

CAP 2093

CAA Impact Analysis – Changes to VMC Minima in UK Class D Airspace



Safety and Airspace Regulation Group

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Civil Aviation Authority

Aviation House

Beehive Ring Road

Crawley

West Sussex

RH6 0YR

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Enquiries regarding the content of this publication should be addressed to:

Airspace & ATS Policy, Airspace and ATM Aerodromes, Safety and Airspace Regulation Group

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Executive summary

On 20 May 2021, the Aviation Safety (Amendment) Regulations 2021 will amend the visual meteorological conditions (VMC) visibility and distance from cloud minima in class D airspace.

This analysis, conducted by the CAA on behalf of the Department for Transport (DfT), identifies and evaluates the impacts of the revised VMC minima on the safe and efficient operation of UK class D airspace.

The adoption of the revised VMC minima returns UK class D airspace to the situation that existed prior to 27 March 2020. It is reasonable to argue that the UK must have considered the class D airspace environment that existed prior to 27 March 2020 to be acceptably safe. Thus, by inference, the class D airspace environment that will exist from 20 May 2021 should also be acceptably safe.

The CAA has concluded that, whilst the revised VMC minima in class D airspace reduces the efficacy of the 'see and avoid' barrier to the risk of mid-air collision (MAC), they consider that the negative effects of this can, generally, be mitigated to an acceptable level; primarily by the way that an air traffic control service is provided in UK class D airspace. However, these statements reflect the general situation and the CAA is concerned that, at present, the changes to the VMC minima have an unacceptable impact on the safe operation of helicopters in the Manchester Low-Level Route.

The DfT is invited to note that:

- (1) The flight crew human factors elements associated with this change remain unquantified. While the provision of an air traffic control service is a key mitigation to the risk of MAC, airspace users' understanding of the applicable requirements and the importance of effective threat and error management has been highlighted within this analysis as key concerns associated with the change. The CAA is continuing work to identify how these can be ensured, both initially and as an ongoing activity.
- (2) Additional mitigations will be required to address the increased risk of MAC to helicopters operating VFR in the Manchester Low-Level Route. The CAA is working with NATS to address this by 20 May 2021.
- (3) Subsequent to the satisfactory resolution of the CAA's concerns regarding the operation of helicopters in the Manchester Low-Level Route, the CAA believes that, on balance, the impact of this change is neutral.

1 Introduction

Background

- 1.1 On 20 May 2021, the Aviation Safety (Amendment) Regulations 2021 will amend the visual meteorological conditions (VMC) visibility and distance from cloud minima in class D airspace¹, and will incorporate the UK's existing general permission relating to flight visibilities in class G airspace².
- 1.2 Following the introduction of Implementing Regulation (EU) No 923/2012 the Standardised European Rules of the Air (SERA), the UK had exempted any aircraft being flown within the UK at or below 3,000 ft AMSL and within class D airspace from the requirements of SERA.5001 (VMC visibility and distance from cloud minima) Table S5-1, subject to specific conditions. However, the UK's exemption case was not supported by the EASA and European Commission (EC) (Commission Decisions 2016/7654 and 2019/1957). Consequently, the exemption was allowed to expire at midnight on 26 March 2020 and, on 27 March 2020, the UK implemented the requirements of SERA.5001 Table S5-1.
- 1.3 Following the end of the EU Exit Transition Period, the Department for Transport (DfT) developed a Statutory Instrument (The Aviation Safety (Amendment) Regulations 2021) to amend SERA.5001 Table S5-1 to reintroduce the operational environment that existed prior to 27 March 2020.
- 1.4 ICAO's Safety Management Manual (Doc 9859)³ asks that States evaluate and manage the impact of change in their aviation system, highlighting the potential for significant impact to the safety risks of the State associated with changes in the regulatory environment. It goes further, saying that the State needs to analyse the impact of the change on the existing system and analyse, assess and if appropriate mitigate any new or altered safety risks.
- 1.5 The Department for Transport (DfT) has requested that the CAA analyse the impact of the changes to the VMC minima on its behalf and advise them of our

¹ As detailed in SERA.5001 Table S5-1.

² ORS4 No.1341.

³ ICAO Doc 9859 Safety Management Manual Section 8.5.6.

findings. This will enable Ministers to determine whether the impacts of the change are acceptably safe.

Purpose and Scope

- 1.6 The purpose of this analysis is for the CAA to identify and evaluate the impacts of the revised VMC minima in those volumes of class D airspace within which the UK is responsible for the provision of air traffic services.
- 1.7 The DfT will utilise the CAA's analysis in order to assure themselves that the effects of the changes to the VMC minima are acceptably safe in those volumes of class D airspace within which the UK is responsible for the provision of air traffic services.
- 1.8 The revision to SERA.5001 Table S5-1 relating to flight visibility in class G airspace is out of scope of this analysis as it does not pose a change to the UK's existing airspace environment.

Responsibilities

- 1.9 The CAA is responsible for the completeness and accuracy of their impact analysis and any recommendations made to the DfT therein.
- 1.10 The DfT is responsible for:
 - (a) evaluating whether the effects of the changes to the VMC minima are acceptably safe in those volumes of class D airspace within which the UK is responsible for the provision of air traffic services; and
 - (b) the ownership of residual safety risk where it has derived from the change to the VMC minima, as identified in the CAA's analysis.

