



Developing ICT Solutions for Dynamic Charging of Electric Vehicles

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Outline

- Introduction to Electro-mobility
- ICT for dynamic charging
- Conclusions and next steps





Electro mobility trends (I)

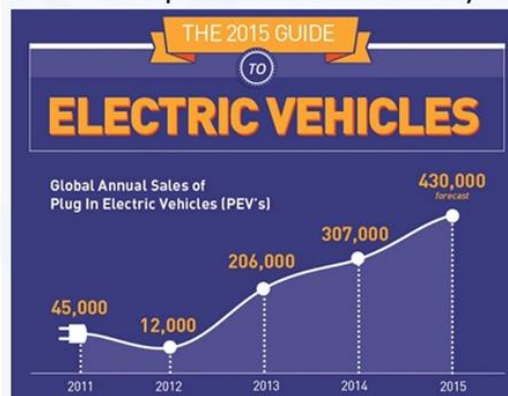
Electric Vehicles

Range increases due to battery breakthroughs



New models

Global adoption increases steadily



Infrastructure

Static charging infrastructure is deployed fast

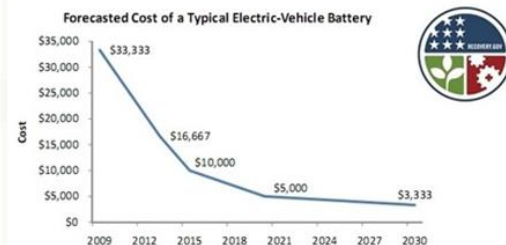


Very fast supercharger deployment (>250km range in 20 minutes)

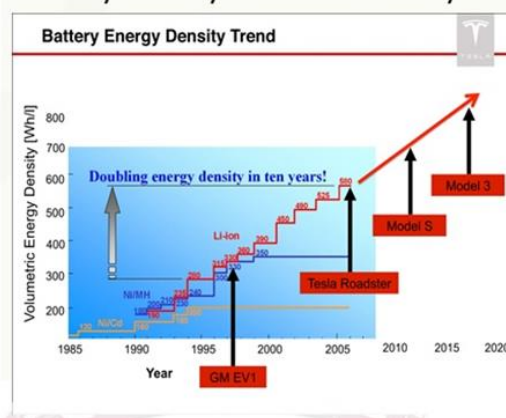


Batteries

EV batteries' price dropping

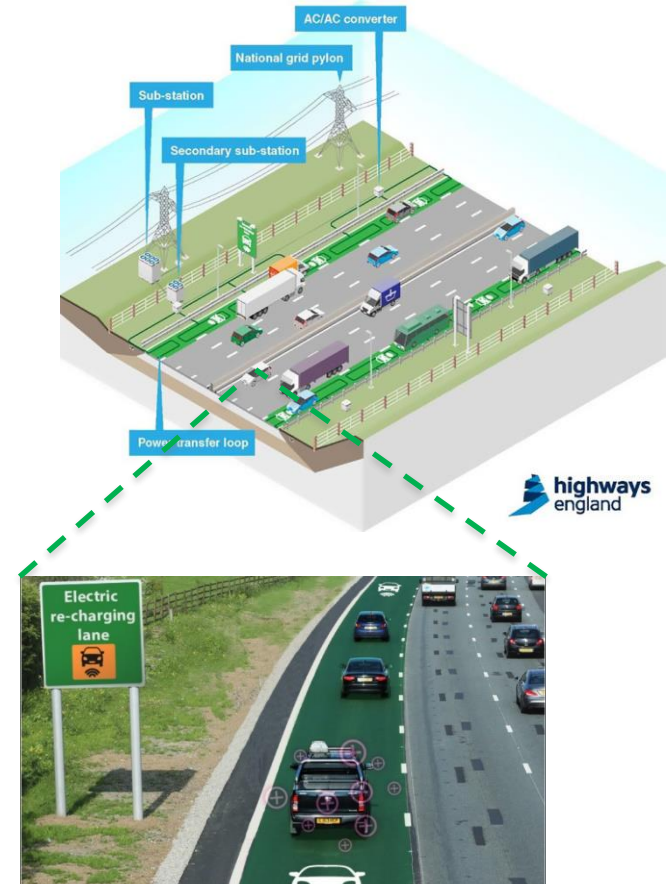


Battery density increases linearly



Electromobility trends (II)

