Hybrid Communication from the point of view of the European association of tolled motorway operators

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ASECAP Total Network: 50846,81 km
ASECAP IN FIGURES*

- 22 Member organizations
- 192 Companies
- 50,266.72 km (tolling/charging)
- 2,069 Toll stations
- 16,668 Toll lanes
- 20,145 ETC lanes**
- 30,416,046 ETC subscribers**
- 2,327 Service areas
- 28,240.28 Mio € Toll revenues

- ASECAP supports the EU policy of the «user pays» and the «polluter pays» principle

*Source: ASECAP Statistical Bulletin 2016
** ETC: Electronic Toll collection
ASECAP Position Paper on C-ITS

- European Strategy on C-ITS outlines how the causes of accidents could be addressed through C-ITS
- Road infrastructure has a key role to play in C-ITS as Traffic Management Centers
  - provide significant safety instructions to the vehicles (closed lanes/ tunnels / bridges, avoiding a secondary accidents, road working zones, speed limits, etc ),
  - manages efficiently the traffic flows (reduction of congestions, reduction of CO2 emissions, optimum adaptation of the speed limits, etc ),
  - decides which measures to take based on improved information available.
- ASECAP welcomes the European Commission’s strategy and is looking forward to the benefits of C-ITS
ASECAP Position Paper on C-ITS

• Interference free coexistence with electronic road charging:
  • ASECAP is not biased regarding communication technologies
  • The hybrid communication approach might be the norm
  • At no moment should C-ITS cause radio interference to road charging or enforcement, and therefore any C-ITS technology has to bring proof of no radio interference to road charging or enforcement

• Solid EU-wide security and data protection framework:
  • The operation of C-ITS will require a firm legal framework assuring an EU-wide security framework
  • C-ITS has to obey the privacy of users and therefore ASECAP supports a thorough data protection governance
ASECAP Position Paper

• C-ITS deployment across brands, modes and borders:
  • C-ITS has undergone more than 10 years of intensive testing and continuous improvement involving road operators, OEMs, ITS industry etc..
  • ASECAP believes that the expected positive benefits of C-ITS and interoperability among the different players have to be ensured

• ASECAP welcomes that within C-ROADS deployment project 150 Mio. EUR are earmarked for the harmonized implementation of C-ITS for European road operators until 2020.
ACEA Position Paper on Frequency Bands for V2X

• The paper highlights the current challenges with the allocated 5.9 GHz band for V2X
• it explains why the automotive industry supports exploring the use of a lower carrier frequency for new approaches to achieve V2X, such as the 3.4-3.8 GHz.
ACEA Position Paper on Frequency Bands for V2X

• ITS-G5 and LTE-V2V cannot co-exist on the same frequency channel because of major differences between the wireless systems.

• This implies that the 5.9 GHz band needs to be divided between the two technologies with a major confusion regarding when, where, and how to operate different V2X applications.

• LTE-V2V in the 3.4-3.8 GHz band and ITS-G5 in the 5.9 GHz can be redundant technologies for serving connected automated vehicles (redundancy and extra robustness).
The ECo-AT project

- ECo-AT is the Austrian part of the corridor
- Focus on infrastructure-based cooperative systems
- ECo-AT Specifications defines hybrid communication from the Traffic Control Center to the Roadside
- Use Cases
  - Road Works Warning (RWW)
  - In-Vehicle Information (IVI)
  - Probe Vehicle Data (via CAM aggregation)
  - Other DENM (event information from the TCC)
  - SPAT/MAP (traffic signal phases)
  - Protected Zone CAM (toll protection)
Hybrid communication approach in Eco-AT
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Hybrid communication approach in Eco-AT

1. TCC sends data

2. C-ITS-S creates messages using standard data structures (i.e. DENM, IVI), and sends them (with the appropriate encoding) over different communication channels

3. V-ITS-S could leverage on selecting the communication channels to receive messages or just simply use the channel available (e.g. Smartphone) to display the data
Hybrid communication approach in Eco-AT

**DENM hybrid:**

- ETSI TC-ITS (DENM)
  - header
    - protocolversion: currentversion (1)
    - messageID: dnm (1)
    - stationID: 1020003
  - dnm
    - actionID
      - originatingstationID: 1000000
      - sequenceNumber: 111
    - detecTime: 184883460000 [bit length 42, 6 LSB pad bits, 0001 1000 0100 1000 0111 0101 0100 1101 0000 1100 00... decimal value 417162671152]
    - referenceTime: 1848354d0c00 [bit length 42, 6 LSB pad bits, 0001 1000 0100 1000 0111 0101 0100 1101 0000 1100 00... decimal value 417162671152]

**IVI hybrid:**

- ETSI TC-ITS (IVI)
  - header
    - protocolversion: currentVersion (1)
    - messageID: ivi (6)
    - stationID: 1030001
  - ivi
    - mandatory
      - serviceProviderID
        - countryCode: c040 [bit length 10, 6 LSB pad bits, 1100 0000 01... decimal value 769]
        - providerIdentifier: 10000
        - iviIdentificationNumber: 3
      - ts: 18629e6e780 [bit length 42, 6 LSB pad bits, 0001 1000 0110 0010 0110 1110 0110 1110 0110 0111 10... decimal value 418924797982]
      - validto: 18629e6e1ef80 [bit length 42, 6 LSB pad bits, 0001 1000 0110 0010 0110 1110 1000 0001 1110 1111 10... decimal value 41892497982]
      - iviStatus: new (6)
Through the C-Roads Platform, authorities and road operators join together to harmonise the deployment activities of cooperative intelligent transport systems (C-ITS) across Europe. The goal is to achieve the deployment of interoperable cross-border C-ITS services for road users.
Planned activities in C - ROADS

- The EK’s program to implement the C-ITS master plan by 2020
- Coordinated by the Member States
- Member States of the first call for tenders: AT, BE, CZ, DE, FRA, NL, UK, SLO
- Member States of the 2nd call for tenders: SP, ITA, PT, HU

- Dedicated Task Force installed in C-ROADS to define an Infrastructure Communication Profile
- Hereby the C-Roads Platform is following the hybrid communication approach, starting with ETSI ITS-G5 and existing cellular networks
Summing up

• ASECAP is eager on harvesting the expected benefits of C-ITS now
• ASECAP is technologically neutral
• C-ITS has to be implemented having in mind incumbent services like tolling
• Implementation of C-ITS should be based on the knowledge gained in the last decade ensure correct operation
• C-ROADS is an implementation funding programme and ASECAP is eager to go ahead now
Thank you for your kind attention!