

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

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GPS antenna monuments and mounts supported by UNAVCO: Options and Effectiveness

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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			
Deep drilled braced <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Concrete pillar <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Polar mast <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Antenna Mounts <ul style="list-style-type: none">• SCIGN mount• SECO 2072-series stainless steel adapter• Cup and brass adapter
Shallow drilled braced <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Shallow foundation mast <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	5/8" all-thread <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Custom monumentation and mounts <ul style="list-style-type: none">• Custom monumentation and mounts
Shallow braced (non-drilled) <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Stainless steel mast <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Tech 2000 (for campaign use) <ul style="list-style-type: none">• 4-6" diameter steel pipe in a deep configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.Pros:<ul style="list-style-type: none">• Excellent stability• Permanent• Requires equipment and materials intensive• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanent• Requires 10-15 people to install in a permanentCons:<ul style="list-style-type: none">• Labor intensive• High costUsed in the Pacific Northwest, Alaska, and the Caribbean.	Things to consider <ul style="list-style-type: none">• Things to consider

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