UTC Project Information – **Center for Transportation, Environment, and Community Health**	
Project Title	Assessing the health and environmental benefits associated with changes in transportation activities in near-road communities using low-cost sensors
University	The University of Texas at El Paso
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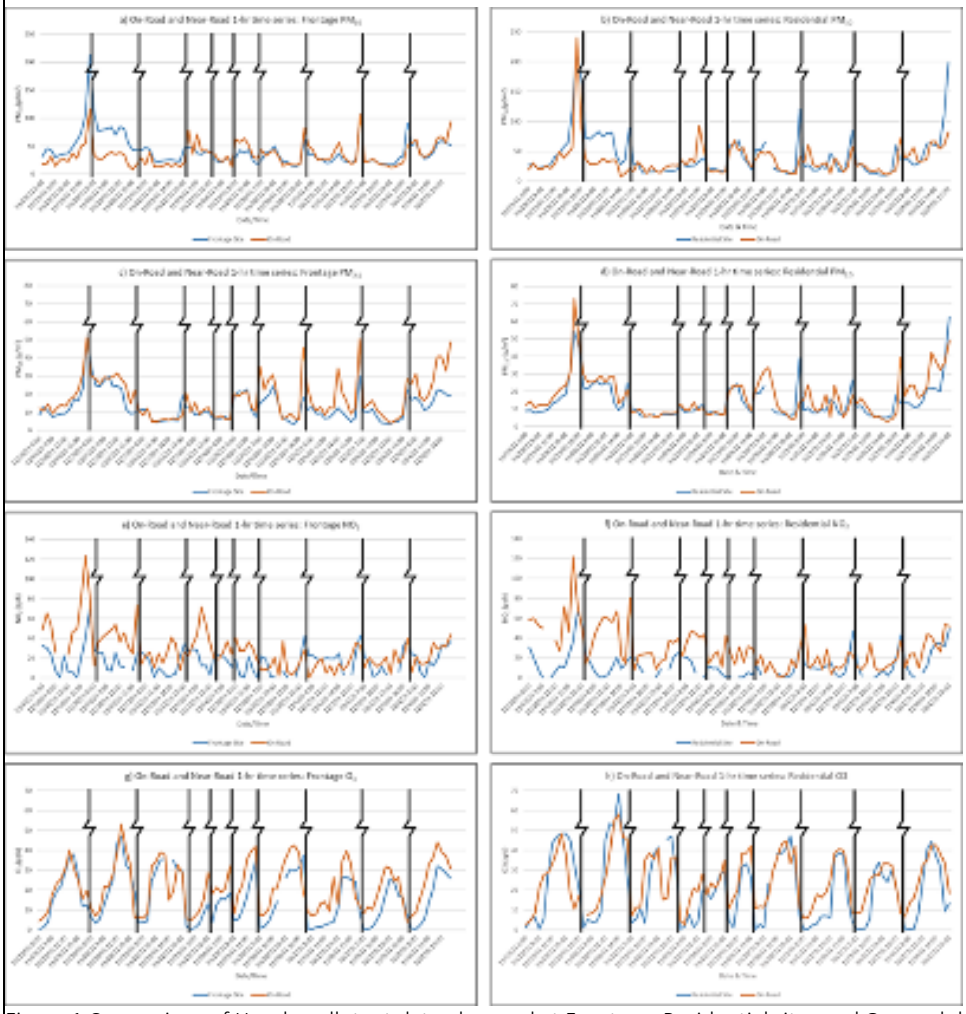
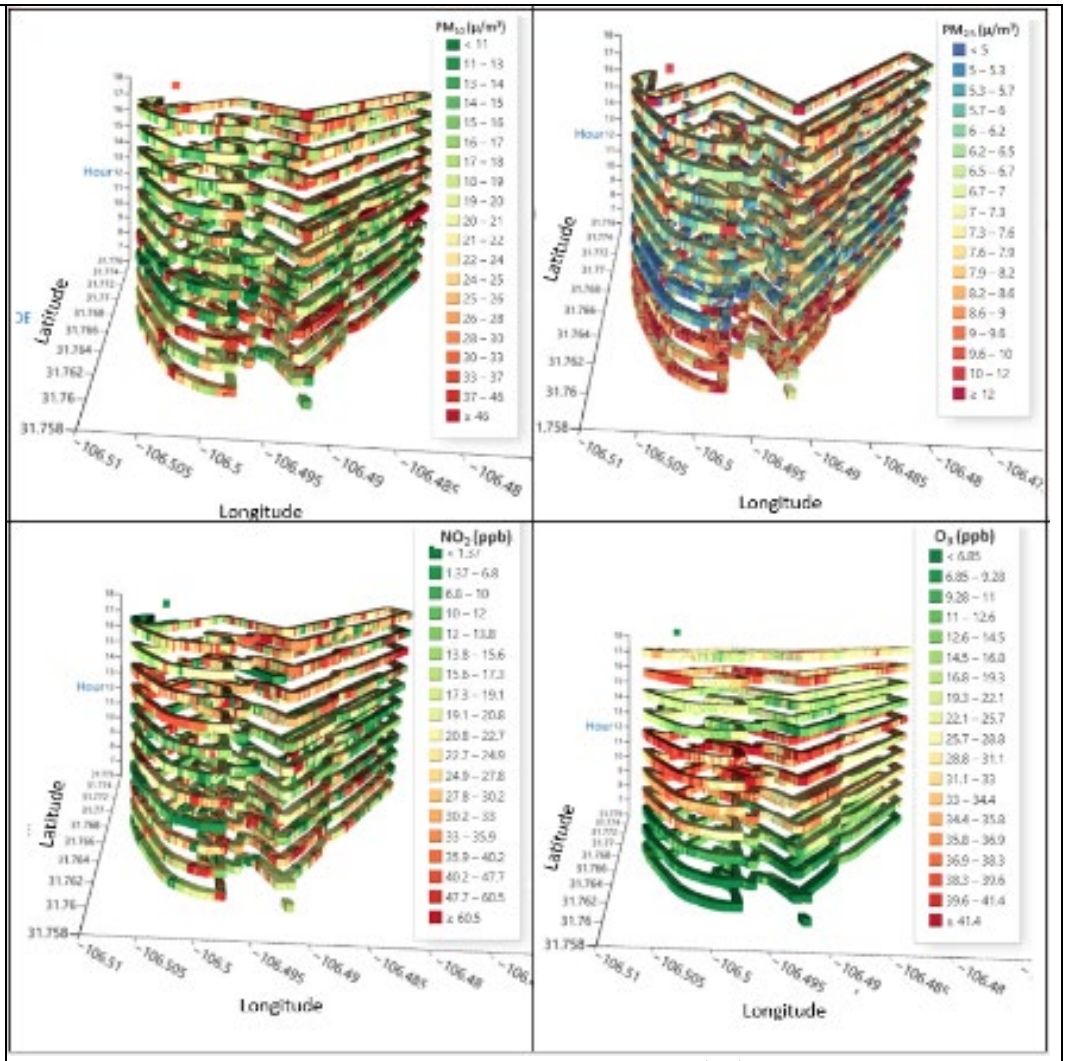
Funding Sources and Amount Provided (by each agency or organization)	CTECH: $88,129 UTEP: $44,065
Total Project Cost	$132,194
Agency ID or Contract Number	Sponsor Source: Federal Government CFDA #: 20.701 Agreement ID: 69A3551747119
Start and End Dates	10/01/2020 – 05/31/2022
Brief Description of Research Project	On-road measurements of four pollutants ($PM_{2.5}$, PM_{10}, NO_2, and O_3) were continuously recorded by three U.S. EPA-certified FEM air pollution monitoring devices installed inside a vehicle traveling repeatedly on the same route in a near-road community. Spatio-temporal on-road air quality data were aggregated and compared to data collected at two fixed stations, one residence located 15 m from the frontage road adjacent to Interstate Highway I-10, and another residential site 300 m from the frontage road. The first objective of this study was to assess the suitability of using the spatio-temporal on-road air monitoring data for representing community exposures to transportation-related air pollutants (TRAPs). The second objective evaluated the feasibility of using on-road air monitors instead of near-road monitors.
Describe Implementation of Research Outcomes (or why not implemented) *Place Any Photos Here*	This project provided support for estimating near-road concentrations using on-road monitoring traveling on fixed paths. The study found that 1) community exposures to transportation pollutants can be represented by short-term spatio-temporal measurements using on-road air monitors; and 2) near-road concentrations can be represented by