

Abstract

Los Gatos Research (LGR) applied its patented laser-based instruments, which are based on the use of high-finesse optical cavities as measurement cells, for real-time measurements of important greenhouse gases and pollutants in ambient air. LGR's technology provides optical path lengths of tens of kilometers to allow gas concentration measurements over a wide range of concentrations with unprecedented sensitivity, accuracy and precision in a compact package. LGR incorporated several instruments, along with global positioning, ambient temperature, air velocity and pressure and relative humidity monitors, into a vehicle that was used to record real-time measurements of several critical atmospheric gases at urban and rural locations, including Caldecott Tunnel, wetlands in the Sacramento-San Joaquin Delta (Sherman Island, Twitchell Island), Zero Emissions Research Technology site, and the Altamont Landfill site. This 'Mobile Emissions Laboratory' enables detailed measurements and long-term monitoring of mobile and fixed-location emissions and pollutant sources with unprecedented accuracy, precision and sensitivity. In addition, the on-board instrumentation is autonomous, easy to use, and automatically store and report data to a central station. The Mobile Emissions Laboratory enables untrained users to record accurate measurements of all important greenhouse gases and several pollutants with high sensitivity and over a very wide range of concentrations at the source in real time. These measurements provide regulatory agencies, monitoring stations, scientists and researchers with temporally and spatially resolved data (measurements of important greenhouse gases and pollutants) necessary for compliance monitoring, as well as cap and trade, at any location.