

GSS

Gas Sensing Solutions

Media Contact:

Name: Nigel Robson

Phone: +44 1481 233080

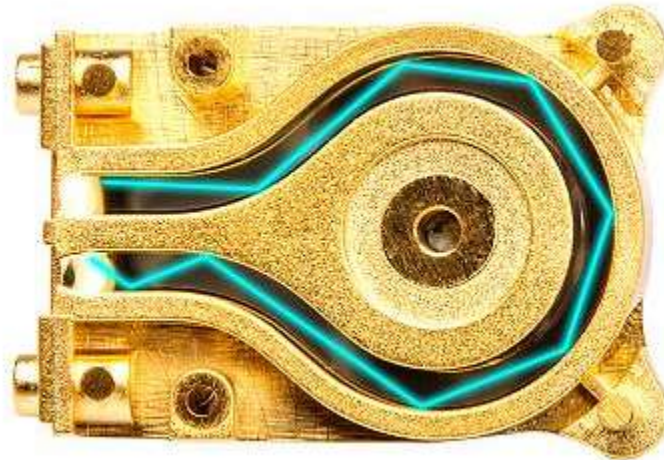
Email address: nigel@vortexpr.com



Prototype light-powered CO2 sensor unit

Gas Sensing Solutions, Sharp and the University of West Scotland partner to develop a "Fit and Forget" wireless enabled CO2 sensor

Cumbernauld, UK - 10 July 2017 The remote world of the IoT and building management systems (BMS) involves the connectivity of autonomous devices which require little or no maintenance - hence the term "Fit and Forget". These "lonely" devices often consist of sensor/actuator functions that need power. The use of replaceable batteries or the provision of mains power is often not ideal due to location, cost and increasingly, user preference. To address this market need, Gas Sensing Solutions (GSS), Sharp and the University of the West of Scotland (UWS) partnered to develop a self-powered, wireless-enabled CO₂ sensor unit for environment monitoring, using Sharp's energy harvesting technology. The development program is being supported by an Innovate UK grant.



GSS patented horse-shoe
light guide

The GSS SmartIR™ NDIR CO₂ gas sensors are based on its proprietary, mid-range Infra Red, Solid State, light emitting diode (LED) and photodiode technology. InfraRed light is discharged from the LED and travels through the CO₂ gas, bouncing round the inside of a horseshoe-shaped light guide. The patented design of the light path provides enough distance between the LED and photodiode for the gas to absorb the InfraRed light, which is important for ambient air environments when measuring low concentrations of CO₂.

With an energy per measurement requirement of just 6mJ, it is ideal for extremely low power and wireless applications. The overall power consumption of the sensor can be adapted to the application by applying a sampling approach whereby the sensor is only switched on when taking a measurement.

The objective was to develop an autonomous wireless CO₂ sensing solution with integrated temperature, humidity and light measurements. The required platform had to self-power using energy harvesting techniques, and needed to perform at light levels down to 200 lux as is typically found in buildings, factories and homes. To support this requirement, the CO₂ sensor node had to consume a miserly amount of power!

Sharp's Photovoltaic energy harvester is a new optoelectronic device optimised for florescent and LED indoor light. The device can harvest ambient light efficiently down to as little as 10 lux and has the potential to drastically reduce or even eliminate the usage of batteries depending on the overall system requirements. The harvester array is capable of

producing $>20\mu\text{W}/\text{cm}^2$ at 200 lux, the 10 cm^2 array used in the prototype produces circa $40\mu\text{A}$ at this light level.

The prototype consists of the Sharp novel energy harvester, a charge management interface module, the GSS SmartIR CO₂ sensor and a low power MCU/wireless module housed in a custom enclosure. The interface module manages the average and peak load power requirements of the storage element, which can be either a rechargeable Li-ion battery or supercapacitor. The MCU module controls the various sensors and minimises system quiescent current.

For this prototype activity, a proprietary wireless interface operating at 868MHz was used. However the energy harvester powers supply module is capable of supporting state-of-the-art, low power wireless formats such as LoRA, BLE, Zigbee, etc. The energy harvesting system developed has proven that "Fit and Forget" self-powered, perpetual operation is achievable with the GSS CozIR™ CO₂ sensor at less than 200 lux.

GSS' multi-patented SmartIR™ technology monitors the presence of CO₂ by detecting how much light is absorbed by CO₂ molecules as light passes through the sample gases - called Non-Dispersive InfraRed (NDIR) absorption. CO₂ absorbs between 4.2 and 4.4 microns and the amount of light absorbed indicates how much CO₂ is present. Typical CO₂ detectors use a heated filament to generate a range of wavelengths in the InfraRed (IR). This is very energy inefficient as the light has to be filtered to leave the required wavelengths, and a lot of waste heat is also produced. By contrast, GSS developed the world's first commercial, mid-range IR LEDs that are specifically tuned to emit between 4.2 and 4.4 microns, making them highly energy efficient.

For more information on the PV Energy Harvester system, please contact Sharp's spin-out "Lightricity" at: sales@lightricity.co.uk or visit: <https://www.lightricity.co.uk/product-line-up>

Gas Sensing Solutions (GSS) www.gassensing.co.uk

GSS is a world leader in CO₂ detector technology with its unique, SmartIR™ technology. Protected by several patents, this disruptive technology uses GSS' proprietary LEDs to enable the company to set best in class records for fastest response times, lowest power consumption and longest product life expectancy. Based in Scotland, this technology innovator exports state-of-the-art sensors all over the world. Tel: +44 1236781900 sales@gassensing.co.uk

Media contact: Nigel Robson, Vortex PR. nigel@vortexpr.com +44 1481 233080

CozIR and SmartIR are trademarks of Gas Sensing Solutions Limited

STAY CONNECTED:

