



# **Air Accident Investigation Unit Ireland**

**SYNOPTIC REPORT**

**INCIDENT**

**Boeing 737-8AS, EI-FIH  
Porto, Portugal**

**5 September 2015**



**An Roinn Iompair  
Turasóireachta agus Spóirt**

Department of Transport,  
Tourism and Sport

## Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable causes.

In accordance with the provisions of Annex 13<sup>1</sup> to the Convention on International Civil Aviation, Regulation (EU) No 996/2010<sup>2</sup> and Statutory Instrument No. 460 of 2009<sup>3</sup>, safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

Accordingly, it is inappropriate that AAIU Reports should be used to assign fault or blame or determine liability, since neither the safety investigation nor the reporting process has been undertaken for that purpose.

Extracts from this Report may be published providing that the source is acknowledged, the material is accurately reproduced and that it is not used in a derogatory or misleading context.

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<sup>1</sup>**Annex 13:** International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.

<sup>2</sup>**Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.

<sup>3</sup>**Statutory Instrument (SI) No. 460 of 2009:** Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.



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In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents, on 20 November 2015, appointed Mr Howard Hughes as the Investigator-in-Charge to carry out an Investigation into this Incident and prepare a Report.

<b>Aircraft Type and Registration:</b>	Boeing 737-8AS, EI-FIH
<b>No. and Type of Engines:</b>	2 x CFM56-7B26E
<b>Aircraft Serial Number:</b>	44697
<b>Year of Manufacture:</b>	2015
<b>Date and Time (UTC<sup>4</sup>):</b>	5 September 2015 @ 21.08 hrs
<b>Location:</b>	Final Approach, Porto Airport (LPPR), Portugal
<b>Type of Operation:</b>	Commercial Air Transport
<b>Persons on Board:</b>	Crew - 6                      Passengers - 160
<b>Injuries:</b>	Crew - Nil                      Passengers - Nil
<b>Nature of Damage:</b>	None
<b>Commander's Licence:</b>	ATPL (A) <sup>5</sup> issued by the Irish Aviation Authority (IAA)
<b>Commander's Details:</b>	Female, aged 40 years
<b>Commander's Flying Experience:</b>	7,166 hours, of which 6,861 were on type
<b>Notification Source:</b>	Occurrence report submitted by the Operator
<b>Information Source:</b>	AAIU Report Forms submitted by the Flight Crew, AAIU Investigation

<sup>4</sup>UTC: Coordinated Universal Time. At the time of the event, local time = UTC + 1 hour.

<sup>5</sup>ATPL(A): Airline Transport Pilot Licence (Aeroplane)

## SYNOPSIS

The aircraft was on a scheduled passenger flight from Lille Airport, France (LFQQ), to Porto Airport, Portugal (LPPR). After an uneventful flight, the aircraft commenced a non-precision approach to runway (RWY) 35 at LPPR. When the aircraft was established on the final approach, the Co-Pilot, who was Pilot Flying (PF), was distracted by a green laser light being shone towards the aircraft and raised his hand to protect his eyes. The Commander, who was Pilot Monitoring (PM), looked up and was struck in both eyes by the laser light. The Commander's vision became temporarily impaired. Due to the laser illumination, Flight Crew coordination was compromised, which led to the final descent being delayed and the approach becoming unstable. The Commander elected to carry out a missed approach. The aircraft subsequently landed on RWY 17 without further incident. There were no injuries.

## NOTIFICATION

The Operator filed a Mandatory Occurrence Report (MOR) through the Irish Aviation Authority's (IAA) Safety Occurrence Tracking System (SOTS). Following receipt of the occurrence report the AAIU notified the *Gabinete de Prevenção e Investigação de Acidentes com Aeronaves* (GPIAA), the Safety Investigation Authority of Portugal, which was the State of Occurrence.

On the 18 November 2015, the GPIAA, in accordance with ICAO Annex 13, Section 5.1.2, delegated the Investigation of this Incident to the AAIU as the Safety Investigation Authority (SIA) of the State of Registration and of the Operator. The GPIAA appointed an accredited representative (ACCREP) to the Investigation.

