

SeaSonde® Pre-Install Site Preparations

February 13, 2009

When planning your SeaSonde installation, remember that not all locations are the same and there is not a “one size fits all” solution. Differences in available power, shelter and human traffic will affect the time and cost involved. Carefully consider the following things in your installation budgets:

Shelter

The SeaSonde electronics are sensitive RF devices that must be isolated against sea air and moisture. If a climate-controlled building already exists in close proximity to the antenna locations and permission to locate the electronics in the structure can be obtained, then you will only need a standard width 19” electronics rack to house the two chassis and the SeaSonde computer. If no suitable building already exists, a prefabricated shelter can be purchased and installed just for the SeaSonde. Consideration should be made for whether the shelter will be just large enough for the electronics or larger to protect one or more operators during inclement weather.



If a pre-fab shelter is installed, it should be:

- Stabilized to withstand strong winds & storms
- Set on a suitable support foundation. Concrete columns into ground would provide support as well as allow for air circulation.
- Appropriate secured against vandalism such as fencing, locks etc.

Whenever the SeaSonde chassis are installed in a closed air system, it is important to employ a cooling system to dissipate the heat generated. The cooling system must be able to dissipate heat at the rate of 500 W as well as any additional heating from the environment like incident solar radiation or heat exchange from warm outside air temperatures. Air conditioners and heat exchangers have both been employed for SeaSonde electronics. For a shelter 2m x 2m, an air conditioner rated at least 7000 BTU/hour is required. If the shelter is larger than 2m x 2m, then a higher rated air

conditioner is necessary. The air-conditioner should also be dehumidifying. It should also be able to automatically restart after any power failure.

Power

A standard SeaSonde requires 500-600 Watts of 120 or 220 V, 50-60Hz AC power. Our 24 volt DC powered system requires 300-400 W. Additional devices (air conditioner, data modems, UPS, etc.) will require additional power. If no power is available at your chosen location, you may be able to pay the local utility service to run power to your location or you may need to consider employing off-grid power like solar, wind or propane with our 24 volt DC powered system.

Whether the power available at your location is free of spikes and brownouts or not, an Uninterruptible Power Supply (UPS) is always recommended. A UPS can both protect your SeaSonde electronics from harmful power being supplied and prevent system downtime during outages. Choose a UPS with of at least 1500 VA (1425 Watts) capacity. This will give you enough power budget for the receiver, transmitter and computer as well as things like communications devices, but not an air conditioner or anything with a large draw. An expandable, rack mountable APC SmartUPS is a good choice.

Communications

An internet data connection is recommended for SeaSonde installations as it is the easiest and fastest method for remote access. When choosing an Internet Service Provider (ISP), it is important to make sure the connection has the following characteristics:

- The upload data rate should be ≥ 256 kbps.
- Incoming access must be available for one or both of these services: SSH (port 22), Timbuktu Pro (port 407)
- One public IP address must be available to connect to the SeaSonde computer

For their internet connection method, SeaSonde customers have utilized existing Ethernet Local Area Networks (LANs) in buildings, Digital Subscriber Lines (DSL), Cable Modems, Satellite Broadband services and Cell Data Modems. All of these types of service are provided by different companies within each region. Two providers of Satellite Broadband services in the U.S. are HughesNet (<http://www.hughesnet.com>) and WildBlue (<http://www.wildblue.com>). If no ISP is available at your location, telephone dial-up modems can still be used, but will provide limited access and control of the SeaSonde.

Cable Routing

For systems operating at 25 MHz and higher, you will need to route three RG-58 and one RG-8 cable to your antenna. For systems operating at 13 MHz and lower, you will need to route three RG-58 antennas to you receive antenna and one RG-8 to your

transmit antenna. GPS SHARES enabled SeaSondes will also have an RG-6 cable that needs to be routed to a small GPS receive antenna.

These coaxial antenna cables are rugged and can withstand large temperature variations as well as water and salt exposure. Cables do need protection, however, from damage by animals such as rodent gnawing or heavy animals crushing them as well as human activities such as lawn mowing or vandalism. Cables can also be a tripping hazard if strung out in a public place. Antenna cables should, therefore, be protected by routing through 3.5 cm diameter PVC pipe (buried, if possible.)

Antenna Mounting

For systems 25 MHz and higher, you need to mount only one antenna. For systems operating at 13 MHz and lower, you will need to mount two antennas: one transmit and one receive antenna. Securing the antennas will both protect the hardware and optimize data quality. There are two popular mounting techniques:

- A small base to keep the very bottom of the antenna from slipping horizontally with guy ropes attached higher
- no guy ropes but a base bolted to a concrete pier. See the Drawings section below for example concrete pier mounting schematics.

