

GNSS Antenna Installation

1. https://files.igs.org/pub/resource/guidelines/Guidelines_for_Continuously_Operating_Reference_Stations_in_the_IGS_v1.0_EN.pdf
2. <https://igs.org/wg/antenna/> (igs20.atx)

Monument Types (for your fix antenna)

- ✓ Recommended: Drilled Braced Monument for highest stability
- ✓ Avoid rooftop mounts unless extremely stable
- ✓ Prevent vibration or resonance in the mount



Antenna Position

- Minimum Elevation Mask

- ✓ Ideal: Unobstructed horizon to 5° elevation
- ✓ Minimum standard: 360° visibility above 5° elevation
- ✓ Keep reflective surfaces 5–10 m away from antenna
- ✓ If unavoidable, keep main satellite directions clear

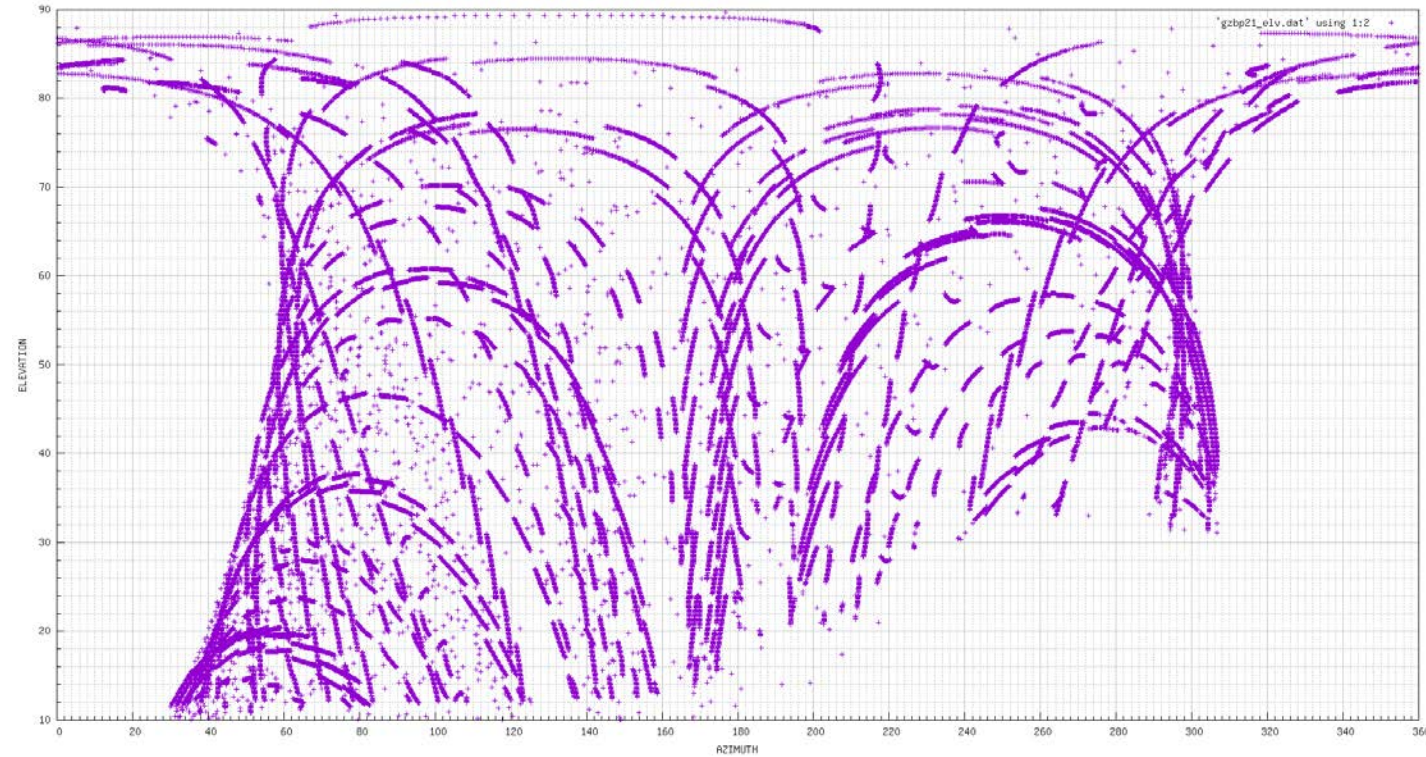


Antenna Position

- Azimuth/Elevation viewed by a BIPM receiver

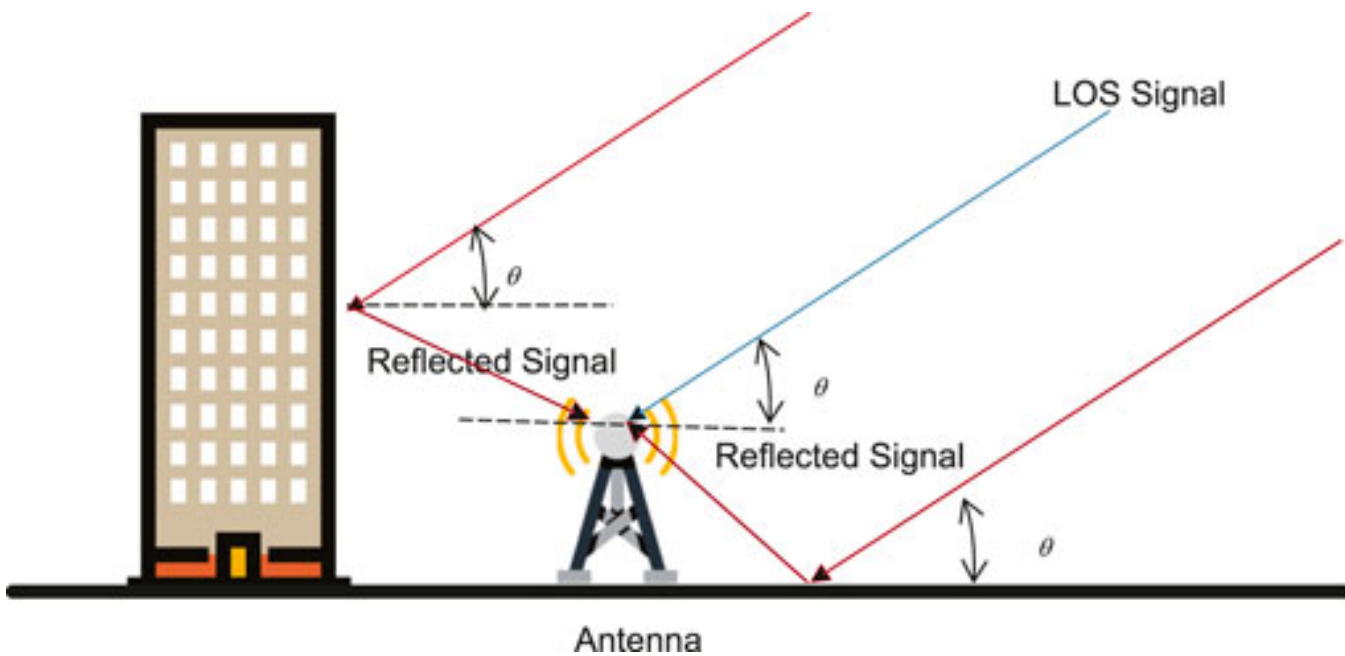


hill masking (right side of photo) a lot of satellites

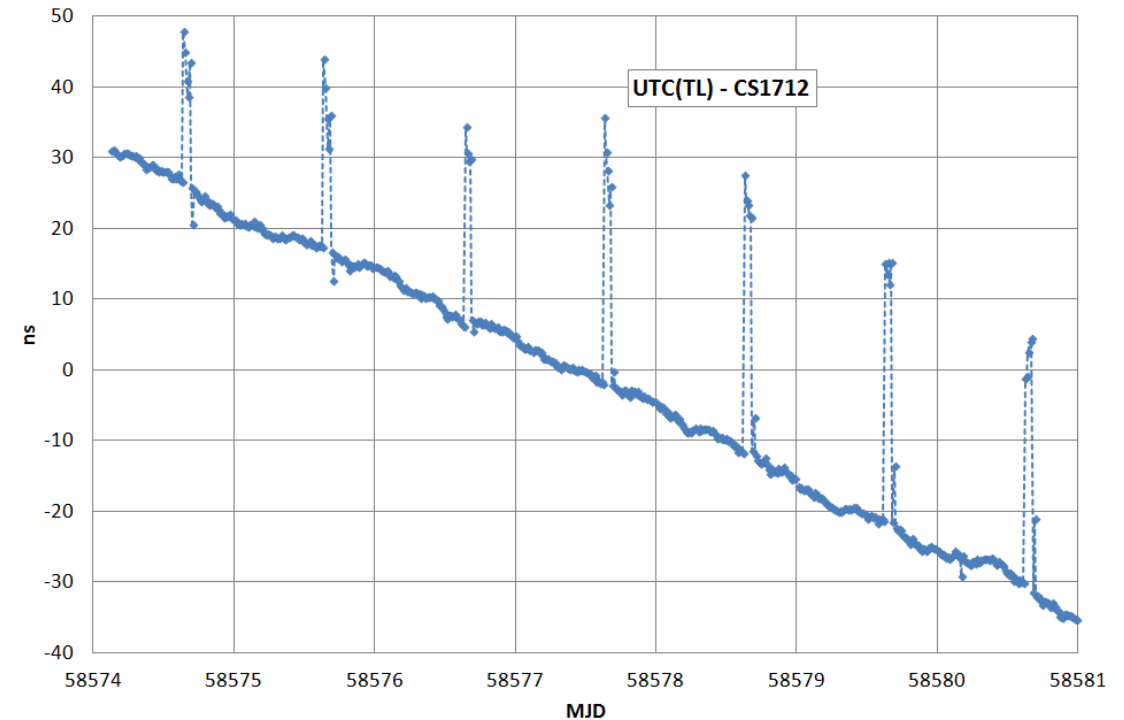


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Multipath Effect for Time Transfer



The reflected signal is not direct from GNSS satellite → **extra propagation delay** → time transfer error



Reflected signal came from certain direction at certain time → Periodical time transfer error

Multipath Reducing

- ✓ Use choke ring antennas to reduce multipath



- ✓ Avoid tall buildings, trees, or metallic objects, solar panel nearby



Temporary Antenna Monument (for G2)

- ✓ prepare empty columns for antenna installation **(the best)**
- ✓ or use mount kit to install on existing monument (second choice)
- Prevent vibration or resonance in the mount
- Ask G1 lab for help if necessary



Antenna Orientation

- **Must be aligned to True North**
 - ✓ Look for **Arrow or Symbol** on antenna
 - ✓ Or the **Antenna connector points to north**
 - ✓ Orientation error should be less than $\pm 5^\circ$
 - ✓ Use a compass or mobile phone APP azimuth determination
- **Do not rotate antenna after installation**
- **slight curvature can reduce stress on the cable**
- **fixing the antenna cable to prevent disturbance or loosening caused by wind.**

