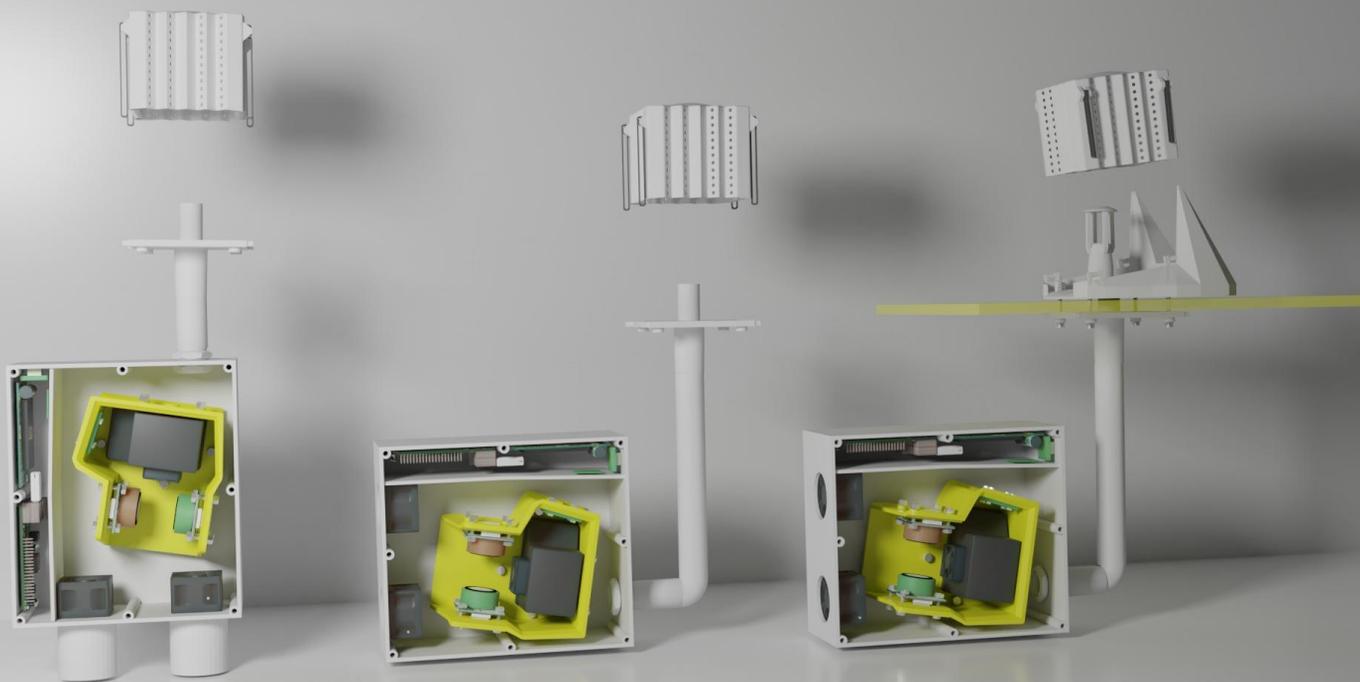


ExpoLIS

Assessment of Human Exposure to Air Pollution
to Change the Way People Move in cities

Newsletter 1

February 2019



Welcome to the first edition of the ExpoLIS Newsletter!

This newsletter is based on the ExpoLIS project. The first and future editions will aim to present the work that has been developed, the main outputs and dissemination activities.



In 2018, two partners joined to propose a new project to the Portuguese Foundation for Science and Technology (FCT). In the last years there has been an improvement in Air Quality in urban areas due to the latest emission control strategies. However, the citizens are still exposed to levels of air pollution above the limits imposed by the legislation. The ExpoLIS project was created with the objective of developing a system that will characterize Air Quality, support air pollution improvement measures and ultimately decrease the citizens exposure to air pollutants.

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Monitoring airborne pollutants is of utmost importance to reliably assess the impact of air pollution on the human health.

Currently, air pollution is monitored by networks of static stations, which are highly reliable and accurate to measure a wide range of air pollutants. However, their high acquisition and maintenance costs severely limit the number of installations.

Hence, very little is known about the spatial distribution of air pollutants in urban environments and there is a lack of accurate urban air pollution maps. Up-to-date information on urban air pollution is of great importance, enabling urban planners to adopt and accurately evaluate new policies, and raise public awareness.

ExpoLIS aims to develop an air quality exposure sensing system, composed by a network of sensor nodes, and deploy it on public transportation (buses) to obtain the real-time air pollution distribution in urban areas. The project takes advantage of concepts like big data analytics and internet of things, and is a step forward into the smart city ideology.

