

LENS project

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Webinar Sound of Silence
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LENS L-vehicles Emissions and
Noise mitigation Solutions

Project Fiche

Grant Agreement number

101056777

Framework Programme

HORIZON Europe

Call

Clean and competitive solutions for all transport modes
(Topic ID: HORIZON-CL5-2021-D5-01-16)

Type of action

Research and Innovation Action

Duration

36 months (ending 8.2025)

Budget

4 995 098 €

Total partners

15

Coordinator

Emisia

Website:

<https://www.lens-horizoneurope.eu>

Consortium

e:misia

Applus⁺
IDIADA

TU
Graz

ivl
Swedish Environmental
Research Institute

ika | RWTH AACHEN
UNIVERSITY

KU LEUVEN

CZU Czech University
of Life Sciences Prague

TNO innovation
for life

ifp *Energies
nouvelles*

KTM

BMW
GROUP



HORIBA

PIAGGIO

POLIS
CITIES AND REGIONS FOR
TRANSPORT INNOVATION

suggestion that two-wheelers are a potential contributor to this enrichment. Considering the high use of two-wheelers in other European cities such as London or Barcelona if Europe is to decrease transport-related air pollution and inner city traffic, policy makers should consider finding alternatives to the conventionally-powered two-wheelers and supporting electric two-wheelers for example. © 2018 The Author(s)

Salameh et al., DOI: 10.1016/j.aeaoa.2018.100003

the period 1999–2012. Projections show that these vehicles will emit more than 7% and 20% of total road transport CO and HC, respectively, by the year 2012, if no additional regulatory measures are taken. In contrast, they will continue to be negligible NO_x (0.7%) and CO₂ (<1%) emitters, while their particulate matter (PM) emission contribution is expected to decline to below 1% in the future. The relative importance of their emissions,

Ntziachristos et al., DOI: 10.1016/j.atmosenv.2006.04.03

Transportation sector contributes as the second largest polluter of the air pollution in Indonesia. Of the transportation sector, road transport has generated 70% of the air pollution, 81% of which is attributable to motorcycles. The motorcycles are currently accounting for 79% of the total motor vehicles. It is predicted that the number of motorcycles will continue to grow at an annual rate of 9-26%. However, due to little attention to the motorcycle's environmental

INS Intelligent Noise Solutions
Sopha et al., DOI: 10.52394/ijolcas.v1i1.3

Switzerland's strict new road noise rules now in force

17/01/2025 BY LE NEWS

Over the years, there has been much political debate on how to limit the noise from vehicles. At the beginning of 2025 new noise rules passed by parliament in 2021 came into force. According to the Federal Roads Office (FEDRO) any avoidable vehicle noise is now banned. This includes additional noise from vehicle modifications and unnecessary engine revving or exhaust back-firing.



Belgian residents' groups take part in first international 'Motorcycle Noise Pollution' protest

