

Hazards and Risk @ SLR Network, Updates and New Challenges

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Previously, in Bad Kötzting...

The basic concepts were introduced



Hazards

What can affect you

Vulnerabilities

How You let Hazards affect you

Risks

What could happens if... .

Disaster

When the Hazards *really* affects You!

What's new with the Hazards & Risks @ SLR Network?

Human Factor

- Alla Massevitch

- Karel Hamal

- Werner Gurtner

- Wolfgang Seemueller

- Yang Fuming

- Mark Davis

- Kasimir Lapushka

- Still losing the **Historical Memory!**

- Example: *Preserving history and technical "know-how" - experience at SLR station Riga*

- **In the next 5-10 years the ILRS generation handover will be a fact.**

Fires

A night photograph showing a large fire burning in a field. The fire is bright orange and yellow, with a large, dark, charred log in the foreground. In the background, there are trees and some distant lights. The sky is dark with many stars, and a bright meteor streak is visible in the upper left quadrant.

The Chariot Fire: MOB LAS-4, July 2013

Fires



- Forests fires continues to be a ***REAL*** Hazard for the ILRS Network.
- 3 Big fires in 10 years.
 - 1 Station destroyed.
 - 2 Stations evacuated.
- All Stations that could be affected should improve and update their fire preparedness program



McDonald Observatory Named Firewise Community

UT Fire Marshal Collaborates to Protect Valuable Research Facility

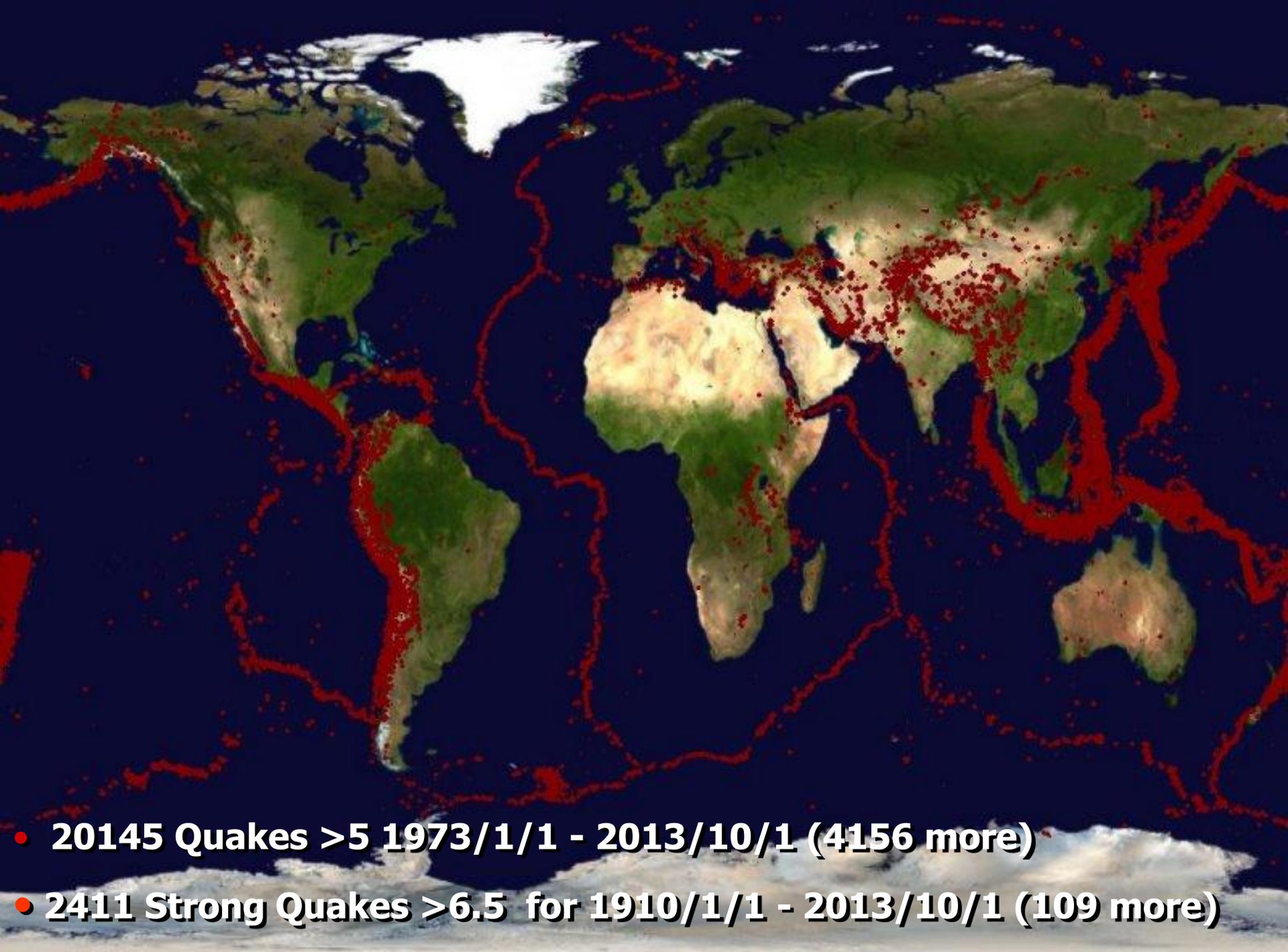
Back in November 2004, Fire Marshal Garland Waldrop made protecting the McDonald Observatory a top priority when he joined forces with The Texas State Fire Marshal's Office, Texas Forest Service, and Fort Davis Volunteer Fire Department to upgrade fire safety measures at The University of Texas at Austin's world-class astronomy facility. Now, only two years later, what Waldrop calls a "precedent-setting collaboration of state agencies" has provided McDonald Observatory with new firebreaks, equipment, and personnel, earning it national recognition as a Firewise Community.

