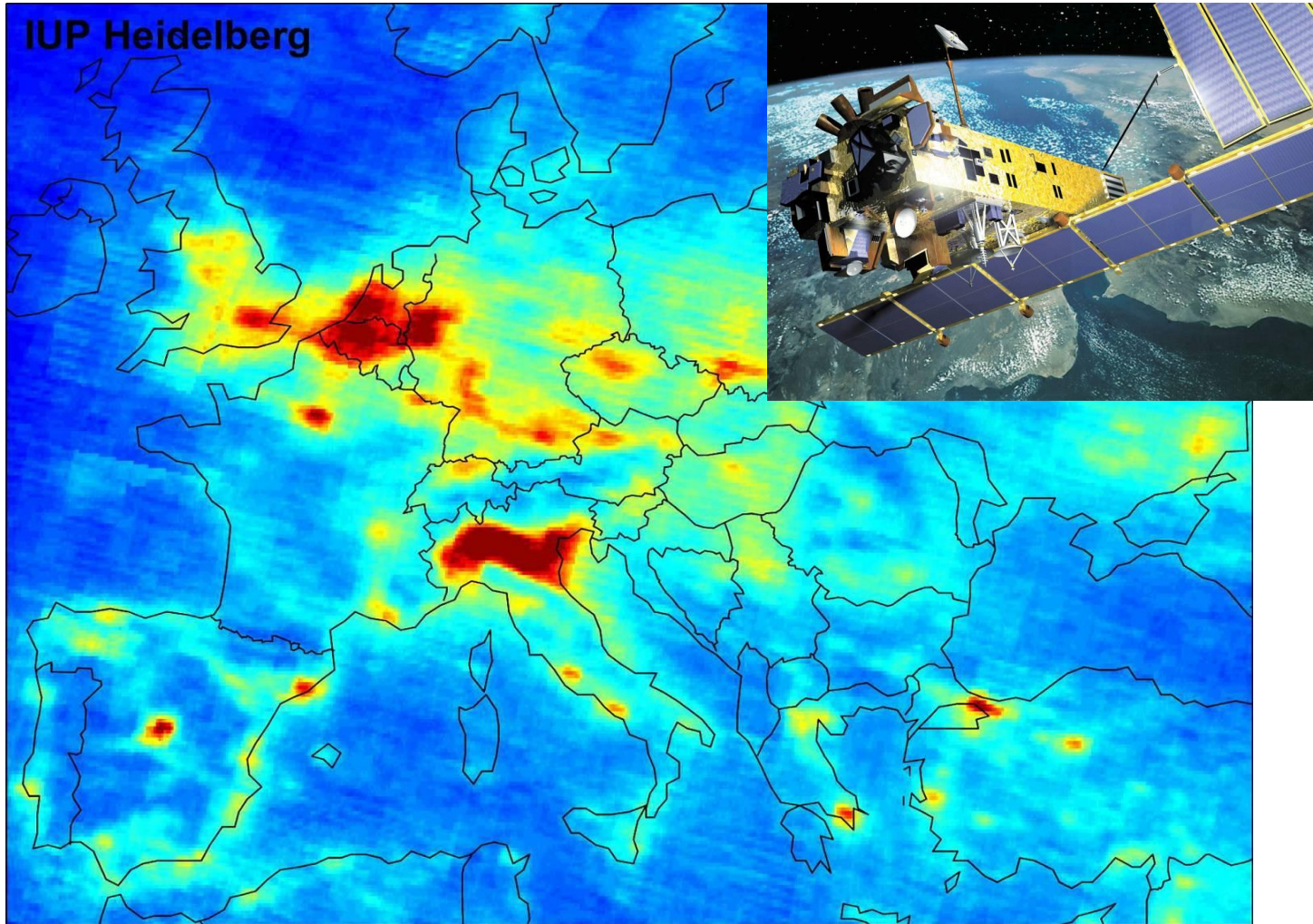


Short Test Procedures for Nanoparticles Emission and Gaseous Exhaust Components of Combustion Engines

