

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.







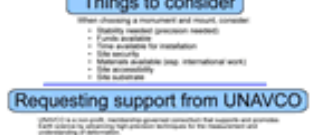





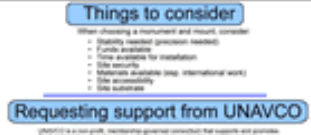



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Many different monumentation types and antenna mounts have been used in UNAVCO-supported projects for campaign, semi-permanent and long-term continuous GPS sites. We summarize nine monuments and mounts currently in popular use in UNAVCO-supported projects 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.



Monuments				Antenna Mounts		Custom monumentation and mounts	
 <p>Deep drilled braced</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock to a depth of about 60 feet. Heavier together as the hole. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Concrete pillar</p> <ul style="list-style-type: none"> Of simple design, but typically composed of reinforced concrete and a steel reinforcement bar. The steel bar is cast into the top of the pillar. Stable, durable, and easy to install. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Polar mast</p> <ul style="list-style-type: none"> Very simple design, but typically composed of reinforced concrete and a steel reinforcement bar. The steel bar is cast into the top of the pillar. Stable, durable, and easy to install. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>SCIGN mount</p> <ul style="list-style-type: none"> Lightweight and portable. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. 	 <p>SECO 2072-series stainless steel adapter</p> <ul style="list-style-type: none"> Lightweight and portable. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. 	 <p>Cup and brass adapter</p> <ul style="list-style-type: none"> Lightweight and portable. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. 	 <p>Custom monumentation and mounts</p> <ul style="list-style-type: none"> Lightweight and portable. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. 	
 <p>Shallow drilled braced</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock to a depth of about 10 feet. Heavier together as the hole. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Shallow foundation mast</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock to a depth of about 10 feet. Heavier together as the hole. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>5/8" all-thread</p> <ul style="list-style-type: none"> A 5/8" diameter steel pipe in a 6" hole configuration embedded into the bedrock to a depth of about 10 feet. Heavier together as the hole. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Stainless steel mast</p> <ul style="list-style-type: none"> A 3" diameter stainless steel pipe in a 6" hole configuration embedded into the bedrock to a depth of about 10 feet. Heavier together as the hole. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Tech 2000 (for campaign use)</p> <ul style="list-style-type: none"> A large, reinforced aluminum mast with a steel or stainless steel base. The base is cast into the ground. Very stable. Very expensive and time-consuming. Requires a large crew and specialized equipment. Requires a large amount of concrete. Requires a large amount of steel. Requires a large amount of time. <p>Used in the following sites: Plateau Station, Hohenpeißenberg, Wettzell, and others.</p>	 <p>Things to consider</p> <ul style="list-style-type: none"> When choosing a monument and mount, consider: <ul style="list-style-type: none"> Stability needed (precision needed) Portability Time available for installation Site security Material availability (esp. international work) Site accessibility Site availability 	 <p>Requesting support from UNAVCO</p> <p>UNAVCO can provide assistance with design, engineering, and construction of monuments and mounts. For more information, contact support@unavco.org.</p>	

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