- Investments on dynamic charging technologies
 - ⇒ UK government £500 million investment over the next five years for the creation and testing of electric highways
 - ⇒ EU R&D project funding focused on dynamic charging:
 - ✓ FABRIC
 - ✓ FASTINCHARGE

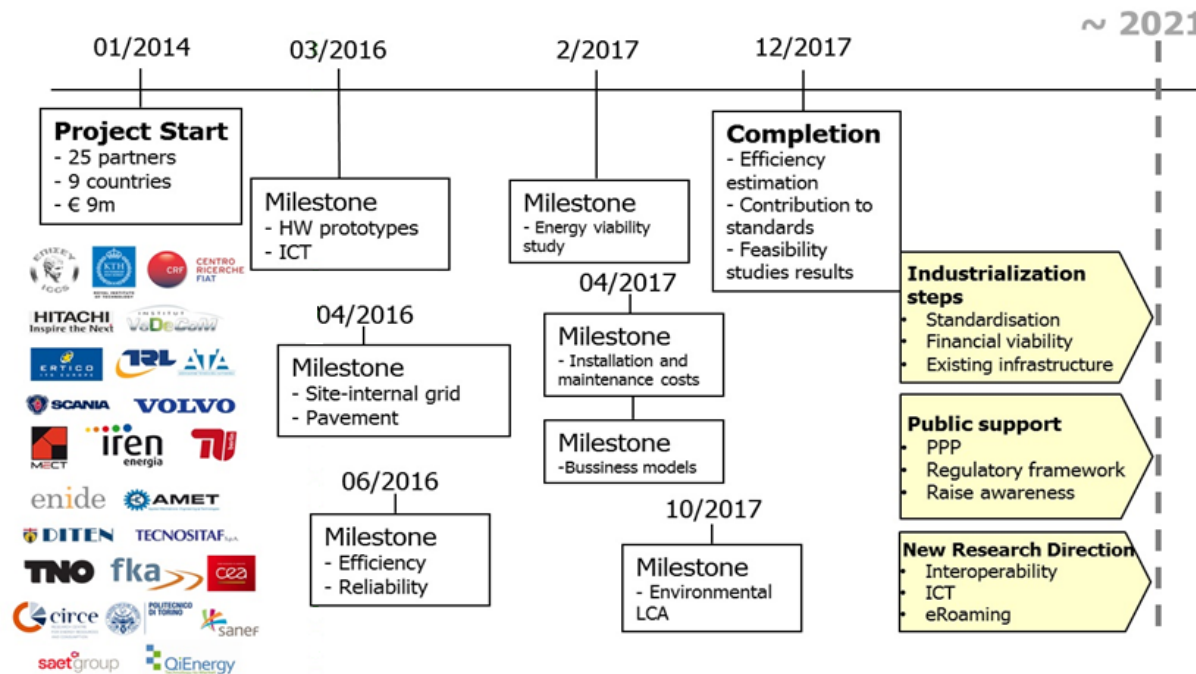




FABRIC project overview

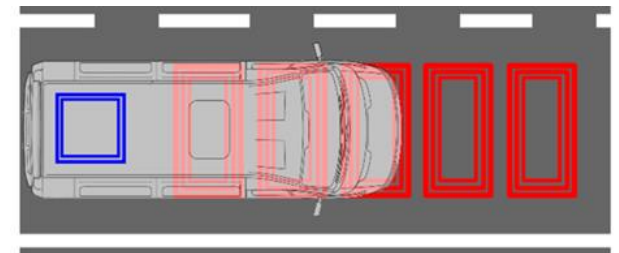
➤ Objective:

⇒ to develop, test and evaluate the efficiency of dynamic charging prototypes to assess the feasibility of large-scale deployment of dynamic wireless charging