McDonald Observatory, a leading center for astronomical research and public education, is located in the Davis Mountains of West Texas, on the highest road in the state. Because the observatory is situated approximately 6,800 feet above sea level and is surrounded by acres of brush and trees, it is at high risk for wild land fires; for this reason, The Texas State Fire Marshal's Office asked Waldrop to take part in an evaluation of the facility's fire safety in 2004.

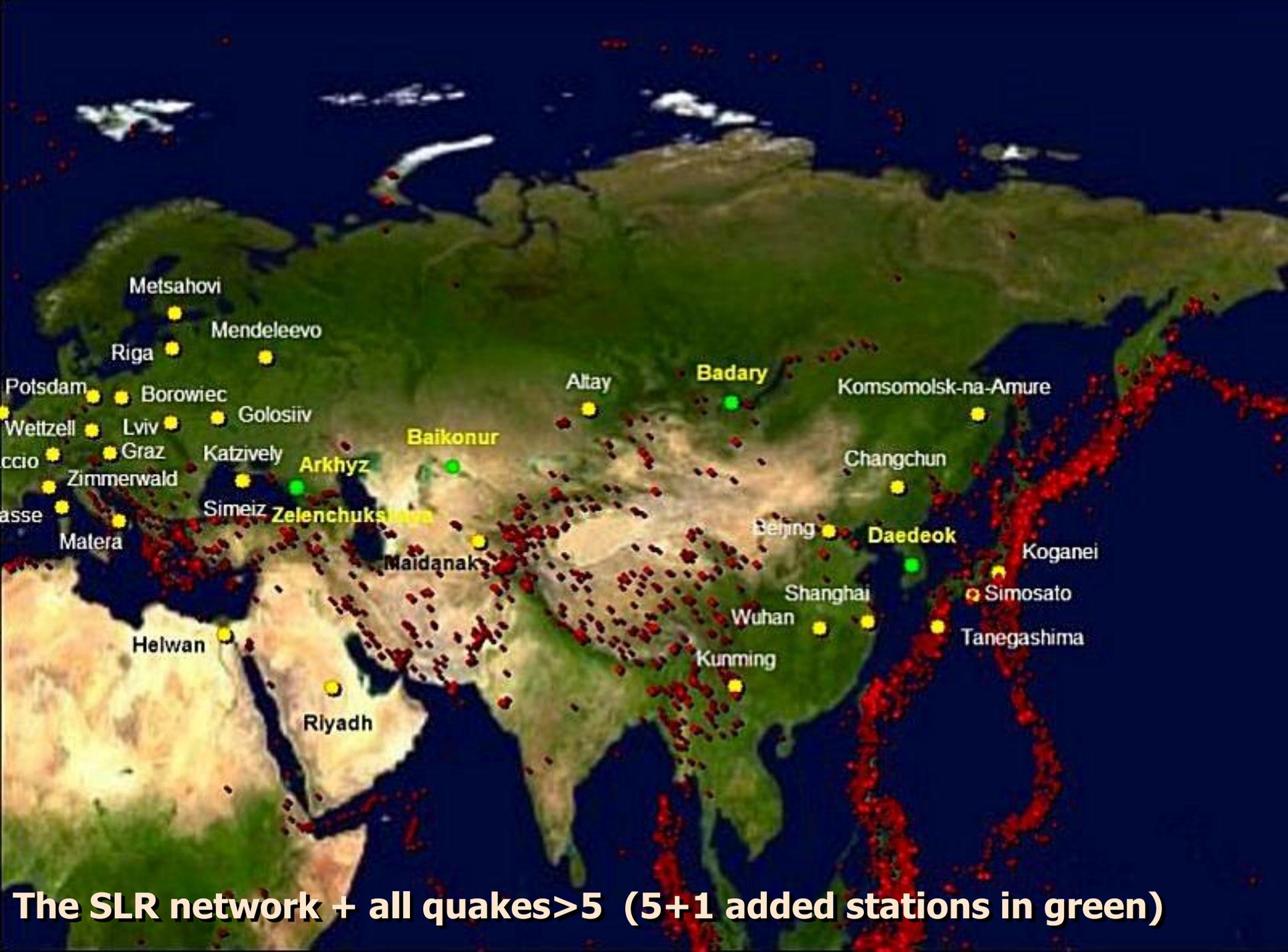


Earthquakes

- **5 Operating Stations added since 2011:**
 - **1879, ALTL, Altay**
 - **1886, ARKL, Arkhyz**
 - **1887, BAIL, Baikonur**
 - **1889, ZELL, Zelenchukskaya**
 - **7359, DAEK, Daedeok**
- **1 possible new place for TIGO**
 - **La Plata, Argentina**



- **20145 Quakes >5 1973/1/1 - 2013/10/1 (4156 more)**
- **2411 Strong Quakes >6.5 for 1910/1/1 - 2013/10/1 (109 more)**



The SLR network + all quakes >5 (5+1 added stations in green)

Earthquakes

- **4 level Hazard classification based on the amount of Quakes for a given radius and the magnitude of the closest/strongest ones.**
- **All the “old” Stations are on the same seismic Hazard category as in 2011.**
- **No significant change in the Hazard ranking for the High “at risk” stations.**

Seismic Hazard classification for the added stations

	<250	250-500	500-1000	>1000	total
High (At risk)					
Arkhyz	2	11	22	44	79
Zelenchukskaya	2	11	23	44	80
Medium					
Badary		3	2	9	14
Daedeok		2	5	125	132
Low					
TIGO@La Plata			8	64	72
Baikonur			11	55	66

Number of Quakes, added stations

Closest Quake, added stations

High (At risk)	mag	date	dist.
Arkhyz	7.0	29/4/1991 9:12	225.3
Zelenchukskaya	7.0	29/4/1991 9:12	226.4
Medium			
Badary	7.5	05/1/1967 00:14	409.8
Daedeok	6.6	20/3/2005 01:53	381.4
Low			
TIGO@La Plata	8.2	30/1/1914 00:00	770.5
Baikonur	7.6	02/11/1946 18:28	871.6

