In-Sky Laser Safety

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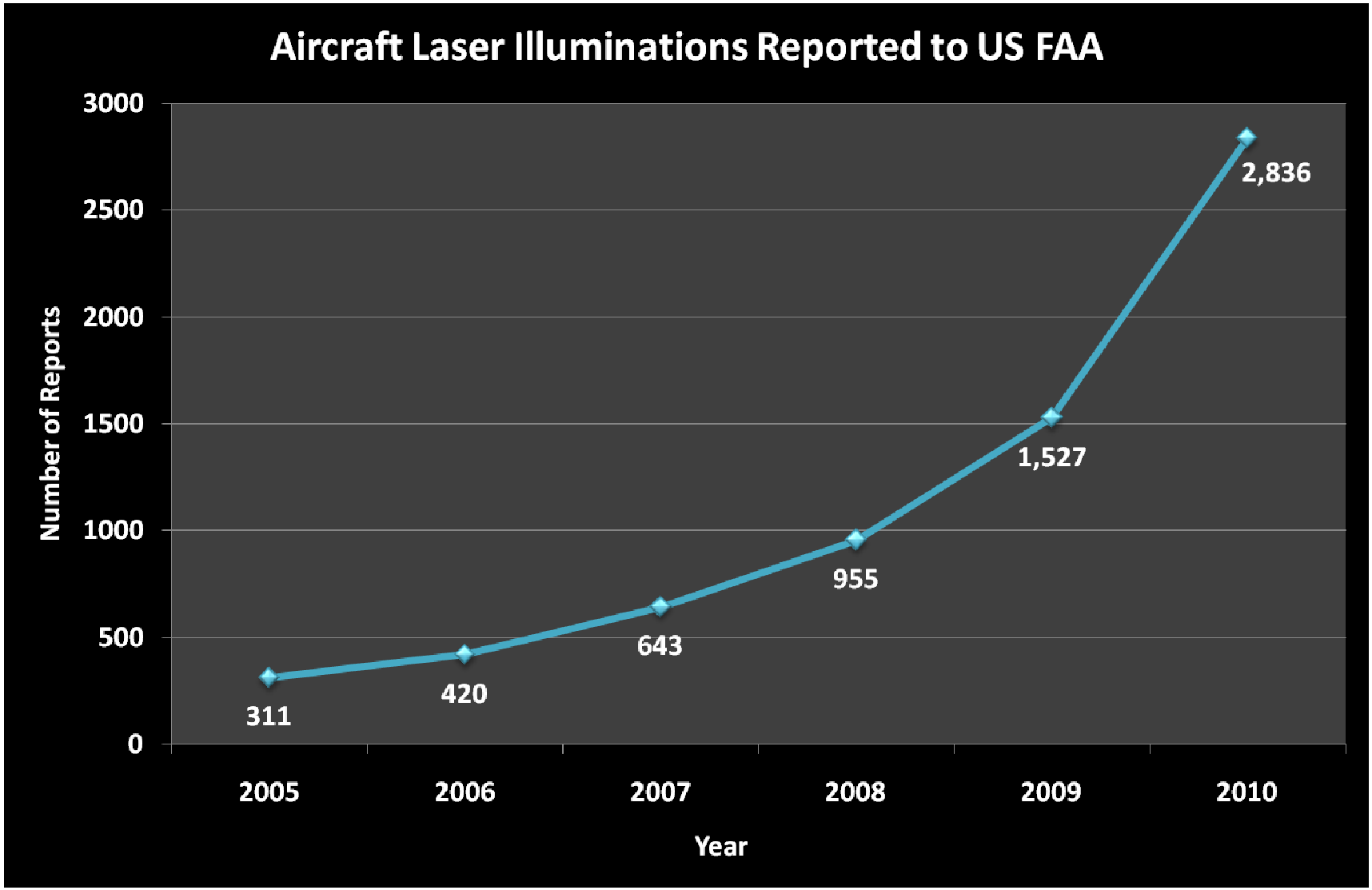
Introduction