Sunday 30 April 2023

by The Brussels Times with Belga

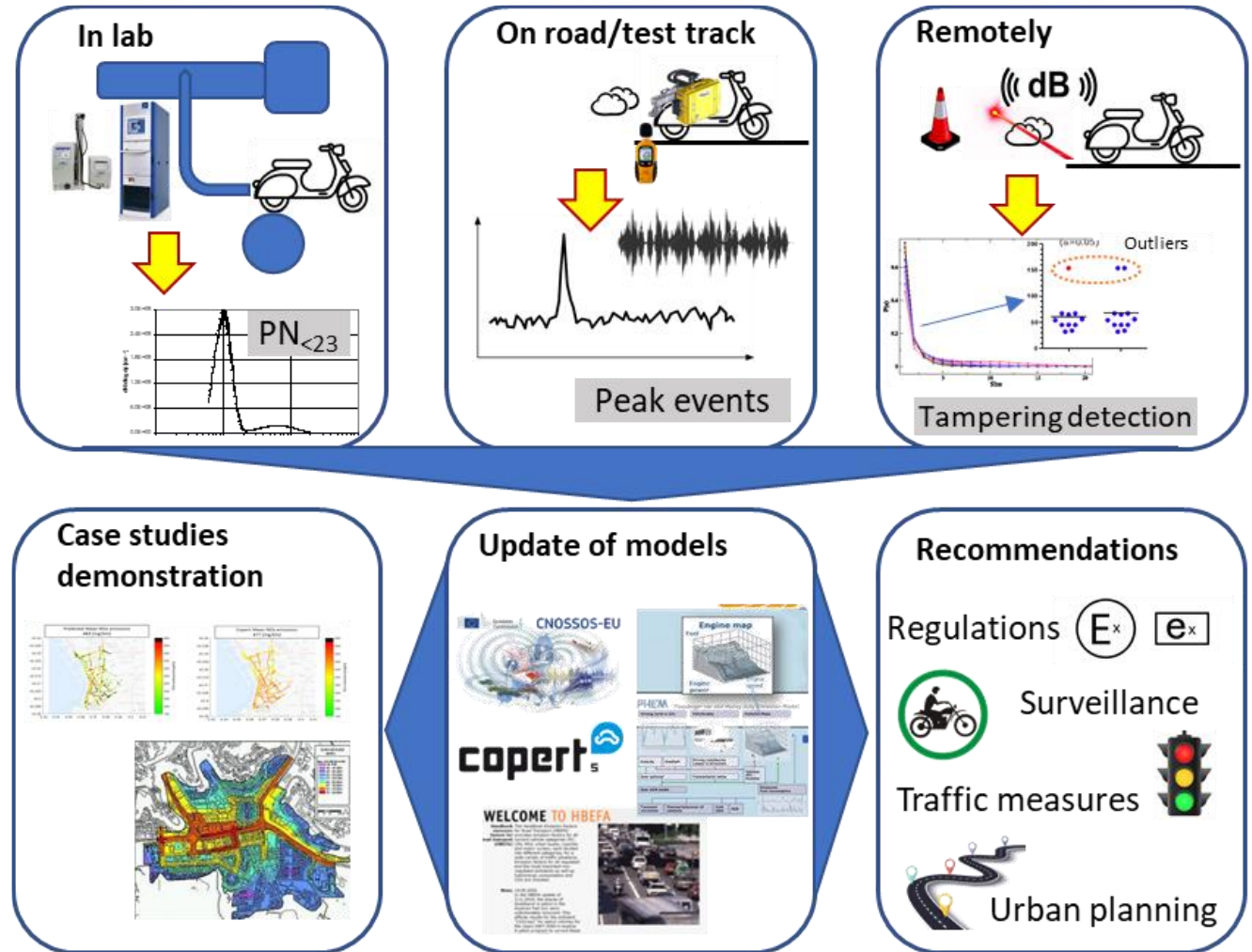


Germany Motorcycle Noise Bans

Access regulated by other requirements

LENS Objectives & Methodology

	Objective
1	Develop emission & noise measurement techniques for LVs
2	Characterize noise & pollutant emissions performance of LVs
3	Deploy techniques to identify in-field tampered LVs
4	Provide recommendations for decreasing noise and pollutants and assess expected impact



Pollutant emissions testing – In lab

- 57 L-Vehs on dyno with CVS system
- Driving cycles: official WMTC & real-world alike RDC (Real Driving Cycle)
- Regulated pollutants: PM, CO, CO₂, NO_x, HC
- Non-regulated gaseous pollutants: NH₃, N₂O, etc.
- PN: 23nm, 10nm, 2.5nm, Solid & total
- Testing labs:
 - EMISIA/LAT
 - TUG
 - IFPEN
 - IDIADA
- Round-robin with 2 motorcycles in all labs to confirm comparability



Pollutant emissions testing – On Road!