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## 1. FACTUAL INFORMATION

### 1.1 History of the Flight

EI-FIH departed Lille Airport, France (LFQQ), at 19.04 hrs on a scheduled passenger service to Porto Airport, Portugal (LPPR). The flight was uneventful until the aircraft commenced a turn from the base leg, onto the final approach track for a Non-Precision Approach to RWY 35 at LPPR. The autopilot and autothrottle were engaged at the time, and 3,000 ft was set in the Altitude Window of the MCP<sup>6</sup>, the minimum descent altitude for point XAPIM<sup>7</sup>.

The Co-Pilot, who was Pilot Flying (PF), noticed a laser light from the city centre area, when the aircraft was on the base leg. The laser was not pointing directly at the aircraft, and then disappeared from view, leading the PF to believe that it had been switched off. However, shortly after establishing on the final approach track, a laser was directed towards the aircraft from the same area and illuminated the cockpit. The PF put his left hand up to shield his eyes. The Commander, who was acting as Pilot Monitoring (PM) and was unaware of the laser, looked up at that moment, and her eyes were struck by the laser light. She sustained flashblindness<sup>8</sup>.

<sup>6</sup> **MCP:** Mode Control Panel

<sup>7</sup> **XAPIM:** The initial approach fix reporting point on the approach to runway 35 at LPPR, see **Appendix A**.

<sup>8</sup> **Flashblindness:** Temporary visual loss or impairment during and following exposure to a light flash of extremely high intensity. The effects may last for several seconds to a few minutes.



This occurred just prior to the point where the PM would normally make the call 'Approaching Descent'. Flight Crew coordination was compromised due to the temporary visual impairment of the PM, and the distraction to the PF. As a result the 'Approaching Descent' point was missed and the call was not made. Coincident with this, ATC instructed the aircraft to contact tower frequency. The PM acknowledged the ATC instruction, and also informed the Approach Controller that the aircraft had been targeted by a laser. Consequently, the PF announced the 'Approaching Descent' call himself and carried out the actions associated with this call in order to set up the modes required for the aircraft to perform the final approach.

As the 'Approaching Descent' point had been passed, the aircraft began to level off at 3,000 ft. Thus, when the PF carried out the *Approaching Descent* items, the aircraft was slightly above the ideal profile and its speed and rate of descent began to increase as the aircraft re-established on the descent path. The PM was aware that the PF had made the 'Approaching Descent' call, and once the flashblindness had passed, the PM confirmed that the 'Approaching Descent' actions had been completed.

The PF requested the extension of landing gear and flaps in order to reduce aircraft speed and descent rate, however, it was realised that the approach had become unstable and the PM called for a go-around. The PF executed a standard go-around manoeuvre, after which the aircraft was positioned for an approach onto the reciprocal runway at LPPR. An uneventful approach and landing was completed on RWY 17 at LPPR at 21.19 hrs.

## 1.2 Injuries

There were no injuries. The Commander reported to the Investigation that her eyesight was only temporarily affected by the laser illumination, and that her vision returned to normal after a few seconds. The Co-Pilot reported that his vision had not been affected.

## 1.3 Approach Procedures

### 1.3.1 General

LPPR is served by a number of Navigation Aids which provide guidance for the Precision Approach and for the Non-Precision Approaches (NPAs) to the airport. There is a Precision Approach (ILS<sup>9</sup>) for RWY 17. However, there is no ILS approach to RWY 35 at LPPR. Two NPA procedures are available for RWY 35, a DVOR/DME<sup>10</sup> and a Localiser approach. At the time of the event the aircraft was using the DVOR/DME Approach to RWY 35. None of the Navigation Aids were reported as being unserviceable. The DVOR/DME Approach Chart for RWY 35 at LPPR as published in the Portuguese AIP<sup>11</sup> is reproduced in **Appendix A**.

<sup>9</sup> ILS: Instrument Landing System.

<sup>10</sup> DVOR/DME: Doppler VHF Omni Directional Radio Range/Distance Measuring Equipment.

<sup>11</sup> AIP: Aeronautical Information Publication.

### 1.3.2 Operator's Procedures for Non Precision Approach to RWY 35

The Operator provided the Investigation with details of the Flight Crew procedures to be used during the DVOR/DME approach for RWY 35 at LPPR. This included details of the vertical and lateral profile to be flown and aircraft configuration changes required during the approach. These procedures include the requirement for the PM to call '*Approaching Descent*'. This call is usually made 2 nautical miles before intercepting the final descent profile. The PF should then reply to this call by stating, '*XXX<sup>12</sup> ft, Vnav Path, Speed Intervent*', and selects these settings on the MCP. The selections are confirmed by the PM.