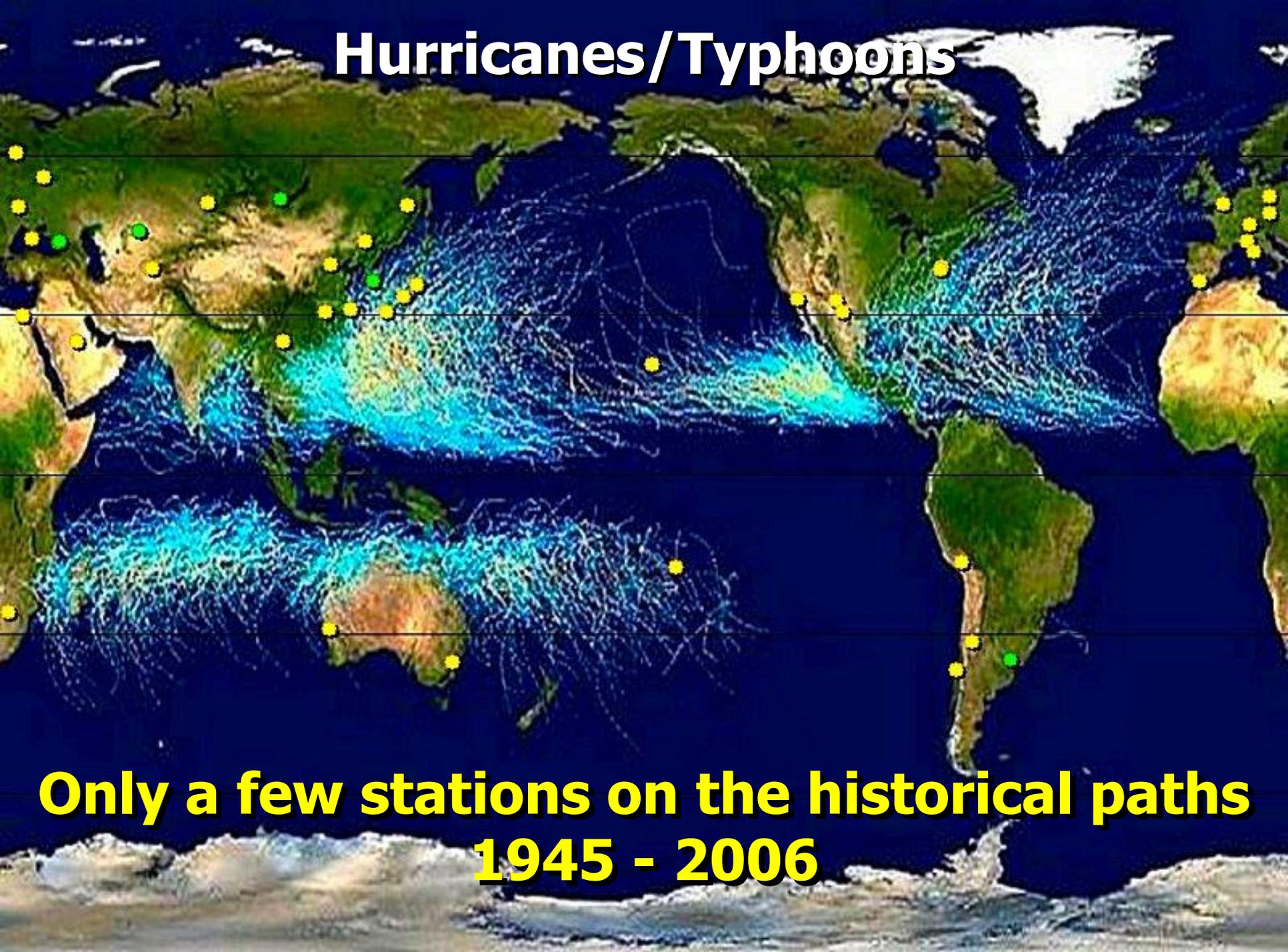
"At Risk" Stations

Station	<250	250-500	>500
Concepcion	19	19	36
Koganei	19	59	75
Simosato	16	37	83
Arequipa	13	21	58
Tanegashima	12	5	59
Graz	4		4
Haleakala Maui	4		4
San Juan	4	35	58
Beijing	3	3	6
Matera	2	15	46
Kunming	2	13	25
Zelenchukskya	2	11	23
Arkhyz	2	11	22
Katzively	1	11	46
Simeiz	1	11	45
Monument Peak	1	2	13
San Fernando	1	1	4

