



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

# Platooning, a natural course to full autonomy

Homayoun Najjaran, PhD, PEng  
Professor

School of Engineering  
The University of British Columbia

September 2016





a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA





## Autonomous Driving: Fast Forward to the Past!

Horse and Cart Traffic in Central London, 1890's -- Film 11270 



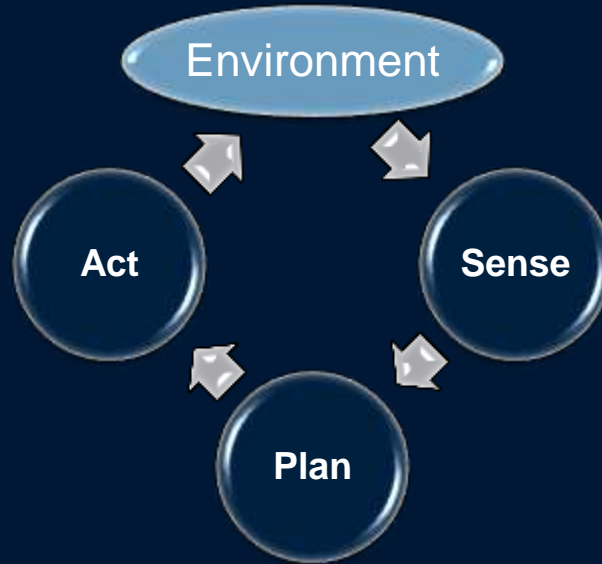
0:19 / 1:28



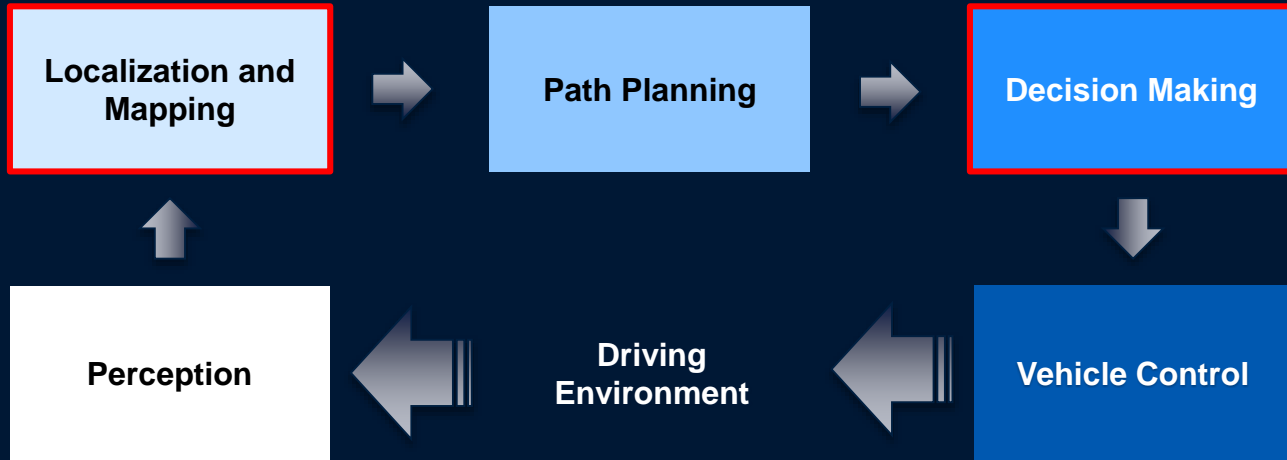
YouTube



# Navigation Process

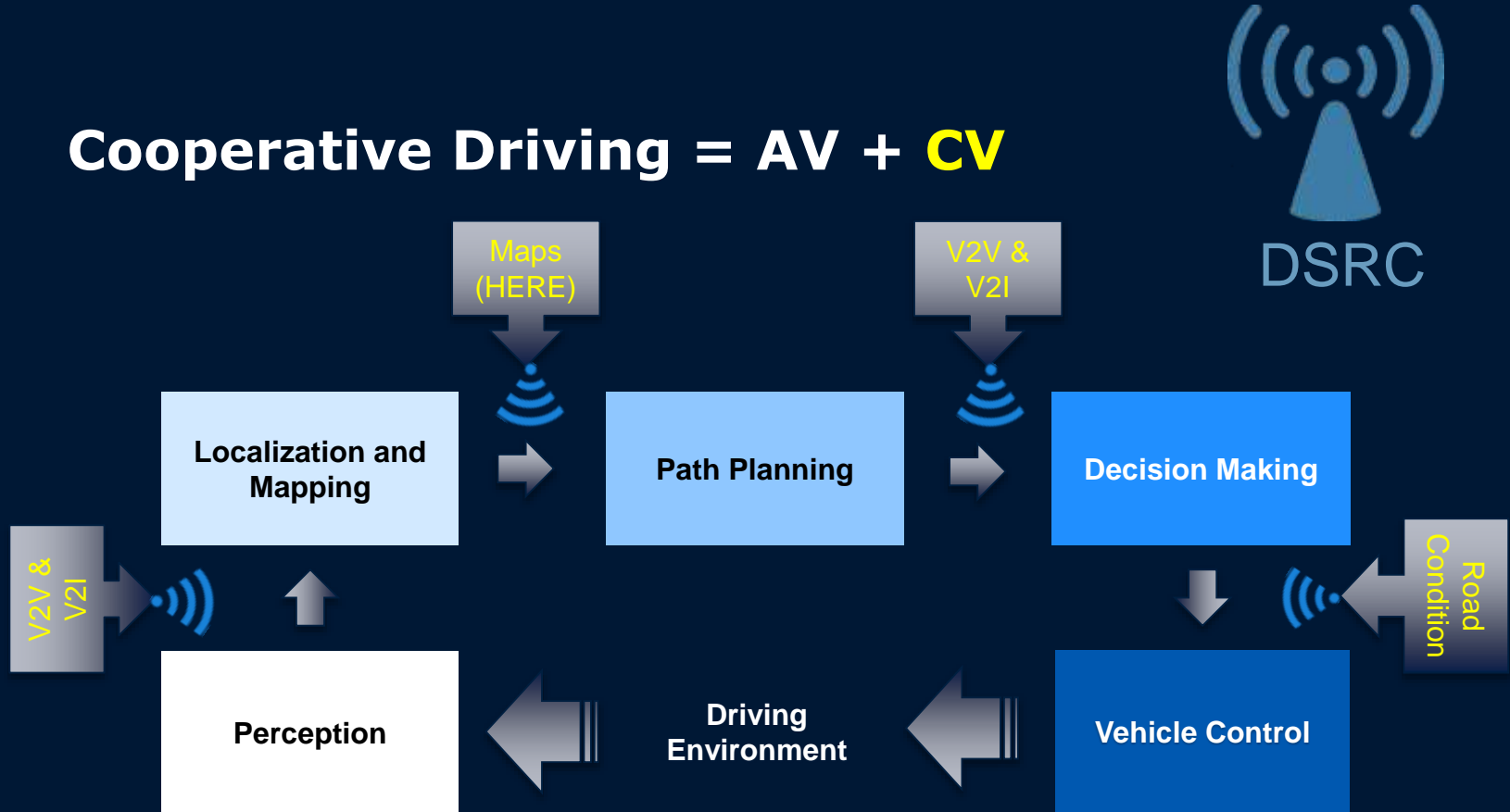


# Autonomous Vehicle





# Cooperative Driving = AV + CV





# Levels of Autonomy

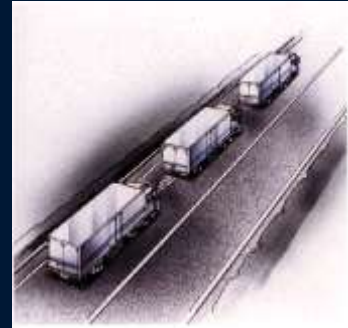
NHTSA September 2016



Safe, Stable, Intelligent  
Hardware and Software

# Highly Automated Vehicle (HAV)

- Advanced Driver Assistance System (ADAS)
  - Blind-spot and lane departure warning, drowsiness alert, collision avoidance warning (CAW)