## 1.4 Personnel Information

### 1.4.1 Commander

Personal Details:	Female, aged 40 years
Licence:	ATPL issued by the IAA
Total as Pilot in Command:	7,166 hours
Total on type:	6,861 hours

### 1.4.2 Co-Pilot

Personal Details:	Male, aged 21 years
Licence:	CPL <sup>13</sup> issued by the IAA
Total Flight Time:	624 hours
Total on type:	420 hours

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## 1.5 Interviews and Reports

### 1.5.1 General

Both the Commander and the Co-Pilot submitted AAIU Report Forms. The Investigation also interviewed both pilots.

### 1.5.2 Commander's Interview

The Commander stated that she was operating as PM, and the Co-Pilot was PF for this flight. She told the Investigation that the flight had proceeded normally until shortly after passing point XAPIM. At this stage in the approach the aircraft was configured with Flaps 5, the aircraft was decelerating normally, and the inbound track to RWY 35 had been established. She recalled that 3,000 ft was set in the Altitude window of the MCP, as per procedures.

The Commander stated that, as the PM, she was concentrating on the flight instruments in order to confirm the aircraft's position on the approach, and was therefore not looking out of the cockpit windows at this stage. The Commander stated that there was no mention made by either the Co-Pilot, or ATC, of laser activity on the approach.

<sup>12</sup> XXX: The minimum descent altitude, expressed in feet for the procedure; in this case 700 ft.

<sup>13</sup> CPL: Commercial Pilot Licence.



As the flight approached the final descent point, the Commander saw the Co-Pilot moving his left hand from the thrust levers to a position in front of his face. The Commander, noticing this movement, looked up to the right and was struck in both eyes by a laser. She told the Investigation that her vision became temporarily compromised, stating '*[it was] completely white in front of me.*'

The Commander stated that coincident with the laser illumination, the Approach Controller called the flight, instructing them to contact the tower frequency. She also stated that she heard the Co-Pilot making the standard '*approaching descent*' call, but said that with her compromised vision and the distraction of the radio call from ATC, '*I was unable to [assist] my pilot flying*'.

The Commander responded to the Approach Controller's request to change frequency. She also informed the Approach Controller of the laser illumination.

The Commander told the Investigation that she believed there may have been a slight tailwind during the latter stages of the approach to RWY 35.

### 1.5.3 Co-Pilot's Interview

The Co-Pilot informed the Investigation that he saw the laser initially on the base leg of the approach, but that at this stage it was not affecting the aircraft. He stated that shortly after noticing the laser, it stopped shining and he thought it had been switched off. He also stated that '*it [laser activity] happens quite a lot at Porto*'. He did not inform the Commander that he had seen the laser. He stated that a laser came on again, this time pointing at the aircraft, just before the '*approaching descent*' point.

The Co-Pilot stated that '*for the approach we had 3,000 feet at XAPIM, and it was somewhere there that [...], we had the laser [illumination] before we had the approaching descent point; which is where we set the lower altitude and descend down to our minimums*'.

The Co-Pilot stated that he had put his hand up to shield his eyes, but the Commander looked up and looked straight into it. The Co-Pilot then lowered his head to ensure his eyes were better protected. He went on to state '*And then [the Commander] started reporting to the tower at the time. So when we had the approach and descent point and [the Commander] was still talking to the tower. So I set the minimums and verified Vnav Path [...] as we do. And when I did that and the aircraft [rate of descent increased]. I called for a configuration gear down, Flap 15. And the speed was still very high.*'

He told the Investigation that the PM called for a go-around, which he performed, followed by an ILS and normal landing on RWY 17.

### 1.6 Meteorology

Weather conditions at the time of the event were reported as:

**Surface wind:** Variable at 02 kts  
**Visibility:** Greater than 10 km  
**Cloud:** No cloud below 5,000 ft  
**Temperature:** 17 °C  
**Environmental:** Night, no precipitation

## 1.7 Flight Data Monitoring

Neither Flight Data Recorder nor Cockpit Voice Recorder data were retained for this flight. However, in order to verify the sequence of events, the Investigation requested the Operator to supply Flight Data Monitoring data. This was made available to the Investigation and confirmed the details provided by the Flight Crew.

