



# **DRIVER CENTRIC AND CONTEXT-SENSITIVE AUTOMATION TO ENHANCE SAFETY AND IMPROVE FUEL EFFICIENCY**

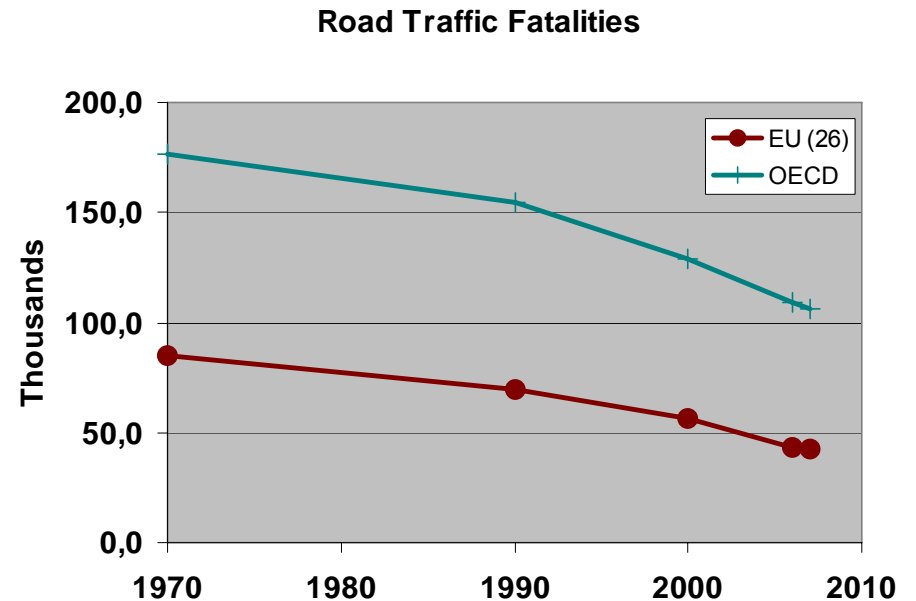
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ITS World Congress, 2009, Stockholm, Sweden

# Need For Action

- Despite all success in passive safety the toll of injured and killed people in traffic is too high
- Environmental impact must be minimized
  - Fuel consumption (CO<sub>2</sub>) and emissions
  - Road infra-structure
- Increasing density and complexity of traffic
  - Loss of convenience
  - unpredictable duration of trip



