
VOLVO
Autonomous Vehicles
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Global Trends

- Internationalisation
- Increased need for people and goods transportation
- Urbanisation
- Growing mega cities
- Air quality major health problem
- Traffic accidents global health issue
- Excessive time for commuting
- Desire for time efficiency
- Desire for constant connectivity

- ***Transportation the backbone of modern society!***

for many CAR consumers the everyday reality looks like this…

Why AD? – Customer Perspective

- What is it that modern people are lacking?
  - Time
  - Constant connectivity

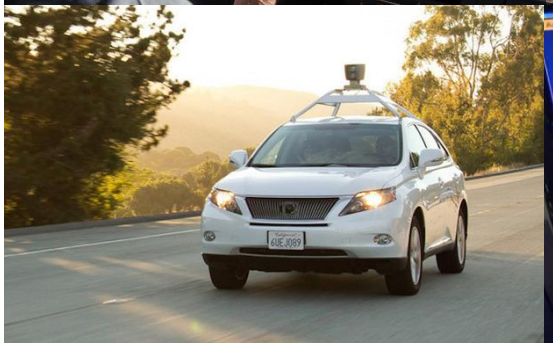
What if we can create a car that offers time, connectivity and a safe ride?

AD Opportunities

- **Safety**
- **Fuel economy**
- **Traffic flow**
- **Improved mobility**
- **Infrastructure**
- **Comfort**
- **Urban planning**

AD will be important for
a sustainable mobility

How Do We Make AD Come True?



Outlook of AD Development

Highway commute

Less complicated
Median separated
No pedestrians, bikes
No intersections

Urban streets

Full complexity
Mix of road users
Intersections
<50mph

Low speed environments

Low speed (<25mph)
Parking
Pod vehicles
Shuttles
Enclosed environments

2020

20XX

Autonomous Drive Development

During next 10 years we will have a scattered implementation of Autonomous Drive

Driver support

No need for back-up systems, rely on driver to monitor

DRIVER RESPONSIBLE

2017

Steps towards full AD

VOLVO Google

Pilots to pioneer Autonomous Drive in restricted use

BMW Mercedes Audi TESLA

Driver monitoring

Extended support offers without back-up systems

2017-2020

Highly Autonomous Vehicles

No driver to hand over control to in a critical situation: need of back-up systems

DRIVER NOT RESPONSIBLE

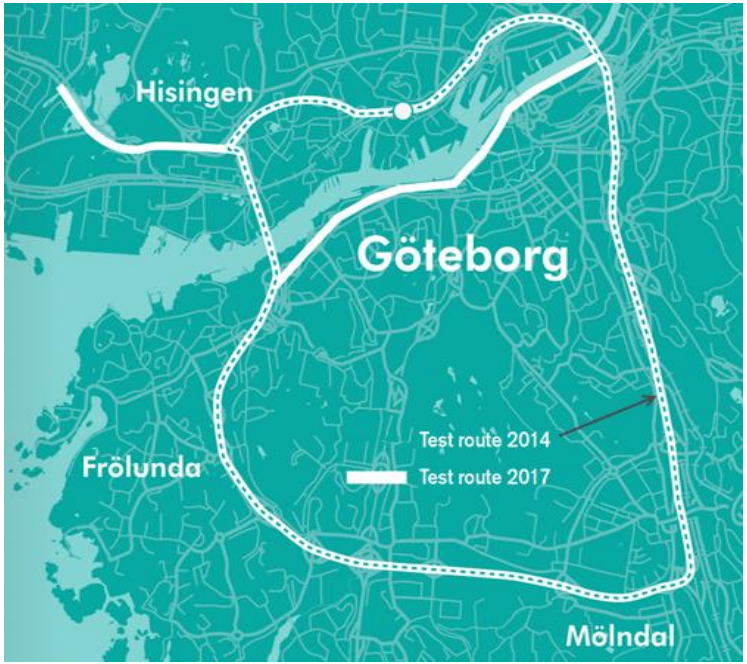
2020 ->

Autonomous Driving Functionality
What is the problem?

Driver out of the loop

A self-driving vehicle must be able to
handle *all* situations (and *prove* that it can!)

Drive Me Project



- Using public roads ~50 km
- Highly autonomous vehicles in 2017
- 100 customer vehicles
- Unsupervised
- Co-operation with Swedish authorities
- SAE Level 4

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

City of Gothenburg

LINDHOLMEN SCIENCE PARK

Autoliv

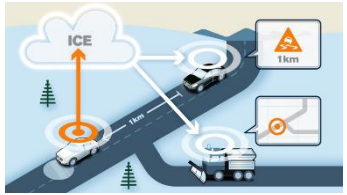
CHALMERS

Volvo AD Technology

Connectivity/ Geofencing

- Connectivity:
  - Autonomous Driven Cars and Connectivity: two separate but linked developments
  - Connectivity: cellular (3G, 4G or 5G) or wi-fi (DSRC/ G5)
  - Connectivity for autonomous driving:
    - Connectivity for communicating with other cars and the infrastructure
    - Connectivity for assessing no road hazards or other issues
  - In vehicle sensors to understand the surroundings.

- Geofencing
  - High defined multi layered maps for guidance and threat assessment
  - First step, AD applied to restricted AD area: Geofencing needed.
  - Supported by a digitized infrastructure. Other benefits, e.g:
    - Forced speed limits at sensitive areas, e.g. schools
    - Hybrids using only electricity in certain zones



Conclusions:

- Autonomous vehicles will bring many opportunities to the society and to its citizens and will enhance sustainable mobility .
- AD level 4 and 5 are the truly safe and viable offers to customers.
- AD cars need to be geofenced to certain certified areas and roads for the first steps in the developments
- A digitized infrastructure is needed to support geofencing
- *Europe face a risk of falling behind the US and China due to legal requirement obstacles.*

- *Save people's time and uncomplicating their lives!*


Thank you!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