

AIR QUALITY MONITORING SYSTEM FOR A MORE COMPREHENSIVE LOOK AT TRANSPORTATION EMISSIONS

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Background and Aims:

Recent studies indicate that pedestrians are regularly exposed to high levels of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), nitric oxide (NO), ozone (O₃) as well as carbon monoxide (CO) at street level, with peak concentrations during the rush hour commute. Many respiratory and cardiovascular issues for children under 18 years of age and elderly people have been linked to exposure to air pollutants. Current roadside monitoring of transportation emissions is irregular and subjective to the availability of personnel to remain on site, indicating the need for a more continuous system for data acquisition.

Methods: The unit under development is compact, unobtrusive, cost effective and easily installed at street level for continuous monitoring of air pollution to provide a more comprehensive data set on daily pedestrian exposure to air pollution. This system utilizes compact sensors and a unique Linux based operating system, facilitating a simple expansion protocol to a network of sensor nodes, allowing for regional comparison as well as the facilitation of modeling urban levels of carcinogenic gas. It currently has pressure, temperature and relative humidity sensors integrated in to the system, while lab testing continues on the selected gas sensors.

Results: The system is fully functional. The temperature, pressure and relative humidity sensors have been integrated and are producing accurate results. The system is functionally robust where any error occurs, the system is set to reboot and start anew. The units can be left running for months at a time without issues enabling them to continuously collect data 24 hours a day.

Conclusions: The system is created in order to minimise size and maximise performance to enable monitoring in close proximity to the breathing height of the public. Additional units deployed are easily integrated in to the network to facilitate mapping of pollution levels.

References:

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