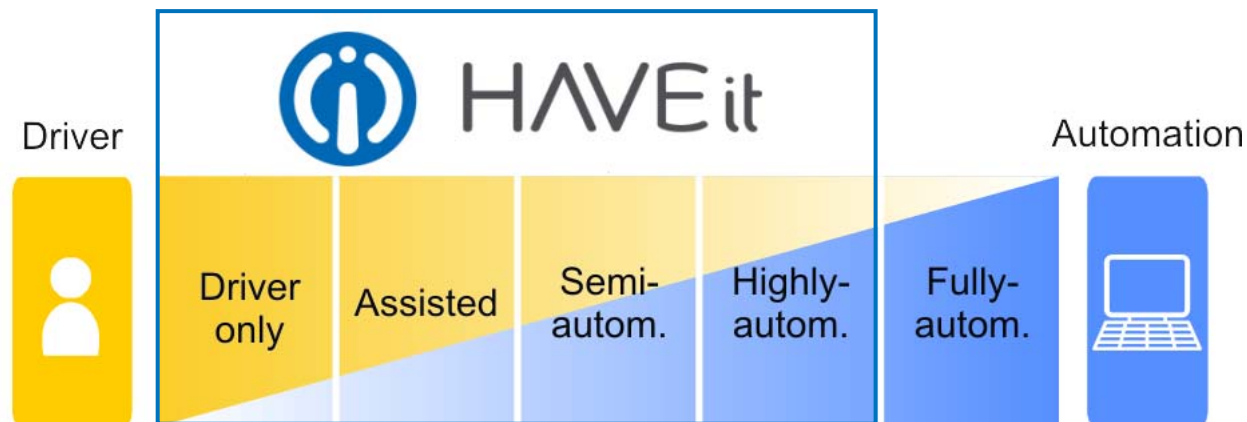
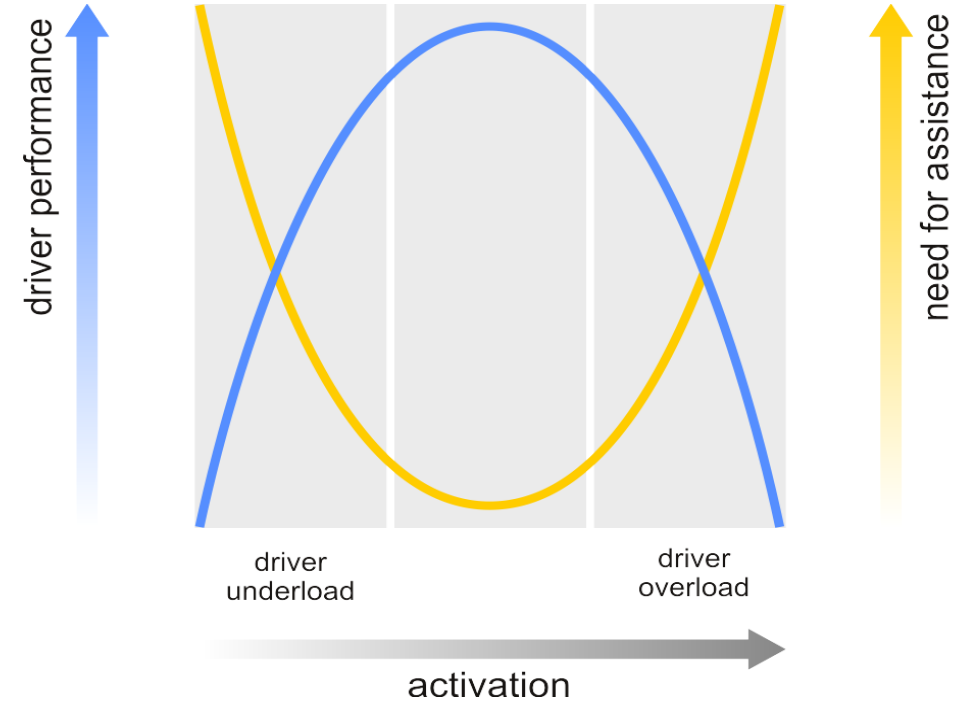
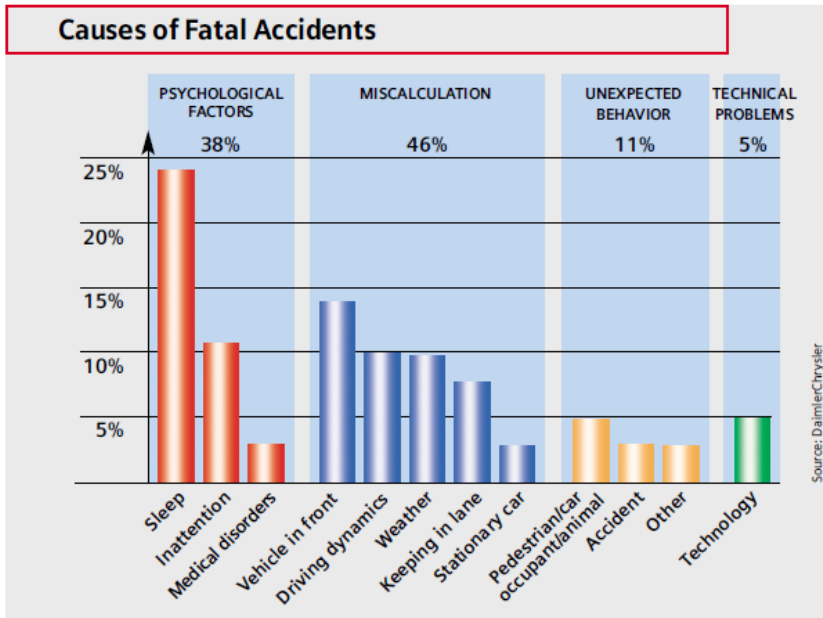
OECD International Transport Forum

[http://internationaltransportforum.org/statistics/trends/index.html#Road\\_Accidents](http://internationaltransportforum.org/statistics/trends/index.html#Road_Accidents)



