



Civil Aviation Authority

SAFETY NOTICE

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Laser Attacks

This Safety Notice contains recommendations regarding operational safety.

Recipients must ensure that this Notice is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

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|---------------------------------------|--------------------------------------------------------------|
| Applicability: | |
| Aerodromes: | All Aerodrome Operators All Ground Handling Organisations |
| Air Traffic: | All ATS |
| Airspace: | Not primarily affected |
| Airworthiness: | Not primarily affected |
| Flight Operations: | All AOC Holders, PAOC Holders and General Aviation Pilots |
| Licensed/Unlicensed Personnel: | All ATCO, Pilots and Ground Service Providers |

1 Introduction

- 1.1 Aircraft continue to be illuminated by lasers when in flight, with most events occurring either when aircraft are carrying out civil safety duties (e.g. police, HEMS or SAR helicopters) or when they are carrying out approaches to airfields (e.g. commercial passenger flights). However, any aircraft in any stage of flight may be subjected to deliberate illumination by a laser or by multiple lasers. Air traffic control (ATC) and aerodrome flight information service (AFIS) towers, together with airfield vehicles, have also been deliberately illuminated by lasers. These illumination events are more correctly termed attacks, in that most are carried out deliberately by individuals using hand-held lasers and pose hazards to the safe operation of aircraft and vehicles.
- 1.2 Shining any light (including that produced by a laser) at an aircraft in flight so as to dazzle or distract the pilot is an offence under article 225 of the Air Navigation Order 2016.

Additionally, the following are offences under the Laser Misuse (Vehicles) Act 2018:

- shining or directing a laser towards a vehicle which is moving or ready to move which dazzles or distracts, or is likely to dazzle or distract, a person with control of the vehicle¹; and
- shining or directing a laser towards an air traffic facility or person providing air traffic services (ATS) so that it dazzles or distracts, or is likely to dazzle or distract, a person providing air traffic services.

¹ This offence applies to both aircraft and airfield vehicles.

1.3 The purpose of this Safety Notice is as follows:

- to update industry with the latest information concerning laser attacks and their reporting;
- to reinforce earlier advice concerning actions to be taken during and after an attack by lasers;
- to provide advice and guidance concerning eye health following such an attack; and
- to provide useful sources of information to help educate and train operators, aircrew, ATS personnel² and airside drivers about the hazards to aircraft in flight, ATC/AFIS towers or airfield vehicles when being targeted by a laser or multiple lasers.

1.4 Laser Attacks must be reported to the CAA as a Mandatory Occurrence Report (MOR) when required by legislation; voluntary reporting using the MOR system is strongly encouraged when mandatory reporting is not required.

2 The Threat

2.1 Laser attacks on aircraft started some years ago when laser pointers became readily available. Events recorded on the CAA's MOR database continue at a rate of over 1,000 such attacks each year and the number of reported incidents is currently increasing again. As the CAA is not always informed of an attack the actual number of attacks may significantly exceed this figure. Most attacks take place on aircraft over or near large centres of population and occur both in the UK and overseas. However, ATC and AFIS towers, together with airfield vehicles, have also been targeted by lasers.

2.2 The earliest laser attacks were from red-light lasers, however over 80% of current attacks are from green-light lasers (around the wavelength of 532 nanometers). The human eye is much more sensitive to green light, so for an equivalent laser output power the green light appears to be much brighter and has a greater impact. Police crews have also reported being targeted with blue-light lasers.

2.3 The main threat posed by a laser attack is from the human reaction to the laser light. Laser attacks are always sudden, very bright, distracting, and can cause temporary visual disturbance for some time after the attack. So far, there have been no documented cases anywhere in the UK where civil aircrew have suffered permanent eye damage as a result of an attack. Current knowledge and experience suggest that permanent eye damage is unlikely. This is principally because the power levels available to legally available hand-held lasers are low and the distances from the laser to the aircraft, tower or vehicle together with the presence of cockpit, tower and vehicle transparencies provide some protection from the beam. Nevertheless, the possibility of permanent eye damage at some time in the future due to the availability of illegal higher power lasers cannot be discounted and there is evidence that more powerful hand-held devices may be reaching the UK.

2.4 The immediate effects of a laser attack are distraction and anxiety. The following are characteristics of a laser attack:

- it is always very sudden;
- it is always very bright;
- it is distracting;
- it has the potential to trigger a Startle Reflex due to the sudden intense visual stimulus
- the glare may obscure many (if not all) instruments;
- night vision may be disrupted;

² ATS personnel include air traffic controllers, aerodrome FISOs and ATS support staff.

- even if the eyes are not directly illuminated, there will be a temptation to look into the beam; and
- for some time after the attack there may be retinal 'after images' or even short-lived 'flash' blindness leading to concern that the eye has been permanently damaged.

