GPS OPTION

Overview

A Gas-Rover™ equipped with GPS attaches longitude and latitude coordinates to a surveyor's path and to any leaks uncovered during the survey. Collected data can be integrated into a GIS asset map or overlaid on other geocoded maps. GPS labeled surveys can be used as records for audits and—since they are specific to time and place—accurate modeling and trending.

Recording of GPS coordinates may be selected during the detector's warm-up sequence. If the GPS option is selected, the Gas-Rover's database stores GPS coordinates in degrees up to five decimal places. At a latitude of approximately 42^{o}, 10^{-5} degrees corresponds to 1.1m (3.5 ft) latitude and 0.8m (2.5 ft) longitude.

The GPS option for the *Gas-Rover* comprises GPS firmware in the detector, an active antenna on a probe, and Data-Link™, a software package for downloading GPS and survey data in various formats.

The hardware incorporated in the GPS enabled Gas-Rover was designed for maximum sensitivity at power levels compatible with the rest the detector. It provides frequency stability, sensitivity at low level signals (down to -159 dBm) and fast time to first fix (TTFF).

Probes

The following probes are available with an active GPS antenna:

- Bar Hole Probe(BP-936)
- Surface Probe with rubber cone (SP-836)
- Drag Probe(SP-936)

In all cases, the magnetic antenna is attached to the probe and electronically connected to the detector. The antenna operates at 3.3V and 4-12 ma.

Technical Specifications

Receiver Architecture	20 channels 200,000 effective correlations Tracking up to 20 satellites Velocity up to 500 m/s, acceleration up to 4G		
Acquisition Performance at -125 dBm		*Typical*	*90%*
	Hot Start	0.5 s	< 1 s
	Warm Start	31 s	36 s
	Cold Start	33 s	38 s
SBAS	WAAS differential corrections		
Software Interface	SIRF Binary		
Accuracy [1]	Real time: 2-5 m Circular probability error: less than 2.5 meters		
Post Processed	< 0.5 m		
Antenna	Patch antenna, magnetic base Active *dc* current, 8.5 +/- 4.5 mA 45x40x13 mm (7x7 cm ground plane) Weight, 43g		

[1]Assumes data is collected using a vertical mounting of the antenna, at least four satellites are in view, reasonable multipath conditions, no interface from buildings or dense foliage and a HDOP of 99.

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DATA-LINK™ AND THE GPS OPTION

Bascom-Turner's DATA-LINK™ software can be used to download GPS and readings data from the Gas-Rover™. Survey data can be exported or mapped in the following formats: TXT files, Google Earth, XML files for export and map in MapFrame, and GMX files for export and map on a DeLorme handheld GPS unit. Gas-Rover users select data for download or mapping based on either the ID number of the machine or the street address where the survey was conducted.

Text Files

GPS and leak data can be exported by DATA-LINK as an ASCII TXT file to be imported into a company's GIS asset map or spreadsheets. The data includes: latitude, longitude, GPS accuracy, PPM reading, operation mode, time, date, and username.

Google Earth Maps

DATA-LINK can overlay leak survey data onto a Google Earth map. These aerial maps display the leak surveyor's path in blue with leaks detected--annotated with the PPM level of natural gas—in red. These maps can be saved as JPG files for printing or archiving.



Survey, with artificial leaks, outside of Bascom-Turner's factory in Norwood, MA.

MapFrame Maps

DATA-LINK can export leak survey data as an XML file for overlay on a MapFrame map. The XML file is imported by MapFrame's FieldSmart Plot, an on-demand server process that creates a MapFrame Binary File (MFB). The MFB is then downloaded to a local computer for plotting by MapFrame's FSViewer. The survey path is indicated on the FSViewer's map as a series of blue dots with detected leaks highlighted in red.

DeLorme Maps

DATA-LINK can export survey data as a GPX file for overlay on a DeLorme PN series GPS unit for leak location. The leak data is displayed on the GPS unit as a red pin with PPM leak levels next to each leak's location. Repair crews and service personnel can relocate the leak by walking towards the leak displayed on the handheld GPS until the leak and the user's location converge.