Primary Instructions for Constructing Building Mount Monuments

Contents

Attachment to a Building

- Stainless Steel (at least 4” OD) is recommended (angle iron or circular pipe).
- Must be bolted directly to the load bearing wall near a corner and attached vertically.
- Mount should not interfere with building’s replaceable roof (see pictures).
- Mount should be attached to the building for a length of at least 1 m (3.28 ft) with at least 3 anchors/bolts.
- Mount should extend about 0.5 m (1.64 ft) above the roofline. The ratio of freestanding part to bolted part should be approximately 1:3.
- The bolts/anchors must penetrate directly through the mount. Use of epoxy is recommended.
- No U-bolts or channel lock systems. There would be no motion of mast/building.

Attaching Antenna, Mount and Monument

- A device/adapter must exist between the monument and the antenna that allows: First, the antenna to be leveled and oriented to north. Second, if the antenna is changed, the new Antenna Reference Point (ARP) (ARP is defined as the intersection point on the centerline of antenna at the mounting surface) must return to the exact same point in 3-dimensional space as the previous ARP, or the change in position between the mark and the ARP must be measured to within 1 mm.
- NGS has instructions and reference materials. Please see the following instructions.
- https://geodesy.noaa.gov/CORS/Adaptors/
- Sample pictures are given below:
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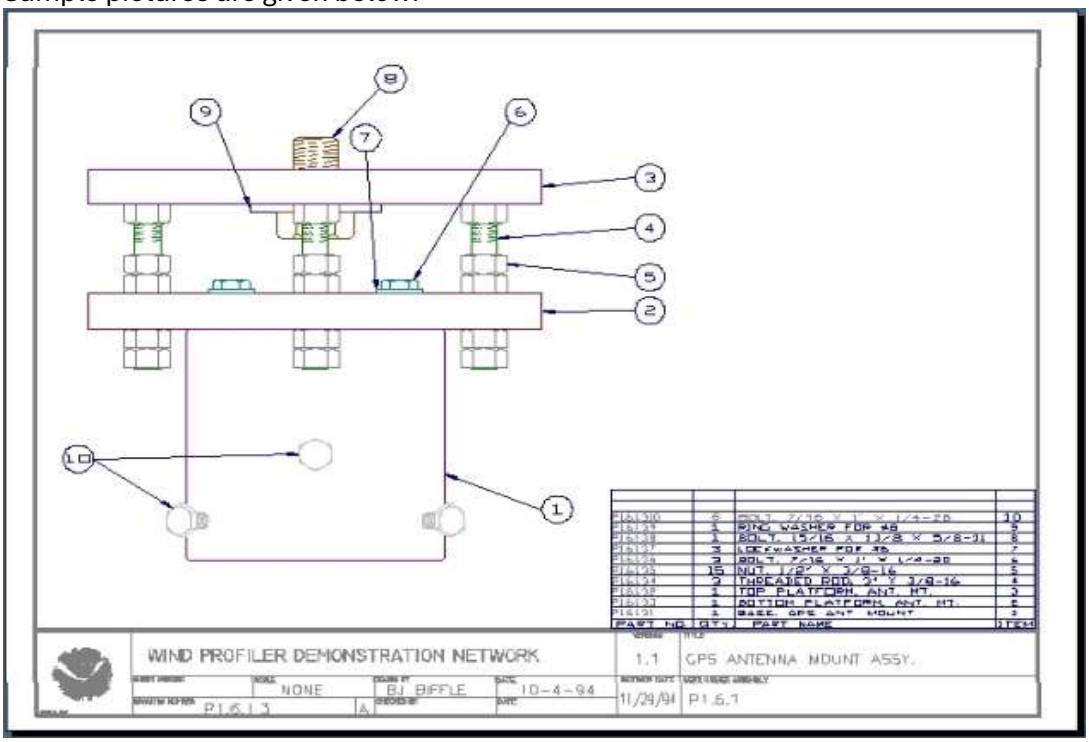


- UNAVCO has reference materials from earthquake center of California (SCIGN), here are the links:
- https://kb.unavco.org/article.php?id=394
- https://kb.unavco.org/article/scign-mount-instructions-references-diagrams-and-schematics-provided-by-scign-541.html

Orienting Antenna

- The antenna must be oriented to the true north.

