

CORS GPS Receiver Bid Specifications

The specification below outlines the requirements for a dual frequency (L1/L2, L2C), network compatible GPS receiver for CORS reference station purposes.

Regulations (that must be displayed)

- United States of America, the receiver must have Class B Part 15 FCC certification
- Canada certified by the Canadian Federal Communication Commission (FCC)
- European Certification CE Mark approved

Physical Requirements of the GPS Receiver

Size of GPS Receiver

- The maximum dimensions, which must be no greater than 9"W x 2.6"H x 5.5"D (22.8cmW x 6.5cmH x 14cmD)

Weight

- Unit Weight must be no more than 3.5lb (1.61kg).

Environmental Requirements of the GPS Receiver

Environmental Requirements

- The GPS antenna and receiver must be rugged and suitable for use in field environments that may be hot, cold, wet or dusty.
- The GPS receiver must meet waterproof specification IPX5
- The GPS receiver electronics must be fully sealed from sand, dust and moisture.
- The GPS must be shockproof for a drop onto a hard surface from a height of 2m (6.56ft) per mil spec MIL-810-F table 516.5-I
- The GPS receiver: must be able to operate to measurement specification in temperatures between -40° to +65°C (-40°F to +149°F)
- The GPS receiver must be not less than 100% condensing humidity proof.
- The GPS receiver must be able to be transported or stored in the following temperature range without sustaining damage to the equipment -40° to +75°C (-40°F to 167°F)

Operating System

- The GPS receiver must have an internal Linux operating system
- Sleep Mode feature allows configuration of an automatic power-saving state when there is no active data-logging session.
- Failsafe Wakeup Alarm assures scheduled periods of communication and receiver control when sleep mode is activated.

Power requirements of the GPS Receiver

Power Requirements

- The GPS receiver must have a nominal voltage range of 11VDC to 28.1 VDC
- The GPS receiver must have at two DC external power inputs
- The GPS receiver must include over-voltage protection on all power inputs.
- The GPS receiver must include reverse polarity protection.
- The GPS receiver must allow for power inputs of up to 28 V and greater without sustaining damage.
- The GPS receiver must have nominal power consumption of no more than 4.0W @ 12 V while powering the dual frequency GPS antenna.

Intelligent Power Management

- The system must turn on automatically when connected to a DC source that is produced by the manufacturer's AC power supply.
- Must power off automatically at a nominal 11V threshold and power on at a nominal 12V threshold (to support operation with charged lead acid power systems).
- The system must have two power input ports externally to support a variety of external power sources
- The system must automatically switch between power sources. There must not be a cycle slip or a new logging file created.
- After a power failure the system must restart with the same settings and configurations that were used before the power failure, for operational recovery without need for user intervention.
- When a power source is removed the receiver must automatically switch to the next best power source available without effect on the data being stored.
- Sleep Mode feature allows configuration of an automatic power-saving state when there is no active data-logging session.
- Failsafe Wakeup Alarm assures scheduled periods of communication and receiver control when sleep mode is activated.

Power Batteries - External

- The manufacturer must be able to supply a cable that allows for the system to be used from a battery for extended operation.

Memory Requirements of the GPS Receiver

Internal Data Storage

- The GPS receiver must have internal 150 MB data storage, fully protected from sand, dust, moisture and 100% non-condensing humidity proof.
- The internal memory must not be removable.
- The internal memory must be able to log L1/L2 data continuously for 173 days: 6Svs and storing at 15sec intervals.

- Data must be stored in compact flash memory, so that no battery backup is required for the data storage memory.
- Download software for an IBM compatible PC running Microsoft Windows 95/98/XP/Me/NT4/2000/XP or above must be provided.
- The receiver must support multiple, simultaneous data logging sessions
- The receiver shall be able to collect Meteorological data from a MET sensor while logging static data

