



Civil Aviation Authority
SAFETY NOTICE
Number: SN-2012/005



Issued: 13 April 2012

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).

Applicability:	
Aerodromes:	Not primarily affected
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 pilots

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 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. Additionally Air Traffic Control (ATC) towers 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. 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 222 of the Air Navigation Order 2009.

1.2 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 and air traffic controllers for the increasing possibility for aircraft in flight or ATC towers being targeted by a laser or multiple lasers.

2 The Threat

- 2.1 Laser attacks on aircraft started some years ago when laser pointers became readily available and have now escalated such that 2,300 events were recorded on the CAA's Mandatory Occurrence Reporting database for 2011. As the CAA is not always informed of an attack the actual number of attacks may significantly exceed this figure. The vast majority of attacks take place when aircraft are over or near large centres of population and occur both in the UK and overseas. In addition, ATC towers have also been targeted by lasers.
- 2.2 The main threat posed by a laser attack on an aircraft or an ATC tower is from the reaction of the pilot/controller to the laser light. The earliest laser attacks were from red-light lasers; most current attacks are from green-light lasers (around the wavelength of 532 nm). 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.
- 2.3 The main problems with a laser attack are that they 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. Although this possibility cannot be totally discounted, current knowledge and experience suggests that permanent eye damage is unlikely. This is principally because the power levels available to hand-held lasers are low and the distances from the laser to the aircraft or tower together with the presence of tower and cockpit transparencies provide some protection from the beam. Nevertheless, the possibility of permanent eye damage at some time in the future due to higher power laser availability cannot be discounted. The CAA has published a [self-assessment tool](#) designed to help those exposed to a laser to make an immediate assessment of their vision and determine whether or not they need to consult an eye specialist.
- 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;
 - the glare may obscure many (if not all) instruments;
 - night vision may be disrupted;
 - 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 before, during and after an attack occurs. However, these actions should be supported by crew/controller education, training and preparation. The text that follows has been written from an aircrew/cockpit perspective, although most of it is also relevant to aerodrome controllers.

a) Before Flight

Assume that at some stage in your career your aircraft or control tower will be the subject of a laser attack or inadvertent laser illumination. Be reassured by the fact that no crew have suffered permanent eye damage from a laser attack. Prepare yourself for the sudden shock that such an attack can have by reading this and similar communications and by

following the advice in the links provided at the end of this notice. Finally, view the training material provide in the links and view the [video on laser attack](#). Operators should establish Laser Awareness Training and detailed SOPs for crews and ATC controllers, as appropriate (this should use a structured approach and be comparable to guidance already published).

b) During and Immediately After an Attack

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

- Do not look into the beam and shield eyes to the maximum extent possible.
- Inform ATC 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 (see the instructions that accompany the self-assessment tool).

c) After the Attack

- As soon as possible after the attack provide ATC 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 Mandatory Occurrence Report (MOR) with as much detail as possible.
- Use the [CAA published self-assessment tool](#) to examine eyesight and, if necessary, seek assistance from an optometrist or ophthalmologist.

3.2 Air Traffic Service Units are also reminded of the current guidance in the Manual of Air Traffic Services Part 1 (MATS Part 1) which at Section 2, Chapter 3 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 lowering/raising 'sun blinds' to reduce the effects.
- Advise aircraft under your control that a laser is illuminating you.
- Avoid rubbing eyes to reduce the potential for corneal abrasion (see the instructions that accompany the self-assessment tool).
- 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.
- In addition, ATC personnel exposed to a laser attack may also wish to use the [CAA published grid](#) to self-assess eyesight or seek assistance from an optometrist or ophthalmologist.

4 Further Reading

- 4.1 The following documents/links provide further information concerning lasers and aircraft illumination:
- [CAP 736 Operation of Directed Light, Fireworks, Toy Balloons and Sky Lanterns within UK Airspace](#) (see Chapter 4 for Laser Information).
 - Laser radiation: introduction and safety advice (Public Health England) ([HPA Information Sheet on Laser Pointers](#)).
 - [Laser Pointer Safety.com](#).
 - [Laser Incident Information and Reporting](#) (Federal Aviation Administration).
 - [Report on Eurocontrol Laser Seminar](#) (held in October 2011).

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

6 Cancellation

- 6.1 This Safety Notice shall remain in force until 31 January 2018.