The data showed that as the aircraft approached point XAPIM, 3,000 ft was set on the MCP, the aircraft was established on the inbound track, Flap 5 was extended and the aircraft was decelerating, as required by procedures. Shortly after passing point XAPIM the data showed that the aircraft began to level at 3,000 ft. The data then showed that 700 ft was selected on the MCP and the aircraft began its descent, but was slightly above the glide path. Speed and descent rate were increasing, and at approximately 2,000 ft the landing gear was extended and Flap 15 was set. With speed and descent rate still high, a go-around was commenced at approximately 900 ft.

## 1.8 Guidance Material

### 1.8.1 Laser Light - General

The ICAO Manual on Laser Emitters and Flight Safety, Doc 9815, defines Laser as: “1) an acronym for light amplification by stimulated emission of radiation. 2) A device that produces an intense, coherent, directional beam of optical radiation by stimulating emission of photons by electronic or molecular transitions to lower energy levels”.

### 7 1.8.2 IAA Guidance Material

The IAA issued ‘LASER Attacks on Aircraft - Information for Pilots and Operators<sup>14</sup>’, which gives guidance to flight crew on the hazards associated with Laser attacks. The guidance notes that, “pilots temporarily blinded by lasers effects have so far suffered no lasting damage to their eye sight. The immediate affect [sic] of a laser blinding can last for several seconds followed by several minutes of transient visual effects such as glare, flashblindness, and after-image”.

The document also points out that “Laser attacks on aircraft in Ireland are part of a global phenomenon that first emerged in the early 1990s. Since then technology has significantly improved the performance of hand held lasers while the Internet has massively increased their availability. Although the sale of the more powerful classes of laser devices is generally restricted, the ease with which they can be obtained from overseas via the Internet totally undermines this sanction. So far, no country has classified laser devices as an offensive weapon thereby outlawing their possession”.

Of relevance to this Investigation the IAA Memorandum states “Aircraft are particularly vulnerable during the critical phases of flight, such as take-off and landing, when pilots need to apply maximum concentration. Any distraction to a pilot’s attention during these phases is dangerous. However, to introduce an intense light into a darkened flight deck is hazardous in the extreme. A laser beam can be refracted through tiny abrasions on the exterior of the cockpit windscreen and thereby illuminate the entire flight deck.

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<sup>14</sup> IAA General Advisory Memorandum, Reference No: 01/11, Issue Date: 05/08/2011  
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An aircraft on final approach at 1,000 ft has around one minute before it reaches the threshold of the runway and touches down. A pilot dazzled by a laser can be blinded for up to 10 seconds followed by over a minute of impaired vision. The risks to passengers and crew are therefore all too obvious”.

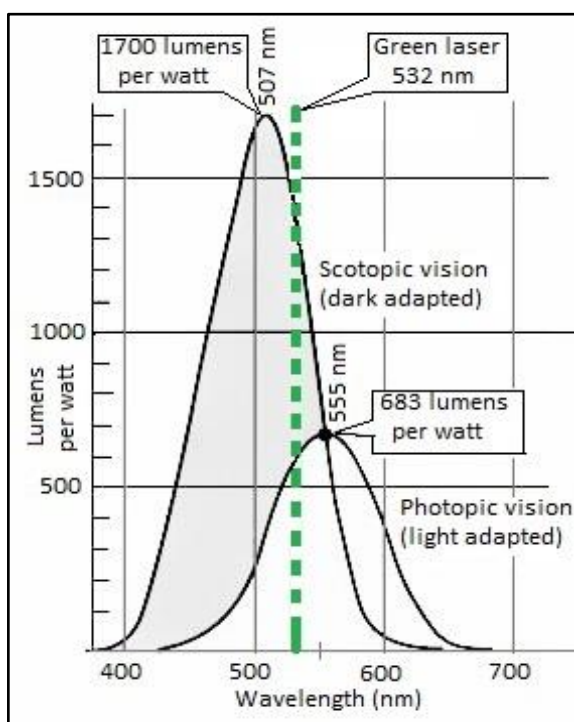
### 1.8.3 Federal Aviation Administration (FAA) Guidance Material

The following is from FAA document ‘Laser Pointers: Their Potential Affects (sic) on Vision and Aviation Safety’.