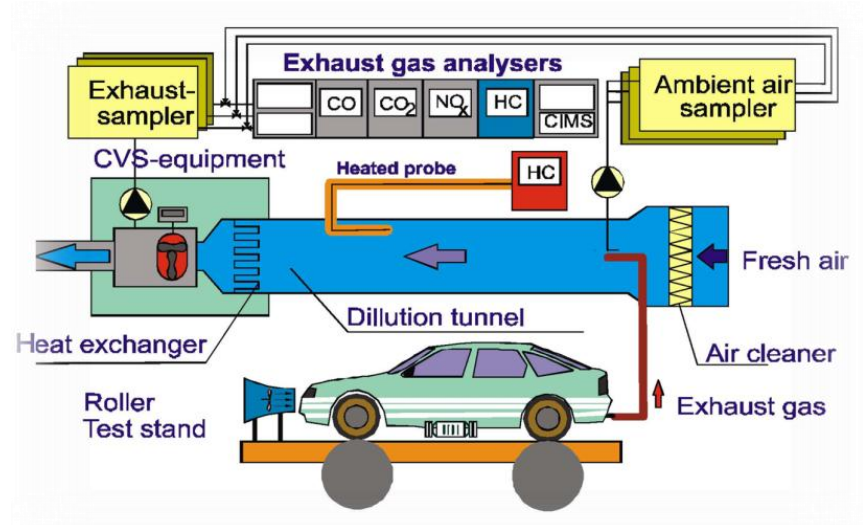


- Significant overruns of PM and NO₂ air quality limits specifically in urban areas



Test Procedures for distance related emissions and a limited number of vehicles:

- Chassis Dyno

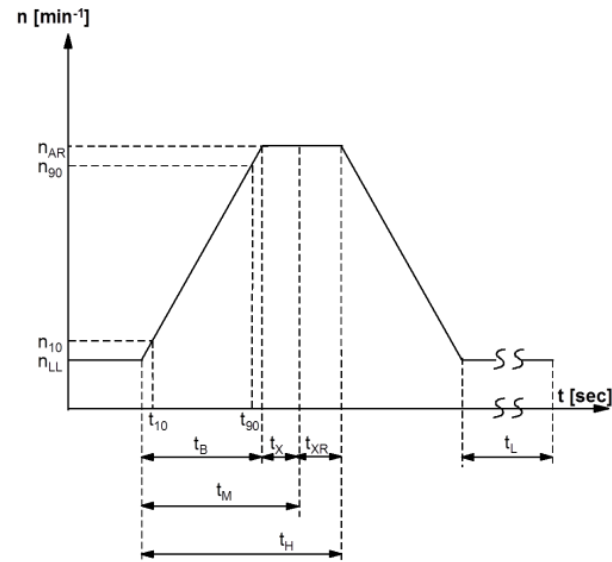


- Real-world testing



Test Procedures for Periodic inspection of all vehicles:

- Gasoline: Lambda λ + CO at high idle (by E. Pucher 1988)
- Diesel: Opacity at free acceleration (from the 1970s)



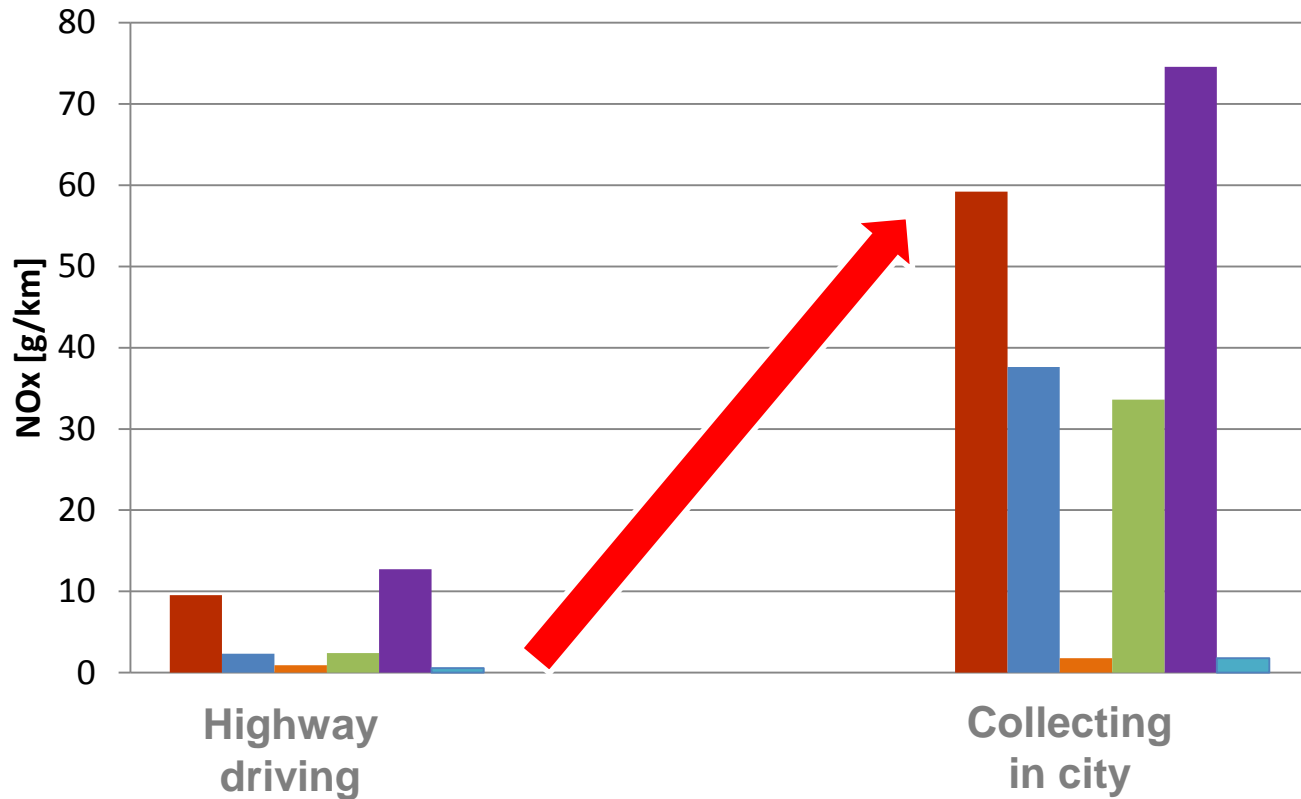
- For cars optional readout of the on-board diagnosis

