

ADFE – AUTONOMOUS DRIVE FUEL ECONOMY



TRAFIKVERKET

- Part of the Drive Me project
- Researching AD impact on Energy Efficiency
- Joint project between Trafikverket and Volvo Cars
- Project end: April 2019

RESEARCH QUESTION:

"How can Energy Efficiency be improved with Autonomous Driving?"

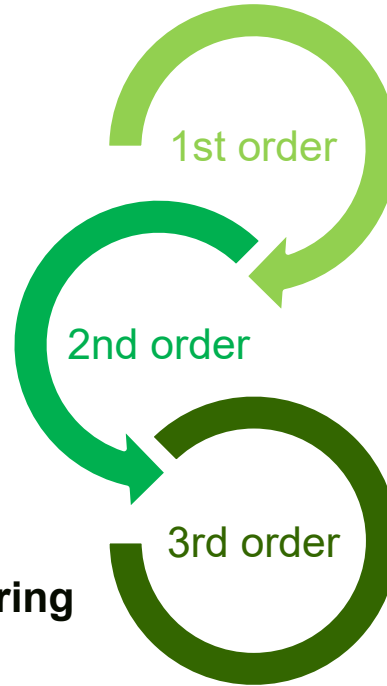




RESEARCH AREAS

1) Vehicle technologies

- Eco Driving
- De-Emphasized Performance
- Feature Content
- Increased Crash Avoidance



2) Traffic Flow

- Speed Limits
- Road capacity
- Platooning
- Eco- Routing
- V2X & V2V
- Congestion Mitigation

3) Personal Mobility

- Increase of Travel
- Increased Carpooling and Car sharing
- Right-sizing of Car to Trip
- Fuel Mix Changes induced by AV
- Travel by Underserved Population

RING ROUTE IN GOTHENBURG



- A research project aiming to investigate the effects of autonomous vehicles on personal mobility
- 30 km long typical commuting route
- Speed limits between 50 and 80 kph and no access for bicycles or pedestrians



KNOWLEDGE ABOUT VEHICLE MOVEMENTS

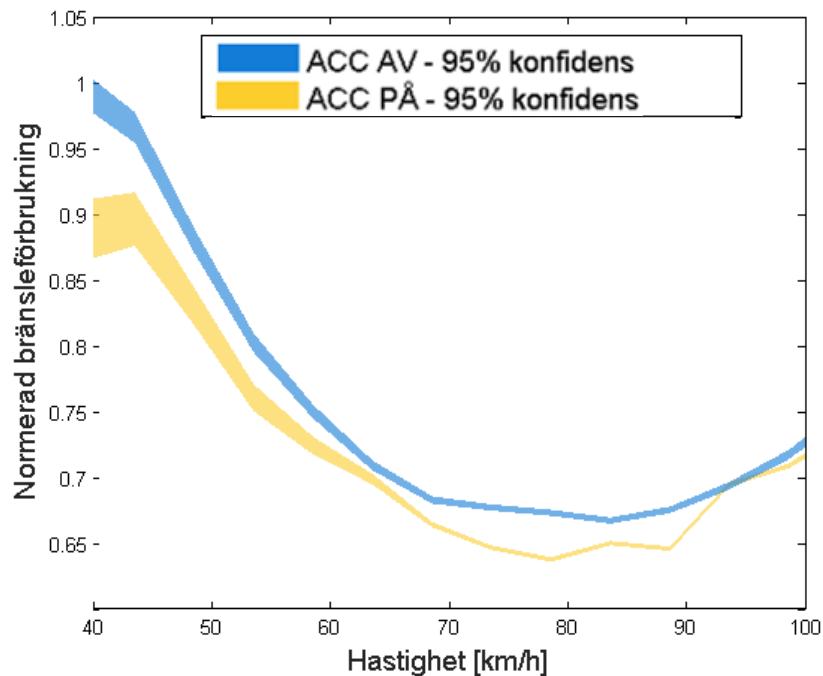


EUROFOT: Data logging project with 100 000+ trips on DriveMe route, measured over years, mainly from Volvo employees and their family members during everyday use.