*‘...momentary ocular exposure to the light emitted by these devices [lasers] can be startling to the observer and may result in temporary visual impairment...The danger from laser pointer illumination is the visible beam hitting an aircraft’s windshield, which can scatter light and completely obliterate a pilot’s forward vision. In low-level flight [...] this type of exposure can substantially increase the risk of accidents due to temporary visual incapacitation, startle effects, spatial disorientation, or the loss of situational awareness...’*

**CONCLUSIONS.** *Laser pointers have caused ocular injury and may compromise aviation safety when used to illuminate aircraft in critical phases of flight.’*

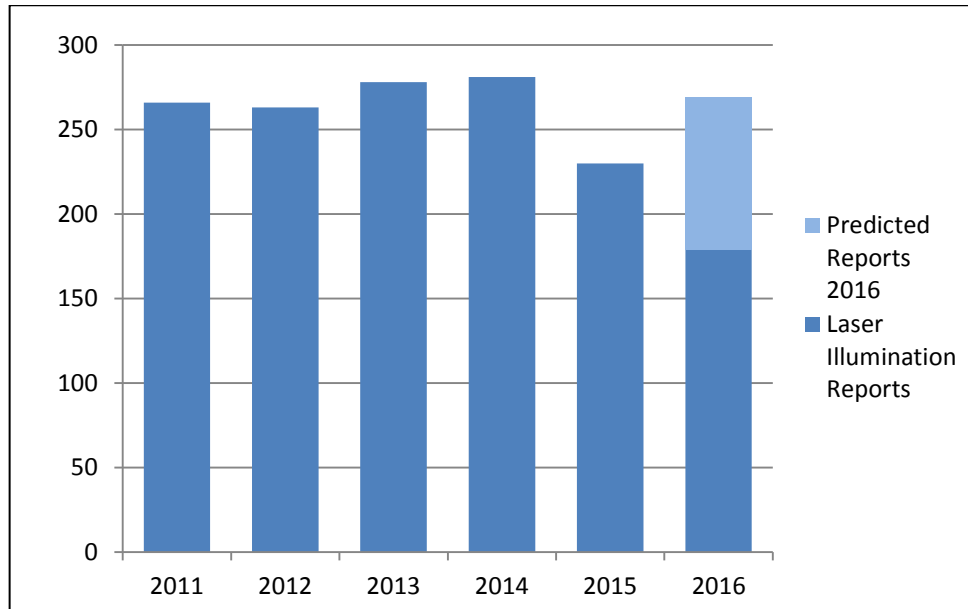
In the US, reports indicate that laser attacks by handheld lasers are primarily green in colour, (91%), as opposed to red (6.3%), which was more common a few years ago. FAA flight simulator studies have shown the adverse visual effects from laser exposure are especially debilitating when the eyes are adapted to the low-light level of a cockpit at night (dark-adapted). This is significant because the wavelength of most green lasers, 532 nanometres (nm), is close to the eye’s peak sensitivity when dark-adapted. A green laser may appear as much as 35 times brighter than a red laser of equal power output. **Graph No. 1** (adapted from the FAA document) shows the sensitivity of the human eye when dark-adapted and light-adapted. The dotted green line represents the frequency of the majority of green lasers, i.e. 532 nm, which lies close to the peak dark-adapted frequency.



**Graph No. 1:** Sensitivity of Human Eye when Dark and Light Adapted

### 1.8.4 Laser Statistics for Irish Operators

Statistical data for laser attacks on Irish registered aircraft are gathered by the IAA through Mandatory Occurrence Reports via the Safety Occurrence Tracking System. **Graph No. 2** shows data for reported laser illuminations to Irish registered aircraft operated by the seven largest Air Operator Certificate (AOC) holders in the State, from 2011 to 2016<sup>15</sup>.



