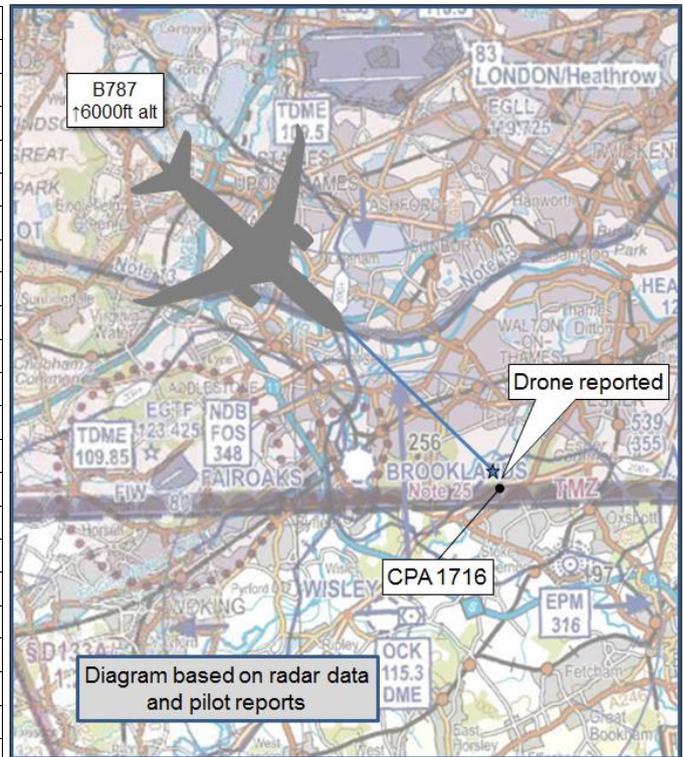


**AIRPROX REPORT No 2016110**

Date: 20 Jun 2016 Time: 1716Z Position: 5120N 00024W Location: 2nm NW EPM

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

Recorded	Aircraft 1	Aircraft 2
Aircraft	B787	Drone
Operator	CAT	Unknown
Airspace	LTMA	LTMA
Class	A	A
Rules	IFR	
Service	Radar Control	
Provider	Swanwick	
Altitude/FL		
Transponder	A, C, S	
<b>Reported</b>		
Colours	Company	Green
Lighting	Strobes, Beacon	
Conditions	VMC	
Visibility	>10km	
Altitude/FL	6000ft	
Altimeter	QNH (1012hPa)	
Heading	130°	
Speed	250kt	
ACAS/TAS	TCAS II	
Alert	None	
<b>Separation</b>		
Reported	<200ft V/0 H	NK
Recorded	NK	



**THE B787 PILOT** reports after departing from Heathrow RW27L, whilst climbing to 6000ft they turned left in accordance with the SID and established contact with London control. A radar heading of 130° was given. Approximately 2nm from EPM VOR the Captain spotted a flying object in the distance, 12 o'clock position, slightly below. There was no TCAS contact or Traffic Information. Only once the object passed beneath the aircraft was it obvious that it was an unmanned drone, metallic green in colour with two ellipsoidal pods. The drone could have been hovering, but the perspective made it look as though it was flying in the opposite direction, vertical separation was not more than 200ft.

He assessed the risk of collision as 'Medium'.

**The Drone Operator could not be traced.**

**THE LONDON TCC CONTROLLER** reports being told about the event some time later and having no recollection of it being reported at the time.

**Factual Background**

The weather at Heathrow was recorded as follows:

METAR COR EGLL 201650Z AUTO 26013KT 9999 FEW042 21/15 Q1012 NOSIG=

## Analysis and Investigation

### UKAB Secretariat

The Air Navigation Order 2009 (as amended), Article 138<sup>1</sup> 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.

In addition, the CAA has published regulation regarding First Person View (FPV) drone operations which limit this activity to drones of less than 3.5kg take-off mass, and to not more than 1000ft<sup>2</sup>.

### Summary

An Airprox was reported when a B787 and a drone flew into proximity at 1716 on Monday 20<sup>th</sup> June 2016. The B787 pilot was operating under IFR in VMC, and in receipt of a Radar Control Service from Swanwick. The drone operator could not be traced.

### **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available consisted of a report from the B787 pilot, radar photographs/video recordings, and a reports from the air traffic controllers involved.

There are no specific ANO regulations limiting the maximum height for the operation of drones that weigh 7kg or less other than if flown using FPV (with a maximum weight of 3.5kg) when 1000ft is the maximum height. Drones weighing between 7kg and 20kg are limited to 400ft unless in accordance with airspace requirements. Notwithstanding, there remains a requirement to 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. CAP 722 gives guidance that, within the UK, visual line of sight (VLOS) operations are normally accepted to mean a maximum distance of 500m [1640ft] horizontally and 400ft [122m] vertically from the Remote Pilot.

Neither are there any specific ANO regulations limiting the operation of drones in controlled airspace if they weigh 7kg or less other than if flown using FPV (with a maximum weight of 3.5kg) when they must not be flown in Class A, C, D or E, or in an ATZ during notified hours, without ATC permission.

<sup>1</sup> 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>.

<sup>2</sup> ORS4 No. 1168 Small Unmanned Aircraft – First Person View (FPV) Flying available at: [ORS4 No 1168](#).

Drones weighing between 7kg and 20kg must not be flown in Class A, C, D or E, or in an ATZ during notified hours, without ATC permission. CAP722 gives guidance that operators of drones of any weight must avoid and give way to manned aircraft at all times in controlled Airspace or ATZ. CAP722 gives further guidance that, in practical terms, drones of any mass could present a particular hazard when operating near an aerodrome or other landing site due to the presence of manned aircraft taking off and landing. Therefore, it strongly recommends that contact with the relevant ATS unit is made prior to conducting such a flight.

Notwithstanding the above, all drone operators are also required to observe ANO 2016 Article 94(2) which requires that the person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made, and the ANO 2016 Article 241 requirement not to recklessly or negligently cause or permit an aircraft to endanger any person or property. Allowing that the term 'endanger' might be open to interpretation, drones of any size that are operated in close proximity to airfield approach, pattern of traffic or departure lanes, or above 1000ft agl (i.e. beyond VLOS (visual line of sight) and FPV (first-person-view) heights), can be considered to have endangered any aircraft that come into proximity. In such circumstances, or if other specific regulations have not been complied with as appropriate above, the drone operator will be judged to have caused the Airprox by having flown their drone into conflict with the aircraft.

Members noted that the drone was operating at 6000ft and therefore beyond practical VLOS conditions. Also, in flying as it was within Class A airspace without the permission of Swanwick ATC, the Board considered that the drone operator had endangered the B787 and its occupants. Therefore, in assessing the cause, the Board agreed that the drone had been flown into conflict with the B787. Turning to the risk, although the incident did not show on the NATS radars, the Board noted that the pilot had estimated the separation to be not more than 200ft from the aircraft, and that it could only be identified as it passed underneath the aircraft. Acknowledging the difficulties in judging separation visually without external references, the Board considered that the pilot's estimate of separation, allied to his overall account of the incident, portrayed a situation where safety had been much reduced below the norm; they therefore determined the risk to be Category B.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: The drone was flown into conflict with the B787.

Degree of Risk: B