<http://www.pdphoto.org/PictureDetail.php?mat=&pg=7228>

# Root Cause and the HAVEit Approach: Automation to Assist and Not Replacing the Driver



# Expected Benefits from Highly Automated Vehicles

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- More convenient driving
- Better overview and proper actions in complex driving situation
- Robustness against temporary driver inattentiveness
- Improved traffic flow
  - Less disturbance due to inadequate maneuvers
- Less accidents

# Principles of HAVEit Control Strategy



- “Autonomous” vehicle control
  - Safety critical decisions are based on onboard real-time sensor data
  - Third party information are used as forecasts
- Driver is always in the loop and in control of the system
- Useable in “mixed mode” traffic
- Driver can override system actions
- System intervenes only in case of
  - Driver is not responding
  - Driver can't handle situation
  - ▶ Minimum risk maneuver to safe state



## Co-operative Driving

C2x communication used as “Asynchronous Sensor” for “out of sight” information

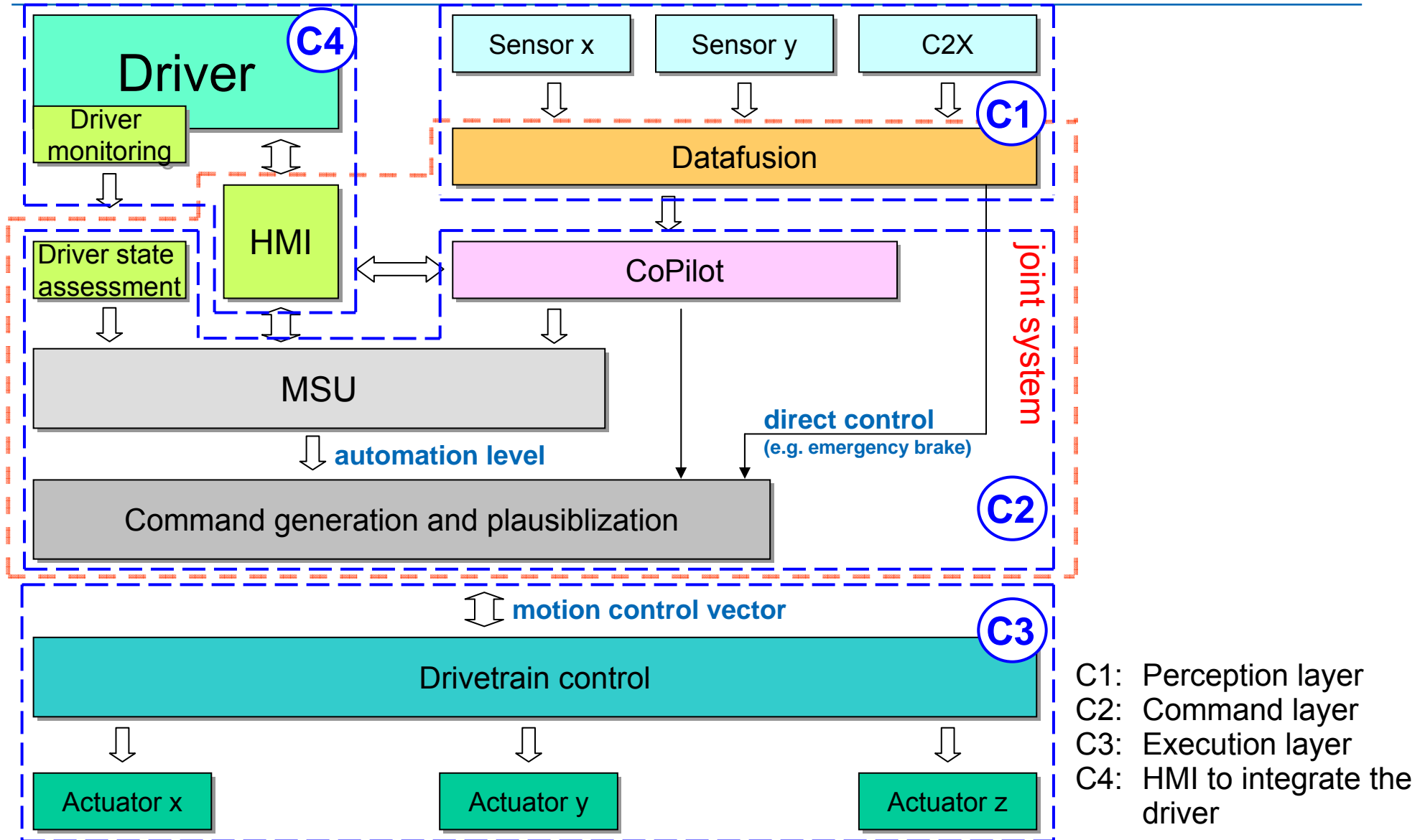
- Valid?
- Complete?
- Accurate?
- Data integrity?

