



Your Research Partner for Photonics Solutions

CENTRE FOR
ADVANCED PHOTONICS
& PROCESS ANALYSIS

CAPPA

Innovation Through Light

Portable/Remote Sensing

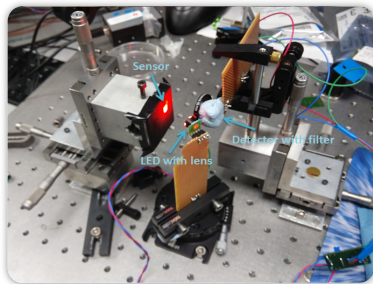
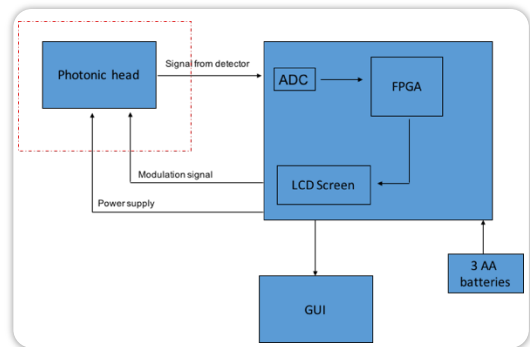
Developing a Sensing Platform Technology

A distinct advantage of optical sensors is their flexibility. A typical optical sensor will generally include components such as a light source, detector, control electronics, on-board data processing and user interface. While a particular application may require careful tailoring of these (e.g. choice of wavelength, modulation scheme, etc.), CAPPA has developed the underlying platform technology which can be rapidly adapted to provide fast prototyping and testing of bespoke sensing applications.

The platform developed by CAPPA offers two formats:

- A **fully stand-alone module**, where all data processing is performed on-board using the FPGA, including fluorescence signal/lifetime calculation, conversion to actual analyte concentration, ambient pressure/temperature compensation, data storage (e.g. SD card) and readout;
- A **miniature 'node' module**, which performs optical excitation and raw data collection only, with post-processing carried out on PC or in the cloud, via a USB or wireless connection.

Both formats include control/modulation of the light source, drive components for photodetector, analog-to-digital converter, etc., and can drive multiple sensors for ambient parameters (temp/pressure) monitoring. The photonic head can be tailored for a range of measurements, e.g. direct absorption or monitoring of a fluorescent biomarker. The entire unit is compact, portable and cost-effective.



- Compact solution, can be adapted for handheld, remote or in-line use
- Photonic head can be tailored to measurement of choice
- can be fully stand-alone, or remote sensor 'node'

Case Study – Miniaturised remote oxygen sensor

Partner company Luxcel Biosciences produce a set of low-cost materials whose fluorescent lifetimes respond to the gas concentration in their environment. CAPPA have developed a hand-held sensor module which can illuminate their oxygen-sensitive material and collect the time-resolved fluorescent signal, complete with a user interface for calibration and data management. This enables the fluorescent material to be placed inside transparent packaging of e.g. food, medical device or pharmaceutical products, and to interrogate the oxygen concentration within the package from outside.