Issues:

- The most important air-quality related exhaust constituents NO_x and PN are not measured
- The free acceleration test for Diesel is used only very limited in reality - Specifically with HDV
- We have more than 100 Million Diesel vehicles in Europe
- How will we handle the deterioration problem
- In urban driving Euro 6 cars, trucks and busses still have highly exceeding NO_x emissions
- NO_x and NH₃ are secondary particulate precursors

HDV Emissions during highway driving and collecting in city

■ Diesel EU3 ■ Diesel EU5 ■ CNG EU5 ■ CNG EU5 ■ Diesel-Hybrid ■ Diesel EU6



Strong fluctuations between engines of the same emission standard

Real-world “Optimization”:

- Chip tuning: Increased maximum power and
- Hardware emulators from third parties

Adblue Emulator 8in1 v3

Vehicle List:most OEMs.....

Special price: \$57.43!!! PayPal Garantee

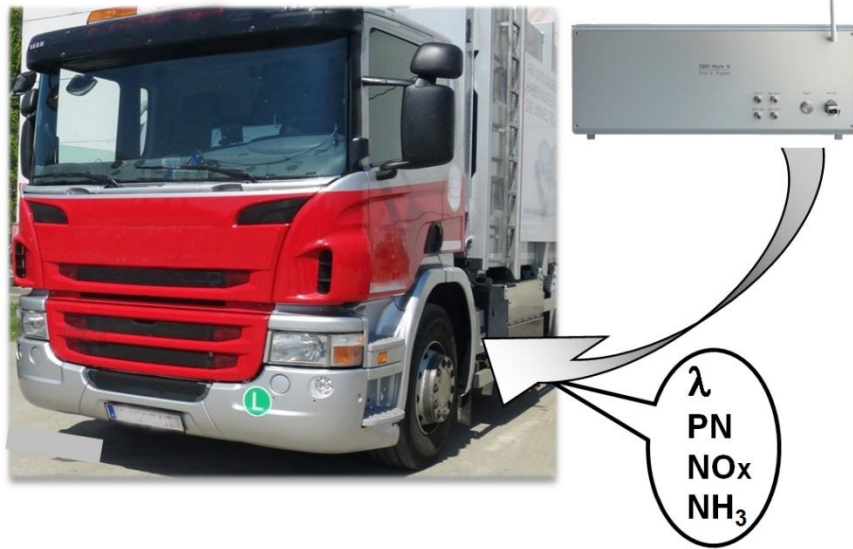
- Defeat device regulation: in US since 1983; in EU since 2009
- Map switching
- Engine protection

What we learned:

- From our experience of a high number of real-world test on all vehicle categories and evaluation of periodic inspection programs of Diesel and Gasoline vehicles over the last 20 years we learned:

- A direct tail pipe check that is independent of the vehicle itself is required!

Universal Short Test Procedures for Nanoparticles Emission and Gaseous Exhaust Components



- Load creation by high idle or auxiliaries
- λ - related measurement of PN and NO_x
- CO and NH₃ if required