

City Air Remote Emission Sensing

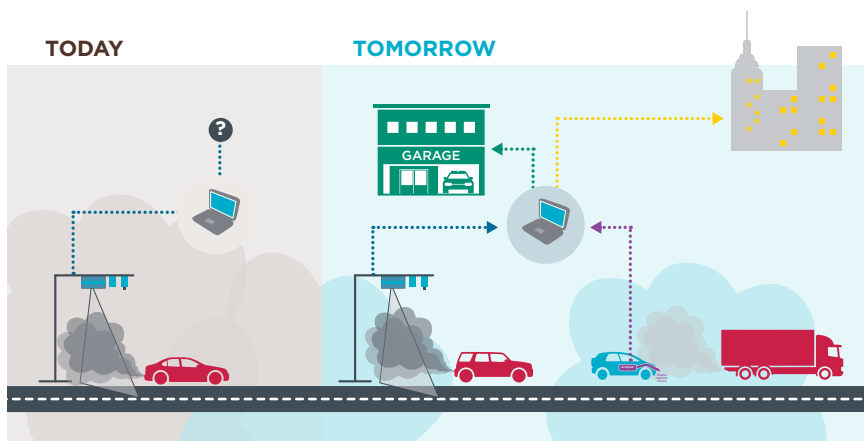


Making remote sensing an effective tool for
monitoring pollutant emissions and improving
city air quality



CARES investigates how contactless measurement of vehicle exhaust emissions can help monitor and enforce pollutant emission limits and improve air quality, particularly in cities.

The use of remote sensing technology to measure vehicle pollutant emissions is becoming more common. But more can be done to reduce the hurdles for practical applications and to make remote emission sensing data collected available and relevant to researchers, regulators, policymakers, and citizens. That is the purpose of the project **CARES - City Air Remote Emission Sensing**.



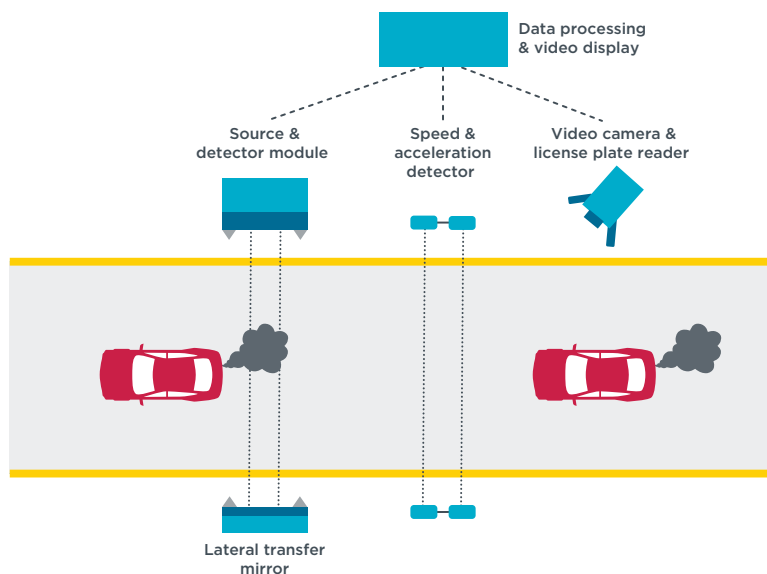
The CARES vision is to determine the actual emission rate of road vehicles quickly and comprehensively. This will help to ensure that vehicles comply with emission regulations over their whole lifetime and under all driving and ambient conditions. The data will further be used to manage air quality and to help to inform consumers and policy makers.

What is CARES?

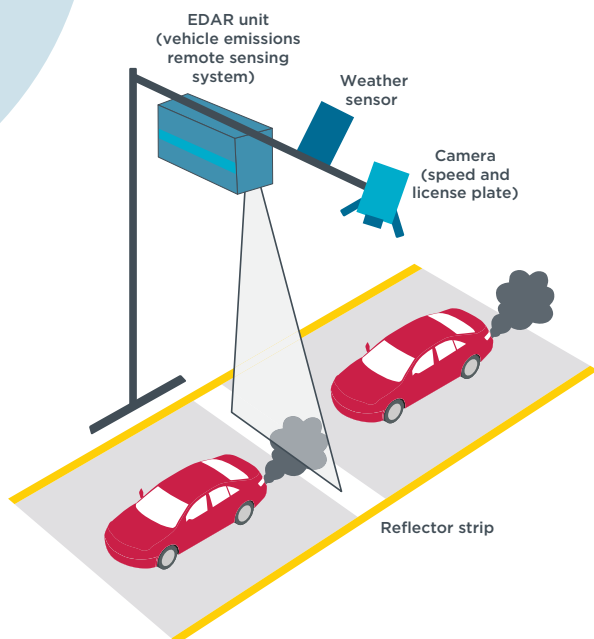
CARES is a research project funded under the European Union Horizon 2020 Research and Innovation programme. The project brings together Europe's experts in non-intrusive vehicle emissions measurement to investigate the use of different remote sensing techniques for monitoring



real-world vehicle emissions performance and enforcing compliance with exhaust pollutant standards. Its goal is to lower barriers to the widespread use of these technologies through a combination of technology development, new analysis techniques, proof-of-concept demonstrations, and extensive dissemination of results, findings, and guidance. The project is coordinated by the IVL Swedish Environmental Research Institute in collaboration with 18 partner organizations. It runs from May 2019 for three years.



