATSU in accordance with ICAO and SERA will:

(i) pass traffic information whenever practicable and suggest avoiding action whenever requested by the pilot; or

(ii) pass traffic information and suggested avoiding action whenever practicable.

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Appendix A – ICAO Class E airspace and ATS requirements

Flight rules	Class E requirements	Type of ATS	Division of ATS	Objectives of ATS	Separation	Scope of Flight Information Service	Speed limitation	Radio Communication Requirements	ATC Clearance	Cruising levels	Transponder requirements
IFR	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1** - Provided with an air traffic control service, are separated from other IFR flights and receive traffic information as far as is practical.	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1 and Appendix 4** - Air Traffic Control Service	**ICAO Annex 11, Chapter 2, Paragraph 2.3.1** - (i) Area control service; (ii) Approach control service; (iii) Flight Information Service; and (iv) Alerting Service.	**ICAO Annex 11, Chapter 2, Paragraph 2.2 and PANS-ATM, Chapter 8, Paragraph 8.8.2.1** - (i) Prevent collisions between aircraft; (ii) expedite and maintain an orderly flow of air traffic; and (iii) provide advice and information useful for the safe and efficient conduct of flights.	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1, Chapter 3, Paragraph 3.3.4 and Appendix 4** - Between IFR flights	**ICAO Annex 11, Chapter 4, Paragraph 4.2** - 4.2.1 Flight information service shall include the provision of pertinent: a) SIGMET and AIRMET information; b) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds; c) information concerning the release into the atmosphere of radioactive materials or toxic chemicals; d) information on changes in the availability of radio navigation services; e) information on changes in condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice or significant depth of water; f) information on unmanned free balloons; and of any other information likely to affect safety. 4.2.4 Flight information service provided to flights shall include, in addition to that outlined in 4.2.1, the provision of information concerning: a) weather conditions reported or forecast at departure, destination and alternate aerodromes; b) collision hazards, to aircraft operating in airspace Classes C, D, E, F and G; and c) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area. 4.2.4 Flight information service provided to VFR flights shall include, in addition to that outlined in 4.2.1, the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.	**ICAO Annex 11, Paragraph 2.3.2 and Appendix 4** - 250 kts below FL 100	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1 and Appendix 4** - Continuous two-way required	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1, Chapter 3, Paragraph 3.3.4 and Appendix 4** - Required	**ICAO Annex 2, Chapter 5, Paragraph 5.3.1** - Odd levels (for tracks between 000° and 179°) and Even levels (for tracks between 180° and 359°)	**ICAO Annex 11, Chapter 2, Paragraph 2.27** - States shall establish requirements for carriage and operation of pressure-altitude reporting transponders within defined portions of airspace.
VFR	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1** - Provided with traffic information as far as is practical.	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1 and Appendix 4** - Traffic information as part of a Flight Information Service	**ICAO Annex 11, Chapter 2, Paragraph 2.3.2** - (i) Flight Information Service; and (ii) Alerting Service.	**ICAO Annex 11, Chapter 2, Paragraph 2.2** - (i) provide advice and information useful for the safe and efficient conduct of flights.	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1, Chapter 3, Paragraph 3.3.4 and Appendix 4** - None			**ICAO Annex 11, Chapter 2, Paragraph 2.3.2 and Appendix 4** - None	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1, Chapter 3, Paragraph 3.3.4 and Appendix 4** - Not required	**ICAO Annex 2, Paragraph 4.7** - Above 3000 feet: Odd levels plus 500 feet (for tracks between 000° and 179°) and Even levels plus 500 feet (for tracks between 180° and 359°)	

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Appendix B – SERA and ICAO Class E airspace and ATS requirements