  - Adaptive cruise control (ACC), lane change assistance (LCA), emergency braking (AEB), automatic parking system (APS)
- Platooning
  - Highly automated vehicle (HAV)
  - IVC-enabled = DSRC + IR + ...





# History of Platooning

- Saves fuel, lowers emission, improves traffic flow that is time and space



ARAMIS  
1970's

Prometheus  
1980-1995

**SARTRE**  
**2010-2012**

**Challenge**  
**2016**



PATH  
1986- ...

**DATP**  
**2013- ...**



**NRC&TC Study**  
**2014**

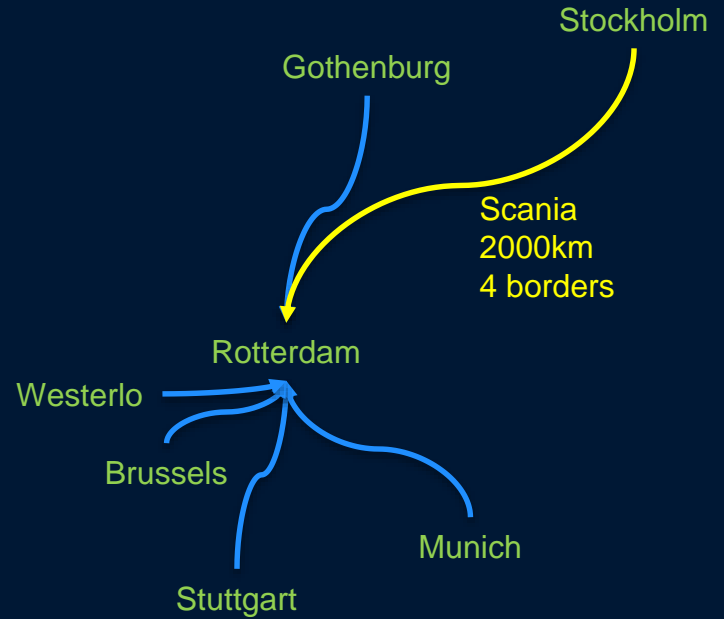
<http://doi.org/10.4224/23000190>

# Learn by Doing!

DAF, Daimler, Iveco, MAN, Scania and Volvo



April 6, 2016





## **Platooning:** Opportunities and Challenges

- From HAV to AV
- Expand IVC network
- Heterogeneity
- Public roads, regulations, driving culture, ...



# Questions?

**Homayoun Najjaran PhD, PEng**

Professor

School of Engineering, UBC

**ACIS Laboratory**

**[h.najjaran@ubc.ca](mailto:h.najjaran@ubc.ca)**