Referencing

- 1.11 References to SERA.5001 Table S5-1 being amended by the Aviation Safety (Amendment) Regulations 2021, and references to other Rules within SERA that are applicable within the UK, refer to Reg UK (EU) No 923/2012 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

2 System Description

Introduction

- 2.1 In order to consider the impacts of the change, it is necessary to describe the current and future systems; i.e. the system that existed before and will exist after the change to the VMC minima⁴.

Current System Description

- 2.2 At present, the VMC visibility and distance from cloud minima detailed in SERA.5001 Table S5-1⁵ (see [Annex A](#)) are applicable in UK law.
- 2.3 In class D airspace, this requires visual flight rules (VFR) flights at and below 3 000 ft above mean sea level (AMSL), or 1 000 ft above terrain, whichever is the higher, to operate in a flight visibility of 5 km and to remain at least 1 500 m horizontally and 1 000 ft vertically distant from cloud. These VMC minima are intended to provide pilots of VFR flights with the meteorological conditions considered necessary by ICAO to discharge their collision avoidance responsibilities⁶; visually acquiring conflicting aircraft, and, within the bounds of their air traffic control (ATC) clearance, taking action necessary to avoid collision.
- 2.4 In class D airspace, ATC is not required to separate instrument flight rules (IFR) flights from VFR flights, nor to separate VFR flights⁷. It is the pilot's responsibility to 'see and avoid' other aircraft, aided by ATC through the provision of traffic information and, when requested, advice on collision avoidance^{8 9}. By doing so, ATC discharges its responsibilities regarding the prevention of collisions, the

⁴ The future system description describes the requirements which exist in law (i.e. SERA, as transposed from the requirements detailed in ICAO Annex 2) and does not include any additional mitigations identified as being necessary to mitigate the safety impacts resulting from the implementation of the revised VMC minima.

⁵ Text originates from ICAO Annex 2 Section 3.9 Table 3-1.

⁶ SERA Section 3 Chapter 2 Avoidance of Collisions.

⁷ SERA.6001, SERA.8005(b) and Appendix 4.

⁸ ICAO Doc 4444 PANS-ATM Section 5.10.

⁹ ATC may also issue routing instructions to assist pilots by reducing or eliminating points of conflict with other flights.

expedition and maintenance of an orderly flow of air traffic and the provision of advice and information useful for the safe and efficient conduct of flight¹⁰.

Future System Description

- 2.5 The amendment proposed to SERA.5001 Table S5-1 VMC visibility and distance from cloud minima is detailed in [Annex B](#). It will permit VFR flights operating at or below 3 000 ft AMSL, or 1 000 ft above terrain, whichever is higher, to fly clear of cloud with the surface in sight if the aircraft is flying:
- (a) during day;
 - (b) at an indicated airspeed of 140 kts or less to give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; and,
 - (c) for aircraft other than helicopters, with a flight visibility of at least 5 km; or, for helicopters, with a flight visibility of at least 1 500 m.
- 2.6 Acknowledging the conditions described in 2.5 (a) to (c) above, it is clear that where a VFR flight operates 'clear of cloud with the surface in sight' (rather than 1 000 ft vertically and 1 500 m horizontally clear of cloud), in certain meteorological conditions, this will restrict the pilot's ability to visually detect IFR flights flying in instrument meteorological conditions (IMC) (i.e. in cloud) in proximity to them. Moreover, it reduces the time available for IFR flights to visually detect VFR flights, once that IFR flight manoeuvres from IMC into VMC. This issue will be explored further in Chapter 4.
- 2.7 The safety mitigation provided by ATC and described in 2.4 above will still apply but it is reasonable to argue that, without additional mitigation being applied, the risk of mid-air collision (MAC) is increased as a result of the effect of the changed minima on a pilots' ability to visually detect conflicting flights.

¹⁰ SERA.7001 General – Objectives of the air traffic services.

3 Impact Analysis Methodology

Introduction

3.1 The purpose of this impact analysis is to:

- identify and evaluate the impacts of the revised VMC visibility and distance from cloud minima in class D airspace; and,
- provide the DfT with the information that they need to assure themselves that the impact of the change in the VMC minima is acceptably safe, in airspace within which the UK is responsible for the provision of air traffic services.

Conduct of the Impact Analysis

3.2 To inform the impact analysis, the CAA facilitated a workshop attended by a small multi-disciplinary team composed of CAA personnel from a variety of technical backgrounds and one external stakeholder with significant commercial and private flying experience.

3.3 The purpose of the workshop was to:

- identify and evaluate the impacts of the change on UK class D airspace against the following criteria:
 - o security;
 - o financial;
 - o environment;
 - o efficiency of the air traffic management (ATM) system; and
 - o safety.
- identify and consider residual safety effects relating to specific operating environments and conditions; and,
- identify and consider any other issues that relate to the revised VMC minima.

3.4 To facilitate the team's evaluation of the impacts on safety, a table-top exercise was undertaken consisting of two class D airspace scenarios involving IFR and VFR flights. A description of the table-top exercise and summary of participants' discussions is at [Annex C](#). The outcomes from the workshop activity then

informed the drafting of this impact analysis, which was subsequently peer reviewed within SARG, and approved by Head of Airspace, ATM & Aerodromes.