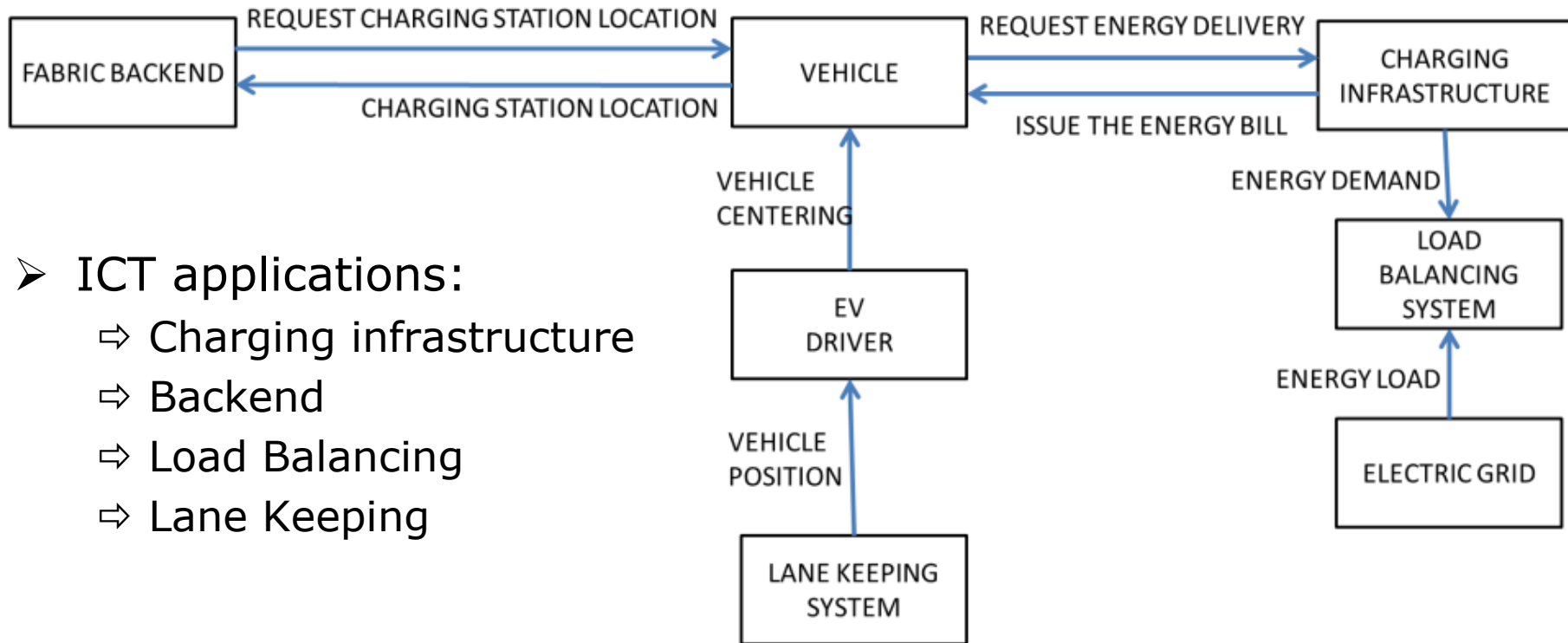
Charging prototypes

- Three different dynamic charging prototypes
- Status: design complete, development ongoing
 - ⇒ Vedecom/QUALCOMM solution
 - ▼ 85kHz, 20kW
 - ⇒ POLITO solution
 - ▼ 20-200kHz , 20kW
 - ⇒ SAET solution
 - ▼ 80-100kHz, 50kW
- Air gaps ~20cm
- Expected delivery:
 - ⇒ 2016
 - ⇒ charging pads ready for test sites





System architecture



- ICT applications:
- ⇒ Charging infrastructure
 - ⇒ Backend
 - ⇒ Load Balancing
 - ⇒ Lane Keeping