**Graph No. 2:** Reported Laser Illuminations

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### 1.8.5 Laser Attacks in Portugal

The Investigation was informed by the GPIAA that the number of reported laser attacks on aircraft in Portugal was as follows:

- 2014, Total Events = 294 of which 107 occurred at LPPR
- 2015, Total Events = 264 of which 105 occurred at LPPR

## 1.9 Legislation

### 1.9.1 ICAO

ICAO Annex 11, Air Traffic Services, Section 2.18, '*Coordination of activities potentially hazardous to civil aircraft*' states:

*'2.18.5 Adequate steps shall be taken to prevent emission of laser beams from adversely affecting flight operations'.*

<sup>15</sup> Data up to and including 31 August 2016 is shown in dark blue. Projected numbers (based on average of previous years) for remainder of 2016 are shown in light blue.



## 1.9.2 Ireland

On 27 July 2014, Irish legislation titled 'State Airports (Shannon Group) Act 2014' was introduced. It states, *inter alia*:

### *'PART 7 MISCELLANEOUS AMENDMENTS – AIRPORTS*

#### *Prohibition on dazzling aircraft.*

*44. (1) A person who deliberately or recklessly directs or shines a light at or in the direction of—*

- (a) a pilot or co-pilot of an aircraft,*
- (b) a person involved in the operation of the flight of an aircraft, or*
- (c) a person carrying out air traffic control services,*

*so that the light may dazzle, distract or confuse the pilot or person in the performance of his or her duties commits an offence.*

*(2) A person who commits an offence under this section is liable—*

- (a) on summary conviction to a class A fine or to imprisonment for a term not exceeding 6 months or to both, or*
- (b) on conviction on indictment—*
  - (i) where the person is an individual – to a fine not exceeding €50,000, or to imprisonment for a term not exceeding 5 years or to both, or*
  - (ii) where the person is a body corporate – to a fine not exceeding €250,000.'*

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## 1.9.3 Portugal

The Investigation was informed by the GPIAA that in Portugal it is not currently an offence to shine a laser light or similar at an aircraft.

## 1.10 Safety Action Taken

The Operator informed the Investigation about procedures for flight crew exposed to laser or high-power light. The new procedures, which were issued in 2016, are included in its Operations Manual, Part A, section 8, as follows:

### *'8.9.9 Laser or High-Powered Light Exposure.*

*At the first sight of a laser or high-powered light on the ground directed to the aircraft, consider switching off all external lights with the exception of anti-collision lights to impede identification. Look away from and do not search for the laser or high-powered light.*

*If the laser or high-powered light strikes the vision of the Pilot Flying (PF), move your head and look down, hand over control and turn up all internal lights to full bright, as the human eye will adjust to bright conditions easier than to dark conditions. Please note, that even a low power "eye-safe laser" can impair human vision up to 8 minutes. Regardless of its severity, please report the event as per OMA 11.3.4'.*

Furthermore, the Operator stated that at the next revision of its Operations Manual, Part A, it will include additional text in 8.9.9, as follows:

1. *Communicate attack to PM/ PF and hand over control if necessary*
2. *Inform ATC*

The Operator has also introduced information for flight crew in their 'Safety TV Video' on the hazards associated with laser/high-powered light illumination, which they informed the Investigation will also include the following additional guidance material:

*Actions in the Event of been targeted by laser;*

1. *Do not rub your eyes*
2. *Shield your eyes*
3. *Look down at your instruments*
4. *The up the background instrument lighting*
5. *Turn on the autopilot/auto throttle*
6. *Communicate attack and hand over control if necessary*
7. *Inform ATC*
8. *File an ASR*

## 2. ANALYSIS

### 2.1 General

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During the initial stages of the approach the PF noticed a laser operating from near the centre of Porto city. It had not targeted the aircraft, and the PF thought it had been switched off. As it was quite a common occurrence to see laser activity at Porto, the PF did not mention it to the PM.

The aircraft continued on the DVOR/DME approach, following the profile set out in the AIP. However, just prior to a position where the Flight Crew would configure the aircraft for the final descent to the runway, the cockpit was illuminated by a laser. The PF shielded his eyes from the light, but the PM was struck in both eyes by the laser and suffered temporary flashblindness. Consequently, the PM did not see the 'Approaching Descent' point on her instruments.

At the same time, the Approach Controller requested the aircraft to change frequency to the Tower Controller. The PM, responded to the ATC transmission, and also advised the Approach Controller that there had been a laser illumination of their aircraft.