Rank	Station	Points
1	Simosato	22
1	Koganei	22
1	Arequipa	22
2	Concepcion	24
2	San Juan	24
2	Tanegashima	24
3	Monument Peak	27
4	Beijing	30
5	Haleakala Maui	31
6	Kunming	33
6	Graz	34
7	Arkhyz	37
7	Zelenchukskaya	38
7	Matera	39
8	Simeiz	45
8	Katzively	45
9	San Fernando	47

Data up to 1/September/2013

Hurricanes/Typhoons



**Only a few stations on the historical paths
1945 - 2006**



24 Oct 2012 13:04 GMT / 24 Oct 2012 09:04 AM EDT

The
Weather
Channel
weather.com

Sandy's path over Cuba



Public Buildings: Santiago de Cuba Science Museum

Former SLR Station 1953, scub

**Barometer alignment to GPS
antenna phase center was lost.**



**Connector and cable of the Vaisala
sensor ripped by the wind, it never
was found**

Sandy

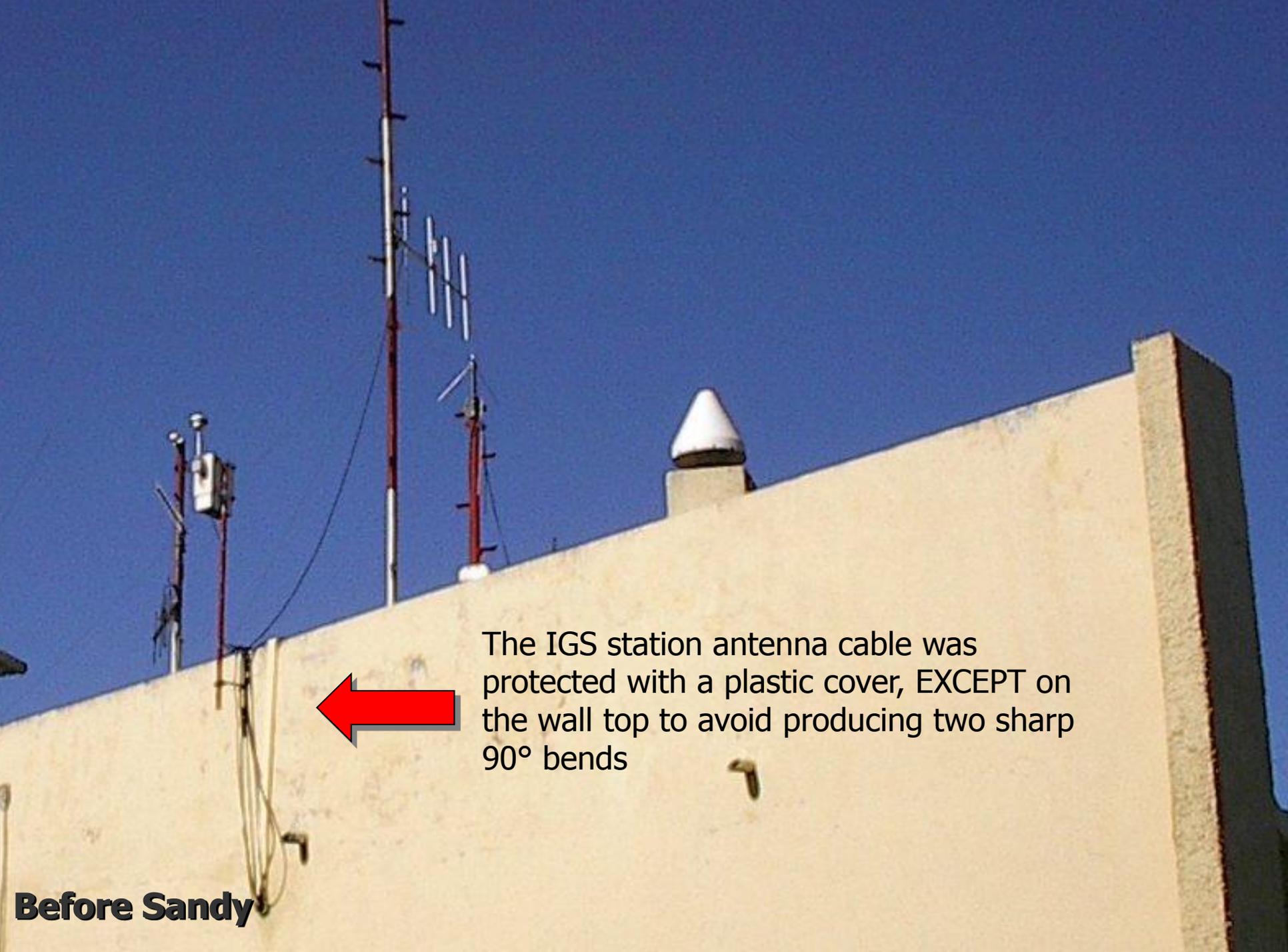


