

# EXPERIMENTAL CAMPAIGN IN A HEAVILY TRAFFICKED ROUNDABOUT IN MADRID FOR THE ASSESSMENT OF AIR QUALITY MONITORING STATION REPRESENTATIVENESS IN TERMS OF POPULATION EXPOSURE TO NO<sub>2</sub>

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Madrid is one of the many urban agglomerations that are struggling to meet NO<sub>2</sub> air quality standards in Europe. The European limit values for this pollutant are targeted to the protection of human health. However, legal compliance is assessed from the data collected in air quality monitoring networks and it is not clear to what extent the information captured in these particular points may be representative of population exposure to air pollution and thus, the real implications of such exceedances. In order to gain some understanding of this issue in the scope of the TECNAIRE-CM research project, an experimental campaign was carried out in Fernández Ladreda Square, a heavily trafficked hotspot where the highest NO<sub>2</sub> concentration values in Madrid are measured. 200 NO<sub>2</sub> passive samplers were deployed in a 0.42 km<sup>2</sup> area (600 m x 700 m) during a three-week period. By interpolating observed values in every sampling location, a detailed spatial concentration map was made showing the concentration gradients in the Square. Hourly values are available from the air quality station of the Madrid City Council located in the study area, so temporal variations and typical daily concentration patterns were assessed as well.

This information was crossed with a pedestrian simulation carried out with the VISWALK module within the microscale traffic model (VISSIM). A series of pedestrians counts were made in different points throughout the square in different days and day periods to feed the model to obtain detailed pedestrian fluxes in the area of interest.

As a preliminary approach to assess the representativeness of the Fernández Ladreda air quality monitoring station, an exposure map was obtained under different scenarios (different days and hours within the day) to understand the implications of using regular air quality measurements in particular spots to assess legal compliance and ultimately, population exposure.