ESSENTIAL SIGNALS:

- Vehicle speed
- Distance to car in front
- Lane
- Fuel Mass flow
- GPS position
- ACC (Adaptive Cruise Control) mode

EFFECT OF ACC ON FUEL CONSUMPTION



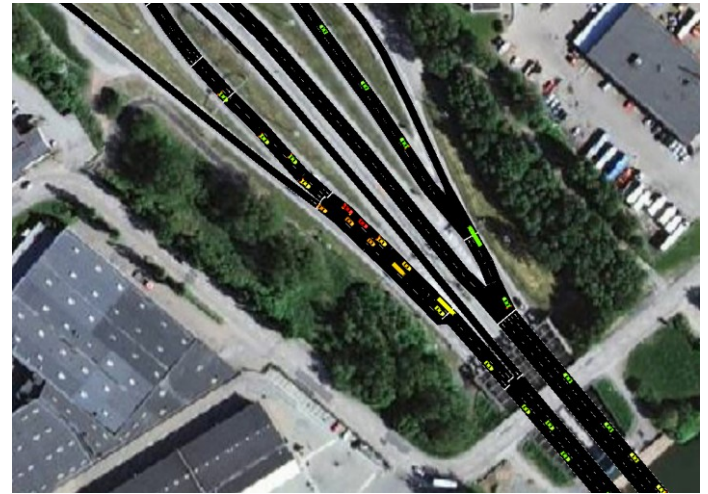
When ACC is used the fuel consumption is lower on average for all speeds up to 100kph*

*) Volvo diesel cars on the ring route in Gothenburg



TRAFFIC SIMULATOR ENVIRONMENT

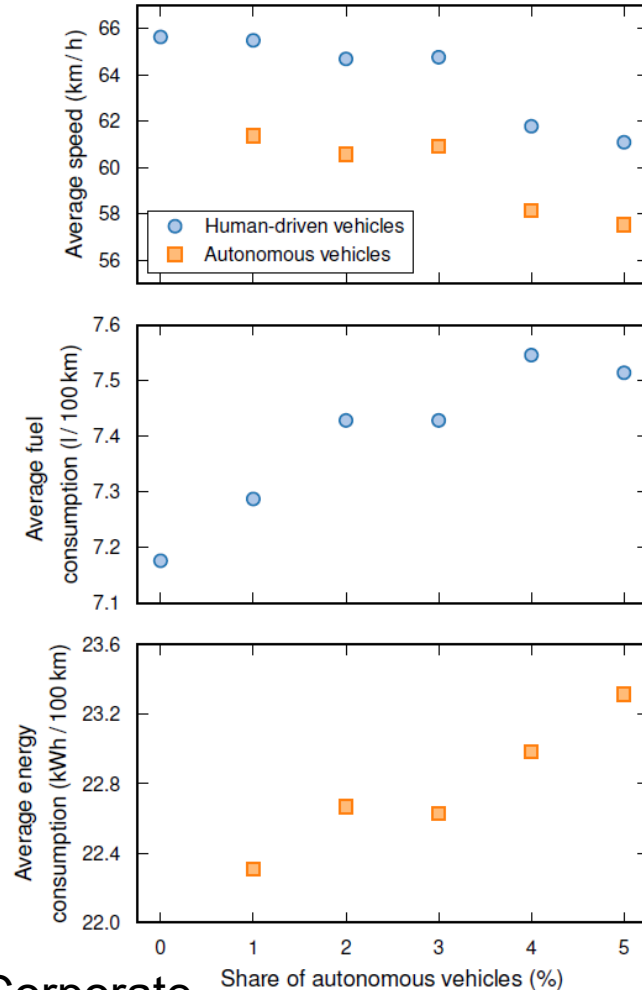
- SUMO - Simulation of Urban MObility.
- Open source – Shareble
- Car Following models
 - Krauss
 - Wiedemann
 - Intelligent Driver Model
- Autonomous driver model
 - ACC (Adaptive Cruise Control)
- Inflows and destinations from Gothenburg municipality.



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SIMULATION RESULTS

- Fuel consumption of system:
If near congested, or congested,
congestion will increase, leading
to a higher fuel and energy
consumption.



PUBLICATIONS

- ITEC 6th IEEE Transportation Electrification Conference and Expo 2017, Chicago.
"Fuel Economy Assessment of Autonomous Vehicles Using Measured Data"
- IEEE Intelligent Vehicle Symposium (IV) 2017, Redondo Beach
"Driver Behaviours Impact on CO2 and Traffic"
- SUMO User Conference 2017
"Towards Simulation for Autonomous Mobility"
- Journal article, 2019
"Assessing the Energy Efficiency Impact of Autonomous Vehicles Using Traffic Simulation"

Issuer: Corporate Communications; Company



THANK YOU FOR LISTENING



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