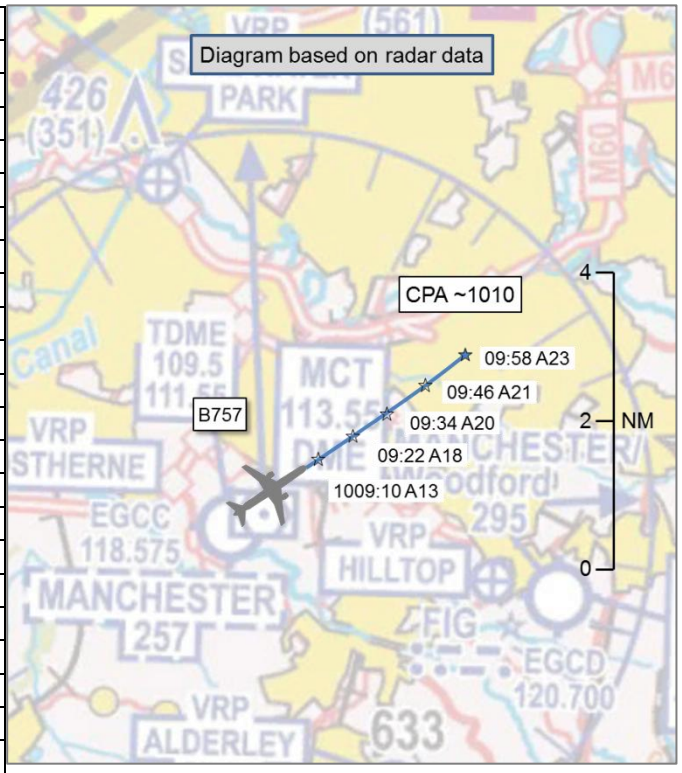
AIRPROX REPORT No 2015052

Date: 20 Apr 2015 Time: 1010Z Position: 5324N 00211W Location: 4nm NE Manchester Airport

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	B757	Drone
Operator	CAT	Unknown
Airspace	Manchester CTR	Manchester CTR
Class	D	D
Rules	VFR	
Service	Aerodrome	
Provider	Manchester	
Altitude/FL	2300ft	
Transponder	A, C, S	
Reported		
Colours	NK	
Lighting	NK	
Conditions	VMC	
Visibility	NK	
Altitude/FL	2300ft	
Altimeter	QNH (NK hPa)	
Heading	056°	
Speed	220kt	
ACAS/TAS	TCAS II	
Alert	Nil	
Separation		
Reported	0ft V/ 200m H	NK
Recorded	NK	



THE B757 PILOT reports climbing straight ahead on the Standard Instrument Departure from Manchester, passing 2300ft during flap clean-up, when a drone passed down the left side of the aircraft at approximately 200m at the same level. The incident was reported to Manchester ATC.

He assessed the risk of collision as 'High'.

THE DRONE OPERATOR: The drone operator could not be traced.

THE MANCHESTER CONTROLLER reports working as the 'Air 1' controller on Runway 05L during single runway operations. He had launched the B757 on a DESIG departure and, after waiting, launched an EMB170 on an ASMIM departure. As the EMB170 was rolling, the B757 pilot reported sighting a drone as he passed about 4nm on climbout and at the same level (2500ft). When the EMB170 was airborne the controller turned it left onto a heading of 360° to avoid the area of the suspected drone, which the EMB170 pilot also reported seeing. The controller then stopped all further departures and start-ups.

Factual Background

The weather at Manchester was recorded as follows:

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EGCC 200950Z 07010KT CAVOK 11/04 Q1032=
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Analysis and Investigation

CAA ATSI

The B757 was on a scheduled flight from Manchester and making a DESIG departure from Runway 05L. At 1010:00 the aircraft had just passed approximately 4 miles on the climb out and 2300ft when the pilot reported passing a drone 'very close'. In a later written report this was stated as approximately 200 metres away. At this point the controller had already given a take-off clearance to the next aircraft which, once airborne, was given a left turn to climb to the north and away from the area of the reported drone sighting. The pilot of the second aircraft also reported seeing the drone at 1011:50, stating that it was at approximately 3000ft. Both pilots reported that it was small in size. The drone did not generate a radar track. Following this occurrence Manchester stopped all departures from Runway 05L and, at 1030, commenced departures from Runway 23L. A Police helicopter that was airborne took up a search but nothing was observed. Runway 05L operations resumed at 1100.

UKAB Secretariat

The Air Navigation Order 2009 (as amended), Article 138[1] states:

> 'A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property.'

Article 166, paragraphs 2, 3 and 4 state:

> '(2) The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.
> (3) The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.'
> (4) The person in charge of a small unmanned aircraft which has a mass of more than 7kg excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight must not fly the aircraft
> (a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained;
> (b) within an aerodrome traffic zone …; or
> (c) at a height of more than 400 feet above the surface unless it is flying in airspace described in sub-paragraph (a) or (b) and in accordance with the requirements for that airspace.'

