



Flash of Light

BY LINDA WERFELMAN

Authorities blame the increased availability of relatively cheap high-powered laser pointers for a surge in laser strikes on aircraft.

Drew Wilkens can't forget his flight into Houston on Jan. 15, 2010.

Wilkens, a first officer for ExpressJet Airlines, was the pilot flying an Embraer EMB-145 on approach to Runway 8L at Houston George Bush Intercontinental Airport about 2005 local time, when, he said, "all of a sudden,

there was a bright green flash on the right side of the airplane."

Telling his story in October to a Washington conference on laser illumination of aircraft cockpits, Wilkens said he "couldn't see anything but green."

The captain, Henry Cisneros, told the conference — sponsored by the Air Line Pilots Association, International

(ALPA) and the Air Transport Association of America — that the laser illumination, which was the second he had experienced in three months, "lit up the whole cockpit ... bright green and opaque."

Wilkens said that immediately after the laser illumination — sometimes called a laser strike — he experienced

flash blindness, a temporary impairment of vision that interferes with the ability to detect objects. After a few seconds, his vision returned to normal, and he believed that he was fit to fly, although he and Cisneros both said they were concerned that the airplane might be struck by the laser again before they could land.

The crew told air traffic control what had happened and conducted a normal landing. Paramedics told Wilkens that, despite the flash blindness and the subsequent burning sensation in his eyes, he had suffered no lasting damage to his vision.

Their experience was one of 2,800 reported laser illuminations of aircraft in the United States in 2010 (Table 1). The number has increased dramatically since 2005, when the U.S. Federal Aviation Administration (FAA) received 283 reports of laser strikes.

A similar trend has been reported in Europe, where Eurocontrol said in October that its voluntary air traffic management incident reporting system had received 500 reports of laser illuminations in 2010, compared with eight in 2005.

In the United Kingdom, about 1,600 events occurred during the first eight months of 2011, compared with 30 in all of 2007, Eurocontrol said.¹

Until recently, when pilots encountered laser beams during flight, the lasers were being used legitimately, such as in laser light shows, Eurocontrol said, noting that the International Civil Aviation Organization developed standards to address those conflicts.

“However, laser interference tactics have changed and a harmonized, multidisciplinary and proactive approach is needed to counter this threat,” Eurocontrol said, referring to the increasing role of laser pointers in cockpit illuminations.

A Eurocontrol-hosted seminar in October resulted in calls for “timely and effective in-flight and post-flight procedures for dealing with interference,” including the development

of regulations on production, distribution, purchase and use of lasers; guidance material to help flight crews in responding to laser illuminations; and filters that might block the harmful effects of laser strikes.

Interfering With a Flight Crew

In the United States, the FAA earlier this year began prosecuting people accused of directing laser beams at aircraft under a longstanding regulation that prohibits interfering with a flight crew.

“Usually when people think of interfering with a flight crew, they think of a disruption on the airplane itself,” FAA Administrator Randy Babbitt told the Washington laser conference, noting that the regulation has been cited in 18 pending enforcement cases. “This interpretation is clear that directing a laser at an aircraft could cause interference with a flight crew.”

Legislation is pending in Congress to make it a federal crime to aim a laser at an aircraft, and some local governments already have implemented laws making it a crime for anyone within their jurisdictions to take such action.

High Power, Low Cost

The FAA and laser safety specialists attribute the increase in the number of reported laser strikes on aircraft to several factors, which the FAA says include “the availability of inexpensive laser devices on the Internet; increased power levels that enable lasers to reach aircraft at high altitudes; more pilot reporting of laser strikes; and the introduction of green and blue lasers, which are more easily seen than red lasers.”

Many of those who point laser beams at aircraft do not understand the dangers, Patrick Murphy, executive director of the International Laser Display Association, told the conference.

Laser beams appear to extend no more than a few feet into the air, said Murphy, whose organization promotes the use of laser displays and also, as a public service, sponsors a website — <laserpointersafety.com> — to provide safety information. He noted that, in fact, laser beams can extend many thousands of feet, and

Laser Strikes on Aircraft Cockpits

Year	Number of U.S. Incidents ¹
2010	2,836
2009	1,527
2008	913
2007	590
2006	384
2005	283

¹In 2011, more than 2,700 incidents had been reported by late October.
Source: U.S. Federal Aviation Administration

Table 1

that pilots have reported laser cockpit illuminations in aircraft at altitudes as high as 30,000 ft.

