

## Wearable CO<sub>2</sub> sensor

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High concentrations of CO<sub>2</sub> may develop particularly in the closed spaces during fires and can endanger the health of emergency personnel by causing serious physiological effects. The proposed prototype provides real-time continuous monitoring of CO<sub>2</sub> in a wearable configuration sensing platform. A commercially available electrochemical CO<sub>2</sub> sensor was selected due to its selectivity, sensitivity and low power demand. This was integrated onto an electronics platform that performed signal capture, processing and wireless communication, all within a compact, low-power, rugged enclosure. Wireless transmission (up to 1 km) of the sensor's signal was achieved using a 2.4 GHz Zigbee module with an integrated ceramic antenna. The signal is currently received by a base station which is connected to a PC and monitored using HyperTerminal. The sensors are powered by a nickel metal hydride rechargeable battery which supplies power to the module for approximately 5 hours. The CO<sub>2</sub> sensor is directly attached to the wireless module housed within the specially designed protective casing, and finally placed inside of the pocket on the boot of fire-fighter. Sensors are calibrated for CO<sub>2</sub> concentrations ranging from atmospheric to 42000 ppm.

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