- 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



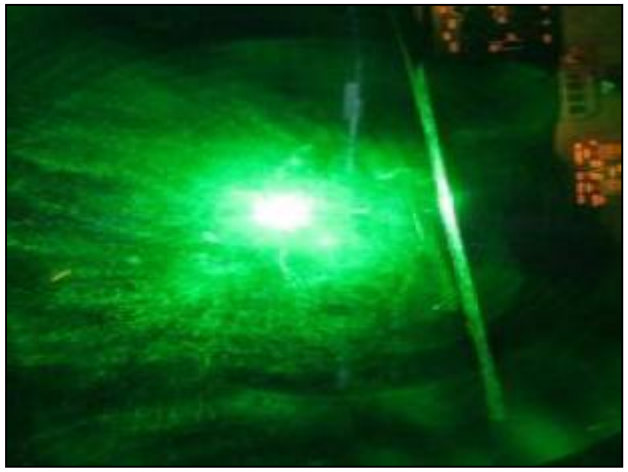
Visual Interference in Aircraft Cockpit

0.1 microwatts

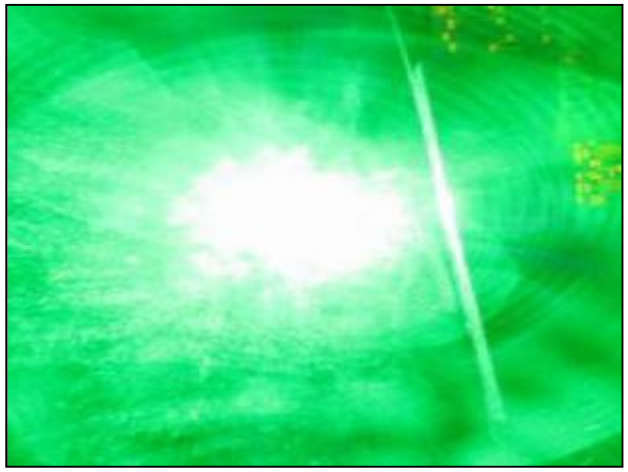
0.5 microwatts

2.5 microwatts

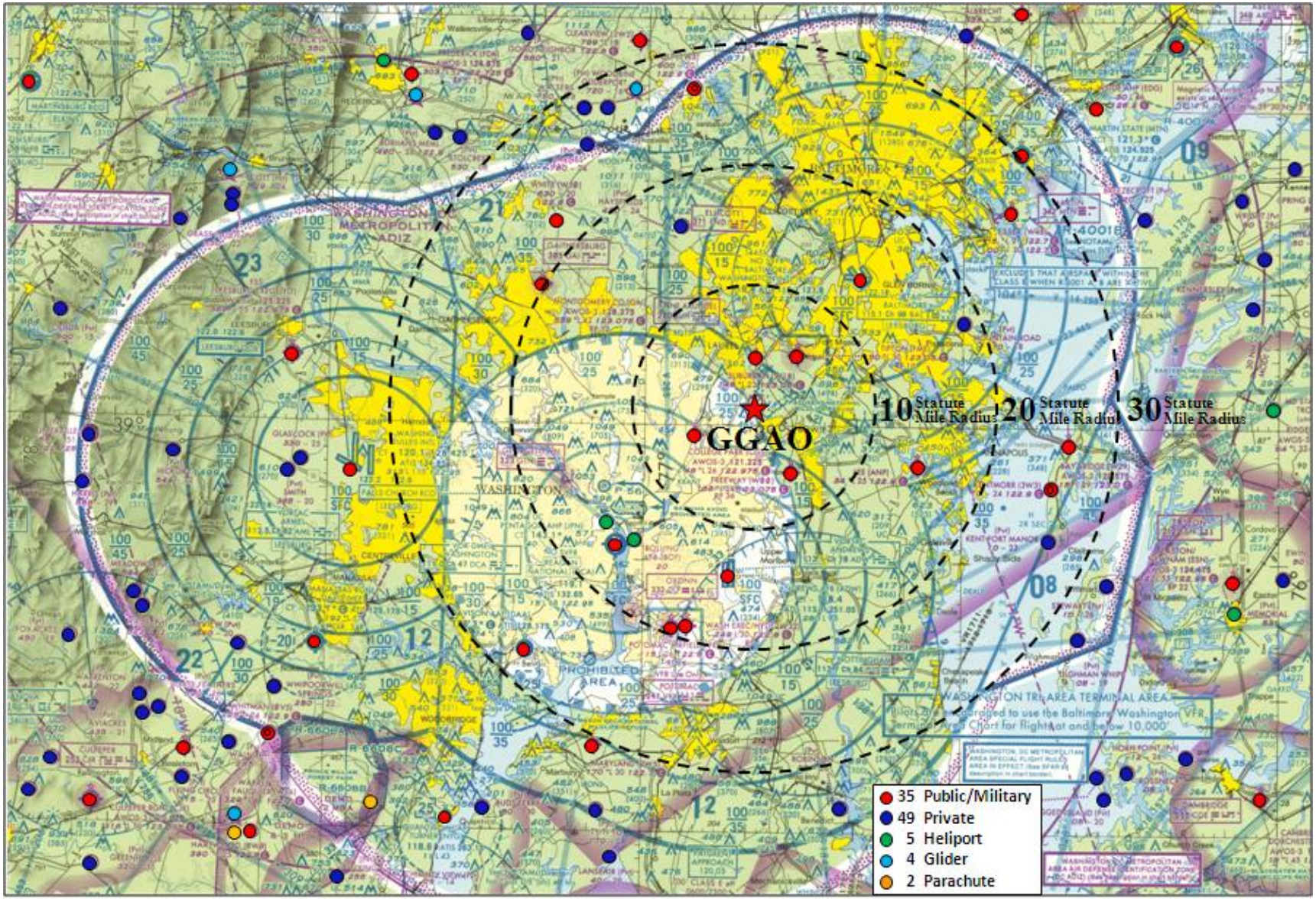
12 microwatts



60 microwatts



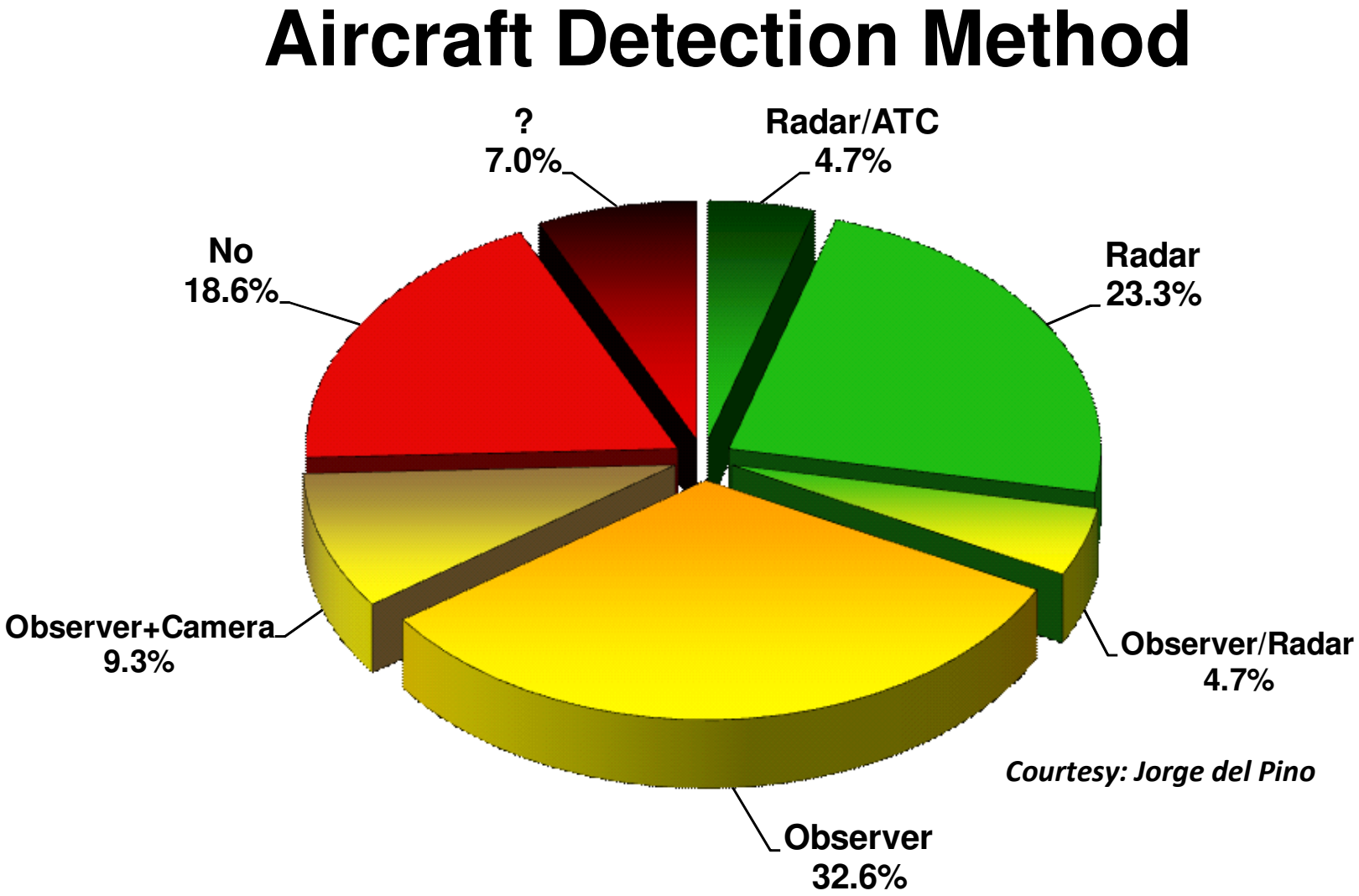
Aircraft Landing Locations



FAA/SAE/ANSI Laser Related Documents

AS4970	**Human Factors Considerations for Outdoor Laser Operations in the Navigable Airspace**
ARP5290	**Laser Beam Divergence Measurements Techniques Comparaison**
ARP5535	**Observers for Laser Safety in the Navigable Airspace**
ARP5572	**Control Measures for Laser Safety in the Navigable Airspace**
ARP5293	**Safety Considerations for Lasers Projected in the Navigable Airspace**
AIR5995	**Evaluation of Human Factor Considerations for Outdoor Laser Operations in the Navigable Airspace**
AC No: 70-1	**Outdoor Laser Operations. AFS-400/ATO-R**
AC No: 70-2	**Reporting of Laser Illumination of Aircraft. ATO-R**
ARP5674	**Safety Considerations for Aircraft-mounted Lasers Projected into the Navigable Airspace**
ARP5560	**Safety Considerations for High-Intensity Lights (HIL) Directed into the Navigable Airspace**
AS6029	**Performance Criteria for Laser Control Measures Used for Aviation Safety**
ANSI Z136.1	**2007 American National Standard for Safe Use of Lasers**
ANSI Z136.6	**2005 American National Standard for Safe Use of Lasers Outdoors**

Worrying statistics?



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