Chief Executive's Office

HM Coroner
For Leicester City and South Leicestershire
The Town Hall
Town Hall Square
Leicester
LE1 9BG

23 February 2018

Dear Madam Assistant Coroner,

Regulation 28 Report to Prevent Future Deaths – John Christopher Armstrong

1. I refer to your letter dated 12 January 2018 regarding the mid-air collision between a glider and a Cessna aircraft over Husbands Bosworth Airfield on 4 December 2016 which led to the regrettable death of Mr Armstrong.

2. In your letter, you highlight 3 areas of concern:

    a. The limitations of the see and avoid principle.
    b. The lack of an effective method to ascertain another aircraft's position in flight.
    c. The lack of Air Traffic Control Provision over Husband's Bosworth airfield.

    I would like to address each of these issues in turn.

See and Avoid

3. In the absence of a full and comprehensive ground surveillance picture, where all airborne are 'electronically conspicuous' and subject to either monitoring or control by air traffic services, the use of see and avoid has been an effective, if not infallible, method of avoiding collision for many decades. But, as you quite rightly mention, it does have its limitations. Limitations of the 'see and avoid' principle include: the difficulty of the human eye in detecting other aircraft on a steady bearing (which would indicate a collision is likely); blind spots within the aircraft (much as there is in a car behind the a-pillars); visual conspicuity of small, often white objects against the sky (such as gliders); and as in this tragic case, the position of the sun in the sky relative to each aircraft. In addition, whilst air traffic control is valid and effective within controlled airspace, the UK structure enables large swathes of 'open, uncontrolled' airspace where users are entitled to operate with little or no electronic equipment or air traffic assistance.

4. The Mid-Air Collision (MAC) Working Group, chaired by the CAA and including representation from across the flying spectrum, has examined the issue of visual conspicuity over many years. There are things than can be done to improve conspicuity, including different paint schemes and high intensity strobe lighting. Gliders though are painted predominantly white due to issues surrounding heat absorption and structural integrity; patently against the majority of meteorological background conditions, this is far from ideal. Some work has been done to raise the visual profile of gliders, including the

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use of stripes and bands of colour, but the key contributor to visual acuity is the use of strobe lighting and, due to weight and power consumption constraints, this has not proven to be a realistic solution. Some modern, high-end gliders are fitted with powerful batteries and in some cases even, a small engine to help sustain flight, but this is in a very small section of the gliding community.

Effective Method to Ascertain another Aircraft's position.

5. There are other facilities and items of equipment that can provide cues for 'see and avoid'; these include: making radio calls when passing an aerodrome, participation in an Air Traffic Control (ATC) service, (an action which is not mandatory in the type of airspace within which this event occurred), and the carriage and use of Electronic Conspicuity equipment. The position of other aircraft can be ascertained by those aircraft carrying interoperable electronic signal emitting transponders and, in some cases, conflicts can be resolved by using collision avoidance technology. This is an enhancement of the 'see and be seen' principle known as 'see, be seen and avoid'.

6. As highlighted in your report, glider GCLJK was fitted with a system known as FLARM, a lightweight collision avoidance solution particularly popular amongst the gliding community as it is light weight and with minimal power requirements. FLARM is also in use by some pilots in the General Aviation (GA) community but it is by no means ubiquitous; FLARM operates on a different frequency to more capable electronic transponders as favoured by the majority of larger aircraft around the world. FLARM has great utility in dense traffic situations such as would exist with groups of gliders soaring around a thermal but is largely incompatible with the equipment in different types of aircraft. Any form of electronic conspicuity equipment relies on all those in the vicinity carrying compatible systems. Had Glider GCLJK been fitted with a newer version of this equipment PowerFLARM https://flarm.com/products/powerflarm/ Mr Armstrong might have been able to pick up emissions from Cessna GCSFC if it were carrying and operating such a system, and thereby been given indication as to the presence of this aircraft.

