

Finance and Corporate Services
Information Management

23 May 2012
FOIA reference: E0001238

Dear XXXX

I am writing in respect of your recent application dated 6 May 2012, for the release of information held by the Civil Aviation Authority (CAA).

Your request:

"I request the information concerning an aircraft flying in large circles over Monmouthshire, Herefordshire and Gloucestershire today, Sunday 6th May 2012 leaving large constant trails which dispersed into the atmosphere in the form of clouds above the natural broken cloud cover, over a period of several hours either side of midday.

This was clearly not a vapour trail as the blue sky turned grey as the aircraft criss - crossed itself constantly".

Our response:

In assessing your request in line with the provisions of the Environmental Information Regulations 2004 (EIR), we are able to provide the information below.

The CAA, as the independent regulator of the civil aviation industry, is not directly involved in the provision of air traffic control services nor is it responsible for monitoring individual aircraft movements; consequently, the Authority does not hold any records that would confirm the identity of the aircraft in question.

However, the CAA's Airspace Utilisation section has previously published an Airspace Co-ordination Notice (ACN) concerning a Military E-3D aircraft which has been conducting training missions in temporary Orbit Areas in preparation for their involvement in supporting the air security plan for the London 2012 Olympic and Paralympic Games. There are two Orbit Areas which form part of this exercise and E-3D Orbit Area 1 covers the area in question (see enclosed image taken from Google Earth); the CAA is aware that the aircraft was operating within this area on both the 5th and 6th of May and the ACN clearly details that the aircraft is to operate at Flight Level 310 (approximately 31,000 feet) when orbiting with this area. Taking this into account, it is likely that this particular aircraft would have been generating "the large constant trails" to which you refer.

The most likely explanation for these "trails" is that they are persistent condensation trails (contrails). Contrails are formed when water vapour, which is emitted from aircraft engines as part of the combustion process, comes into contact with cold air. Depending on the ambient atmospheric conditions, such as temperature, pressure and humidity, the water

Civil Aviation Authority

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vapour may form cirrus clouds. Depending on such factors as temperature and wind speed, the cirrus clouds may develop further or subside. These conditions vary greatly, even at the same altitude and a result of this would be that the contrails appear in an intermittent manner.

The water ejected through the exhaust tends to raise the relative humidity of the air in the wake of the engines. On the other hand, the heat generated by the engines tends to lower the relative humidity by raising the temperature of the wake. In certain conditions the net result is to increase the humidity to saturation so that a cloud is formed which trails behind the aircraft. This type of trail can ordinarily occur only if the air temperature is below a critical value, which varies almost linearly from about -24 deg Celsius at sea level to about - 45 degrees Celsius at 50,000 feet. The critical temperatures, which are only slightly affected by the type of aircraft, apply to aircraft flying at cruising speed in an atmosphere just saturated with respect to ice; the corresponding temperatures for saturation with respect to water are lower by about 2 or 3 degrees. Contrails can occur exceptionally at temperatures above the critical values when the free air is supersaturated with respect to ice (i.e. the air contains more water which, if all frozen, the air could not 'hold'), or when fuel consumption is greater than it is under normal cruising conditions e.g. with the throttle fully open.

Once a trail is formed, it broadens by diffusion. If the surrounding air is at or near saturation, the trail evaporates slowly or not at all and is then long and persistent. If the relative humidity is low, the trail only appears as a short plume behind the aircraft. It is not uncommon for the air to be supersaturated with respect to ice. Since the exhaust gases contain sublimation nuclei from combustion, any trail formed in these conditions is persistent and may thicken until the ice particles fall out as snow. However, the attainment of saturation of the atmosphere is not sufficient for the trail to become visible; condensed water or ice particles must be in sufficient concentration to be seen, and this further depends on illumination, background contrast, distance and other viewing conditions.

This phenomenon has been widely observed and reported over many years and there is much ongoing research into the impact of aviation on climate change including the effects of contrails and cirrus clouds. Further information on contrails is reported in the Intergovernmental Panel on Climate Change report on Aviation and the Global Atmosphere, Cambridge University Press, 1999 (<http://www.ipcc.ch/ipccreports/sres/aviation/index.htm>). A simpler explanation is provided in the Royal Commission on Environmental Pollution report on the Environmental Effects of Civil Aircraft in Flight published in 2002 (http://eeac.hscglab.nl/files/UK-RCEP_CivilAviation_Nov02.pdf - see page 13 in particular).

If you are not satisfied with how we have dealt with your request in the first instance you should approach the CAA in writing at:-

Mark Stevens
External Response Manager
Civil Aviation Authority
Aviation House
Gatwick Airport South
West Sussex
RH6 0YR

mark.stevens@caa.co.uk

The CAA has a formal internal review process for dealing with appeals or complaints in connection with Freedom of Information requests. The key steps in this process are set in the attachment.

Should you remain dissatisfied with the outcome you have a right under Section 50 of the Freedom of Information Act to appeal against the decision by contacting the Information Commissioner at:-

Information Commissioner's Office
FOI/EIR Complaints Resolution
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF
www.ico.gov.uk/complaints.aspx

Should you wish to make further Freedom of Information requests, please use the e-form at <http://www.caa.co.uk/foi>.