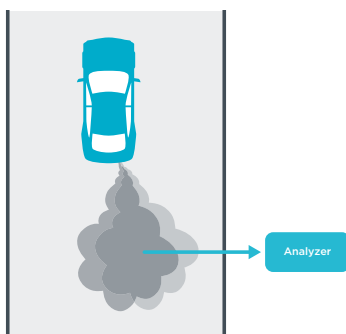
Schematic of cross-road remote emission sensing device.



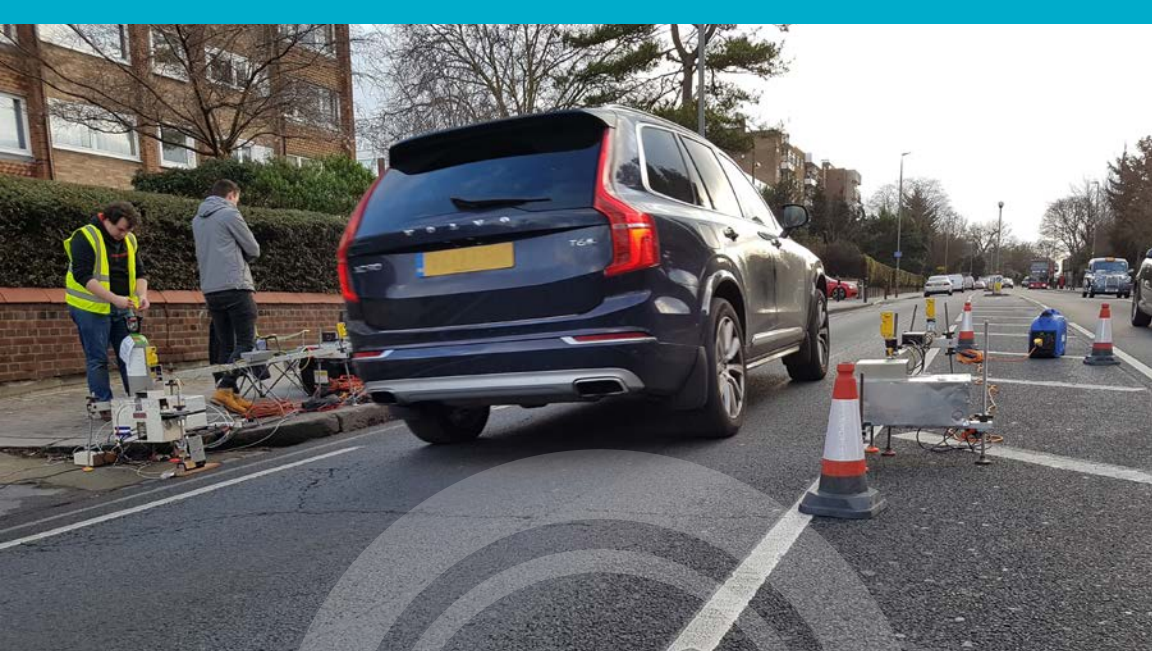
Schematic of top-down remote emission sensing device.



Schematic of plume chasing remote emission sensing device.



Schematic setup of point sampling remote emission sensing device.



CARES aims to improve the performance and reduce the costs of equipment and data infrastructure to facilitate the application of remote emission sensing.

Activities

CARES is taking practical action:

