

## *Leak detection in Natural Gas Pipelines*

Natural gas pipeline owners require improved routine monitoring of pipelines for safety, economic and regulatory reasons. Leaking natural gas can cause explosions leading to loss of life and property. Loss of product through undetected leaks dramatically reduces a pipeline operator's profitability.

Traditional ground-based leak detection with hand-held or vehicle mounted FID detectors is slow and labour - and maintenance - intensive. IR detectors have been used for both airborne and vehicle mounted surveys, but with limited success because of cross interference from other atmospheric gases.

Boreal Laser's GasFinder CH<sub>4</sub> detector enables both airborne and ground based pipeline monitoring with the same analyzer. With over 10 years of experience, and thousands of kilometers of pipeline surveyed, Boreal's GasFinder has detected many pipeline leaks that would not otherwise have been detected. Recently, the robust external probe, proven in the airborne system, has been adapted for ground based measurements on a truck, car.

Unlike other optical methods which can be confused by other gases present in air, the single line laser spectroscopy technology in the GasFinderFC responds only to methane.

### One analyzer, two probe options:

1. Airborne probe for helicopter surveys
2. Vehicle probe for truck/car/quad surveys

## BENEFITS

- Methane specific
- No interferences & no false alarms
- High resolution – down to 0.2 ppm CH<sub>4</sub>
- Wide measurement range
- Fast response time – as low as 0.33 seconds
- Survey vehicle can fly/drive at normal speed
- Self-calibrating—no calibration needed
- Direct measurement – no sample line
- Robust, solid state instrument
- No need for instrument operator
- Easy installation and removal
- Optional GPS



Above: GasFinderFC CH<sub>4</sub> analyzer

Left: Probe mounted under aircraft. Foam shroud minimises dust and debris entering the cell, but allows free passage of air.

## How the Methane leak GasFinder works

The heart of the system is a GasFinderFC CH<sub>4</sub> gas analyzer (see schematic below). The GasFinderFC houses a laser diode, drive electronics, and micro-computer subsystems. A fibre-optic cable carries the laser light to an external measurement probe. The laser light makes multiple passes through this probe and is focused on a photo-detector. The resulting photo current is returned to the GasFinderFC control unit via coaxial cable for analysis. The airborne probe employs a robust mechanical design with simple, stable optical components. A foam shroud minimises dust and debris entering the path, but allows free passage of ambient air into the measurement zone. The vehicle probe employs the same basic design but is simpler and shorter. Both probes have a sensitivity of 0.2 ppm and a range of 0 to 200 ppm. The airborne probe takes 3 readings per second. The vehicle probe takes readings once per second.

A portion of the laser beam is passed through a stable built-in reference cell inside the GasFinderFC to provide a continuous calibration update. Real time readings are provided on a local display unit and transferred via serial interface to a data logging PC. The serial signal includes comprehensive system diagnostics.

A GPS system provides spatial coordinates to the data-logging PC, which enables CH<sub>4</sub> data to be mapped along the survey route.



**Ambient probe for vehicle mounted leak detection – shown with dust cover and cable shrouds removed**

## Specifications

### GasFinderFC

Weight	5.2 kg
Dimensions (L x W x H)	29 x 20 x 15 cm
Power Requirements	2A @ 12 Vdc
Ambient Temperature	-20 °C to +40 °C

### External Airborne Probe

Weight	14.1 kg
Dimensions (L x W x H)	130 x 29 x 20 cm
Resolution	0.5 ppm (CH <sub>4</sub> )
Ambient Temperature	-20 °C to +40 °C
Range	0.5 to 600 ppm (CH <sub>4</sub> )
Alarm settings	Default 10 ppm
Sampling rate	3 readings per second
Recommended flying speed	60 – 90 knots
Recommended altitude	100 – 150 feet

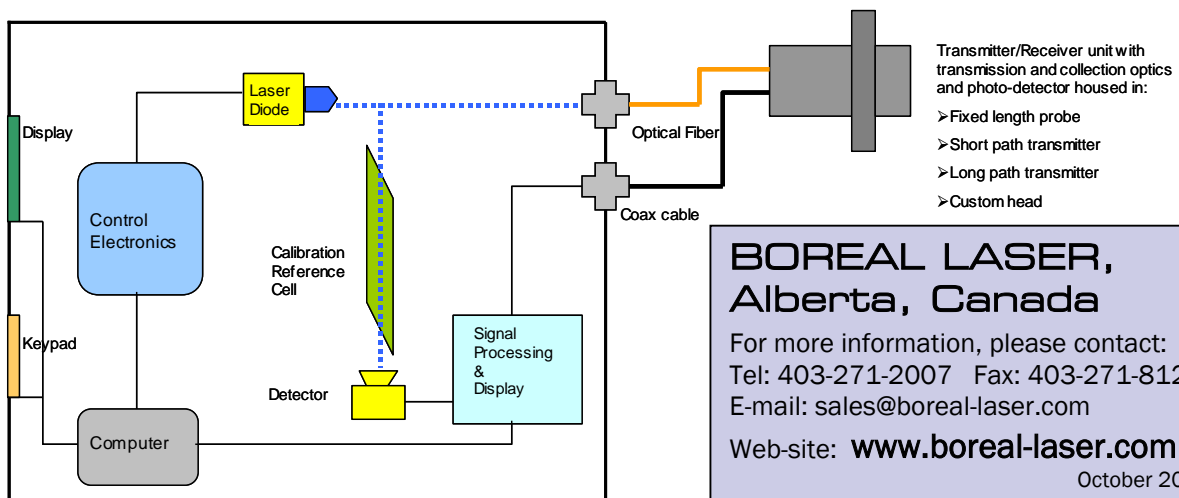
The system has been installed on Bell 206B, 206L, AS355, R44, M18 and Schweizer helicopters

### External Vehicle Probe

Weight	6.5 kg
Dimensions (L x dia)	112 x 18
Ambient Temperature	-20 °C to +40 °C
Resolution	0.2 ppm (CH <sub>4</sub> )
Range	0.2 to 200 ppm (CH <sub>4</sub> )
Sampling rate	1 reading per second
Recommended driving speed	30 to 80 km/hr

## Accessories

GPS receiver	Display Unit with Alarm
Rugged laptop	28Vdc to 12Vdc Power Converter
Cables	



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October 2006