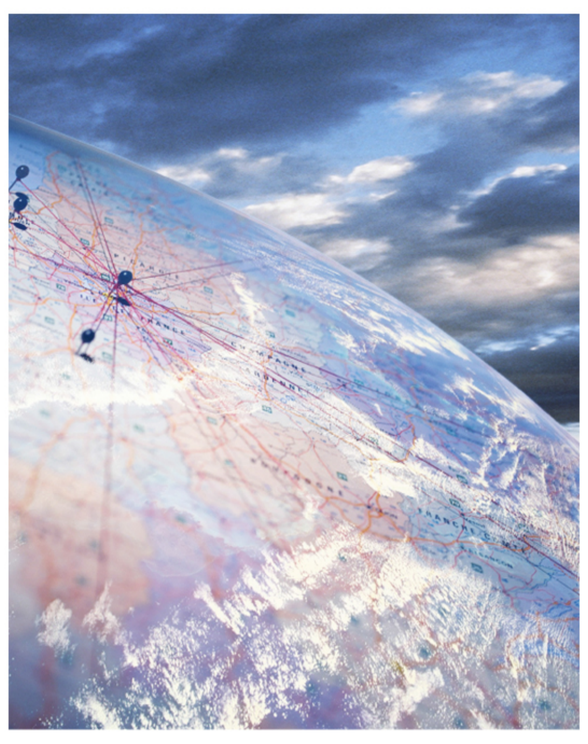
Core Scientific Systems Private Ltd.

IONOSPHERIC / ATMOSPHERIC MONITORING RECEIVER WITH CALIBRATOR

(IONMGPS-001-04)

- IONMGPS offers all GPS data (L_1 and L_2 pseudorange, phase, amplitude etc. output at 0-50 Hz)
- IONMGPS offers a patented internal calibrator for measuring absolute L_1 and L_2 offset, to 0.1 mm
- IONMGPS is a digital software receiver providing total flexibility and upgradeability



INTERNAL CALIBRATION

IONMGPS has an internal calibrator for measuring internal receiver code and phase delays. Analog receiver components apply delays to the L_1 and L_2 signals, which present a receiver bias to users measuring ionospheric TEC and tropospheric water vapor. The phase difference and differential code delay between L_1 and L_2 can vary with time, temperature, and other factors affecting the precision of ionospheric measurements and thereby atmospheric moisture content measurements. To mitigate these effects, the CRS GPS receiver has a built-in calibrator that can be used for:

1. Calibration of absolute pseudorange code L_1 and L_2 offset, for accurate absolute TEC and tropospheric monitoring
2. Quantifying drift of both phase and code for accurate differential TEC and tropospheric water content measurement.

SPECIALIZED SCIENTIFIC RECEIVER

Precise atmospheric and ionospheric monitoring requires a special receiver architecture and features not available in conventional GPS navigation receivers. These include precise monitoring of differential phase between L_1 and L_2, unbiased measurement of pseudorange, as well as robust and unbiased tracking of phase under scintillating and variable ionospheric or propagation conditions. The CRS GPS receiver has been designed from the ground up to be the most advanced, accurate,
and easy to use scientific GPS monitoring receiver available.

Applications

- Ionospheric Monitoring
- Atmospheric Monitoring
- GPS algorithm and signal research

Technical Data

- Tracks L_1 and L_2 from all satellites in view
- USB 2.0 output and control.
- CRS GPS Data Analyzer software provides communication with a PC
- Data stored as binary and/ or ASCII (Rinex).
- Size: 13” x 13” x 5.25”
- Weight: 17 lbs.
- Signals tracked: L_1 C/A & P, L_2 P

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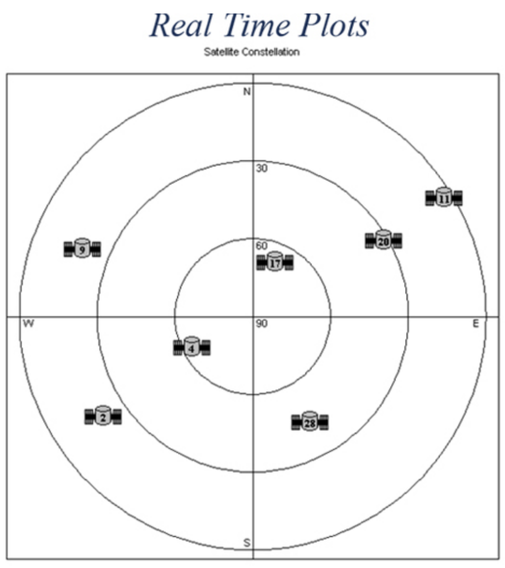