- World's first comprehensive campaign of measuring pollutant emissions on the road
- 109 LVs measures with PEMS or SEMS
- GPS
- ECU data recorder (OBD)
- Locations:
 - EMISIA – Thessaloniki
 - TUG – Graz
 - IDIADA – Barcelona
 - IFPEN – Paris
 - CZU – Prague



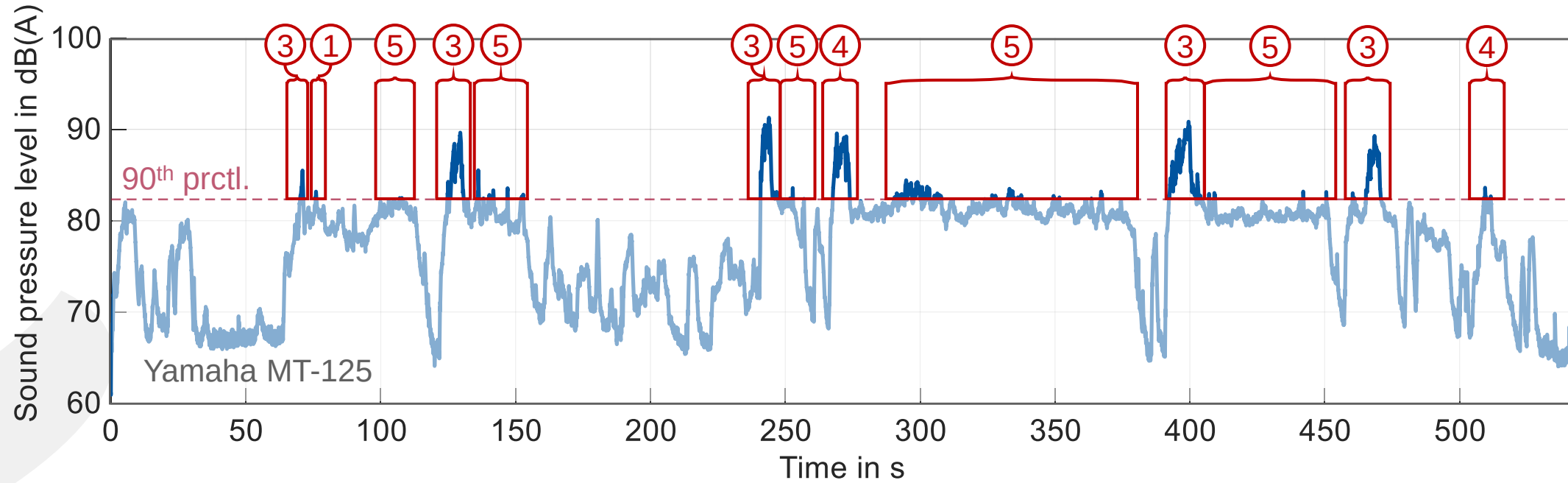
Noise emissions testing – On Road!

- Custom-made on-board noise measurement device
- 12 LVs measured
- ECU data recorder (OBD)
- Locations:
 - IKA RWTH – Aachen
 - EMISIA – Thessaloniki
 - TUG – Gratz
 - IDIADA – Barcelona
 - IFPEN – Paris



Exemplary result of on-road test 1(2)

11 kW (15 PS)
PMR: ~51 W/kg
124,7 ccm



- ① Acceleration phase while driving*
- ② Acceleration from standstill*
- ③ Acceleration from standstill, gear shift(s)*

- ④ Acceleration phase while driving, gear shift(s)*
- ⑤ Constant driving phase, (gear shift(s))*

