



on behalf of



www.erticonetwork.com



http://vra-net.eu

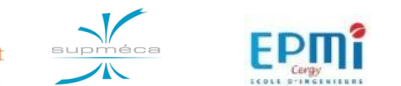
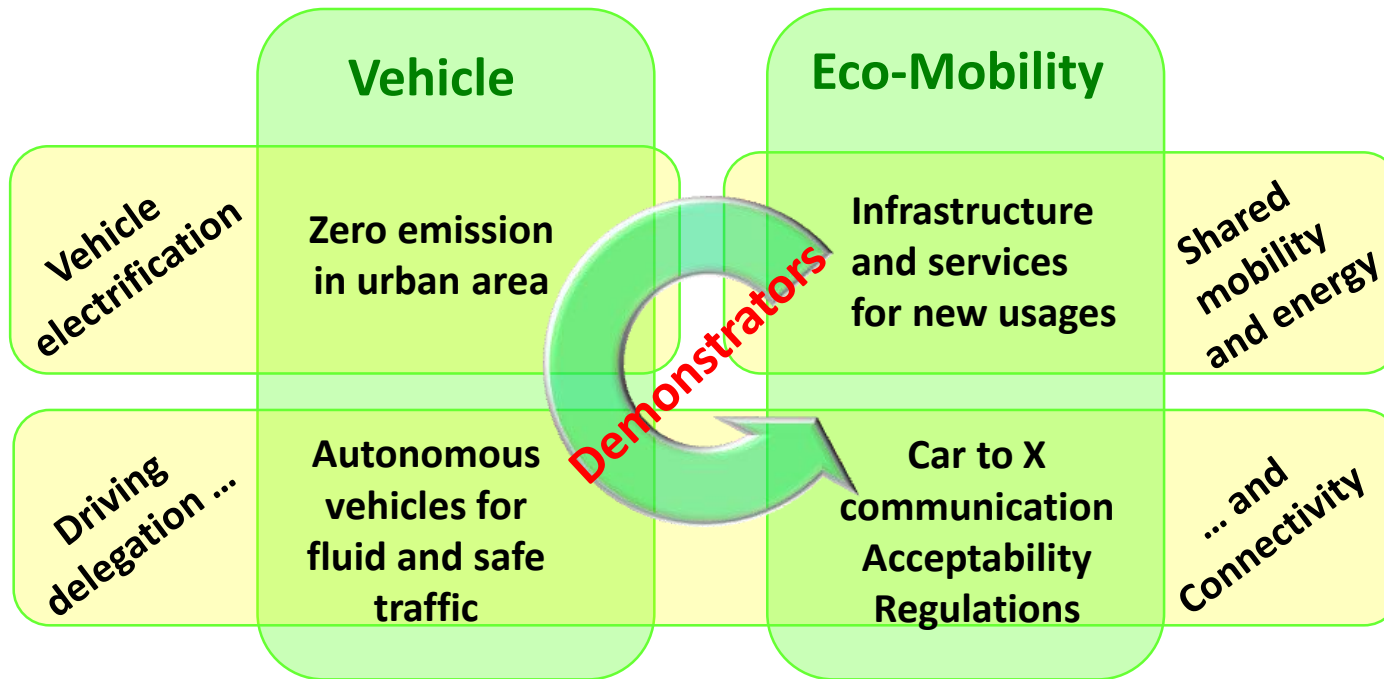
Sharing roles between driver and vehicle system a European perspective

Ebru DOGAN, PhD

- VEDECOM and VRA Network
- Existing European projects treating human factors issues in vehicle automation
- Joint driver-vehicle system / Collaborative automation
- VEDECOM's research

VEDECOM

an institute for the carbon-free and connected vehicle and its mobility
a public-private partnership federating industrial & academic research in France



Objectives of VRA Support Action

Create an active European network of experts on Vehicle and Road Automation and foster cooperation within the Automation WG



Contribute to EU-US-JPN trilateral WG on road vehicle automation (EC – US DoT – MLIT)

Identify deployment needs for Vehicle and Road Automation

Deployment paths, Regulatory issues, Testing, Connectivity, Evaluation of Benefits, Digital Infrastructure, Human Factors, Decision and Control Algorithms

