

# 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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| Monuments   |  |   |  | Antenna Mounts  |  |
|---|--|---|--|---|--|
| <b>Deep drilled braced</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).          | <b>Concrete pillar</b><br>A 6" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).         | <b>Polar mast</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).                   | <b>SCIGN mount</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). | <b>SECO 2072-series stainless steel adapter</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). | <b>Cup and brass adapter</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). |
| <b>Shallow drilled braced</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).       | <b>Shallow foundation mast</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). | <b>5/8" all-thread</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).              | <b>Custom monumentation and mounts</b><br>UNAVCO can provide custom design, construction, and installation of monuments and mounts. Contact us for more information.   |   |  |
| <b>Shallow braced (non-drilled)</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). | <b>Stainless steel mast</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada).    | <b>Tech 2000 (for campaign use)</b><br>A 3" diameter steel pipe is a major configuration connected into the bedrock up to depths of about 40 feet. Mounted together at the top.<br>Pros:<br>- Excellent stability<br>- Permanent in any substrate<br>Cons:<br>- Requires equipment and materials intensive<br>- Requires drilling to install in a permanent<br>- Requires high quality<br>Used throughout the Pacific Basin (Hawaii, Alaska, USGS, and Canada). | <b>Things to consider</b><br>When choosing a monument and mount, consider:<br>- Stability (precision needed)<br>- Portability<br>- Ease of installation<br>- Maintenance (long-term work)<br>- Site accessibility<br>- Site suitability  |   |  |
| <b>Requesting support from UNAVCO</b><br>UNAVCO can provide assistance with design, construction, and installation of monuments and mounts. Contact us for more information.  |  |   |  |   |  |

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