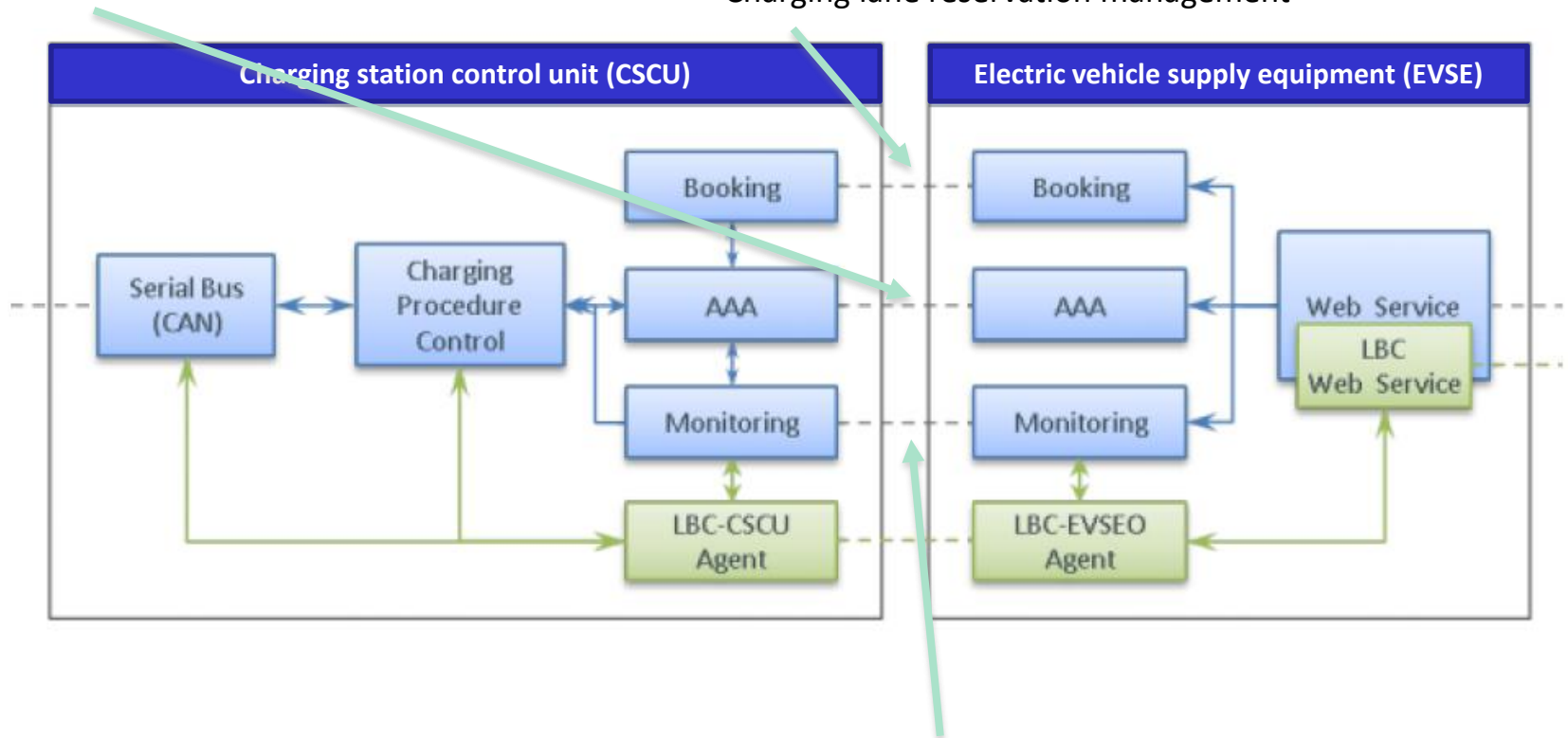




Charging Infrastructure

Authentication, Authorization and Accounting of the charging process.

Charging lane reservation management



Detection of vehicle arrivals

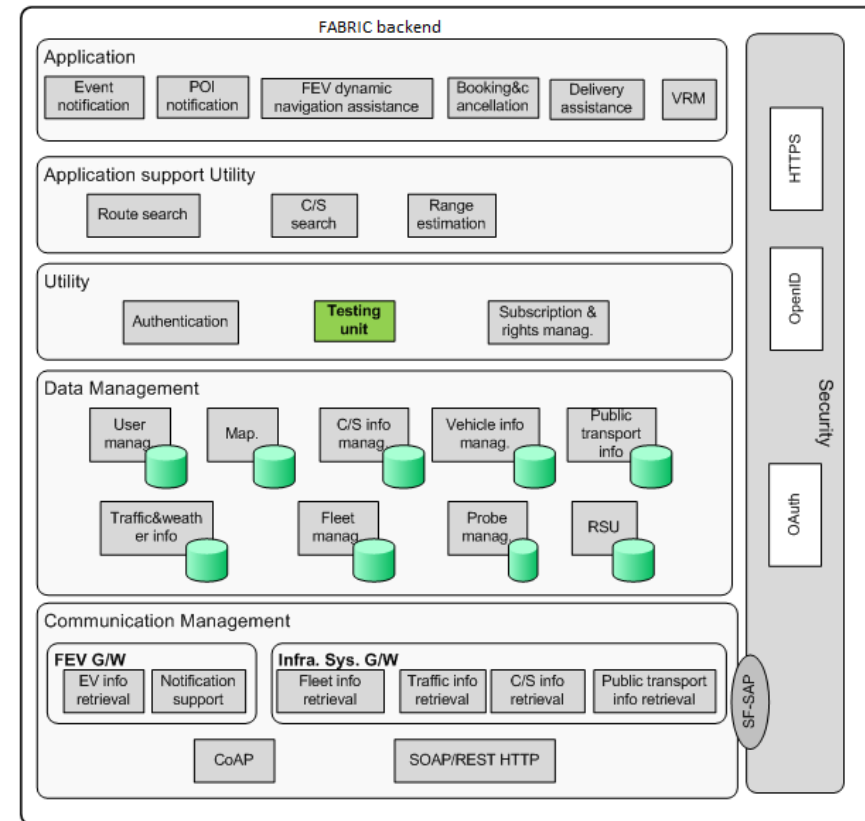
Operational and technical status of the charging system