Before Sandy

A photograph showing a flat roof of a building after a storm. The roof is covered with a grid of rectangular panels, which are the remaining aluminum/asphalt thermal isolation layer. The panels are light-colored and show signs of wear and damage, including some dark staining and peeling. The roof is bordered by a concrete curb. In the background, there are trees and another building with a corrugated metal roof.

Only the aluminum/asphalt thermal isolation layer remains.

After Sandy



The IGS station antenna cable was protected with a plastic cover, EXCEPT on the wall top to avoid producing two sharp 90° bends



Before Sandy



After Sandy

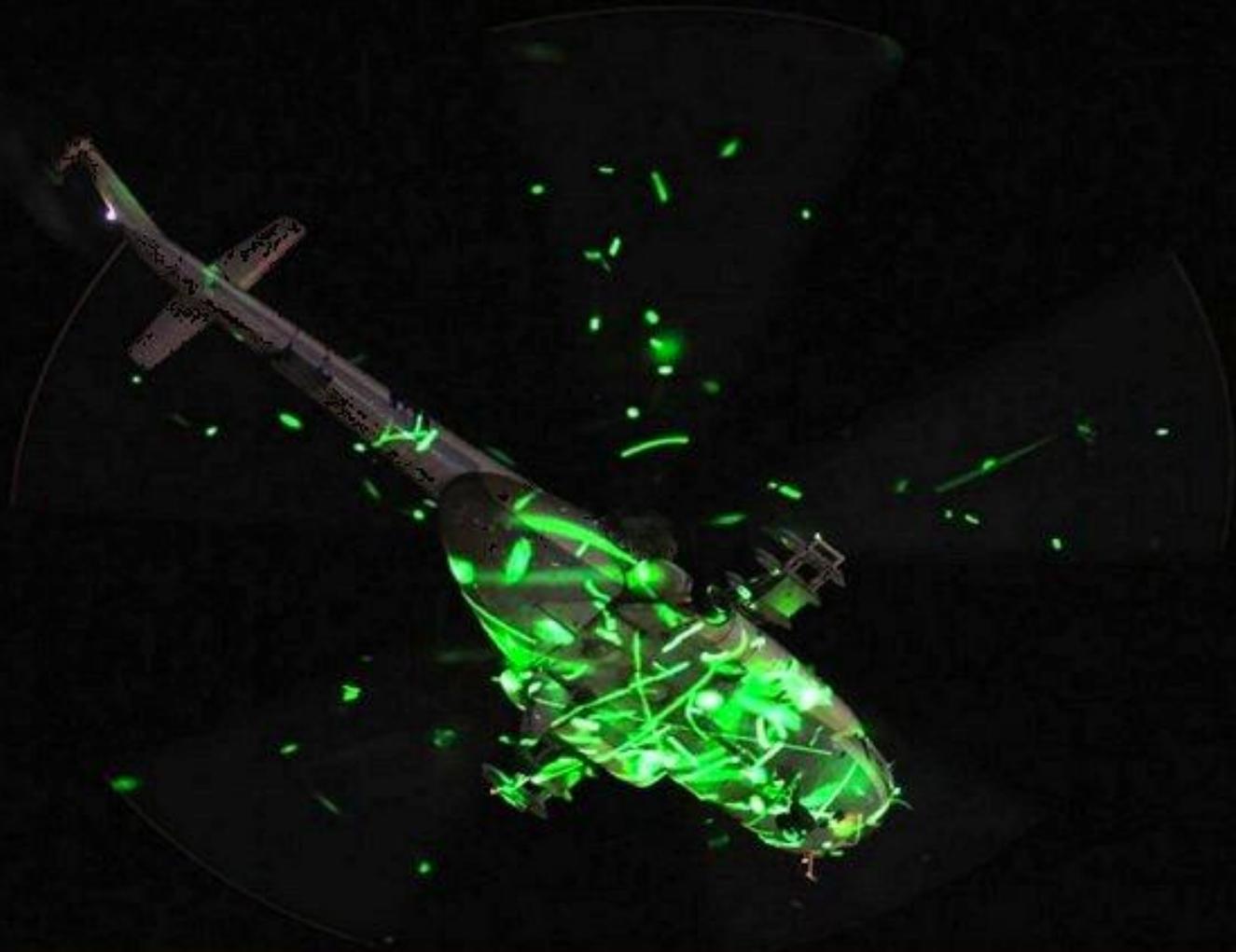
CDI: Computer, Data and Internet Security