Antenna Cable

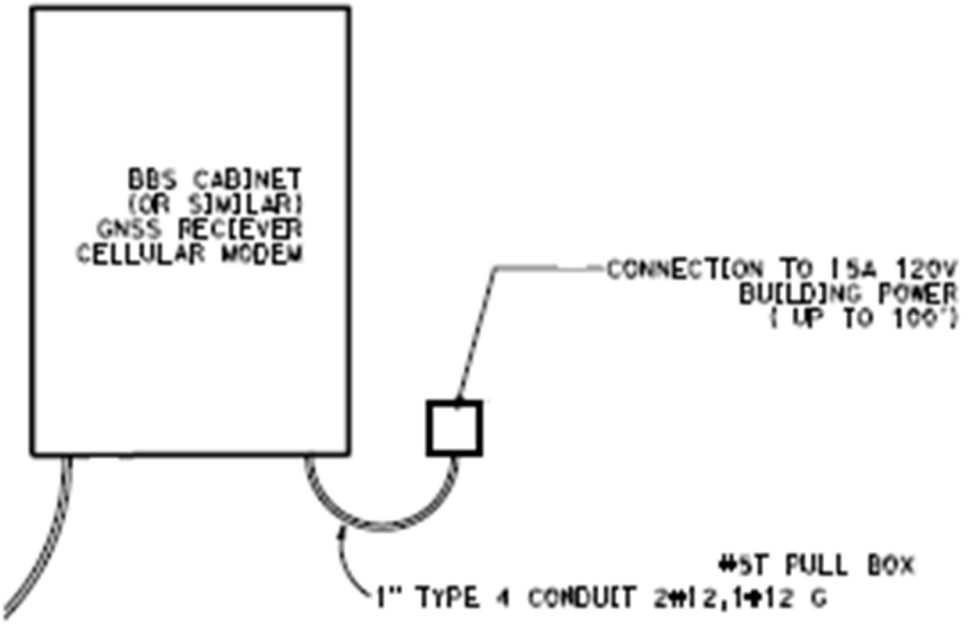
- The antenna cable should directly connect to the receiver and antenna, no connectors should be inserted.
- The junction point of the antenna cable and antenna after the two have been connected should be sealed with waterproof material e.g. butyl wrap.
- The antenna cable should not be under tension. Looping the first section of cable next to the antenna and attaching it to the mount can best avoid this problem.

Lightening Arrestor

- Insert a lightning arrestor in the antenna cable between the antenna and the receiver with its own independent ground.
- The arrestor should be located on the outside of the building at or near the egress point of the cable into the building.
- UNAVCO provides a grounding terminal in its enclosure design that, when connected to an 8 foot grounding rod, provides protection for permanent station equipment.
- UNAVCO reference material, https://kb.unavco.org/article/power-surge-and-lightning-protection-462.html

Receiver Location

- Determine where the power for the receiver will come from.
- If required, determine where the internet access is and plan the route for internet cable.
- A sample picture of receiver/modem enclosure,



- Determine where the antenna cable will enter the building.
- Receivers must have an uninterrupted power supply with a minimum of 5 minutes backup power, 30+ minutes strongly preferred.

Receiver Setting

Receivers must be programmed:

- So that no smoothing is applied to the observables.
- Track with an elevation cutoff angle of 5 degrees.
- Record at 1-second sampling intervals.
- Create hourly sessions of GPS time.
- Track all satellites of all constellations (GPS+GLN+GAL+BDS) regardless of health status.

NGS Documents

The above instructions are taken from the following NGS documents. If you need details, please follow the documents:

- https://geodesy.noaa.gov/CORS/Establish_Operate_CORS.shtml
- https://geodesy.noaa.gov/PUBS_LIB/CORS_guidelines.pdf
- https://geodesy.noaa.gov/library/pdfs/NOAA_Manual_NOS_NGS_0010.pdf

MSL Remarks

- It is advised to contact an experienced builder and show them the specifications.
- The builder sets up the receiver for a compatible data type for transfer. They would contact MSL for setting up NTRIP Caster of MTSRN.
- The builder would provide login credentials for accessing the receiver.
- The builder would provide an autonomous position for the station.
- The builder should assist in taking the metadata including photographs.
- The builder should fill out the following information:

Site Identification Template

Four Character ID: Please contact MSL for assigning station ID
Site Location Information: Approximate Position

GNSS Receiver Information

Receiver Type:
Satellite System : (GPS+GLO+GAL+BDS+QZSS+SBAS) (Choose the combination that your receiver is actually tracking NOT what it can potentially track. Many receivers require special codes to access certain satellite systems.)
Serial Number:
Firmware Version:
Elevation Cutoff Setting: (deg)

GNSS Antenna Information

Antenna Type:
Serial Number:

Alignment from True N: (deg; + is clockwise/east)