7. You also mention in your letter that the CAA has published CAP1391. This document is the result of many years of work of the Electronic Conspicuity Working Group (ECWG), that has striven to overcome the challenges of the need for low power consumption, portability and affordability to encourage the wider use of electronic conspicuity devices. The CAA, alongside the ECWG, has provided specifications to industry for such devices and is actively encouraging the licensing and equipage of such equipment, to minimise the incidents of mid-air conflict. There are several trials currently being run in the UK airspace to examine the efficacy of this equipment.

8. Indeed, some of this work has already born fruit with at least 4 different devices being declared as meeting the CAP1391 requirements and available for purchase for a few hundred pounds. http://www.caa.co.uk/General-aviation/Aircraft-ownership-and-maintenance/Electronic-Conspicuity-devices/ There is an intention that there will be gradual convergence of technology and greater compatibility between systems as technology advances and greater gains are made in miniaturisation.

Air Traffic Control Provision

9. As is with the case of the fitment of electronic conspicuity, the participation in an air traffic control service is also not mandatory in this type of airspace. The gliding community generally reserve their radio transmissions for club communications and deconfliction with other gliders, whereas GA aircraft on a navigation exercise would normally speak with ATC or air to Ground stations along their route, although this is not mandatory unless they are planning to penetrate an air traffic control zone.

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10. Large parts of the airspace in the south of the UK are facilitated by the provision of a Lower Airspace Radar Service (LARS) mainly provided by military units. However, coverage is sparse in some areas. This service is provided through the long standing joint and integrated approach to airspace regulation in the UK, which corrals the capabilities of both civil and military facilities to the benefit of all airspace users. The service is however entirely voluntary: there is no requirement to provide nor utilise the service. It is understood from the AAIB report that the Cessna GCSFC was in communication with Leicester Airport, but that aerodrome does not have a radar facility. The provision of radar facilities at an aerodrome is a decision for the operator of the airfield, although it does have a role to play at busier airports where commercial air transport operates and where the CAA may require the operator to provide radar service provision as part of the airport's safety management system. This is not the situation in the case of Leicester aerodrome due to the small scale of their operation and the absence of public transport flights.

11. Whilst an air traffic service is a good cue to assist 'see and avoid', it does depend on the capabilities of the service provider (are they equipped with radar?), the ability of the radar to detect aircraft made from composite non-radar reflective materials, and that all aircraft in the same area are receiving a service from the same provider (i.e. on the same frequency). The nature of gliding operations is such that preference is given to remaining on a 'gliding frequency'. Accordingly, the CAA and the various working groups looking at these issues over the years, have concluded that proactively enabling the development and manufacture of lightweight, low cost electronic conspicuity devices and encouraging wider carriage of compatible electronic conspicuity devices is the best option to mitigate the risks of mid-air conflict and the prevention of collision. It should be noted however, that in a busy visual air traffic circuit, the utility of electronic conspicuity devices is reduced, as pilots do not have the time to look into the cockpit to track other aircraft - they must be predominantly "heads out" as this is the safest way of operating with other aircraft that are using the circuit at the same time. Pilot education in the dangers associated with circuit operations is currently the most effective tool.

Conclusion

12. The CAA will continue to drive forward the plan to ensure operators are 'electronically conspicuous' which will help to reduce the incidence of such events as those at Husbands Bosworth and others more recently. The risk of mid-air collision is a complex and long-term challenge and as such the CAA's MAC programme aims to reduce the risk of mid-air collision by pursuing targeted and continuous improvements in systems, cultures, processes and capability. The MAC programme works closely and collaboratively with the UK Airprox Board, UK Flight Safety Committee, Military Aviation Authority and industry stakeholders to understand and assess risk and identify effective and collaborative mitigations. This programme also meets the European Plan for Aviation Safety (EPAS) requirement for Member States to address MAC in their safety plans.

Yours sincerely

Andrew Haines
CHIEF EXECUTIVE

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