



DAYS
2021

November 16,17 and 18

Antenna environment

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Session 3 – Presentation 7

1. Weather conditions

Antenna environment / EX. I_295bis:

Avoid very corrosive environments as much as possible. Excessive marine humidity may lead to antenna damage.

Antenna environment / EX. I_140:

For a region where snow cover height can reach H centimeters in one day, at least H centimeters clearance between the antenna bottom and the top of pillar is mandatory, to keep the foot of the antenna away from the snow bank.



2. RF environment

Antenna environment / EX. I_181 & 182:

The characteristics of each radiofrequency system on the station site shall be listed : frequencies used, emitting/receiving, permanently/episodically, power... Before installation, radiofrequency interferences with other systems shall be managed.

Antenna environment / EX. I_140:

No metal object likely to cause multipath in a 5 m radius around the antenna

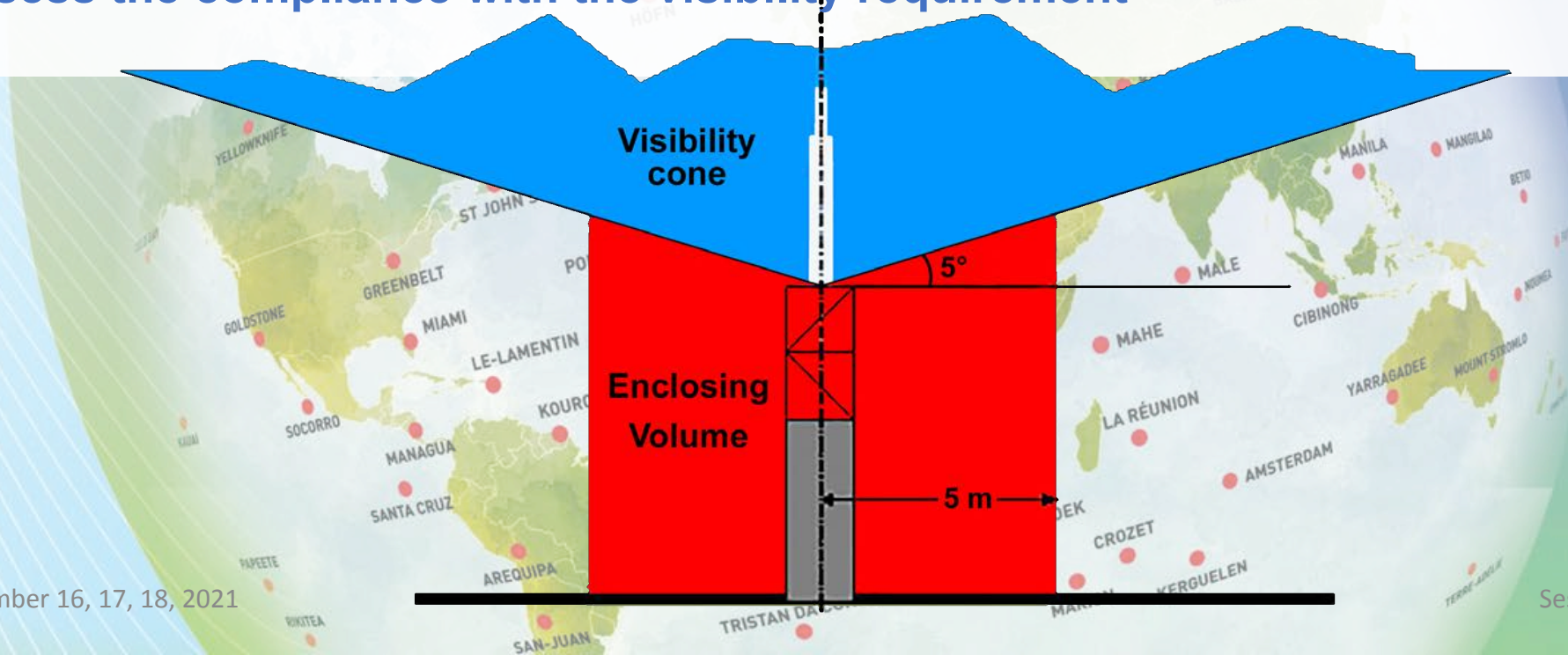
⇒ **Installing antennae above corrugated iron roofs or a slabs covered by metal-plated protection shall be avoided**



3. Visibility

Antenna environment / EX. I_150: Nothing must stand within the visibility cone, apart from the antenna itself. The antenna must be installed so as to have a clear view of the sky: ideally no obstruction above 5° elevation.

