

GPS antenna monuments and mounts supported by UNAVCO: Options and Effectiveness (poster for Fall AGU, 2008)

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Abstract

Many different monumentation types and antenna mounts have been used in UNAVCO-supported projects for campaign, semi-permanent and long-term continuous GPS sites. We summarize nine monuments and mounts currently in popular use in UNAVCO-supported projects as options to the greater scientific community. The designs range in height from 0 to 3 meters; substrates into which they are installed include soil, bedrock, and concrete; and costs range from approximately \$30 to \$15000. In many places outside the US, logistical, economical, and material restraints make installation of deep- and shallow-drilled braced monuments at best difficult and at worst impossible. Simpler single-mast or concrete monuments offer less expensive, more portable installation options.



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Monuments				Antenna Mounts	Custom monumentation and mounts
Deep drilled braced <ul style="list-style-type: none"> A 3" diameter steel pipe is a heavy configuration considered only the best option as it is capable of about 40 ton load - heavier together as the height. Must be installed in any substrate. Requires auguring and concrete installation. Requires 2" diameter hole in a permanent monument for cable and antenna. Requires 1" hole for cable. Requires 1" hole for antenna. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Concrete pillar <ul style="list-style-type: none"> Of simple design, but typically comprised of reinforced concrete and a steel cap. The steel cap is used to secure the antenna and cable to the top of the pillar. Requires suitable substrate, can be constructed around any shape monument or structure. 1" cable and antenna clearance. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Polar mast <ul style="list-style-type: none"> Heavy-duty aluminum mast bolted into bedrock. Mast about 1.5 to 2 meters tall. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	SCIGN mount <ul style="list-style-type: none"> Customized for SCIGN sites. Requires 2" diameter hole in a permanent monument for cable and antenna. Requires 1" hole for cable. Requires 1" hole for antenna. 	Things to consider When choosing a monument and mount, consider: <ul style="list-style-type: none"> Quality needed (precision needed) Field availability Time available for installation Site security Material availability (esp. international work) Site accessibility Site availability 	
Shallow drilled braced <ul style="list-style-type: none"> A 1" diameter stainless steel pipe is a heavy configuration considered only the best option as it is capable of about 10 ton load - heavier together as the height. Must be installed in any substrate. Requires auguring and concrete installation. Requires 2" diameter hole in a permanent monument for cable and antenna. Requires 1" hole for cable. Requires 1" hole for antenna. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Shallow foundation mast <ul style="list-style-type: none"> Of simple design, but typically comprised of reinforced concrete and a steel cap. The steel cap is used to secure the antenna and cable to the top of the pillar. Requires suitable substrate, can be constructed around any shape monument or structure. 1" cable and antenna clearance. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	5/8" all-thread <ul style="list-style-type: none"> Of simple design, but typically comprised of reinforced concrete and a steel cap. The steel cap is used to secure the antenna and cable to the top of the pillar. Requires suitable substrate, can be constructed around any shape monument or structure. 1" cable and antenna clearance. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	SECO 2072-series stainless steel adapter <ul style="list-style-type: none"> Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 		
Shallow braced (non-drilled) <ul style="list-style-type: none"> A 1" diameter stainless steel pipe is a heavy configuration considered only the best option as it is capable of about 10 ton load - heavier together as the height. Must be installed in any substrate. Requires auguring and concrete installation. Requires 2" diameter hole in a permanent monument for cable and antenna. Requires 1" hole for cable. Requires 1" hole for antenna. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Stainless steel mast <ul style="list-style-type: none"> Of simple design, but typically comprised of reinforced concrete and a steel cap. The steel cap is used to secure the antenna and cable to the top of the pillar. Requires suitable substrate, can be constructed around any shape monument or structure. 1" cable and antenna clearance. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Tech 2000 (for campaign use) <ul style="list-style-type: none"> A large, reinforced aluminum mast with a plate on the end that fits into a concrete drilled cavity. The mast is secured to the concrete by a steel cap that is bolted to the concrete. Requires suitable substrate, can be constructed around any shape monument or structure. 1" cable and antenna clearance. Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 	Cup and brass adapter <ul style="list-style-type: none"> Used in the High-Resolution Earthquake System (HRES), Plate Boundary Observatory (PBO), and other sites. 		

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