

UNAVCO Resources: GNSS Station Monumentation

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[Current as of December 2008 .]

UNAVCO can provide assistance with design, purchasing, and construction of geodetic monumentation to NSF- and NASA-funded science groups. We currently support and recommend the following monument types for permanent, long-term, and campaign GNSS site installations. Click on the links below for more information on each.

Things to consider in choosing a monument type include stability (precision) needed, funds available, time available, site accessibility, site security, substrate, and materials available. For details on site selection and additional information on monumentation in general consider reading: [Physical Site Specifications: Geodetic Site Monumentation](#) .

Permanent and Long-term Monument Comparison Table

	Type	Stability*	Cost**	Install Time	Labor	Substrate	Site Impact
	Deep drilled braced (permanent)	↑ high	● \$7,500- 15,000	●● 2-4 d	●●● 3-4	BR, U	● high
	Shallow drilled braced (permanent)	↑ high	▬ \$800+	●● 1-3 d	●● 2-3	BR	▬ med
	Shallow braced (non-drilled) (permanent)	▬ med-high	▬ \$800	● 1 d	●● 2-3	U	▬ med
	Concrete pillar (permanent)	▬ med	▬ \$500- 2,000	●● 1-3 d	●● 2-3	BR, U	▬ med
	Thermopile (permanent)	▬ med-high	● \$6,700- 16,000	●● 1-4 d	● 1	U	● high
	Polar mast (permanent, long-term, campaign)	▬ med-high	▬ \$500	▬ 1 hr	● 1	BR	▬ low

							
	Shallow foundation mast (permanent)	 med-high	 \$150	 1-2 d	 1	BR	 low
	Stainless steel pin w/ mast (permanent, long-term, campaign)	 med-high	 \$130	 1 hr	 1	BR, R	 low
	5/8" all-thread (permanent, long-term, campaign)	 med-high	 \$30	 1 hr	 1	BR, R	 low
	Tech 2000 (campaign)	 low	 \$600	 < 1-2 hr	 1	BR	 low
	Monument Marker (campaign)	 med-high	 \$15-50	 <1 hr	 1	BR, R	 low
	Building / other	 med-high	 \$150-200	 <1 hr	 1	BR	 low

Install time: Estimated # of days to complete

Labor: Minimum # of people required

Substrate: BR = bedrock, U = unconsolidated, R = rooftop (parapet)

Cost: low = < \$200, med = < \$1000, high = > \$5000 -- Note that these are very rough approximations. The actual cost of a monument installation may vary depending upon site conditions and materials required.

Site (Environmental) Impact:

high : large footprint, construction disturbance potentially lasting several years

med : modest footprint, construction disturbance small, short duration

low : hardly any footprint, construction disturbance negligible

**depends upon the material the monument is set within*

***cost for monumentation only; does not include antenna mount or anything above (SCIGN mount, raydome, etc.)*

For other monumentation ideas, check out:

- http://pfostrain.ucsd.edu/gpsmon/monument_design/intro.html

Posted by: **Beth Bartel** - Wed, Feb 24, 2010 at 7:40 PM. This article has been viewed 68034 times.

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