Flight crew coordination was compromised by the laser illumination and the aircraft passed the 'Approaching Descent' point without the appropriate call being made. The PF, realising this, made the call himself and configured the MCP to establish the aircraft on its final descent. The PM was aware of the call, but waited for her vision to recover before confirming the actions taken. However, the aircraft was now slightly above the approach profile. The rate of descent was increased by the auto pilot in an attempt to regain the profile.



When the PM's vision had returned to normal the PF called for the landing gear and flaps to be extended, to reduce aircraft speed. However, the aircraft speed and rate of descent did not reduce sufficiently for the aircraft to be stabilised on the approach by the prescribed point, so the PM called for a go-round. A normal go-around was carried out and the aircraft subsequently landed on RWY 17 at LPPR, without further incident.

## 2.2 Green Laser Light

Data indicates that the majority (91%) of laser attacks on aircraft are from green lasers, and that the attacks occur during night operations, when the aircraft are approaching an airport. In general, during night approaches, flight crew will have the cockpit lighting off, or dimmed, to allow the eye to become dark adapted, thus maximising the acquisition of visual cues from the airport and runway environment. The operating frequency of green lasers is in the region of 532 nm, and consequently will have a significant effect on a dark-adapted human eye.

Published documentation shows that flight crew may become distracted and/or suffer temporarily flashblindness as a result of an aircraft cockpit being illuminated by a laser. This can also lead to spatial disorientation and loss of situational awareness.

The Investigation found that the laser illumination affected both pilots on this occasion. The PF was distracted by the laser light and needed to shield his eyes. The PM's vision was temporarily compromised by the laser illumination, at the same time as ATC called the aircraft to change to the Tower frequency. Consequently, the '*Approaching Descent*' call was not made at the correct point.

The Investigation believes that if the PF had brought the laser activity to the attention of the PM it would have heightened her awareness of the possible exposure to laser illumination. The Investigation notes that the Operator has included guidance to flight crew on actions to be taken in the event of a laser illumination, in its Safety TV Video, which includes '*Communicate attack and hand over control if necessary*'. The Operator has stated that it will include similar guidance in the next revision of its Operations Manual, Part A. In light of these safety actions, this Investigation does not sustain a Safety Recommendation to the Operator.

## 2.3 Legislation

The Investigation notes that other states have introduced legislation making it an offence to illuminate an aircraft with a laser or other bright light. The GPIAA advised the Investigation that '*in Portugal, at present, it is not an offence to shine a laser light or similar, at an aircraft*'. In 2014 and 2015 there were a significant amount of laser illuminations of aircraft in Portugal generally, and Porto Airport specifically. Therefore, the following Safety Recommendation is made to the Portuguese Civil Aviation Authority, the *Autoridade Nacional de Aviação Civil (ANAC)*.

### **Safety Recommendation No. 1**

The ANAC should review the current civil aviation legislation with a view to taking account of occurrences of deliberate or reckless illumination of aircraft, or persons involved in the operation of aircraft, by laser light or similar **(IRLD2016013)**.

### 3. CONCLUSIONS

#### (a) Findings

1. Both Flight Crew members were appropriately licensed.
2. The Commander was the pilot monitoring and the Co-Pilot was the pilot flying.
3. Navigation aids associated with the DVOR/DME approach to RWY 35 were serviceable.
4. The PF noticed a green laser operating from an area close to the centre of Porto City, which he stated was a common occurrence.
5. The PF did not mention observing the laser to the PM because it was not targeting the aircraft initially and was then switched off.
6. At a critical phase of the approach, the PM sustained temporary flashblindness caused by a laser that targeted the aircraft.
7. Crew coordination was compromised and the standard call '*Approaching Descent*' was not made by the PM.
8. A delayed '*Approaching Descent*' call, and MCP configuration changes required to commence the final descent were made by the PF.
9. The PM heard the '*Approaching Descent*' call, and confirmed the MCP settings when the effects of the flashblindness had passed.
10. Due to the delay in commencing the final descent the approach became unstable.
11. The PM called for a missed approach at approximately 900 ft, which was carried out by the PF.
12. The aircraft subsequently landed on RWY 17 without further incident.
13. It is not currently an offence in Portugal to illuminate an aircraft with a laser or other bright light.

#### (b) Probable Cause

Laser illumination of the aircraft cockpit area that caused temporary flashblindness to a flight crew member during a critical phase of flight.