The main innovative objectives of the project are:

-  Design and development of sensor nodes, following the open-source software and hardware paradigms;
-  Development of a route selection algorithm based on multi-criteria optimisation techniques to improve the spatial coverage of the sensor nodes;
-  Integration and calibration of the air quality exposure sensing system with the existing static monitoring stations;
-  Development of a module for continuous update of a data-driven predictive model capable of correlating pollution incidence with topology, environmental conditions, and traffic density. This model will interpolate/extrapolate the temporal and spatial gaps of the sensing system;
-  Deriving and online public sharing of real-time detailed spatio-temporal air quality road maps;
-  Introduction of a health-optimal routing service, which helps citizens to reduce their exposure to air pollutants.

The ExpoLIS system

The ExpoLIS system is a 3 layered system, whose purpose is to collect, map, and predict geo-referenced air quality data in urban environments, as well as to provide citizens with intuitive access to these data when planning daily commutes, fostering a healthier lifestyle.

ExpoLIS system's bottom layer

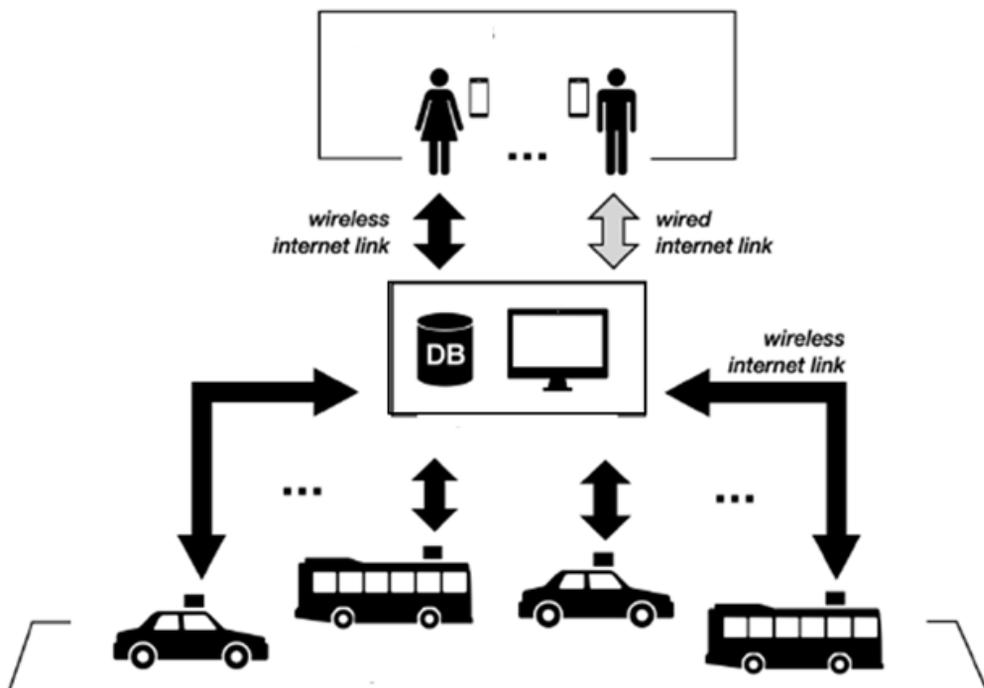
Includes all mobile sensor nodes (distributed across vehicles). These sensor nodes sample the environment autonomously and communicate the gathered data to the ExpoLIS server via a wireless channel over the internet.

ExpoLIS system's middle layer

Includes the ExpoLIS server, which is responsible for collecting all sensor data, filtering it for smoothing and removal of outliers, storing in a geographical database, and to provide citizens with web-based access to these data.

ExpoLIS system's top layer

Includes all ExpoLIS users, which access individual and spatiotemporal aggregated air quality data stored in the server's database



Meet the team

The ExpoLIS project was born in a cooperation network between researchers from environment, transports, computer science and electrical Engineering.

This project is a joint initiative of IST-ID/C2TN and ISCTE-IUL/IT, with collaboration of CARRIS (bus public transportation company) and CCDR-LVT).



What will you find in the next issue?

-  Get to know the ExpoLIS sensor node
-  “Construir conhecimento sobre qualidade do ar: A Ciência e o cidadão”: the first paper publish in the context of the ExpoLIS project
-  ExpoLIS in the 7th Iberian Meeting on Aerosol Science and Technology
-  Meet the team: Marta Almeida, the project coordinator

Keep in touch!



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