








# UNAVCO Resources: Communications Options

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UNAVCO has worked with and supports the following communications options for GPS and meteorological data transmission. Click on the photograph of the hardware for more information, including specifications, how-tos, and configuration examples. UNAVCO will work with individual groups to help determine the most effective communications option for each remote site or network.

	<p style="text-align: center;"><a href="#"><u>Cellular Modems</u></a></p>	<p>Cellular modems work anywhere there is adequate cell service, and do not require line-of-sight to another modem. Cost-effective hardware and ongoing cellular service. Cellular modems are currently used in the Boundary Observatory (Western US), BARGEN (CA, NV, UT), and N. Peninsula (Costa Rica) networks.</p>
	<p style="text-align: center;"><a href="#"><u>Radio Modems</u></a></p>	<p>Radio modems require line-of-sight between modems, either directly or via a repeater. A master radio modem connected to a computer can be used remotely to a download computer. Radio modems can support either serial or Ethernet protocols, depending on make and model. There is no ongoing service fee as there is with many of the other communication options, making radio modems ideal for networks or sub-networks with significant line-of-sight visibility. Links can be effective even through dense foliage, depending on foliage, atmospheric conditions, and topography. Either serial or Ethernet radio modems are currently in use in the Boundary Observatory (Western US), Negra (Galapagos), BARGEN (CA), and Peatland Bogs (MN) networks. Sites include CHPI (Brazil), TANZ (Tanzania), and BOGT (Colombia).</p>
	<p style="text-align: center;"><a href="#"><u>Satellite Communications</u></a></p>	<p>Satellite communications options, including Iridium modems, can work anywhere on the globe; no line-of-sight between modems is required. Because of high ongoing costs, satellite options are generally chosen only when cellular or internet availability is not possible.</p>

		<p>satellite communications allow data to be transferred from remote sites in sparsely populated or uninhabited areas. VSAT modems are currently used in the Plate Boundary Observatory (Western US) and Puerto Rico networks; Iridium modems are currently used in the POLENET network (Antarctica and Greenland).</p>
	<p><u><a href="#">Wireless</a></u></p>	<p>Cisco Aironet Wireless Bridge.</p>
	<p><u><a href="#">Analog (Dial-up) Modems</a></u></p>	<p>Analog (dial-up) modems work where a phone line is available. These modems are still useful for sites with direct phone lines to master download sites. Because they are generally faster options, analog modems are decreasingly used but still transfer data at many sites established in the past. Analog modems are currently used in the BARGEN network (CA, NV, UT).</p>
	<p><u><a href="#">Short-haul Modems</a></u></p>	
	<p><u><a href="#">Serial to Ethernet</a></u></p>	<p>Serial to ethernet devices are typically used to interface older, serial-based receivers (e.g., Trimble 4000) with an ethernet network. They are also used to connect serial devices directly to the internet or to tie into an existing network. Serial to ethernet devices are currently used in the BARGEN (CA, NV, UT) and Bogs (MN) networks and at IGS stations in India.</p>