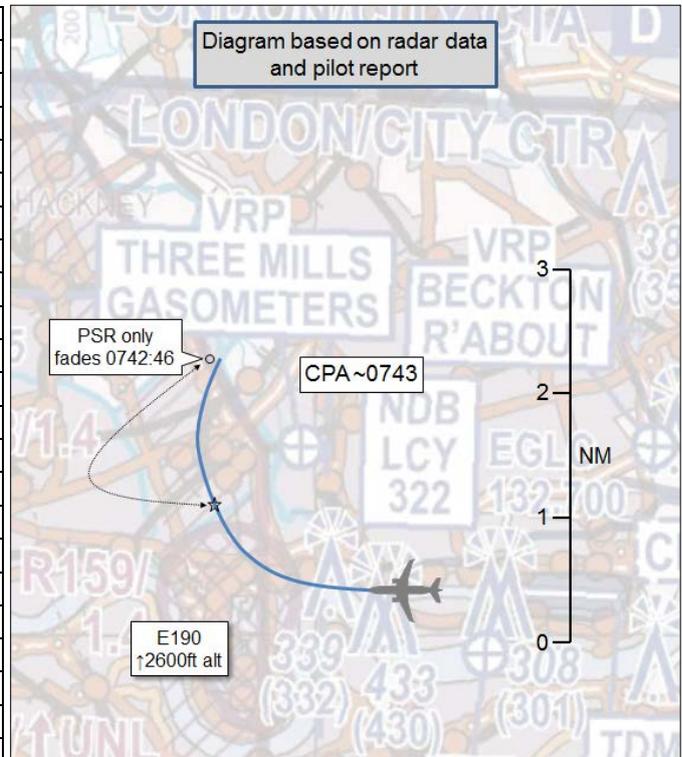


**AIRPROX REPORT No 2016158**

Date: 20 Jul 2016 Time: 0743Z Position: 5132N 00001W Location: Queen Elizabeth Olympic Park

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

| Recorded          | Aircraft 1    | Aircraft 2   |
|-------------------|---------------|--------------|
| Aircraft          | Embraer 190   | Drone        |
| Operator          | CAT           | Unknown      |
| Airspace          | London TMA    | London TMA   |
| Class             | A             | A            |
| Rules             | IFR           |              |
| Service           | Radar Control |              |
| Provider          | 'City Radar'  |              |
| Altitude/FL       | 2600ft        |              |
| Transponder       | A, C, S       |              |
| <b>Reported</b>   |               | Not reported |
| Colours           | Company       |              |
| Lighting          | All on        |              |
| Conditions        | VMC           |              |
| Visibility        | 10km          |              |
| Altitude/FL       | 2700ft        |              |
| Altimeter         | QNH (1007hPa) |              |
| Heading           | 360°          |              |
| Speed             | 210kt         |              |
| ACAS/TAS          | TCAS II       |              |
| Alert             | None          |              |
| <b>Separation</b> |               |              |
| Reported          | 30ft V/20m H  |              |
| Recorded          |               | NK           |



**THE E190 PILOT** reports that during initial climb from London/City, in a right turn passing about 2700ft, the First Officer (FO) saw what appeared to be a drone in close proximity to the aircraft, in the left 11 o'clock position and slightly above. The FO assessed that the drone would not collide if the E190 maintained its turn and rate of climb. The drone passed down the left side of the aircraft. Once the turn was complete and the aircraft level, the Captain informed ATC of the close proximity of a drone. Once safe to do so, both pilots discussed the incident and concluded the best decision was to continue with the flight and complete a safety report.

He assessed the risk of collision as 'Medium'.

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

**THE CITY RADAR CONTROLLER** did not file a report with UKAB.

**Factual Background**

The weather at London/City was recorded as follows:

METAR EGLC 200750Z NIL=  
 METAR EGLC 200720Z 18008KT 150V220 CAVOK 25/17 Q1007=

## Analysis and Investigation

### UKAB Secretariat

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. 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.

A CAA web site<sup>1</sup> provides information and guidance associated with the operation of Unmanned Aircraft Systems (UASs) and Unmanned Aerial Vehicles (UAVs) and CAP722 (UAS Operations in UK Airspace) provides comprehensive guidance.

Additionally, the CAA has published Drone Aware<sup>2</sup> 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).  
..., stay well clear of airports and airfields'.

### Summary

An Airprox was reported when an Embraer 190 and a drone flew into proximity at about 0743 on Wednesday 20<sup>th</sup> July 2016. The Embraer pilot was operating under IFR in VMC in receipt of a Radar Control Service from City Radar. The drone operator could not be traced.

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<sup>1</sup> [www.caa.co.uk/uas](http://www.caa.co.uk/uas)

<sup>2</sup> CAP 1202

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

Information available consisted of a report from the Embraer pilot and radar photographs/video recordings.

Members noted that the drone was operating at 2600ft 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 E190 and its occupants. Therefore, in assessing the cause, the Board agreed that the drone had been flown into conflict with the E190. 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 30ft vertically and 20m horizontally from the aircraft as they had been in a climbing turn, and that it had not been possible to increase the miss-distance other than to maintain the turn which they hoped would keep them clear. 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 a collision had only been narrowly avoided and chance had played a major part; they therefore determined the risk to be Category A.

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

Cause: The drone was flown into conflict with the E190.

Degree of Risk: A.