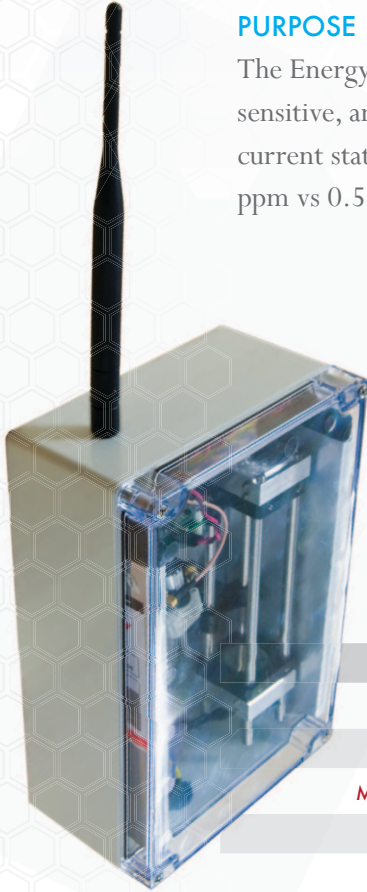




# HIGH-SENSITIVITY, FAST-RESPONSE CARBON DIOXIDE POINT SENSOR

## PURPOSE

The Energy Dynamics Laboratory (EDL) has developed a field-deployable, compact, highly sensitive, and battery-operated CO<sub>2</sub> sensor for atmospheric monitoring. It outperforms the current state-of-the-art instrument (Vaisala Field Check Adapter) in both sensitivity (160 ppm vs 0.5 ppm) and measurement response time (20 sec vs 250 msec).



## CONCEPT OF OPERATION

### Wavelength modulation spectroscopy

- Modulate a 2µm, SLM, VCSEL at 10 kHz for lock-in detection
- Sample through a Herriott configured multi-pass cell
- Detect with InGaAs detector
- Convert signal to ppm vs. time using CO<sub>2</sub> calibration curve
- Transmit data wirelessly from sensor to laptop controller

## PERFORMANCE SPECIFICATIONS

PARAMETERS	CO <sub>2</sub> SENSOR
LASER FREQUENCY	2 µm
SENSITIVITY	< 540 ppb
MEASUREMENT RESPONSE TIME	250 ms
OPTICAL PATH-LENGTH	3.5 m width / 11.4 cm cavity length
DIMENSIONS	23.9 x 16 x 8.9 cm
WIRELESS TRANSMISSION RANGE	45 m (indoor), 124 m (outdoor)
WEIGHT	< 4 lbs
BATTERY PACK / BATTERY LIFE	3.7V, 10 amps, Li-ion; 20 hrs