## Vienna Convention

- Responsibility
- Technological capabilities

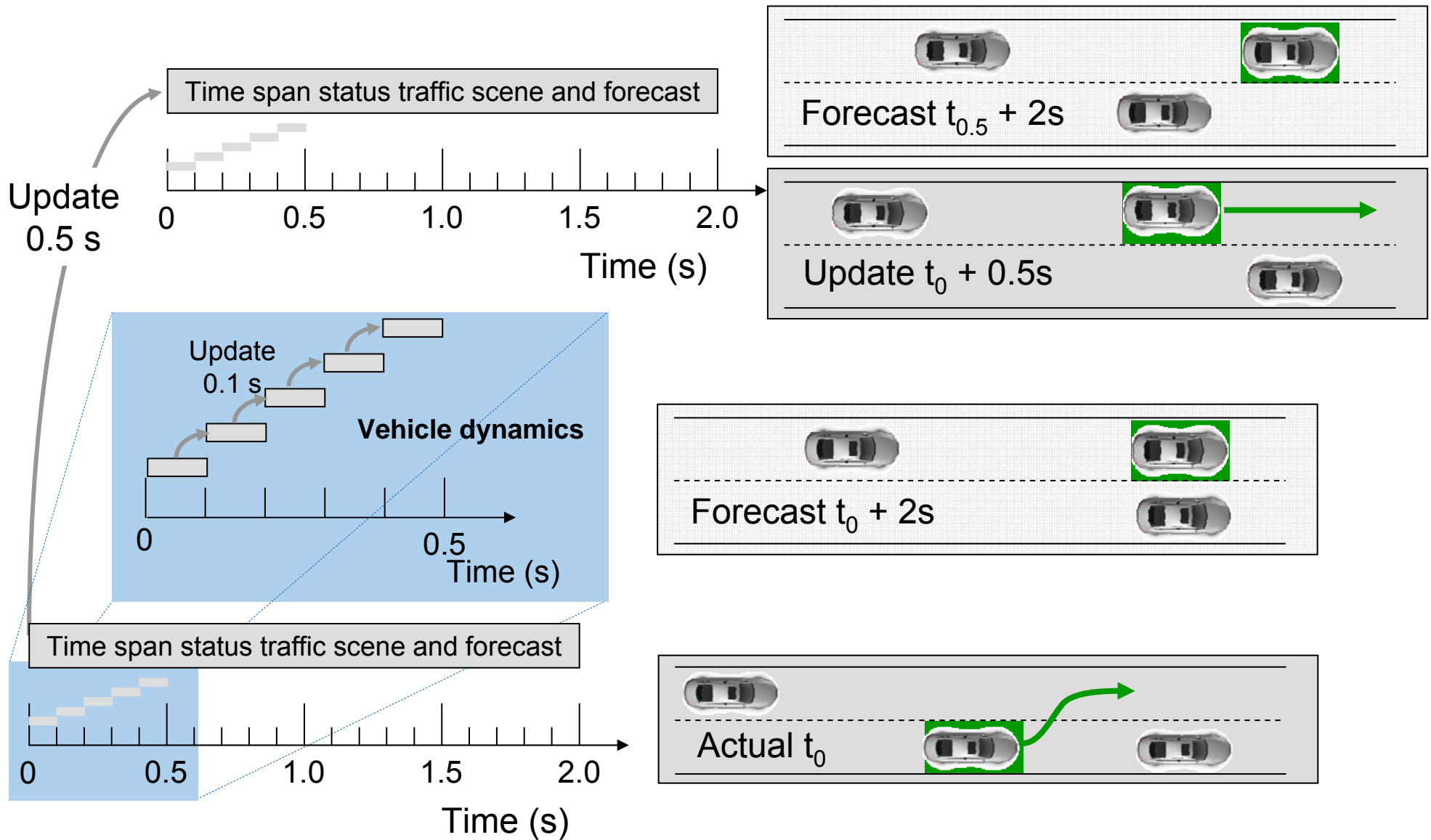
## Driver-less Driving

# The Central Element of