Flight rules	Class E requirements	Type of ATS	Division of ATS	Objectives of ATS	Separation	Scope	Speed limitation	Radio Communication Requirements	ATC Clearance	Cruising levels	Transponder requirements
IFR	**SERA.6001 and Appendix 4** - Provided with an air traffic control service, are separated from other IFR flights and receive traffic information as far as is practical.	**SERA.6001 and Appendix 4** - Air Traffic Control Service	**ICAO Annex 11, Chapter 2, Paragraph 2.3.1** - (i) Area control service; (ii) Approach control service; (iii) Flight Information Service; and (iv) Alerting Service.	**SERA.7001 and SERA.7002** - (i) Prevent collisions between aircraft; (ii) expedite and maintain an orderly flow of air traffic; and (iii) provide advice and information useful for the safe and efficient conduct of flights.	**SERA.6001, SERA.8005and Appendix 4** - Between IFR flights	**SERA.9005** - (a) Flight information service shall include the provision of pertinent: (1) SIGMET and AIRMET information; (2) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds; (3) information concerning the release into the atmosphere of radioactive materials or toxic chemicals; (4) information on changes in the availability of radio navigation services; (5) information on changes in condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice or significant depth of water; (6) information on unmanned free balloons; and of any other information likely to affect safety. (b) Flight information service provided to flights shall include, in addition to that outlined in (a), the provision of information concerning: (1) weather conditions reported or forecast at departure, destination and alternate aerodromes; (2) collision hazards, to aircraft operating in airspace Classes C, D, E, F and G; (3) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area. (c) Flight information service provided to VFR flights shall include, in addition to that outlined in (a), the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.	**SERA.6001 and Appendix 4** - 250 kts below FL 100 except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed.	**SERA.6001 and Appendix 4** - Continuous two-way required	**SERA.6001 and Appendix 4** - Required	**SERA.5020** - Odd levels (for tracks between 000° and 179°) and Even levels (for tracks between 180° and 359°)	**ICAO Annex 11, Chapter 2, Paragraph 2.27** - States shall establish requirements for carriage and operation of pressure-altitude reporting transponders within defined portions of airspace.
VFR	**SERA.6001 and Appendix 4** - Provided with traffic information as far as is practical.	**ICAO Annex 11, Chapter 2, Paragraph 2.6.1** - Traffic information as part of a Flight Information Service.	**ICAO Annex 11, Chapter 2, Paragraph 2.3.2** - (i) Flight Information Service; and (ii) Alerting Service.	**SERA.7001** - (i) provide advice and information useful for the safe and efficient conduct of flights	**SERA.6001, SERA.8005 and Appendix 4** - None			**SERA.6001 and Appendix 4** - None	**SERA.6001 and Appendix 4** - Not required	**SERA.5005** - Above 3000 feet: Odd levels plus 500 feet (for tracks between 000° and 179°) and Even levels plus 500 feet (for tracks between 180° and 359°)	

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Appendix C – UK Class E airspace and ATS provisions

Flight rules	Class E requirements	Type of ATS	Division of ATS	Objectives of ATS	Separation	Scope	Speed limitation	Radio Communication Requirements	ATC Clearance	Cruising levels	Transponder requirements
IFR	UK AIP ENR 1.4	SERA.6001 and Appendix 4	MATS Part 1 (CAP 493, Section 1, Chapter 1, Paragraphs 5.3, 7.1 and 8.1)	MATS Part 1 (CAP 493, Section 1, Chapter 1, Paragraphs 4 and 7, and Section 1, Chapter 6, Paragraph 10A.4(3))	MATS Part 1 (CAP 493, Section 1, Chapter 3)	MATS Part 1 (CAP 493, Section 1, Chapter 12 and Section 1, Chapter 6, Paragraph 10.4(3) and UK FIS (CAP 774, Chapter 1, Paragraph 1.4)	SERA.6001 and Appendix 4, UK AIP ENR 1.4, MATS Part 1 (CAP 493, Section 1, Chapter 2, Paragraph 3A)	SERA.6001 and Appendix 4	SERA.6001 and Appendix 4	SERA.5020	UK AIP ENR 1.4
VFR	UK AIP ENR 1.4	ICAO Annex 11, Chapter 2, Paragraph 2.6.1	MATS Part 1 (CAP 493, Section 1, Chapter 12 and CAP 774, Chapter 1, Paragraph 1.4)	MATS Part 1 (CAP 493, Section 1, Chapter 12) and UK FIS (CAP 774, Chapter 1, Paragraph 1.4)	MATS Part 1 (CAP 493, Section 1, Chapter 12) and UK FIS (CAP 774, Chapter 1, Paragraph 1.4)			SERA.6001 and Appendix 4	SERA.6001 and Appendix 4	ORS4 No. 1126	

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Appendix D – Consequential UK AIP amendments

ENR 1.6 will need to be amended to reflect the change in definition of ‘conspicutiy codes’,as follows:

2.2.2.1.3 Types:

*7000 – general VFR conspicuity code.

*2000 – general IFR conspicuity code for use in Class G airspace.

ENR 1.6 paragraph 2.2.2.2.1 is proposed as follows:

Code	Use	Conditions / Remarks
*0024	Radar Flight Evaluation / Calibration	Aircraft conducting radar evaluation / calibration flights shall only squawk 0024 for the duration of the trial. When a radar evaluation / calibration flight is conducted within Class E airspace, unless the pilot is already operating within controlled airspace in accordance with an IFR clearance or has obtained an IFR clearance prior to the entry of Class E airspace, this code is deemed to be for VFR conspicuity. The code shall not be used whilst transiting to/from the trial; in such circumstances the appropriate Mode A code as per paragraph 2.2.2.1 should be selected. May be selected at pilot’s discretion.

Class E airspace established within the United Kingdom does not currently require any particular Frequency Monitoring Code listed in ENR 1.6 to be notified for the purposes of VFR conspicuity. However, should Class E airspace be established in lieu of Class G airspace where a Frequency Monitoring Code is currently used, the Air Navigation Service Provider will notify their Frequency Monitoring Code for the purpose of VFR conspicuity only. The following amendments will be necessary:

(i) ENR 1.6 paragraph 2.5.1.2 will need to state:

2.5.1.2 Pilots who wish to operate within Class E airspace in accordance with the VFR without receiving an ATS must display the general VFR conspicuity code A7000 with altitude reporting, or designated Frequency Monitoring Code defined as VFR conspicuity with altitude reporting.