A CAA web site[2] provides information and guidance associated with the operation of Unmanned Aircraft Systems (UASs) and Unmanned Aerial Vehicles (UAVs).

Additionally, the CAA has published a UAV Safety Notice[3] which states the responsibilities for flying unmanned aircraft. This includes:

> 'You are responsible for avoiding collisions with other people or objects - including aircraft.
>
> Do not fly your unmanned aircraft in any way that could endanger people or property.
>
> It is illegal to fly your unmanned aircraft over a congested area (streets, towns and cities).
>
> Also, stay well clear of airports and airfields'.

[1] Article 253 of the ANO details which Articles apply to small unmanned aircraft. Article 255 defines 'small unmanned aircraft'. The ANO is available to view at http://www.legislation.gov.uk.
[2] www.caa.co.uk/uas
[3] CAP1202.

The CAA issued SI 2015/02 (Issue 1), AIRPROX Involving Small Unmanned Aircraft, on 8 May 2015. This is an amendment to the Airprox reporting procedure at Section 6, Chapter 3 of CAP 493 (Manual of Air Traffic Services Part 1) and states that reporting action at aerodromes and ACCs is to include notification to civil police of the location of the Airprox as soon as practicable to initiate tracing action. The SI is included at Annex A to this report.

Summary

An Airprox was reported when a B757 and a drone flew into proximity at about 1010 on Monday 20th April 2015 in the Class D airspace of the Manchester CTR. The B757 pilot was operating under IFR in VMC in receipt of an Aerodrome Control Service from Manchester.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of a report from the B757 pilot, radar photographs/video recordings, a report from the air traffic controller involved and a report from the appropriate ATC authority.

Members quickly agreed that, at the altitude reported (1500-2000ft above ground), the drone was probably either being operated beyond visual range using a First-Person View (FPV)[4] system, or the operator had lost control of the drone and it had strayed in height. The Board noted that if it was being flown using FPV then it was constrained by regulation to be below 1000ft, and the operator was required to have a competent observer present in order to detect converging aircraft. It was also noted that the relevant ANO Articles (which may also be found at www.caa.co.uk/uas) state that a person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made, and must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions. In short, as the CAA website states, "The operation [of the drone] must not endanger anyone or anything". The Board opined that, in collision avoidance terms, the perception and definition of 'endanger' could be very different between an experienced aviator and a person with no aviation experience at all. That being said, the Board noted that this incident had occurred in the fairly obvious climb-out lane of Manchester airport, for which 'endangerment' of commercial airliners would hopefully be self-evident. The Board commented that the potential sanctions of prosecution, financial penalty or further action all act as deterrents to non-compliant behaviour, but only in the presence of a realistic expectation of being apprehended. Without that expectation, it seemed that some drone operators may feel they are free to conduct whatever action they desire with impunity, at best unthinkingly but at worst deliberately.

In summary, the Board observed that operators of drones less than 7kg mass have a right to conduct their leisure activities throughout UK airspace (even controlled airspace) provided they are reasonably satisfied that the flight can be safely made and they maintain visual line of sight with the drone "(normally taken to be within 500m horizontally and 400ft vertically) of its remote pilot..."[5] After much discussion, and recognising that operations beyond these distances must in theory be approved by the CAA, it was agreed that, with its increasing sophistication, the reality of current drone technology provided capabilities to operate well beyond the current regulatory framework designed to ensure safe operation in a shared aviation environment. In this respect, members agreed that drone collision was especially hard to mitigate, and that, in their opinion, expressions

[4] First Person View flying is the ability to control a radio controlled aircraft from a "pilot's eye" perspective through the use of an on-board camera and ground-based receiving and viewing equipment. The viewing equipment is normally a set of video goggles. FPV systems usually involve on-board flight control, navigation and camera systems to transmit an image to the operator on the ground. CAA ORS4 No 1108 (available at http://www.caa.co.uk/docs/33/1108.pdf) dated 6 May 2015 requires that, amongst other rules, to fly under FPV the drone must not exceed 3.5kg, it must not be flown in CAS or above 1000ft, and that the person in charge is accompanied by a competent observer who maintains direct unaided visual contact with the SUA sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions and advises the person in charge accordingly.

[5] See www.caa.co.uk/uas.

such as ‘endanger’ were open to interpretation, particularly by non-aviators who may not have an appreciation for the risks that were involved. Ultimately, operators of drones of less than 7kg mass were required to maintain at least 50m from any third parties but, in the air-to-air case, the Board opined that judging 50m to any degree of accuracy from the ground (or air) was practically unachievable and therefore largely unworkable as a rule. This particular Airprox highlighted the issue, the drone was probably greater than 50m from the B757, and had therefore satisfied the legal minimum, but there was clear endangerment and associated risk of collision, especially had the B757 pilot not seen the drone and had deviated left to any minor degree.