Yours sincerely

Rick Chatfield
FoIA & EIR Case Manager

CAA INTERNAL REVIEW & COMPLAINTS PROCEDURE

- The original case to which the appeal or complaint relates is identified and the case file is made available;
- The appeal or complaint is allocated to an Appeal Manager, the appeal is acknowledged and the details of the Appeal Manager are provided to the applicant;
- The Appeal Manager reviews the case to understand the nature of the appeal or complaint, reviews the actions and decisions taken in connection with the original case and takes account of any new information that may have been received. This will typically require contact with those persons involved in the original case and consultation with the CAA Legal Department;
- The Appeal Manager concludes the review and, after consultation with those involved with the case, and with the CAA Legal Department, agrees on the course of action to be taken;
- The Appeal Manager prepares the necessary response and collates any information to be provided to the applicant;
- The response and any necessary information is sent to the applicant, together with information about further rights of appeal to the Information Commissioners Office, including full contact details.

ACTIVITY NO: 2012-01-0045

12 Apr 12

See Distribution

AIRSPACE CO-ORDINATION NOTICE
E-3D OLYMPIC ORBIT AREA MISSIONS
4 JAN – 12 SEP 2012
AL2

References:

- A. Email AEW Operations for OLYMPICS dated 12 Dec 11.
- B. Manual of Military Air Traffic Management – Chapter 33.

ALL TIMES UTC

INTRODUCTION

1. As requested at Reference A, and in accordance with Reference B, the following measures have been agreed by AUS with the organiser and airspace controlling authorities to accommodate the subject Unusual Air Activity.

ACTIVITY/OVERVIEW

2. **An E-3D will conduct missions in temporary Orbit Areas between 4 Jan and 12 Sep 2012 for training and operations related to the London 2012 Olympic and Paralympic Games.** It is anticipated that each mission will be accomplished in one day (TBC). The E-3D will operate in one or both of 2 separate tactical orbits, one overhead Malvern and the other over the Channel south of Southampton (Map at Annex A). Training and operations may be required until the completion of the London 2012 Olympic and Paralympic Games programme and therefore this ACN is valid until 12 Sep 2012.

DATES AND TIMES

- 3. a. **Activity Period:** 4 Jan – 12 Sep 2012. [Sponsor giving 24hrs notice of intent].
- b. **Flight Times:** Times as and when pre-notified and agreed by ATC.

Coordination will be undertaken when dates are confirmed.

VERTICAL LIMITS

4. **E-3D.** The E-3D will operate in a tactical orbit at **FL310 for Orbit Area 1** and at **FL330 for Orbit Area 2**. The aircraft will fly at 360 Kts GS. There is some flexibility with the aircraft level but this must be agreed and fixed prior to the commencement of data gathering.

Civil Aviation Authority

CAA House, 45-59 Kingsway London WC2B 6TE www.caa.co.uk
Telephone 020 7453 6583 DFTS (9) 6453 ext 6583 Fax 020 7453 6593
Email mandy.biggs@caa.co.uk

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INVESTOR IN PEOPLE

EXERCISE AREA/COORDINATES

5. The aircraft will operate in the following orbit areas:
- E-3D Orbit 1: 520808N 0023623W radius 12nm.
 - E-3D Orbit 2: 5015N 00051W radius 12nm.

Note: Strong winds may necessitate a request from the aircraft operators for a slightly wider orbit.

OPERATING AUTHORITY/SPONSOR

6. Flt Lt C Curry
8 Sqn
RAF Waddington
Lincoln LN5 9NB
- Civ Tel: 0044 (0) 1522 726681
Mil Tel: 95771 Ext 6681
Email: Craige.Curry432@mod.uk

AIRSPACE RESERVATIONS

7. Danger Area Reservation. One of the proposed E-3D orbit areas lies within the D038-D039 complex. Reservation and coordination for use of this airspace will be undertaken by the aircraft operators in liaison with the Danger Area operating authority (Plymouth Mil/FOST).

CO-ORDINATION & CONTROL ARRANGEMENTS

8. E-3D. The E-3D will be RVSM compliant and will operate in the proposed orbit areas under the control of LATCC (Mil) LJAO as required.
9. Flight Status Priority. E-3D aircraft engaged on the missions are approved as **Category E** flights and once established in the orbit area will be afforded **Non-Deviating Status (NDS)**. **These missions are granted NDS as it is essential that the aircraft maintains the orbits at para 5 at a constant level. Deviation would nullify results.**
10. Mission Confirmation. The E-3D Tactical Director is requested to provide 24hrs notice of the mission and all available mission details by telephone to LATCC (Mil) LJAO South Bank Supervisor (**01489 612417**). RAF Waddington Stn Ops are requested to telephone LJAO South Bank Supervisor **at least 3 hrs prior to the mission** to confirm whether it will proceed. ATC agencies must be informed of late notice cancellation as soon as possible.

AERONAUTICAL PUBLICATIONS

11. As this activity is wholly contained within CAS, NOTAM action by AUS is not required.

AMENDMENT ACTION

12. Proposed changes to this ACN should be sent to AUS (AS3) on Tel: 0207 453 6599, Fax: 0207 453 6593 or email ausops@caa.co.uk quoting Activity Number 2012-01-0045.

<original signed>

Amanda Biggs

A J BIGGS
Sqn Ldr
Airspace Specialist 3
For Hd of AU&ORA

Annexes: [Chart extract for information only and not to be used for flight planning purposes]

Annex A: E-3D Mission Orbits.

Distribution: All by e-mail

Action:

LAC (Swanwick)	-	LAC Ops
LATCC (Mil) LJAO	-	South Bank U Ops O
Plymouth Mil	-	FOST SATCO
RAF Waddington	-	8 Sqn [FAO: Flt Lt C Curry], Stn Ops

Information:

HQ Air	-	SO2 ISTAR Air
LAC (Swanwick)	-	AMC
LATCC (Mil) LJAO	-	MABCC, WO Ops
RAF Boulmer	-	OC CRC

**ANNEX A TO
ACN 2012-01-0045
DATED 29 FEB 12**

E-3D Mission Orbits



