Digital Innovation in Transport Systems

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Digitalization in Transport Systems

- Vehicle & ICT Convergence for V2X (V2I, V2V, V2N, V2P) Connectivity
- Cooperative Intelligent Transport Systems (C-ITS)
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- Cooperative ITS (C-ITS) Pilot Project in Korea for V2X Connectivity
  - Focusing Safety, Promoting Mobility & Sustainability (Green Transport)
  - Next Generation ITS to provide a service on the open platform utilizing Big Data
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- Challenges of a resilient investment environment for transport systems

Intelligent Transport Systems (ITS) (1990s-2010s)
- Vehicle Detection System (VDS)
- Road Surveillance & Monitoring
- Variable Message Signs (VMS)

Cooperative ITS (C-ITS) (2020s-2040s)
- Digital Infrastructure by ICT (V2X)
- Mobile & Nomadic Devices
- Big Data & AI for Connected & Automated Driving
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- Integrated Smart Mobility based on Connected & Digitalized Travelers
  - A User-Centric Approach to Mobility-as-a-Service
  - Enabling real-time (on-demand), door-to-door, multi-modal transport services
  - Bringing convenience, time & cost savings to mobility users
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- V2X Issues for Connected & Automated Driving (CAD)

Sources: Qualcomm, 2016
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- V2X Issues for Connected & Automated Driving

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- V2X Issues for Connected & Automated Driving

802.11p has established the foundation for V2X

- **Wi-Fi based technology - 802.11p standard**
  Adapted for latency-critical V2X communications in the 5.9 GHz band

- **Established security and upper layer specifications**
  With service layer / performance requirements defined by SDOs, e.g. SAE, ETSI-ITS1

- **Path to DSRC2 rulemaking in USA by NHSTA3 expected to start in 20164**
  Based on 802.11p standard

- **Large scale field trials completed over the last decade**
  Commercially available technology here today

Introducing Cellular V2X (C-V2X)

A unified connectivity platform for the connected vehicle of the future

- **Part of Release 14 of the global 3GPP standard**
  Target C-V2X specification completion end of 20165

- **Builds upon existing LTE connectivity platform for automotive**
  LTE already delivering key services today, e.g. telematics, eCall, connected infotainment

- **Enhances LTE Direct for V2X direct communications**
  Improvements over 802.11p - up to a few additional seconds of alert latency and 2x range6

- **Leverages existing LTE networks for V2X network communications**
  Using LTE Broadcast optimized for V2X to offer additional applications/services

- **Rich roadmap towards 5G with strong ecosystem support**
  Technology evolution to address expanding capabilities/use cases

Sources: Qualcomm, 2016
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- Investment issues of digital infrastructure for V2X connectivity
  - DSRC (WAVE) V2X based on IEEE 801.11p by Public Sectors
  - Cellular V2X based on 4G/LTE and/or 5G by Private Sectors
  - Or, PPP?

- Management issues for Big Data in smart mobility & CAD services
  - Who owns the big data collected by V2X, Public(Government) and/or Private?
  - How much do users pay to get the services to be affordable?
Thank you very much!

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