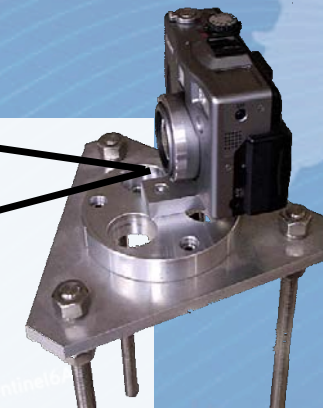
- ⇒ The visibility of the antenna from the satellites is a key factor in the station performance and the contribution to Precise Orbit Determination
- ⇒ Systematic survey prior installation or on the occasion of further visits in order to assess the compliance with the visibility requirement



360° panorama view

Methodology

- Shots from the antenna base
- Using special device to rotate the camera on its nodal point (convergence)
- Overlapping between adjacent photos
- Professional photo tool software supporting manual stitching for inserting matching points, geometric distortion correction, optimizer...
- Equirectangular projection
- Display of cardinal points and elevation lines

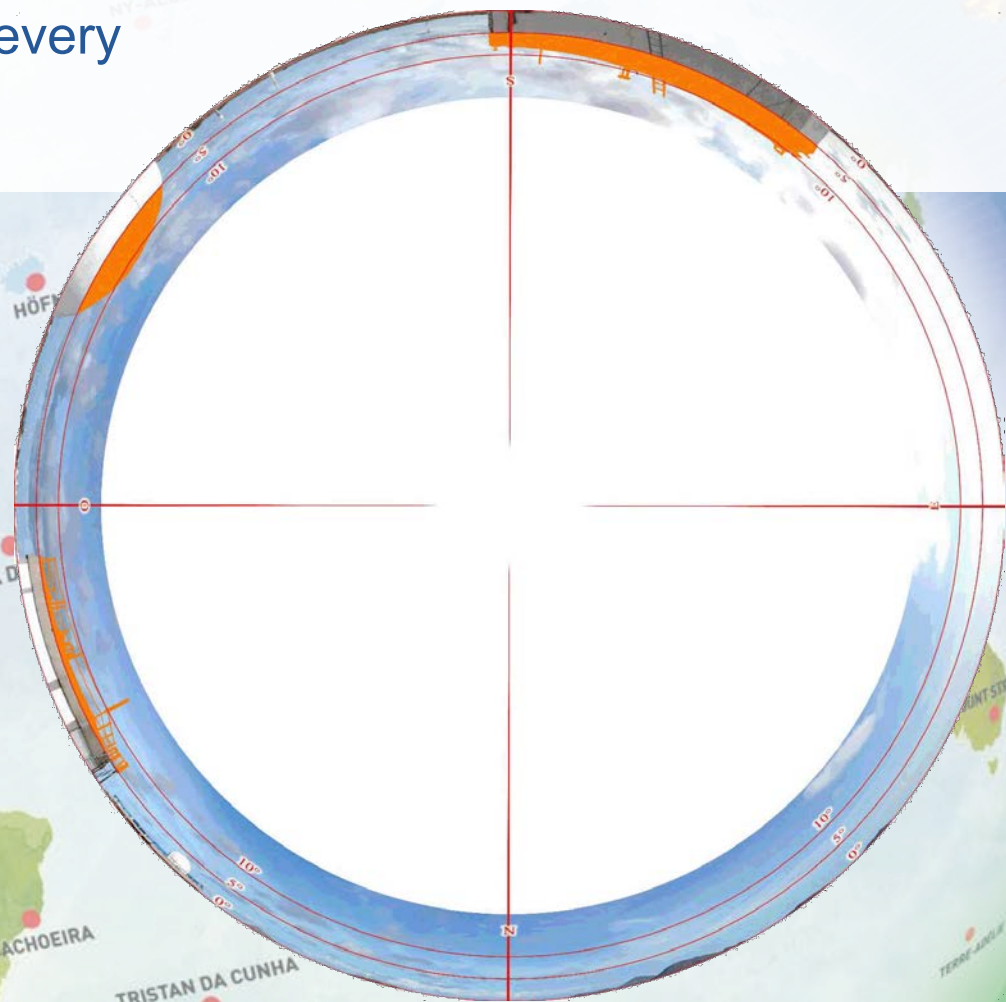


Fisheye view and obstructed areas rates

RF environment assessment

- Fisheye view from equal-area re-sampling of the 360° panorama view
- Area dimensions remain scaled in order to provide the rate of obstructed areas / sky
- Obstructed areas rate in total + for every elevation sections: 5-10°, 10-15°...

Elevation section	Obstructed areas Rate
5°-10°	17.6%
10°-15°	0.8%
> 15°	None
Total (> 5°)	1.8%



Antenna vicinity requirements in summary

- Prevent moisture or snow accumulation at the antenna bottom
- Regular management of the RF environment to avoid interferences with other local systems
- No metal object or reflective surfaces in the antenna vicinity likely to cause multipath interferences in the signal propagation
- No obstructions 5° above the horizon so as to have a clear view of the sky
- Maintaining a good antenna environment in the long term