3 Mitigation Strategies

3.1 This section provides some advice concerning actions that can be taken when an attack occurs. However, these actions should be supported by education, training and preparation. Aircrew, ATS personnel and airside drivers should assume that at some stage in their career their aircraft, tower or vehicle will be the subject of a laser attack or inadvertent laser illumination. They should be reassured that no personnel are believed to have suffered permanent eye damage from a laser attack but should prepare themselves for the sudden shock that such an attack can have by reading this and similar communications and by viewing the advice and training material in the links provided at the end of this notice and viewing the [video on laser attack](#). Operators should establish Laser Awareness Training and detailed SOPs for aircrew, ATS personnel and airside drivers, as appropriate (this should use a structured approach and be comparable to guidance already published).

3.2 Aircrew

In the event that your aircraft is deliberately and persistently illuminated (attacked) by a laser the following immediate actions are recommended:

a) During and immediately after an attack

- Do not look into the beam and shield eyes to the maximum extent possible. Inform ATS as soon as possible and in particular if a decision has been made to diverge from the cleared flight path.
- Consider re-engaging the autopilot (if disengaged) or handing control of the aircraft to the other pilot (if there is another pilot in the cockpit and he/she is less affected by the attack).
- If the aircraft is on the approach, consider executing a missed approach.
- Turn up cockpit lighting.
- Avoid rubbing eyes to reduce the potential for corneal abrasion.

b) Subsequent to the attack

- As soon as possible after the attack provide ATS with as much detail as possible concerning the event so that law enforcement organisations can take appropriate action. If possible, include a description of the location of the source of the laser beam, its direction and colour, and the length of exposure. Follow any additional company reporting procedures.
- Report the occurrence to the CAA as a MOR with as much detail as possible.
- If you have any concerns relating to long lasting damage to your eyesight, seek assistance from an optometrist or ophthalmologist.

3.3 ATS Personnel

ATS personnel are reminded of the current guidance to Air Traffic Service Units regarding the malicious use of lasers against ATS facilities which is contained in the Manual of Air Traffic Services (MATS) Part 1 (CAP 493) Section 2, Chapter 3, Paragraph 5C and the FISO Manual Section 6, Chapter 18, Paragraph 18.8 respectively which states:

- Look away from the laser beam if possible. Do not attempt to find the light source by staring at the laser.

- Shield eyes and consider the feasibility of lowering/raising 'sun blinds' to reduce the effects of the laser.
- Advise aircraft under your control/in contact that a laser is illuminating you.
- Avoid rubbing eyes to reduce the potential for corneal abrasion.
- Consider the feasibility of increasing ambient light levels to minimise any further illumination effects.
- Consider handing over the control position to a colleague in a position not exposed to the laser.
- Where local arrangements have not been established, inform a Supervisor who, in turn, can:
 - decide on restricting traffic in/out of the aerodrome;
 - inform the aerodrome operator; and
 - dial 999 and pass all relevant information to the local police.
- Ensure the event is recorded in the watch log and reported for further investigation by submitting a MOR to the CAA with as much detail as possible.
- Attacks on aircraft reported to ATS units should also be reported by ATS by submitting a MOR to the CAA.
- If you have any concerns relating to long lasting damage to your eyesight, seek assistance from an optometrist or ophthalmologist.

3.4 Airside Drivers

In the event that your vehicle is deliberately and persistently illuminated (attacked) by a laser the following actions are recommended:

- Stop the vehicle and look away from the laser beam if possible. Do not attempt to find the light source by staring at the laser.
- Shield eyes and consider using 'sun visors' to reduce the effects of the laser.
- Inform ATS as soon as possible.
- Avoid rubbing eyes to reduce the potential for corneal abrasion.
- Follow local procedures or, where local procedures have not been established, inform a Supervisor who, in turn, can:
 - inform the aerodrome operator; and
 - dial 999 and pass all relevant information to the local police.
- Ensure the event is recorded by ATS in the watch log, reported for further investigation in accordance with notified occurrence reporting procedures and reported to the CAA by submitting a MOR with as much detail as possible.

It recognised that not all attacks on airside vehicles will result in circumstances which require mandatory reporting, however when mandatory reporting is not required the voluntary submission of a MOR is strongly recommended so that a true picture of the threat can be obtained.

- If you have any concerns relating to long lasting damage to your eyesight, seek assistance from an optometrist or ophthalmologist.

4 Further Reading

4.1 The following links provide further information concerning lasers and aircraft illumination:

- [Laser radiation: introduction and safety advice](#) (Public Health England).
- [Laser Interference in Aviation](#) (SKYbrary).
- [Laser Pointer Safety.com](#).
- [Laser Hazards and Effects](#) (Federal Aviation Administration).
- [Lasers - CAA Web Site : Laser incidents | Civil Aviation Authority](#)

5 Queries

5.1 Any queries or requests for further guidance from AOC and PAOC holders as a result of this communication should be addressed to the assigned Flight Operations Inspector in the first instance.

5.2 Any queries or requests for further guidance from Aerodrome Licence holders as a result of this communication should be addressed to the assigned Aerodrome Inspector in the first instance.

5.3 Otherwise, queries should be addressed to the following e-mail address:
SafetyPublicationsTeam@caa.co.uk.

6 Cancellation

6.1 This Safety Notice shall remain in force until further notice.