First: A correct name is important!
(What's in a name? that which we call a rose, By any other name would smell as sweet)

Insiders at the SLR community usually say “We shoot at 10 Hz, but for HEO we shoot at 5 Hz”, or “We start shooting at 15 degrees elevation”.

But in communicating to the general public, and government institutions with phrases as “We have an alarm system to avoid shooting laser pulses to an airplane”, sounds very dangerous and creepy!

So we should define, propose and use a name that is:
- Precise.
- Neutral on Danger Perception and Responsibility.
- Technical looking.
- Sounding good!

Two names can fill all these requirements:
- **Aircraft Illumination Avoidance (AIA)**
- **SLR-Airspace Interaction Events (SIE)**

Using the AIA acronym could hint that, somehow, the SLR station is actively following the Airplane we have to avoid the airplane.

While in fact, if it happens, it is the airplane who, without knowing, is crossing the SLR laser beam path.

The SIE acronym, is more neutral.

SIE is used in this poster and is our proposal to the SLR community to be used as the preferred name.

Introduction:
This problem started about 20 years ago, when relatively cheap and powerful laser pointers started to appear on the market.

The amount of events was kept very low until the middle 2000’s when the green light pointer model became popular.

In 2006 the United States FAA (Federal Aviation Administration) started to keep record of these events.

Note there is not only a place to register the incidents, but a strong set of laws to pursue and punishing the people who do it.

In Australia, law forbids importing and using high power green laser pointers.

And the European Union and individual European countries are also legislating in this sense.

Still should the ILRS keep a global database of the SIE Events?
This is something that has to be considered very carefully.

Not because it is technically possible, means should be done.

Not all the implications are positive for its implementation, facts as legal sovereignty and data ownership, liability claims, perception by the general public of the information released should be taken into account.

For keeping a global SLRS SIE database:
- The ILRS will have solid data to prove that the numbers of SIE events are insignificant in relation to the number of stations and satellite observations.
- Will help to study the geographic distribution effects in relation to flight paths.
- An important starting point, during related law discussion, or to define a special legal status for SLR systems.
- Will prove that the money invested by the SLR stations on SIE technology is effective.
- A solid point when asking for SIE upgrade funding.

Against keeping a global SLRS SIE database:
- Can this information be used in legal proceedings against the SIE station or parent institutions?
- Are all the SRF stations allowed to release this information to an open global database?
- Are time delay limits for the information release?
- Will be legally convenient NOT to have a real time reporting?
- Is it possible to report the event without identifying the SLR station?
- In the case of anonymous reporting, can the ILRS be legally forced to identify the SLR station that reported?
- In case the database is kept in different data centers, according to which set of laws the information will be managed?

The SIE Format

Given information on the plane windows sizes and its placement.

The primary global code to be reported by all SLR Stations.

<table>
<thead>
<tr>
<th>MJD</th>
<th>Minutes (0 UTC)</th>
<th>Station Code</th>
<th>Satellite Code</th>
<th>Detection Code</th>
<th>Trigger Distance (degrees)</th>
<th>Min Distance (degrees)</th>
<th>Epoch of Min (seconds 0 UTC)</th>
<th>Range@Min Distance</th>
<th>Airplane Registration Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>41913</td>
<td>141</td>
<td>9995</td>
<td>800411</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>0.369</td>
<td>85083</td>
<td>16.128</td>
</tr>
<tr>
<td>41943</td>
<td>141</td>
<td>9996</td>
<td>720100</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0.369</td>
<td>85083</td>
<td>16.128</td>
</tr>
</tbody>
</table>

Defining the reporting format
Switching off the laser at the SLR system when an airplane enters a security area near the SLR laser pointing position does not mean that in all cases the airplane was to be illuminated by the laser beam.

Different technological levels to address the SIE problem means different levels of information.

The primary level of reporting will cover the 4 basic points of the SIE event:
- **When?**
- **Where?**
- **Which Satellite was being observed?**
- **How was it determined a SIE event?**

This information can be reported by any technology currently available and is the basic format level.

One of the most interesting part of the monitoring is to find any case that the plane would have been REALLY illuminated if the laser beam has not been switched off.

Only SLR stations with the proper technology and software will be able to determine the minimum angular distance between the airplane and the satellite path and confirm if a laser illumination would have occurred.

This secondary level of reporting covers 4 points of the SIE event:
- What would have been the minimum distance between the laser beam and a plane?
- When it was?
- At what distance from the SIE was the airplane?
- Is possible to identify the plane?

For this a combination of Radar, ADS-B and or Air Traffic monitoring technologies are needed.

The SIE Format

At what distance from the laser beam the security measures are taken. Normally it is the primary value at each Station.

If this value is very close to zero, it could be assumed that the plane was illuminated by the SLR laser.

In order to calculate the energy density at the plane and the eye effects.

Cases reported to the FAA

The format should be as compact as possible, and not necessarily the most user readable.

At the database centers this information can be expanded to be in a more ‘reader friendly’ format.

The "Where?" question can be reported using the station code only.

The "How?" can be addressed giving a numerical code to each technology so any number is a single or a combination of SIE technologies.

Making the SIE information "reader friendly"

The full format should be as compact as possible, and not necessarily the most user readable.

At the database centers this information can be expanded to be in a more "reader friendly" format.

The "Where?" question can be reported using the station code only.

The "How?" can be addressed giving a numerical code to each technology so any number is a single or a combination of SIE technologies.