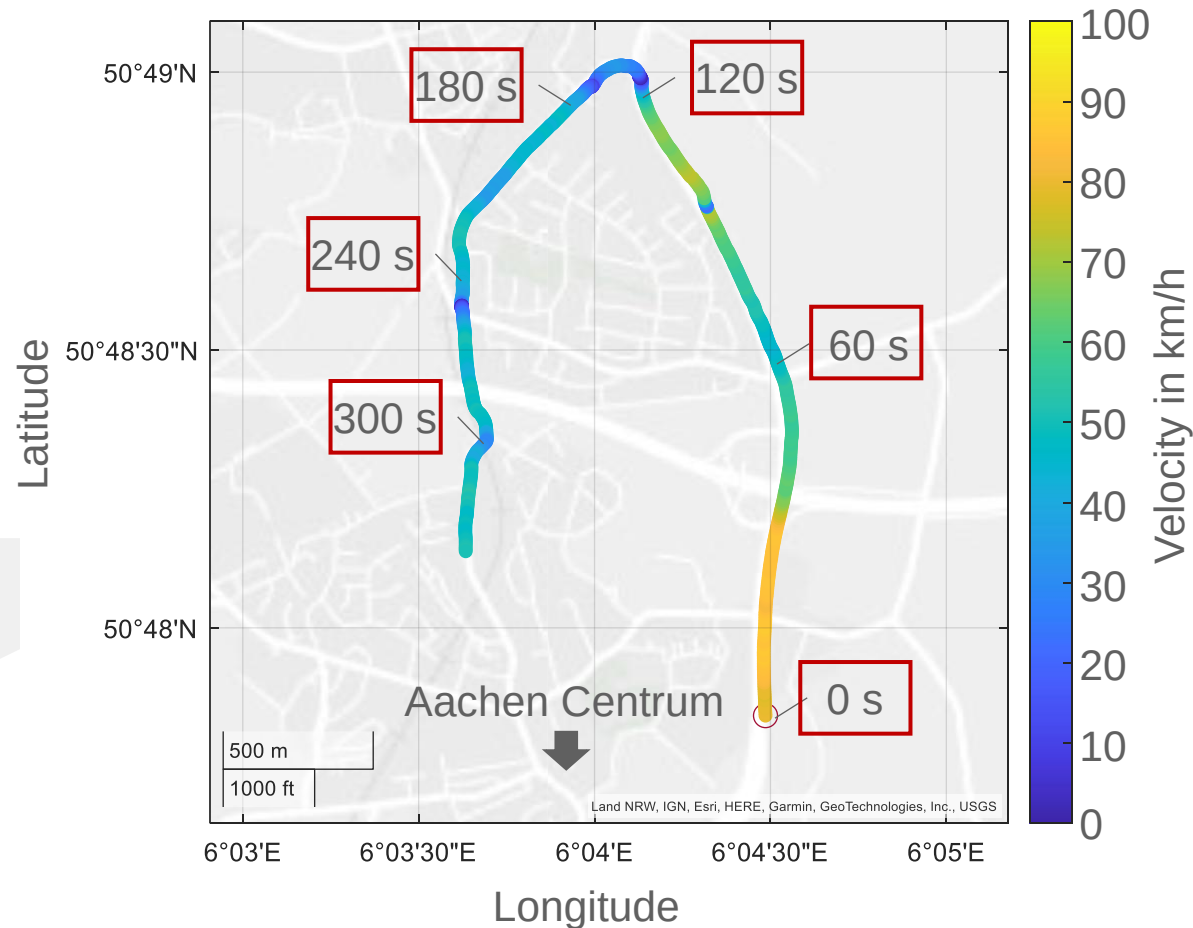
*most ended with deceleration

Exemplary result of on-road test 2

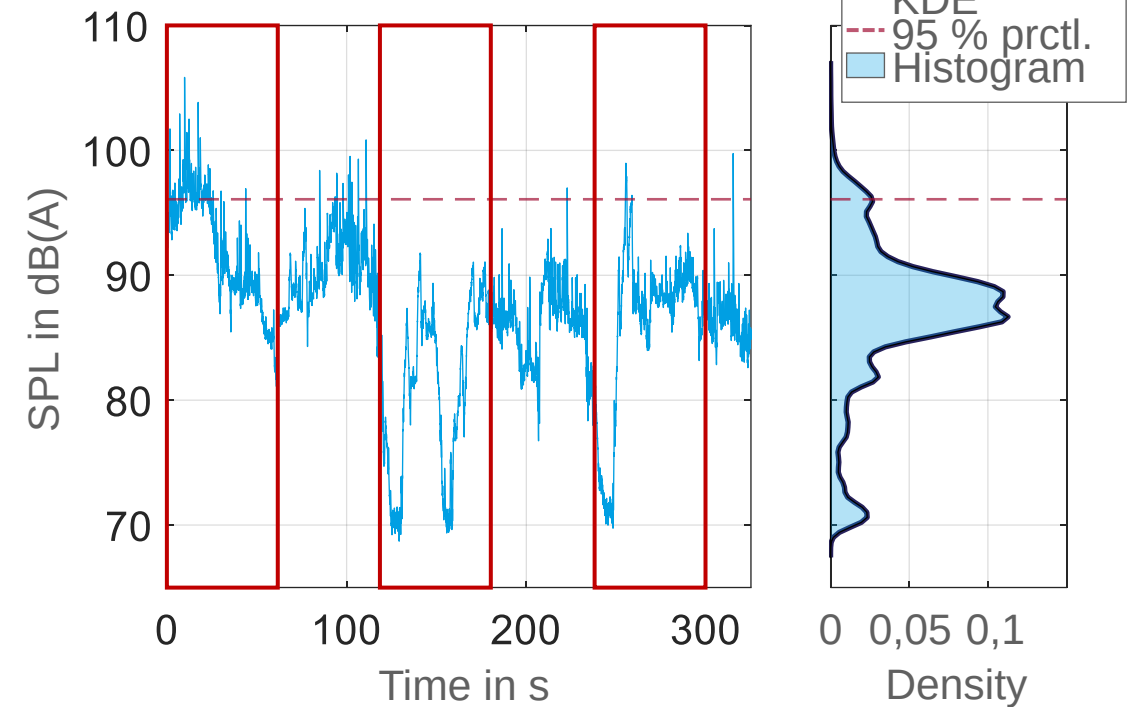
65 kW (88 PS)
PMR: ~101 W/kg
1868 ccm



Route



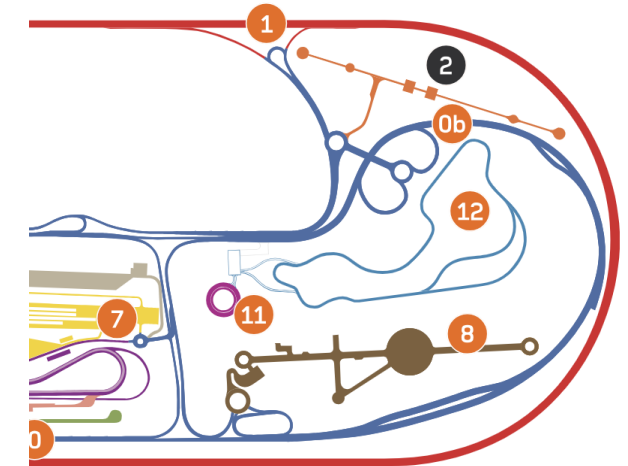
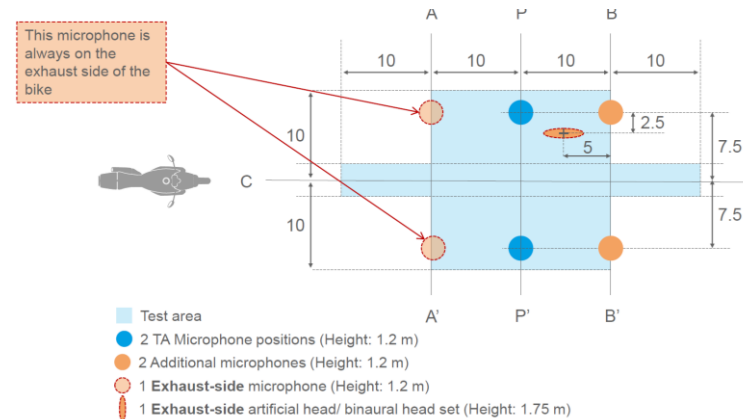
Sound pressure level



- SPL density between 70-105 dB(A)
- Velocity ↓ → SPL ↓

Noise emissions testing – On track

- Noise TA testing on ISO certified track
- Noise testing of real-world driving events on track under controlled conditions
- 115 LVs measured on track
- Real-world patterns derived from on-road noise measurements.
- Testing partners:
 - IKA RWTH
 - IDIADA
 - TUG



Tempering detection & Remote sensing

- Roadside measurement of noise & pollutant emission for in-field tampering detection
- Field survey locations:
 - Flanders - Leuven 5.2024
 - France - Paris region 9.2024
 - Spain - Barcelona 10.2024
- ~ 500 individual measurements



Summary

- LENS provides evidence needed for effective policy in terms of PTW noise and emissions.
- Development of devices and methods for real world characterization and monitoring of emissions and noise
- We are now in the phase of calculating cost-benefit scenarios for different potential measures (project ends Q3.2025)

Thank you!

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