HAVit: Joint System

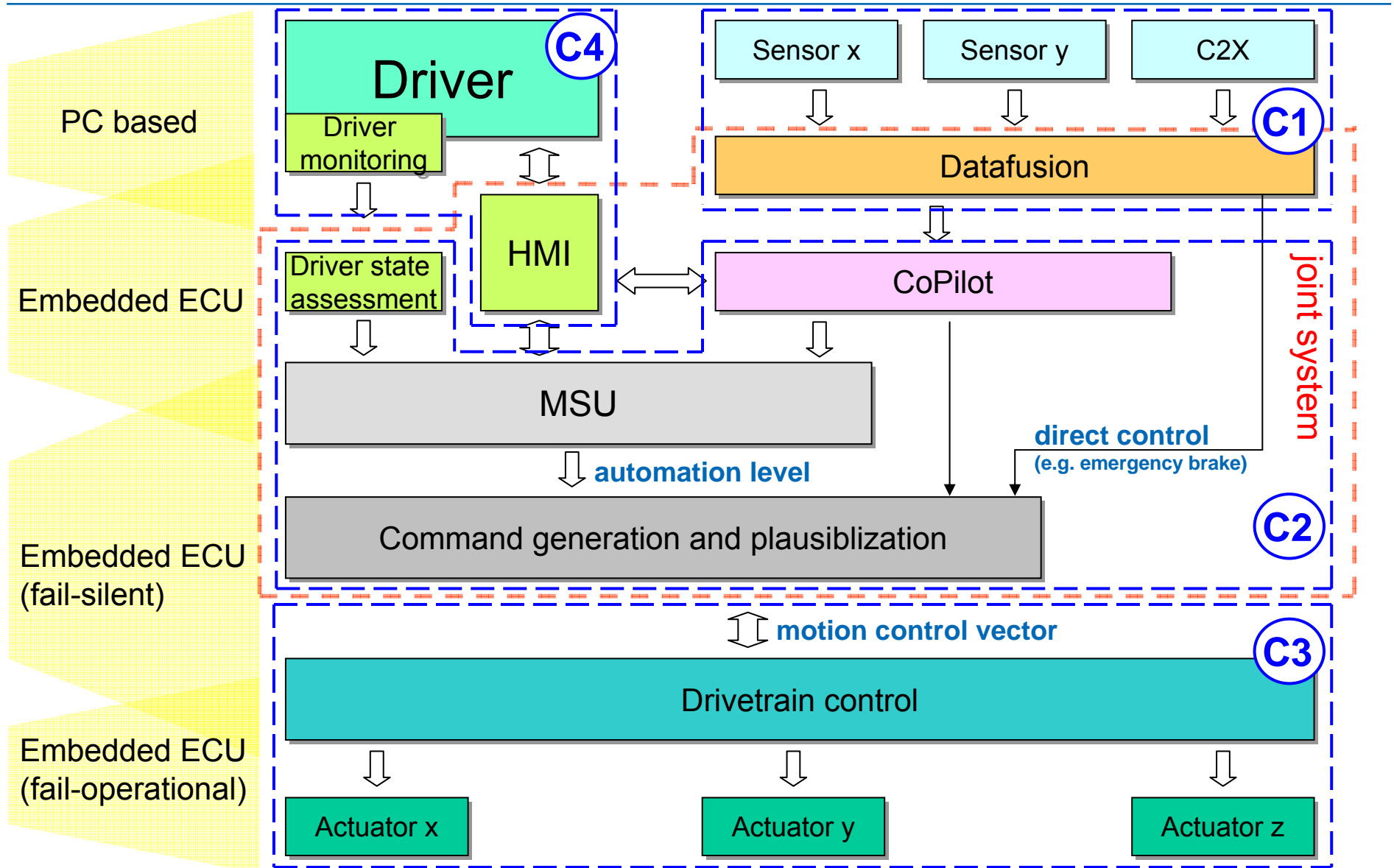


- C1: Perception layer
- C2: Command layer
- C3: Execution layer
- C4: HMI to integrate the driver