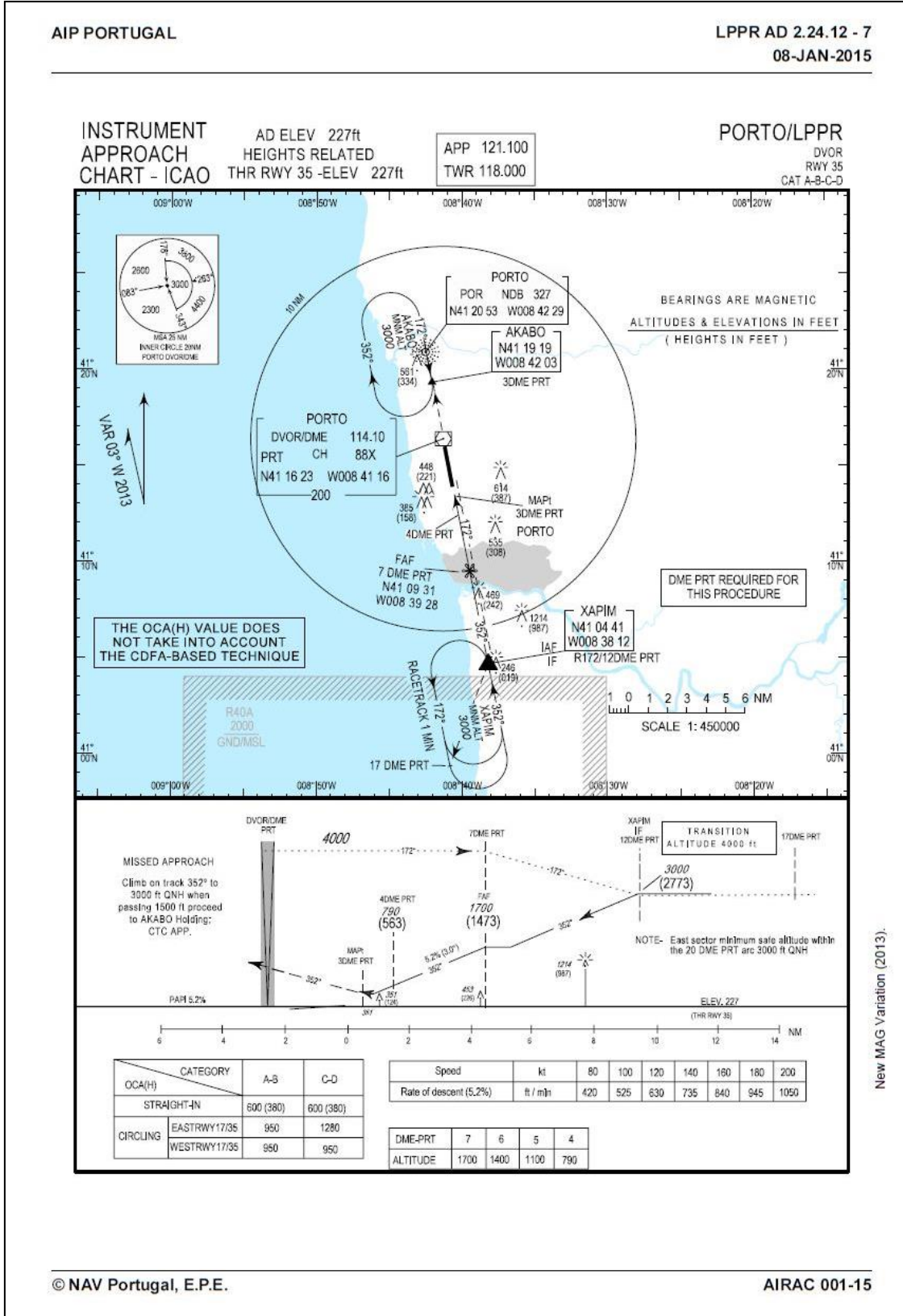


#### 4. SAFETY RECOMMENDATIONS

No.	It is Recommended that:	Recommendation Ref.
1.	The ANAC should review the current civil aviation legislation with a view to taking account of occurrences of deliberate or reckless illumination of aircraft, or persons involved in the operation of aircraft, by laser light or similar.	<a href="#">IRLD2016013</a>

[View Safety Recommendations](#) for Report 2016-018

Appendix A





**In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No. 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.**

**A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.**

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