

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 up to depths of about 60 feet. Member together at the top. 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 at the following sites: Plateau Station, Hohenstein Station, and others.</p>	<p>Concrete pillar</p> <ul style="list-style-type: none"> 3" diameter steel pipe, fast quickly, consisting of reinforced concrete and a steel cap. The steel cap and pipe are attached to the top of 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 at the following sites: Plateau Station, Hohenstein Station, and others.</p>	<p>Polar mast</p> <ul style="list-style-type: none"> 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 at the following sites: Plateau Station, Hohenstein Station, and others.</p>	<p>SCIGN mount</p> <ul style="list-style-type: none"> 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>SECO 2072-series stainless steel adapter</p> <ul style="list-style-type: none"> 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>Cup and brass adapter</p> <ul style="list-style-type: none"> 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>Shallow drilled braced</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock up to depths of about 60 feet. Member together at the top. 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>Shallow foundation mast</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock up to depths of about 60 feet. Member together at the top. 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>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 up to depths of about 60 feet. Member together at the top. 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>Custom monumentation and mounts</p> <p>UNAVCO can provide support with design, engineering, and construction of custom monumentation and mounts. We have a wide range of options to meet your needs. Contact us for more information.</p>				
<p>Shallow braced (non-drilled)</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock up to depths of about 60 feet. Member together at the top. 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>Stainless steel mast</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock up to depths of about 60 feet. Member together at the top. 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>Tech 2000 (for campaign use)</p> <ul style="list-style-type: none"> A 3" diameter steel pipe in a 6" hole configuration embedded into the bedrock up to depths of about 60 feet. Member together at the top. 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>Things to consider</p> <ul style="list-style-type: none"> When choosing a monument and mount, consider: <ul style="list-style-type: none"> Stability (required precision needed) Portability Time available for installation Site availability Material availability (esp. international work) Site accessibility Site security 				
<p>Requesting support from UNAVCO</p> <p>UNAVCO can provide support with design, engineering, and construction of custom monumentation and mounts. We have a wide range of options to meet your needs. Contact us for more information.</p> <p>To request support from UNAVCO, fill out a support request form at http://www.unavco.org. For questions, contact support@unavco.org.</p>							

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