# Scenerary Detection and Maneuver Discrimination

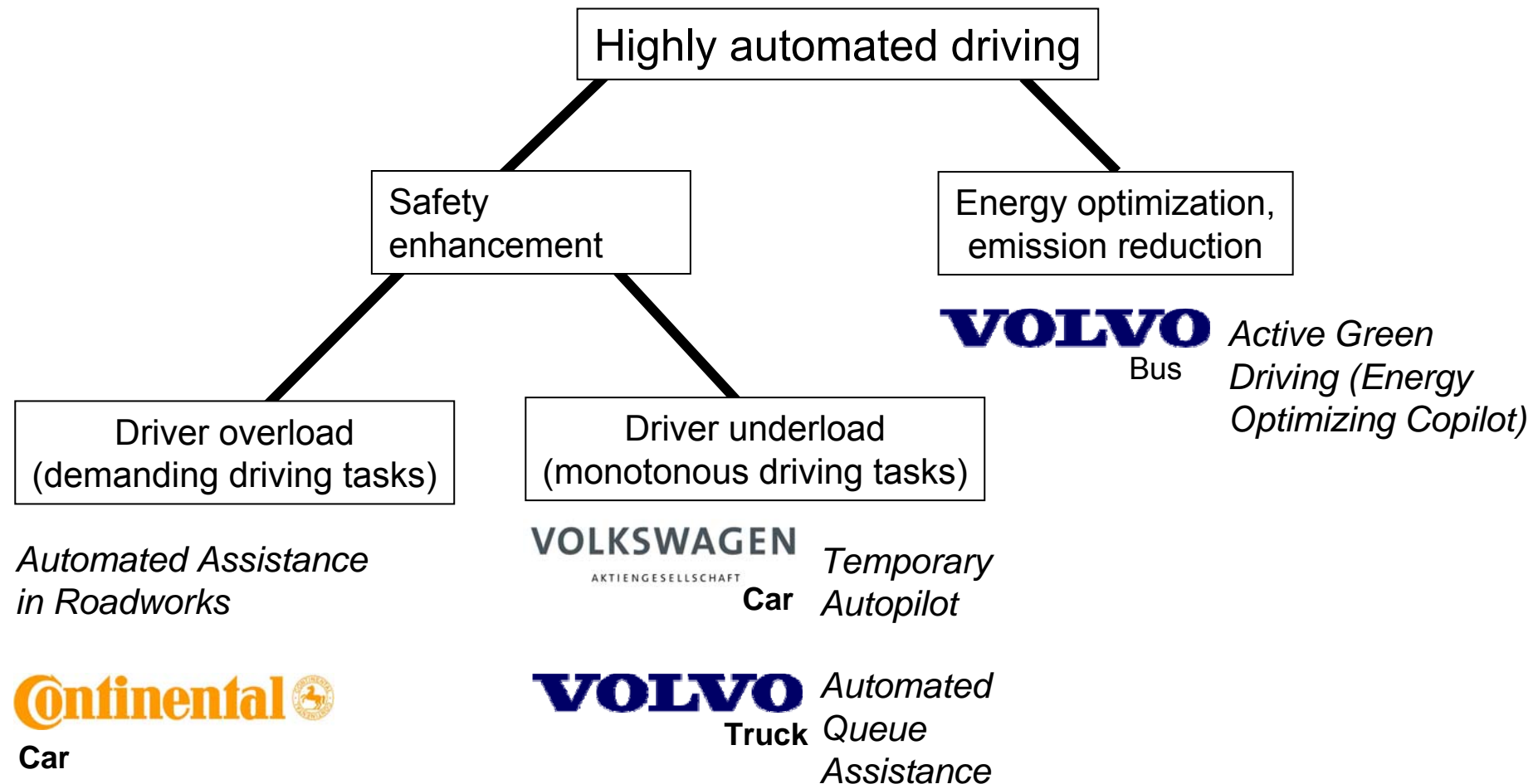


# Cost Effectiveness and Migration Paths

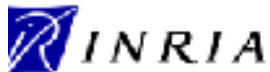




# One Approach: Several Use Cases



# HAVEit Consortium





# Thank you!

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**For more information, please visit our website: [www.HAVEit-eu.org](http://www.HAVEit-eu.org)**