

## MODALES

Ensuring lower vehicular emissions through a user-centric approach.



### Inspiration

In the light of road traffic impacts on local air quality, there is a pressing need to reduce emissions from all types of motorized vehicles. As a major policy concern within the European Union, numerous researches have been conducted. However, considering multiple emissions sources at the same time (e.g. brakes, powertrain and tires), as well as their potential correlation with driver behaviour, has so far not been explored by the scientific community, yet.

### Innovation

MODALES' objective is to advance the fundamental understanding of the co-variability of user behaviour and vehicular emissions from three main sources: powertrain, brake wear and tyre wear. Through an international collaboration gathering 14 partners, this European project aims to enhance low emission practices, as well as suppress high-emission behaviours.

To do so, MODALES will follow an unprecedented user-centric approach by researching, developing and testing a number of innovative and complementary solutions in four key areas (namely, Driver, Retrofits, European On-Board Diagnostics and Inspection) in order to substantially reduce vehicular emissions.

LIST researchers will ensure the link between the theoretical aspects of the project and their validation, as well as use for experiments and awareness campaigns. With a strong experience in data analytics, they will be in charge of data collection from smartphones sensors and On-Board Diagnostics (EOBD) dongles reporting vehicles emissions. LIST researchers will also perform data interpretation using machine learning and classification models, with the aim of automatically recognising a driver's behaviour profile (while driving, but also about vehicle maintenance) based on the collected data. Following these two phases, LIST will make benefit of its mobile analytics expertise to validate the approaches developed throughout the project by developing a personal driving assistant application prototype enabling real-time and proactive recommendations to drivers.

### Impact

This international cooperation represents a considerable opportunity for LIST to work closely with recognized European industrial and academic partners in their field, as well as with non-EU structures, such as Chinese research organisations.

MODALES will significantly contribute to the current state of art by providing a better understanding of the impact that a user's behaviour has on the emissions produced by his/her vehicle. As a result, these findings will support effective quality plans, as well as enforcement strategies to be developed by local and national authorities.

While most similar solutions are using remote and privacy-invasive resources, the MODALES project will provide an innovative approach with machine learning techniques implemented locally on the mobile devices. This approach and its subsequent distribution to the end-users will firstly be validated with a driving school. This unprecedented personal driving assistant application will enable to modify driver behaviour substantially. A 5 to 10% emissions reduction is expected by applying the MODALES low emission driving guidelines. The overall approach of the project will then be validated through real experimentation campaigns all around Europe, including Luxembourg, and awareness campaigns will allow the dissemination of the project's findings to the public.

### Partners

EUROPEAN ROAD TRANSPORT TELEMATICS IMPLEMENTATION COORDINATION ORGANISATION - INTELLIGENT TRANSPORT SYSTEMS & SERVICES EUROPE (BE) , SPARK LEGAL NETWORK (EU) BVBA (BE) , PROVENTIA OY (FI) , MANUFACTURE FRANCAISE DES PNEUMATIQUES MICHELIN (FR) , BRIDGESTONE EUROPE NV/SA (BE) , FRENI BREMBO Spa (IT) , CENTRE D'ETUDES ET D'EXPERTISE SUR LES RISQUES RELATIFS A L'ENVIRONNEMENT, LA MOBILITE ET L'AMENAGEMENT (FR) , ISTANBUL OKAN UNIVERSITESI (TR) , IRU PROJECTS ASBL (BE) , FEDERATION INTERNATIONALE DE L'AUTOMOBILE (FR) , AUTOMOBIL CLUB ASSISTENCIA SA (ES) , University of Leeds (United Kingdom) , Teknologian Tutkimuskeskus Vtt Oy (FI) , Ethniko Kentro Erevnas Kai Technologikis Anaptyxis (GR)

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Horizon2020

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