VRA-net.eu/wiki

Promote the Research on Vehicle and Road Automation

HMI design for automated vehicle

- **HAVEit** (finalized in July 2011)
Highly Automated Vehicles for Intelligent Transport
www.haveit-eu.org
- **InteractiVe** (finalized in November 2013)
Accident avoidance by active intervention for Intelligent Vehicles
<http://interactive-ip.eu>
- **D3CoS** (finalized in February 2014)
Designing Dynamic Distributed Cooperative Human-Machine Systems
www.d3cos.eu



AdaptiVe – Automated Driving Applications and Technologies for Intelligent Vehicles

www.adaptive-ip.eu



HFAuto – Human Factors of Automated Driving

<http://hf-auto.eu/>



VRA – Vehicle Road Automation support action

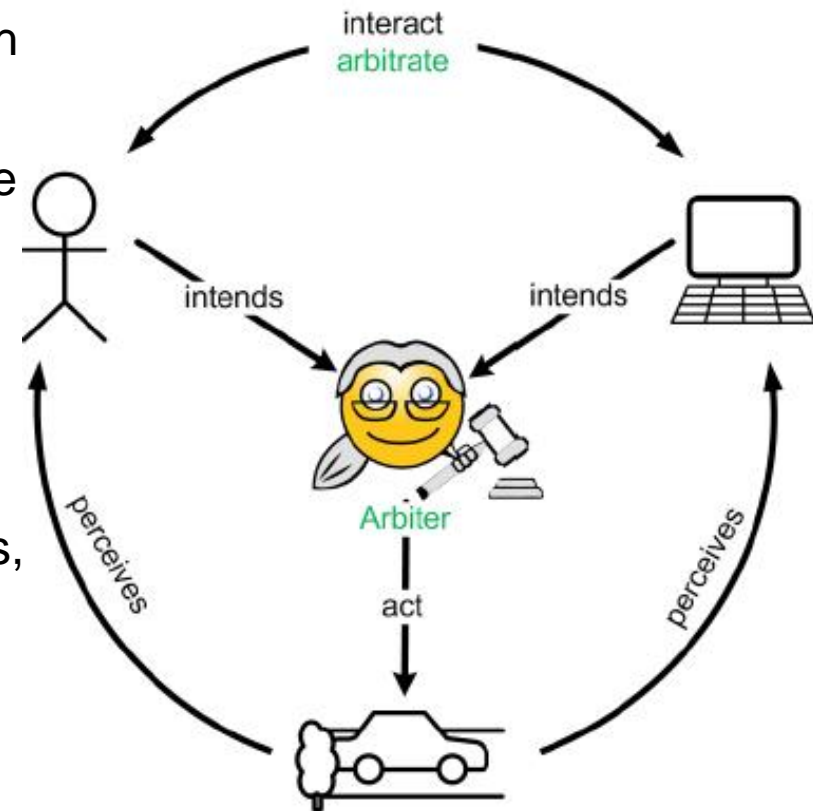
<http://vra-net.eu>



- DLR (Germany), Uni. Roma (Italy), Uni. Chalmers (Sweden),
 - France: IFSTTAR, Valeo, VEDECOM
 - Greece: ICCS, HIT
 - Netherlands: TU Delft, TU Eindhoven,
 - UK: TRL, ITS Leeds
-
- Human factors-related recommendations and roadmaps to European Commission
 - Implications of highly automated road transport for drivers, VRUs, society
 - Cooperative driver-vehicle system, HMI design (usability), and controllability
 - Social acceptability



- is a human perception-action model, which considers the vehicle as a cognitive agent
- implies **intuitive interactions** between the driver and vehicle, relying on **complementary skills** that are organized together to achieve a **common goal**.
- The basis of such system is a continuous interaction between the agents with respect to their intentions, actions, abilities, and limitations.
- Conflicts between agents are resolved by **arbitration**.



* Parasuraman, R. & Wickens, C.D. (2008). Humans: Still vital after all these years of automation. *Human Factors*, 50, 511-520.