Interfaces

- External data storage must be possible using an Ethernet connection and Windows XP/Me/2000/NT based data logging software
- The GPS receiver must have four independently configurable RS232 ports for serial data input or output.
- The GPS receiver must have an internal LAN interface
- The GPS receiver must support an RJ45 connector with links to 10BaseT/100BaseT networks without the use of external terminal servers
- The GPS receiver must provide PPP server capability through a serial port to enable remote operations.
- All network functions must be performed through a single IP address – including web GUI access, FTP file transfer and RT17 streaming.
- Network connection must allow multiple security options for varying levels of user access
- The GPS receiver must support streaming of GPS observables, RTCM, or CMR data over TCP/IP or UDP links.
- The GPS receiver must support configuration using a web browser over HTTP links.
- The GPS receiver must support automated configuration using a command set designed to operate using HTTP links.
- The GPS receiver must allow download of logged data files using either FTP or HTTP.
- The GPS receiver must have an external frequency input
- The GPS receiver must have two external ports available for power input.
- The GPS receiver must have four ports capable of handling baud rates up to 115,200.
- The GPS receiver must have flow control on four serial ports
- The GPS receiver must be capable of 1PPS output with an accuracy of 1μsec.
- The GPS receiver must use an N connector for the antenna

Display

- The system must have front panel indicators for status of:
 - External frequency input
 - Ethernet
 - Satellite reception

- Logging
- Primary and secondary power inputs

Keyboard

- The GPS receiver must have only one key.

GPS Signal

Tracking

- The GPS receiver signal tracking must support, in RINEX notation: L1, C1, P1, D1, L2, P2, D2*
- On L1: C/A Code, Carrier Phase and Doppler
- On L2: P Code (derived under encryption) or, when available, L2C, Carrier Phase
*Note Doppler on L2 can be constructed from the Raw data
- The GPS receiver, when Anti-Spoofing (A/S) (P-code) is activated, should measure L1 C/A pseudo ranges, L2 range measurements and the full cycle L1 and L2 carrier phases
- The GPS receiver must provide unfiltered and unsmoothed pseudorange data for low noise, low multipath error.
- The GPS receiver performance must not be lower during times when A/S is activated, compared to during times when A/S is not activated.
- When Anti-Spoofing (A/S) (P-code encryption) is activated, the receiver must measure L1 C/A pseudo ranges, P2 range measurements on L2, and the full cycle L1 and L2 carrier phases.
- When L2C signals are available, the receiver must be capable of tracking and logging L2C range data as the L2 pseudorange.
- The GPS receiver requires multipath mitigation techniques.
- The GPS receiver must report Signal-to-Noise Ratio (SNR) values for L1 and L2 GPS signals for all satellites, in decibel-Hz (dB-Hz) referenced to a 1 Hz bandwidth.
- SNR values must be reported in the same units for L1 and L2
- The GPS receiver must be able to track and compute corrections available from WAAS geostationary satellites.
- The GPS receiver must use multi-bit aided analog to digital (A/D) sampling.
- The GPS receiver must have technology that enhances low power satellite signal acquisition.
- The GPS receiver satellite acquisition technology must increase the GPS receiver's ability to maintain a firm lock on signals once acquired.
- The GPS receiver satellite acquisition technology must provide improved tracking in areas of high radio interference such as under power lines, around airports, near radio-intensive construction sites.

Channels

- The GPS receiver must be able to track L1 and L2 on 12 satellites simultaneously
- The GPS receiver must have a total of 24 channels

RF Section

- The receiver must use SAW filter technology.

WAAS / EGNOS / MSAS tracking

- The GPS receiver must be capable of tracking a WAAS / EGNOS / MSAS satellite for real time free of cost differential positioning and base station location.
- The GPS receiver must not require any additional hardware or firmware options nor the use of an additional antenna to track and use WAAS / EGNOS / MSAS satellites.

Operational requirements

Control

- The GPS receiver must be capable of logging data at operator selected intervals of 0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 30, 60, 300, 600 seconds.
- The system must be controlled by an HTML web browser; Internet Explorer v 5.0 or newer and Netscape v 4.78 or newer
- Multiple security options for varying levels of user access.
- Allows the storage of all operating parameters to a file thereby facilitating the transfer of identical operating parameters across a group of receivers being installed within a network.

Broadcast/Receive Options

- The GPS receiver must have RTCM Output Version 2.1, 2.2 and 2.3, 3.0 available as a standard.
- The Receiver must support CMR output and RTCM simultaneously via separate ports.