

Introducing PIMS: The Pollution In-Cabin Measurement System

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Much work has been done to address tailpipe emissions, its contribution to ambient air pollution, and its associated negative impacts on public health. However, less is known about the indoor air quality inside vehicles, an environment where people spend approximately one hour per day: this is referred to as Vehicle Interior Air Quality (VIAQ). Despite the relatively short period of time spent in vehicles, exposure levels are of concern given the immediate proximity to other vehicles, plus in urban areas, high ambient concentrations compared to other micro-environments.

NAQTS has developed the measurement technology to help address this public health concern: The Pollution In-Cabin Measurement System (PIMS). The NAQTS PIMS is configured to provide simultaneous measurements inside and outside vehicles to help understand the relationship between ambient air quality and VIAQ. This allows us to characterise vehicle performance to see whether it protects occupants from poor air quality or exacerbates the problem. The NAQTS PIMS performs a wide range of air quality measurements (PN, CO₂, CO, NO₂, VOCs [including four integrated thermal desorption tubes]), environmental measurements (T, P, RH, Noise), as well as vibration and GPS, to facilitate a holistic understanding of a vehicle's "comfort."

With new advances coming in the automotive industry concerning HVAC and control strategies for improving VIAQ, and a context in which governments and regulatory agencies are becoming more aware of the public health costs associated with poor VIAQ, this topic is anticipated to grow. To provide data driven guidance to improve air quality and public health regulations, the air quality inside vehicles must be considered.

This presentation will cover the regulatory context of VIAQ, the application of novel technologies to measure inside and outside vehicles, and the effects of occupant behaviour and ambient air quality on VIAQ. This will include data insights from more than 3 years of development and testing, including results from a recent case study of driving across the breadth of the United States of America.