Only a few questions:

- Does everybody have now a full updated software/data backup outside the station?
- All the data stored in obsolete formats, has been saved?
- How the hacking is going in our servers?

New Challenges

In-Sky Laser Safety and the SLR Network



Cairo, Tahir Square 2013

In-Sky Laser Safety events

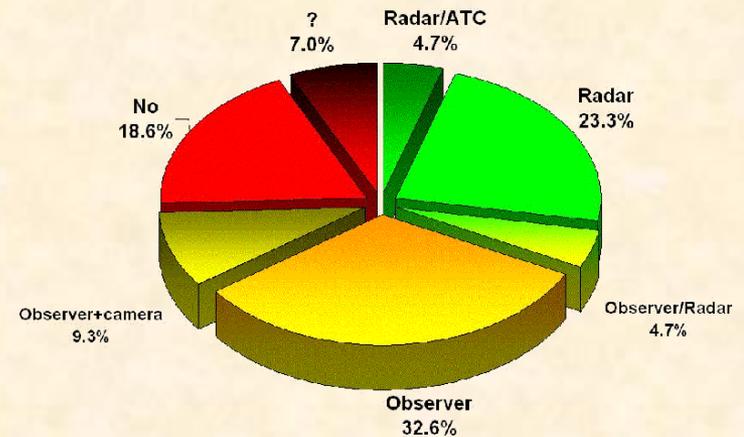
- How many?
- Where?
- When?
- How many direct laser hits on a plane?



