In-Sky Laser Safety

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Introduction

• As for all complex procedures, laser ranging teams have the need for safe working practices uppermost in their day-to-day operations;

• Recent mal-practice with laser-pointers has raised the profile of the potential danger to aircraft personnel & passengers from ground-based lasers;

• From time to time, it is reasonable for the ILRS to review the operational practices of its stations;
Safe range?

• Calculations show that most ILRS laser pulses are non-eye-safe at any range in the Earth’s atmosphere
• Good assumption is that sky must be monitored continuously
Illumination Incidences in USA

Aircraft Laser Illuminations Reported to US FAA

Year

2005 2006 2007 2008 2009 2010

Number of Reports

0 500 1000 1500 2000 2500 3000

311 420 643 955 1527 2836

19/05/2011 LW 17, Kötzting
Visual Interference in Aircraft Cockpit

0.1 microwatts

0.5 microwatts

2.5 microwatts

12 microwatts

60 microwatts
### FAA/SAE/ANSI Laser Related Documents

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<tr>
<td>AS4970</td>
<td>Human Factors Considerations for Outdoor Laser Operations in the Navigable Airspace</td>
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<td>ARP5290</td>
<td>Laser Beam Divergence Measurements Techniques Comparison</td>
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<td>ARP5535</td>
<td>Observers for Laser Safety in the Navigable Airspace</td>
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<td>AIR5995</td>
<td>Evaluation of Human Factor Considerations for Outdoor Laser Operations in the Navigable Airspace</td>
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<td>AC No: 70-1</td>
<td>Outdoor Laser Operations. AFS-400/ATO-R</td>
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<td>Reporting of Laser Illumination of Aircraft. ATO-R</td>
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<td>ARP5674</td>
<td>Safety Considerations for Aircraft-mounted Lasers Projected into the Navigable Airspace</td>
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<td>ARP5560</td>
<td>Safety Considerations for High-Intensity Lights (HIL) Directed into the Navigable Airspace</td>
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<tr>
<td>AS6029</td>
<td>Performance Criteria for Laser Control Measures Used for Aviation Safety</td>
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<tr>
<td>ANSI Z136.6</td>
<td>2005 American National Standard for Safe Use of Lasers Outdoors</td>
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Worrying statistics?

Aircraft Detection Method

- Radar/ATC: 4.7%
- Radar: 23.3%
- Observer/Radar: 4.7%
- Observer+: 9.3%
- Observer: 32.6%
- No: 18.6%
- ?: 7.0%

 Courtesy: Jorge del Pino
Issues to consider

• How does your station ensure in-sky safety?
• If RADAR, how do you know the RADAR is operational and pointing correctly?
• If visual observer, how do you know that undivided attention is given to the sky situation?
• Is this not an issue at your station, far from aircraft routes?
• Airplanes, gliders, balloons, parachutes...
Session aims

• In this session, we have five presentations dealing with solutions to in-sky safety;
• In addition, we would like to hear from as many stations as possible about their problems & solutions;
• We will summarize the session, pointing out strengths and weaknesses