For added security, some clients have chosen to enclose the antennas in fencing. Make sure the fencing does not extend above the antenna, and the fencing is not electrified.

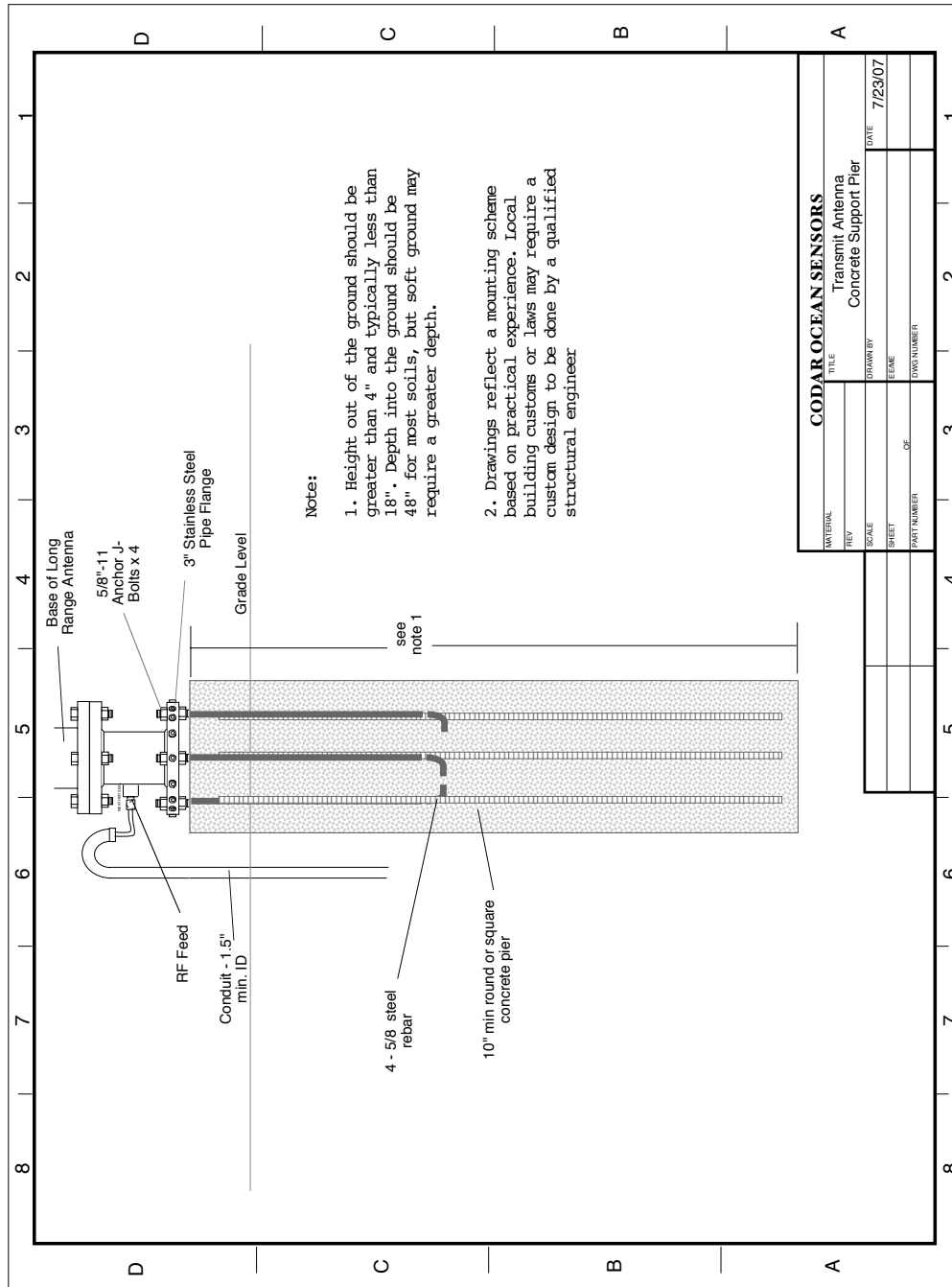
Antenna mounts for systems with separate transmit and receive antennas should be spaced a minimum of one RADAR wavelength from each other and other vertical metal structures or trees of similar height:

Frequency (MHz)	Separation (meters)
5	72
12	30
25	14
42	9

If trees of similar height or larger than the antennas are within the recommended separation then they should be cleared, if possible.

Appendix A: Drawings

Long Range Transmit Antenna Concrete Pier (constructed locally):



Long Range Transmit Antenna Base Plate (shipped with antenna):