on-road air monitors. Furthermore, the study provided concentration estimates for a community using on-road air pollutant monitoring and evaluated associations of short-term TRAP concentrations between near-road and on-road receptors. Figure 1 shows the comparison at the two near-road sites implying that community exposures to transportation pollutants are well represented by the on-road monitors.

	The 1-hr average concentration loop shown in Figure 2 represents the average concentrations of the 3 trips along the same route collected during the hour. The on-road monitor has the advantage of collecting spatiotemporal pollution data that are a better representation of the true exposure concentrations. It appears that community exposures to TRAPs can be represented by short-term spatio-temporal measurements using on-road monitors. On-road air pollution measurements provide a rapid assessment of the air quality in a community without installing multiple stationary sites. In general, near-road concentrations could be represented by on-road air monitors. Exposure maps provide citizens data on how concentrations of pollutants vary within the community and can make decisions on healthier route choices.  Figure 1 Comparison of Hourly pollutant data observed at Frontage, Residential sites and On-road data (1 Hour)

	 Figure 2 Hourly Average of On-Road Pollutant Concentrations, 1 day (11/22/2021)
Impacts/Benefits of Implementation (actual, not anticipated)	This study provides a methodology to assess the on-road transportation-related air pollutant data against data obtained at near-road stations. It provided further scientific knowledge concerning the differences between on-road and near-road pollution levels. The on-road mobile monitoring data provided detailed analysis on spatial distribution of pollutant concentrations that citizens can use to identify healthier routes for walking and bicycling.
Web Links • *Reports* • *Project website*	https://ctech.cee.cornell.edu/final-project-reports/