How ICT can support industrialisation of autonomous cars?

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Introduction

**Myself:**
- Deputy head of Innovation at AKKA Technologies for autonomous driving since 2015
- Previously worked in research at INRIA (PhD) with VALEO group

**AKKA Technologies:**
- Provide engineering and expert services to industry
- 1,2 B€ of turnover
- 13 000 persons
- Active in 20 countries over the world

**Topic of this talk:**
- Outline context and technical challenges linked with autonomous driving growth
- Highlight the importance of ICT in this growth
- Insist on the System approach required to deal with ICT integration in massively produced vehicles
Autonomous driving context

- Public Transportation
- ADAS

2 distincts markets - 1 fused solution

Mobility 2.0
- New Services
- New Usage
- Robotised transports
- High safety requirements

System responsibility
Driver responsibility

Source graphique : ERTRAC
The technical shifts behind autonomous driving

- **New services / usages** → Shift of added value toward services → **Market value of ICT**
- **Robotized functions** → Need to see further than platform sensors → **Technical value of ICT**
- **Safety Constrains** → Need to confront and support robotized system decisions → **Safety value of ICT**
ICT as AD friendly infrastructure

**User friendly infrastructure:**
- Road infrastructure received lots of investment to fit with human ergonomy and to enhance its comprehensions of road rules
- Since robots would share the road with humans, infrastructures have to be thought for robots users

**ICT as main “robots’ feeling”:**
- ICT allows to share information with robotized system without perceptions problems
- ICT enables all the autonomous system to collaborate in their driving tasks
System Engineering approach for ICT

**System design:**
- Apply top-down approaches to answer services requirement before addressing ICT technical issues
- Integrate infrastructure in this process
- Design functional requirements of ICT support to autonomous functions both into the vehicle and the infrastructure
- Clear responsibility involvement of design stakeholders

**System balance:**
- Balance this support with functional then organic safety into the vehicle
- Characterize the ICT limits at an industrial scale
Multi-layers Autonomous cars

- Fleet pilot
- Advanced autonomous pilot
- Basic autonomous pilot
- Robotised system
- Vehicle platform

Cloud / Distributed / Collaborative computing possible

Into the vehicle

Safety constrains

Using advanced ICT and AI solutions while insuring system safety:
- Secure low levels architectures and integrity
- Monitor orders from advanced autonomous pilot
- Authorize cloud / distributed / collaborative support at an abstract level