** Hollnagel & Woods (1983).

Figure: Kelsch (2014). Joint.System.As.a.guiding.approach.for.driver-automation.system.design.H-CPS-I WS, 22-23 Sept, Paris

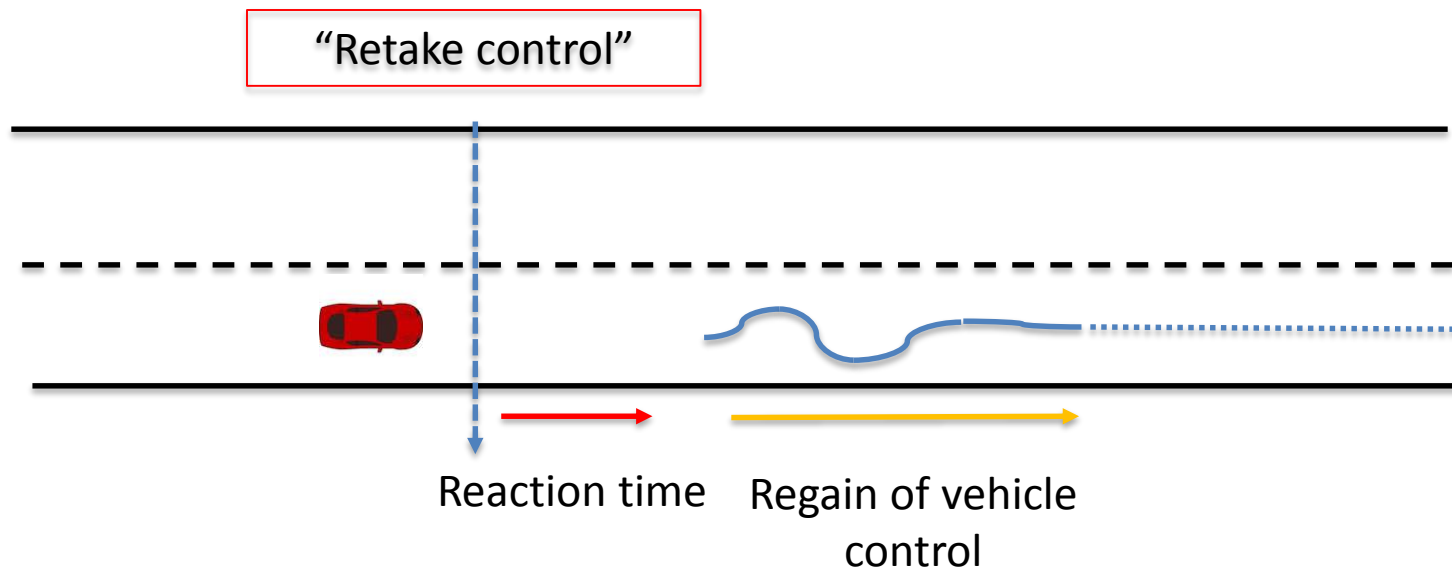
- How to avoid having a passive driver?
- Return the automated task briefly to the driver at low workload? *
- What is the correct task allocation keeping the integrity of driving task?
- Conflict between the driver and the vehicle?

* Parasuraman & Wickens (2008)

TRANSITION OF CONTROL: EXPERIMENTS CARRIED OUT AT VEDECOM

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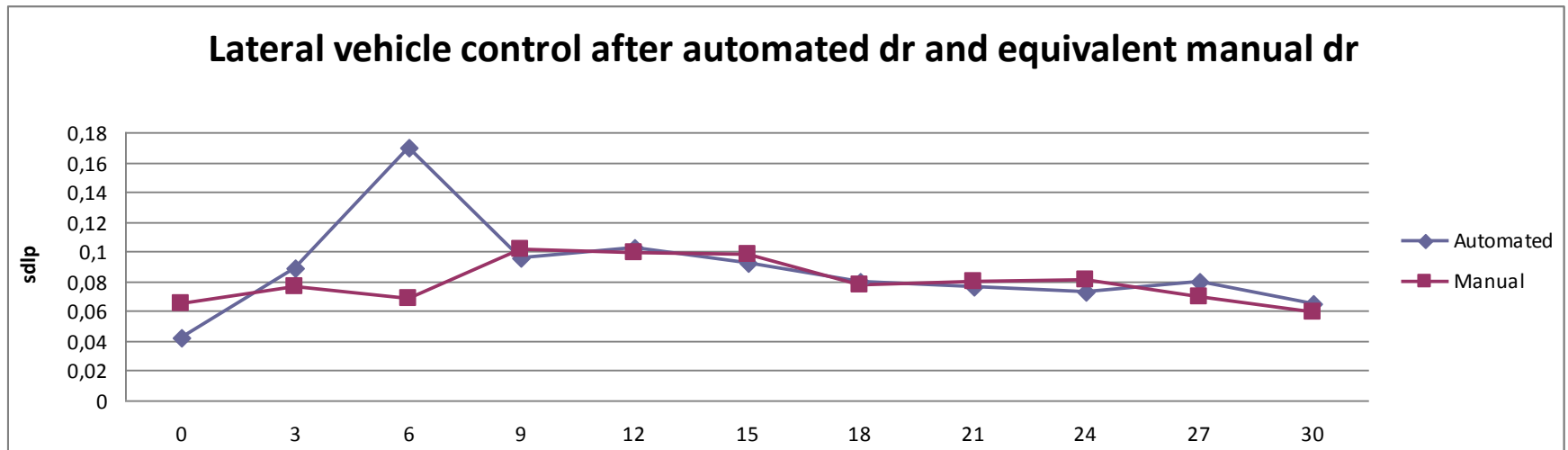
- Transition of control and driver performance at low-speed (50 km/h) automation on highway (i.e. Traffic Jam Assist)*