(ii) ENR 1.6 paragraph 2.2.5.6 to state which Frequency Monitoring codes are used for 'VFR conspicuity'.

Appendix E – MATS Part 1 amendment

The Class E airspace ATS provision principle within the MATS Part 1[17] will require amending to the following:

10A.4 Aircraft Under Radar Control Service. If the intentions of Mode C transponding aircraft are not known the minimum separation for:

(1) IFR flights within Class A-D airspace, must be increased to 5000 feet, or alternative approved minima within MATS Part 2;

(2) VFR flights within Class B and C airspace, must be increased to 5000 feet, or alternative approved minima within MATS Part 2;

(3) IFR flights within Class E airspace, except against VFR flights, must be increased to 5000 feet, or alternative approved minima within MATS Part 2

10A.5 Unverified Mode C data may be used for separation purposes within controlled airspace provided a minimum vertical separation of 5,000 feet, or alternative approved minima within MATS Part 2, is maintained. With exception to IFR flights within Class E airspace against aircraft displaying VFR conspicuity, radar returns, however presented, are not allowed to merge.

10A.6 Aircraft Under Deconfliction Service. If the intentions of the Mode C transponding aircraft are not known, the vertical deconfliction minima must be increased to 3000 ft, and unless the SSR Mode 3A indicates that the Mode C data has been verified, the surveillance returns, however presented, should not merge.

[17] CAP 493 - The Manual of Air Traffic Services Part 1 (Edition 5, incorporating amendment to 6 March 2014), Section 1, Chapter 6

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Appendix F – Consequential change in purpose of SSR conspicuity codes

Mode A SSR code	Extant purpose	Proposed purpose	Impact
7000	General conspicuity (regardless of flight rules used)	General VFR conspicuity	Change of purpose means that an aircraft transmitting the mode A transponder code 7000, whilst airborne, is operating in accordance with VFR.
2000	When entering United Kingdom airspace from an adjacent region where the operation of transponders has not been required; or by Mode S transponder equipped aircraft on the aerodrome surface when under tow, or parked and prior to selecting OFF or STDBY - unless otherwise instructed by ATC.	When entering United Kingdom airspace from an adjacent region where the operation of transponders has not been required; IFR conspicuity; or by Mode S transponder equipped aircraft on the aerodrome surface when under tow, or parked and prior to selecting OFF or STDBY - unless otherwise instructed by ATC.	Change of purpose means that an aircraft transmitting the mode A transponder code 2000, whilst airborne, is operating in accordance with IFR.
Special Purpose Code 0024	Radar evaluation / calibration flight (regardless of flight rules used)	When a radar evaluation / calibration flight is conducted within Class E airspace, unless the pilot is already operating within controlled airspace in accordance with an IFR clearance or has obtained an IFR clearance prior to the entry of Class E airspace, this code is deemed to be for VFR conspicuity.	Unless the radar evaluation / calibration flight has obtained an IFR clearance to operate within Class E airspace, the transponder code 0024 denotes that the radar evaluation / calibration flight is operating in accordance with VFR within Class E airspace.
Other Special Purpose Codes	Conspicuity (regardless of flight rules used)	Conspicuity (regardless of flight rules used)	No change.
Frequency Monitoring	Conspicuity	As defined within ENR 1.6	Subject to consultation with airspace users, ANSPs to notify

Mode A SSR code	Extant purpose	Proposed purpose	Impact
Codes (FMC)	(regardless of flight rules used)		an FMC for the purposes of VFR conspicuity.

Appendix G – Consultees

NATMAC
Airlines UK
Airport Operators Association
Aircraft Operators Group
Aircraft Owners and Pilots Association
Association of Remotely Piloted Aircraft Systems
British Airways
Bae Systems
British Airline Pilots Association
British Balloon and Airship Club
British Business and General Aviation Association
British Gliding Association
British Helicopter Association
British Hang Gliding and Paragliding Association
British Microlight Aircraft Association
British Model Flying Association
British Parachute Association
Civil Aviation Authority (Safety and Airspace Regulation Group)
Future Airspace Strategy VFR Implementation Group
General Aviation Alliance
Guild of Air Traffic Control Officers
Honourable Company of Air Pilots
Helicopter Club of Great Britain
Heavy Airlines
IOM Government
Light Aircraft Association
Low Fares Airlines
Military Aviation Authority
Ministry of Defence (Defence Airspace and Air Traffic Management)
NATS (NERL)
NATS (NSL)
Royal Navy
PPL / IR Group
United Kingdom Airprox Board

UK Flight Safety Committee
United States Airforce

NON-NATMAC
ATC Procedures Working Group (CAA working group)
Aberdeen International Airport
BAE Systems (Warton)
Eastern Airways
Edinburgh Airport
FlyBe
Gama Group
Glasgow Airport
Glasgow Prestwick Airport
Highland and Island Airports Ltd
Isle of Man Airport
Loganair

INFORMATION ONLY
Irish Aviation Authority