When authorities have questioned those responsible for aircraft laser strikes, many have said they acted out of curiosity, Murphy said, quoting one man who “wondered if the beam could hit the belly of the helicopter” and a child who said he aimed a laser pointer at an airplane because “I wanted to say hello to the pilot.”

Murphy and others called for intensified efforts to educate the public in general — and especially people purchasing laser pointers — about the aviation-related risks presented by the devices. Among their suggestions were restrictions on sales of laser pointers and institution of a “laser safety tax” of as much as \$5 per milliwatt.

They also noted that the U.S. Food and Drug Administration, which regulates laser use, is expected to publish revised standards for laser pointers later this year.

Although lasting eye damage caused by laser cockpit illumination is rare — perhaps eight such injuries in 30 years, Murphy said — there are numerous reports of distraction and temporary visual disruptions such as the flash blindness experienced by Wilkens.

Studies have identified other temporary visual problems, including discomfort in the eyes, blurred vision, dazzle (intense glare) and headache. In some cases, corneal abrasions have resulted, probably when pilots rubbed their eyes after laser exposure.²

Quay Snyder, M.D., ALPA aeromedical adviser and CEO of the Aviation Medicine Advisory Service, said that in the past five years, 37 pilots have called his office complaining of after-images — vision disruptions that linger

Guidelines for Pilots

Pilots’ organizations recommend the following actions in case of laser illumination of a cockpit:^{1,2}

- Look away from the laser beam. If possible, shield your eyes.
- If the other pilot was not exposed, consider transferring control of the aircraft. Engage the autopilot. If the airplane was on approach, consider a missed approach.
- Do not rub your eyes. Rubbing can result in eye irritation or abrasions on the cornea, the transparent dome at the front of the eye.
- Turn up cockpit lights. This helps minimize the effects of further laser illumination.
- Inform air traffic control of the event and include a description of the location of the source of the laser beam, as well as the beam’s direction, color and the length of exposure. Follow company procedures for additional reporting.
- If visual symptoms persist after landing, consult an ophthalmologist.
- If you are notified of a laser event while on approach, request a different runway or ask to hold until the threat has been resolved.

— LW

Notes

1. International Federation of Air Line Pilots’ Associations. Medical Briefing Leaflet 09MEDBL07, *The Effects of Laser Illumination of Aircraft*. February 2009.
2. Air Line Pilots Association, International. *Laser Illumination Threat Mitigation*.

after an episode of flash blindness — and one pilot has been disabled for two years because laser exposure resulted in a burn on his retina (the eye’s light-sensitive innermost lining).

Nevertheless, Snyder said, the greatest hazard often is a pilot’s fear of a repeat episode.

For that reason, he also endorsed protective training to help pilots practice the best way of responding to a laser strike (see “Guidelines for Pilots”).

Increasing Injuries

Timothy Childs, a supervisory federal air marshal and liaison to the U.S. Federal Bureau of Investigation who has worked to develop interagency efforts to prevent laser strikes, said that, although many people do not understand the dangers presented by “a tiny dot of laser beam,” the newest, most

powerful laser pointers can produce beams that can be seen for 85 mi (137 km).

When these powerful lasers become more prevalent, one result, Childs predicted, will be an increase in pilot reports of laser-related eye injuries. ➤

Notes

1. Eurocontrol. *Doing Nothing Is Not an Option — Laser Interference Seminar’s Conclusions Now Available*. Oct. 12, 2011.
2. Rash, Clarence E.; Manning, Sharon D. “Laser Light Displays, Laser Pointers Disrupt Crewmember Vision.” *Human Factors & Aviation Medicine* Volume 48 (November–December 2001). This article cited Sethi, C.S.; Grey, R.H.B.; Hard, C.D. “Laser Pointer Revisited: A Survey of 14 Patients Attending Casualty at the Bristol Eye Hospital.” *British Journal of Ophthalmology* Volume 83 (1999): 1,164-1,167.