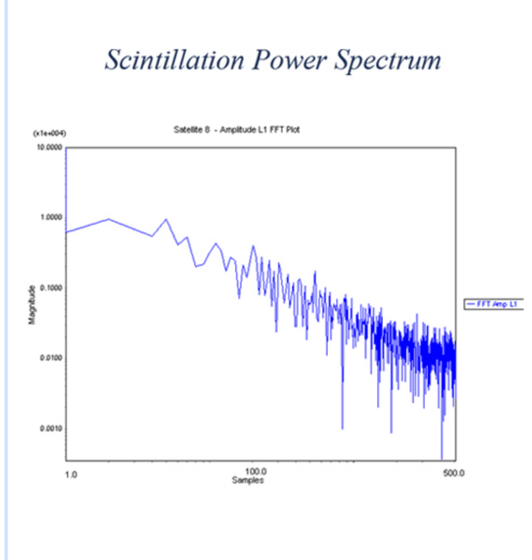

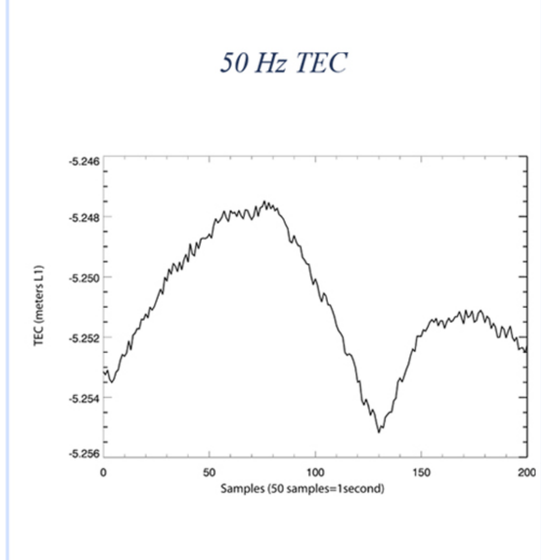

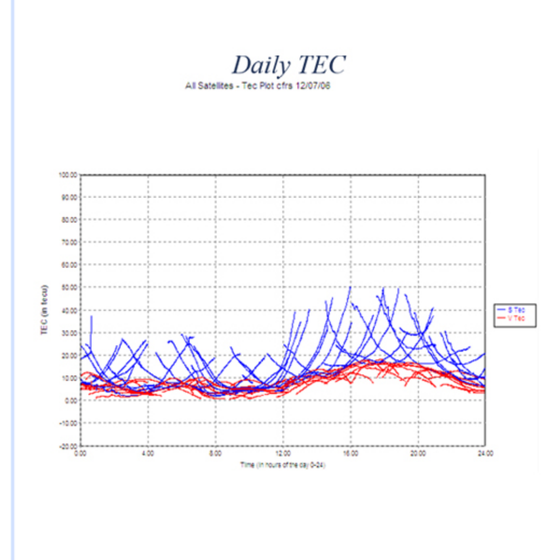

IONMGPS DOES MORE ,SO YOU DO MORE

- Real-time visualization tools with CRS GPS Data Analyzer software for plotting all GPS parameters, including phase, amplitude, pseudorange, TEC, and their spectra (See adjacent examples).
- The only GPS receiver to output all receiver data at user selectable 0-50 Hz including L_1 and L_2 Amplitude, phase and pseudorange, allowing for scintillation and TEC calculations at 50 Hz.
- Ionospheric science derivables are plotted in real-time and output directly. TEC, scintillations S4 and σ_φ.
- The software-based digital receiver utilizes the most modern electronics and processing capabilities. It provides a flexible, userdefinable system.
- Built-in patented calibrator ensures receiver calibration enabling precise estimation of differential phase and TEC. (US Patent 722131 B2, Issued May 22, 2007)
- Interested in ionospheric scintillation data at 50 Hz, but don't want to sort through Gbytes of data? IONMGPS has a S4 triggered burst mode for 50 Hz data recording during periods above user specified settings.

TECHNICAL FEATURES

- Prevents obsolescence against future upgrades: in hardware; in satellite codes (M-code, L_2C); systems (Galileo); different architecture, etc.
- The CRS GPS Data Analyzer allows scheduling, controlling, data analysis via plotting, and logging.
- Uses architecture where L_1 and L_2 are treated independently. Users can optimize the performance for their needs.
- Provides scheduling, real-time monitoring, and a user-friendly GPS Data Analyzer software for operation, control, and data analysis.
- User configurable receiver parameters. The bandwidths of the tracking loops (filters) can be set by the users in order to get the best performance for every situation. The tracking loop bandwidths can be varied from a fraction a Hz to 100 Hz. Typically, the noise power bandwidth lies between 25 Hz to a hundred Hz and the phase noise bandwidth is approximately 15 Hz. Users can vary these bandwidths to optimize for S/N conditions, loop stability, and scintillation monitoring.
- Typical user specified parameters include: start time, stop time, file name, data, time (UTC), lat, long, PDOP, sat PRN, PR, EL, AZ, TEC, CNO, and carrier phase.

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