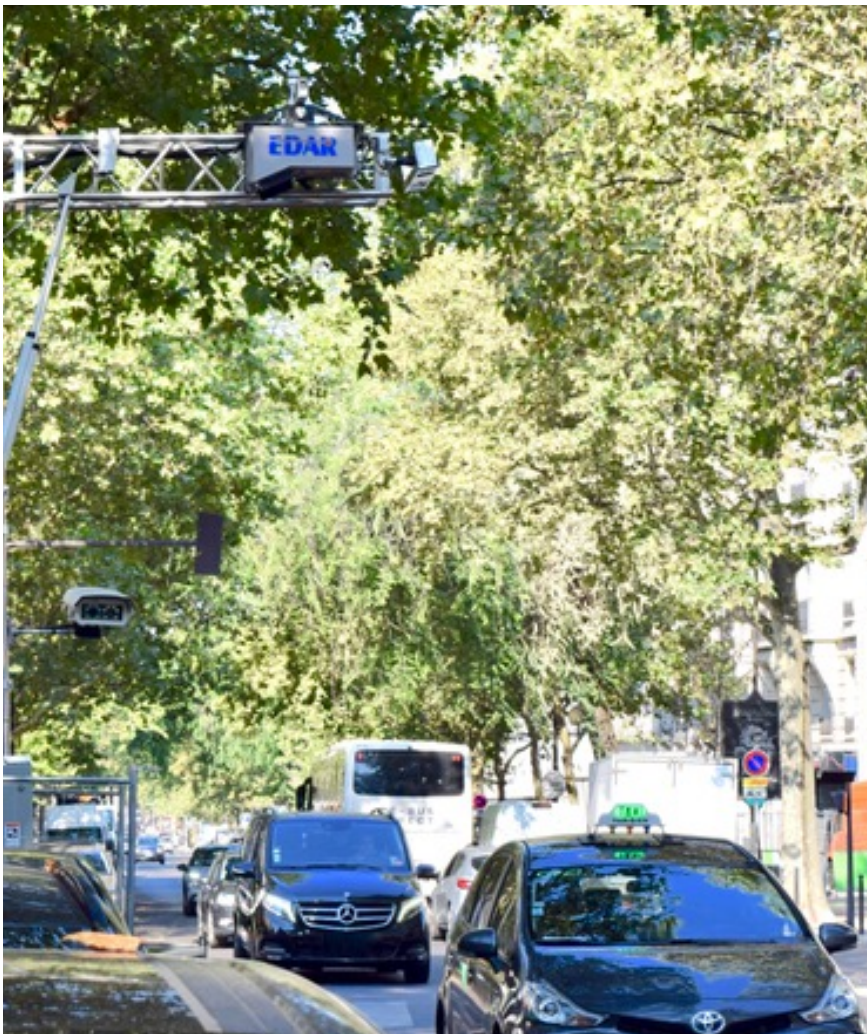
Technology development. CARES is further developing plume-chase and point-sampling equipment and comparing these innovative remote emission sensing technologies to existing commercial techniques. This will help to improve performance, reduce costs, and cover more pollutants.

Data standardization. CARES is creating a standardized data infrastructure that will allow for easier, faster, and more accurate integration and aggregation of remote emission sensing data. This will ease the analysis of remote emission sensing data.

Real-world demonstration. CARES is working with three European cities—Krakow, Milan, and Prague—to develop best practices and demonstrate the practical potential of the various remote emission sensing techniques.

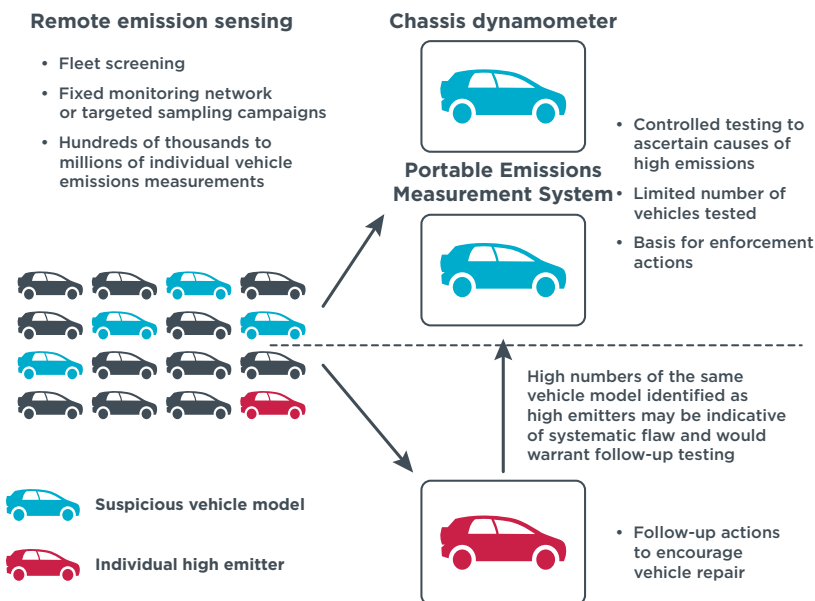
Integration with enforcement policies. CARES is developing a concept for integrating remote emission sensing technology with enforcement capacity at local, national, and EU levels to help identify possibly non-complying vehicles.

Collaboration and information sharing. Through the CARES Cities' Exchange Network we share knowledge and skills. We actively collaborate with experts in China and other international experts, as well as a range of stakeholders from regulatory and industry backgrounds.



Real-world results

Until now, only few local and national authorities have used remote emission sensing to identify high-emitting vehicles and monitor fleet-wide emissions. The CARES project is working to expand the applications of remote emission sensing in ways that will be relevant to regulators, policy makers, and the general public. Future applications will, for example, include identifying individual high- or low-emitting vehicles, tracking policy effectiveness, and informing consumer purchase decisions.



Remote emission sensing can screen a large number of vehicles to identify models or even individual vehicles with suspiciously high emission levels for further in-depth testing under laboratory or on-road conditions.

Impact

The CARES project focuses on vehicle emissions in cities, but the impact of vehicle pollution extends far beyond urban areas. Comprehensive data on fleet emissions is vital to solving air-quality problems. CARES data will help to make remote emission sensing readily available to authorities for developing accurate emission factors and emission inventories. Quantifying the local, regional, and global extent of vehicle emissions will allow for effective actions, helping to reduce the impacts on air quality and human health.



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