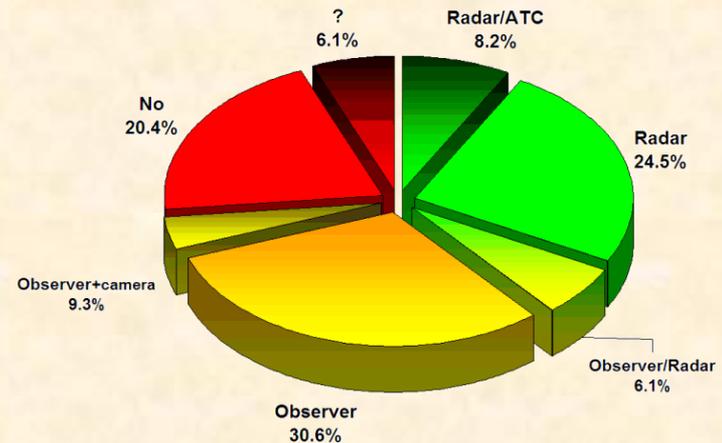
Aircraft Detection: facts

- The number of stations equipped with **ADS-B** increased by 100% in 2 years.
- In a few years it will become the global standard for ATC.
- Possibly light planes and helicopters included later.
- The close integration between the **ADS-B** and the SLR control software is already being carried out.
- This integration includes the automatic log of any Safety event.
- Other methods are able to do this too.
- ***This is an unique possibility to start generating a reliable database of SLR-In Sky safety events.***

2010: 2 stations with ATC



Aircraft Detection Method/2013



2013: 4 stations with ATC

Aircraft Detection: Facts

integrating the ADS-B
generating a global event database

- Request that all stations upgrading to an integrated **ADS-B** use to include the automatic “**In-Sky Safety event log**” option.
- Ask the stations using other detection methods, to carry out the “event log”, if technically possible.
- Define a **common format** both for the “**event log**”, and the **naming** of the log files in order to create a ILRS-wide **event database**.
- Use the simplest, software independent, richest format.
- Ask the **ILRS** CB to consider and support the inclusion of this **event database** among the engineering/housekeeping products.
- Uploading method and frequency t.b.d.
- Regular analysis about the occurrence of these events.

Aircraft Detection

integrating the ADS-B

On the event log file possible format:

(csv format, ASCII, comma separated fields, one line per event)

- Station Id: Numerical/4letter/Name
- Event Epoch: yyyy/mm/dd, hh:mm *and/or* mjd.mjd
- Unit used to define an event: 1=Degrees, 2=Km, 3=nm,.....
- Distance criteria to define an event: numerical value
- Minimum distance to laser beam: numerical value
- Airplane position at min distance: Az, El, Range, Id (if available)
- Satellite Code: Cospas Code/Satellite name
- Numerical code for the tech used 0=ADS-B, 1= Radar, 2=optical,...

Examples

1884, 2020/9/12 16:48,1,4,1.3,204,45,24,FL310,Stella,0 (2020_1884.sft)

Metsahovi, 61234.9678,1,3,0,46,65,,,7603901,2 (METL_2023.sft)

Act locally



Think globally

**Do we need a:
“best practices & hazard management book”?**

Are we fully exploiting our practical know how?

Hazards Management Book

The pro's and con's of doing this

FOR:

- New Stations, more (expensive) equipment everywhere, -lots of money to take care of-.
- Richest selection/ design/upgrade criteria for new stations.
- Applying this collective experience to increase the operational efficiency and reduce future damages and losses.
- Preserving the know-how.
- Learning from past problems.

AGAINST:

- Local hazards could not considered on the proposed recommendations.
- Local regulations could be stronger than the recommended ones.
- Could increase costs in Station design and upgrades
- Extra work/expense, in creating updating and distributing it.

Hazards Management Book

Not only Hazards and Risks information

There are operational know-how details which are passed now only by person to person interaction or scattered in papers presented over time.

- How to deal with polarization effect on the SLR optics?
- What are the criteria to select the optimal filter for a given configuration?
- How to monitor the filter degradation?
- Managing the Telescope-Enclosure interaction.

Hazards Management Book

What we could do now?

Can we get a consensus about:

- The need to know what is the real situation regarding the Hazards & Risks practices in the ILRS community?
- Creating a “best practices” book?
- This effort to be supported/integrated on the ILRS frame?

If we get the support of all of You, we could now:

- ◆ Create a (virtual) team interested in working on this problem.
- ◆ Carry out an in-depth Hazards & Risks survey during 2014.
- ◆ Receive proposals on operational tips to be included.
- ◆ Present the survey results and a first draft during the 2015 workshop.

Stay tuned to 2015!