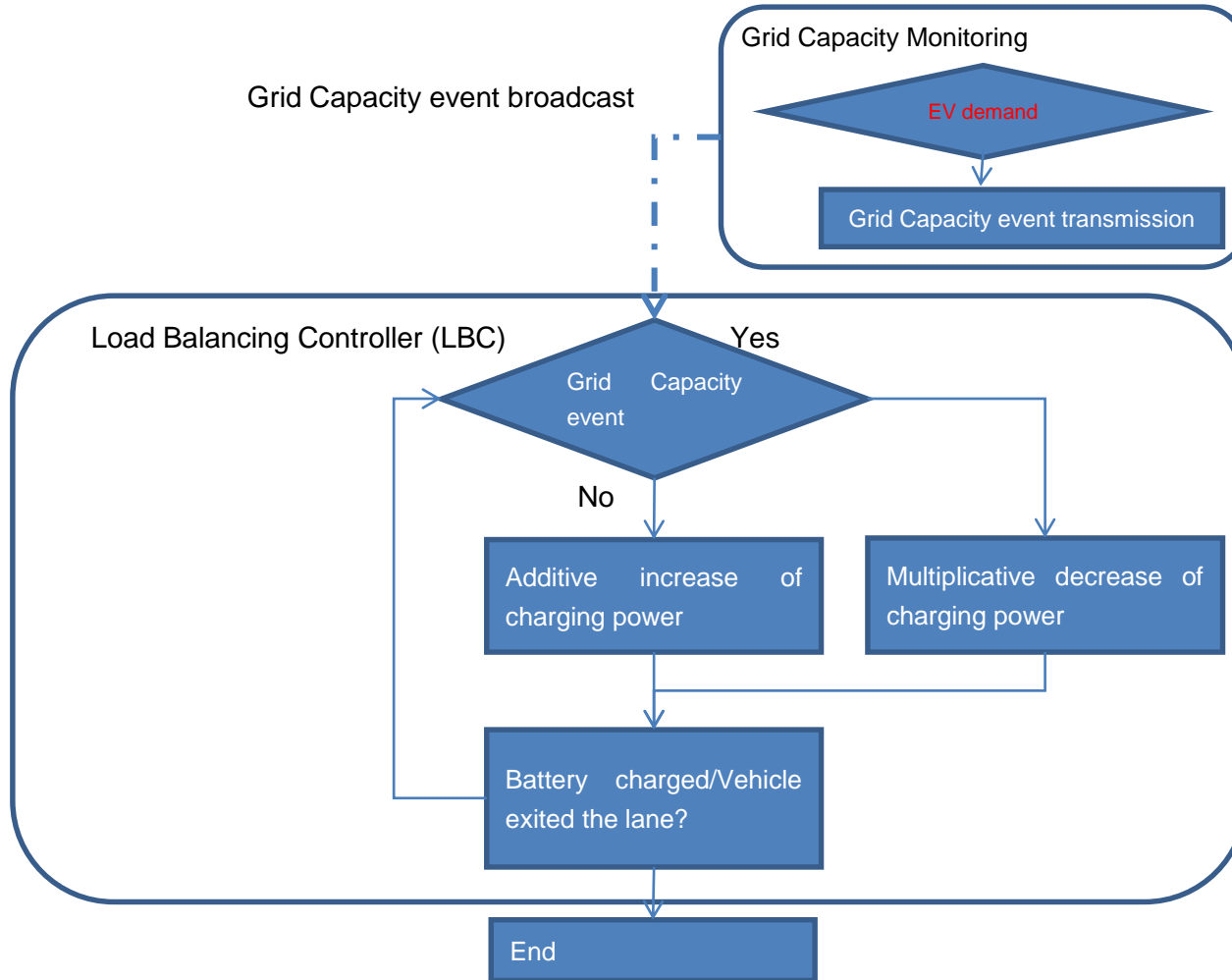
Backend

- Communication with vehicles, users and infrastructure operators
- Manage user data, vehicle data, traffic data and charging station data
- Authenticate user and vehicles, manage user access rights and generate notification messages.
- Security functions
- VPN to the Control Units



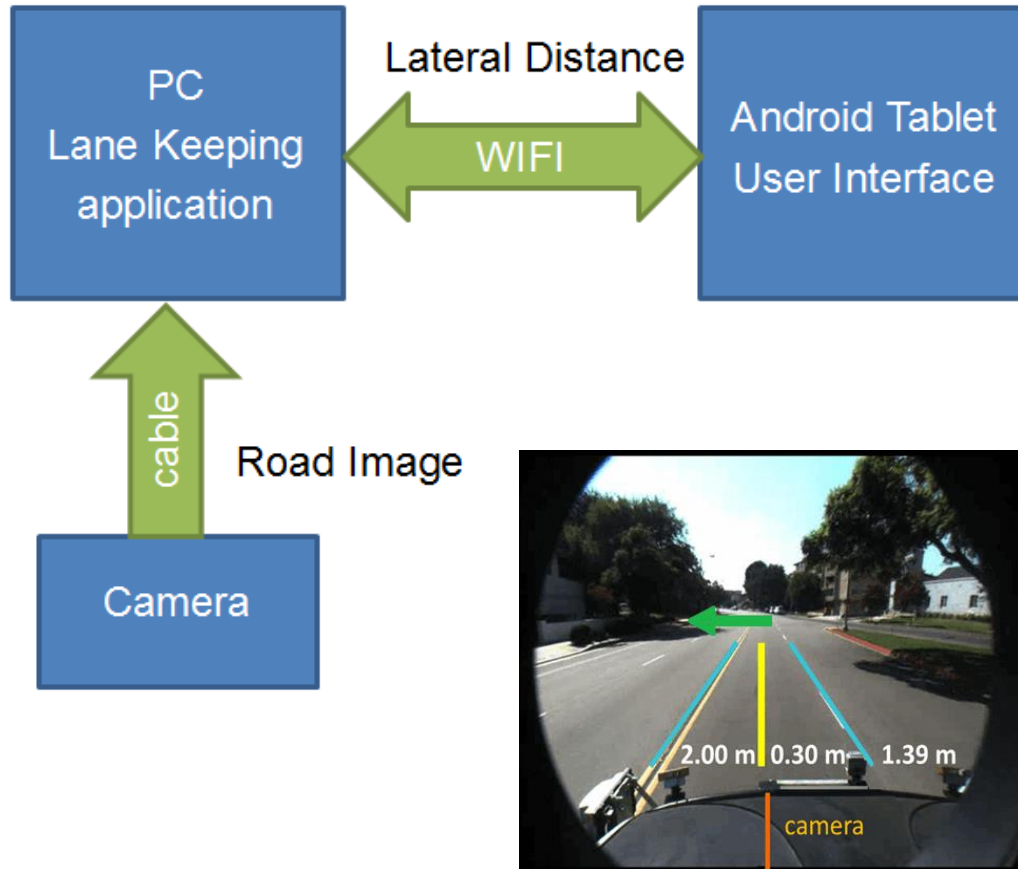


Load Balancing





Lane Keeping



Lane detection in starlight road



Lane detection in curved road



Lane detection in shadow

Driver guidance using
an Android Tablet





Conclusions and next steps

- Dynamic Charging needs ICT
- The ICT applications presented today will be tested in Turin and Paris this year
- ICT interoperability is a key requirement for European roll-out of dynamic electric charging:
 - ⇒ both technical compatibility and institutional interoperability