Without a report from the drone operator, some members felt that meaningful analysis of the event was not possible. Others considered that if the drone was not under control, or even if it was, then the limitations of FPV and visual lookout at such a height were such that chance had played a major part in events. After much discussion, it was finally agreed by a majority that, whilst in this case it could not be said that the incident warranted a Category A assessment (actual risk of collision), the fact that the drone had flown so close to the B757 in the Manchester CTR meant that safety margins had been much reduced below normal.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The drone was flown within the Manchester CTR and into conflict with the B757.

Degree of Risk: B.

Supplementary Instruction (SI)
CAP 493 MATS Part 1

Safety and Airspace Regulation Group

Intelligence, Strategy and Policy

Number 2015/02 (Issue 1)

Issued: 8 May 2015

Effective Date: 8 May 2015

AIRPROX Involving Small Unmanned Aircraft

1 Introduction

1.1 A marked increase in the number of AIRPROX reports involving small unmanned aircraft (more generally referred to as 'drones') has occurred recently. A common theme through these recent reports is that the encounters have been reported at altitudes above 1,500 feet, which is in almost all cases well beyond a height that the person flying the 'drone' will be able to maintain visual contact with it, and the airspace around it.

1.2 The purpose of this Supplementary Instruction is to amend the AIRPROX reporting procedure within CAP 493 - Manual of Air Traffic Services Part 1 when an AIRPROX report involving a small unmanned aircraft is reported to ATC.

2 Background

2.1 A small unmanned aircraft is defined within the Air Navigation Order (ANO) as 'any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20 kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight.' This definition is all encompassing and includes traditional 'model aircraft' as well as the newer 'multicopter' types, whether they are being used recreationally or for commercial purposes. Small unmanned aircraft operations are specifically regulated by ANO 2009 articles 166 and 167; however, ANO 2009 article 138 (endangerment) also applies.

2.2 Because of their relatively simple nature, unless specific approval has been given, a small unmanned aircraft must always be operated within the direct visual contact of the person flying it so that they can avoid collisions with other aircraft. ANO 2009 article 166(3) specifically states:

> 'The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.'

2.3 Unlike manned aviation, tracing the person in charge of small unmanned aircraft is extremely challenging, due to their remoteness from the aircraft itself. Therefore, speed of reporting is essential so that the operator can be located, particularly if it is likely that the aircraft is being operated in a manner that is likely to endanger others (e.g. in close proximity to another aircraft and/or at an excessive height). In order to achieve this, Air Traffic Service Units receiving an AIRPROX report involving what is

thought likely to be a small unmanned aircraft must inform the Civil Police as soon as practicable.

3 Revised MATS Part 1 Procedures

3.1 With immediate effect, CAP 493 is amended as shown at Appendix A.

3.2 This change will be incorporated into CAP 493, Edition 6 at Amendment 2 in due course.

4 Queries

4.1 Any queries or further guidance required on the content of this SI should be addressed to:

ATS Enquiries
Intelligence, Strategy and Policy
CAA Safety and Airspace Regulation Group
2W Aviation House
Gatwick Airport South
West Sussex
RH6 0YR

E-mail: ats.enquiries@caa.co.uk

4.2 Any queries relating to the availability of this SI should be addressed to:

ATS Documents
Intelligence, Strategy and Policy
CAA Safety and Airspace Regulation Group
2W Aviation House
Gatwick Airport South
West Sussex
RH6 0YR

E-mail: ats.documents@caa.co.uk

5 Cancellation

5.1 This SI shall remain in force until incorporated into CAP 493 or it is revoked, suspended or amended.

Appendix A

Glossary

Definitions

Small Unmanned Aircraft Any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20 kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight. (ANO)

Abbreviations

SUA Small Unmanned Aircraft

Section 6: Chapter 3: Aircraft Accident, Incident and AIRPROX Reports

Paragraph 3: Reporting Action at Aerodromes

Table 2

Circumstances of an Incident	Reporting Action by telephone to	Subsequent Action
AIRPROX Report	ACC Watch Manager Aircraft Operators Other ATSUs involved	Dispatch CA 1094A. SRG 1602 from all concerned to Safety Data.
AIRPROX Report involving SUA	Civil Police: Provide location of AIRPROX as soon as practicable to initiate tracing action ACC Watch Manager Aircraft Operator Other ATSUs as necessary	

Section 6: Chapter 3: Aircraft Accident, Incident and AIRPROX Reports

Paragraph 4: Reporting Action at ACCs

Table 3

Circumstances of an Incident	Reporting Action by telephone to	Subsequent Action
AIRPROX Report	Aircraft Operators Other ATSUs involved	Dispatch CA 1094A. SRG 1602 from all concerned to Safety Data.
AIRPROX Report involving SUA	Civil Police: Provide location of AIRPROX as soon as practicable to initiate tracing action Aircraft Operator Other ATSUs as necessary	