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 happen 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.
The Chariot Fire: MOBLAS-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 seismical 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

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<td>72</td>
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<tr>
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Number of Quakes, added stations
## Closest Quake, added stations

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<th>mag</th>
<th>Date</th>
<th>Distance</th>
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<td>05/1/1967 00:14</td>
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**“At Risk” Stations**

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Data up to 1/September/2013
Only a few stations on the historical paths
1945 - 2006
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.
Before Sandy
Only the aluminum/asphalt thermal isolation layer remains.

After Sandy
Before Sandy

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