* Dogan et al. (2014). Evaluating the shift of control between driver and vehicle at high automation at low speed. 5TH TRA, Paris

TRANSITION OF CONTROL: EXPERIMENTS CARRIED OUT AT VEDECOM

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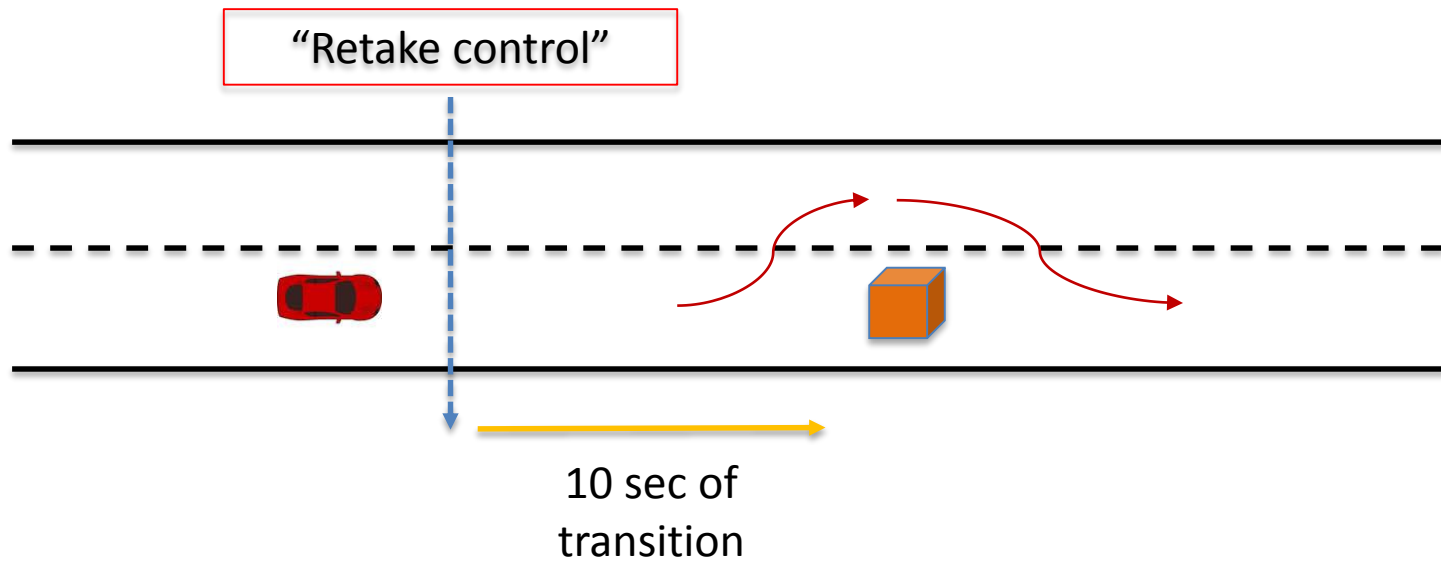


- Cooperation in joint driver-vehicle system during the regain of vehicle control

TRANSITION OF CONTROL: EXPERIMENTS CARRIED OUT AT VEDECOM

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- Maneuvering performance subsequent to transition of control
- Effect of different tasks on HMI (writing emails versus watching video clips)



TRANSITION OF CONTROL: UPCOMING PROJECTS AT VEDECOM

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- Two PhD thesis on situation awareness
- A post-doc project on driver state assessment

THANK YOU FOR YOUR ATTENTION

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