



*Association Européenne des Concessionnaires  
d'Autoroutes et d'Ouvrages à Péage*

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

**Marko Jandrisits**

Date



Association Européenne des Concessionnaires  
d'Autoroutes et d'Ouvrages à Péage

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



Legend:

- ASECAP Full Member
- ASECAP Associate Member

PDF | www.asecap.com



Association Européenne des Concessionnaires  
d'Autoroutes et d'Ouvrages à Péage

# 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**



# 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).

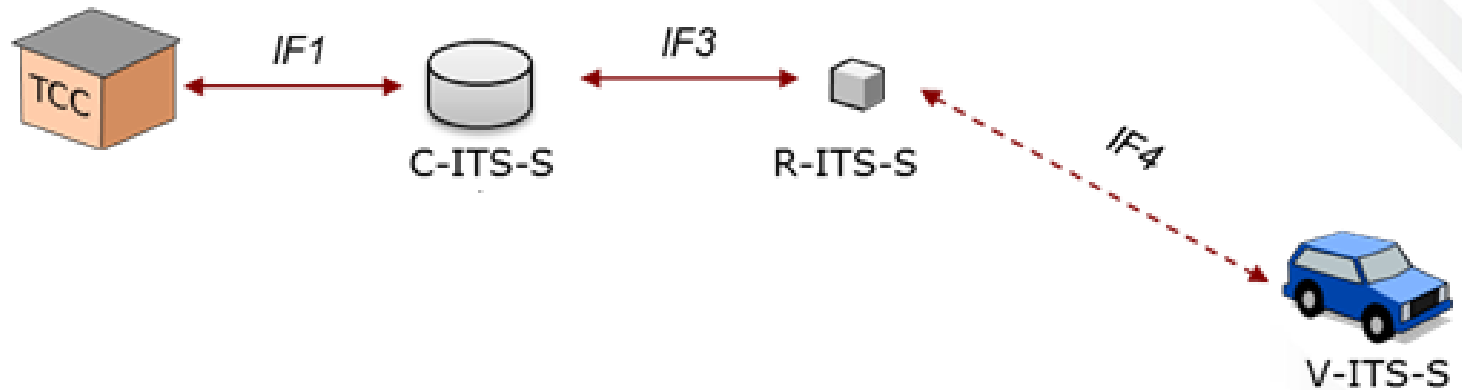


# The ECo-AT project

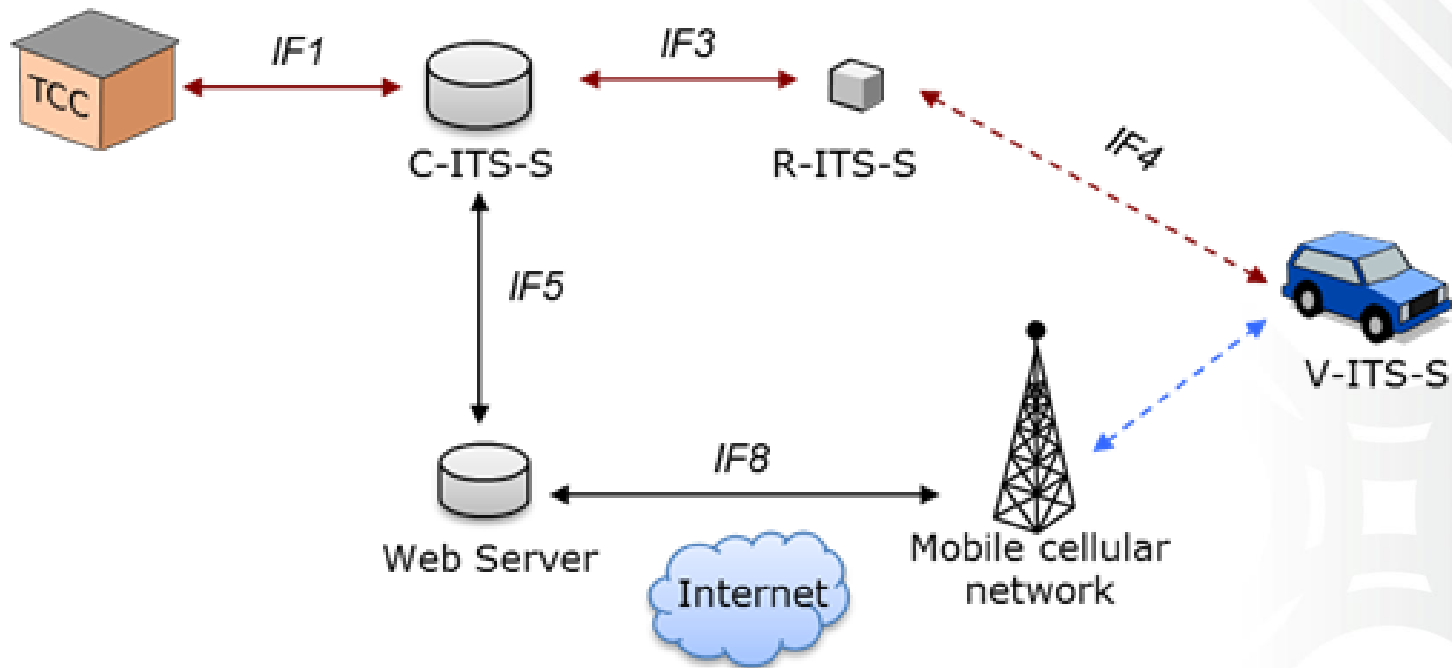
---

- 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

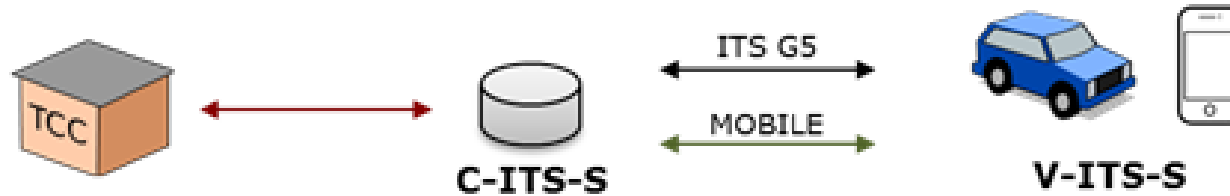


# Hybrid communication approach in Eco-AT



# Hybrid communication approach in Eco-AT

1. TCC sends data



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

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

# Hybrid communication approach in Eco-AT

## DENM hybrid:

```

❑ ETSI TC-ITS (DENM)
  ❑ DENM
    ❑ header
      protocolVersion: currentVersion (1)
      messageID: denm (1)
      stationID: 1020003
    ❑ denm
      ❑ management
        ❑ actionID
          originatingStationID: 1000000
          sequenceNumber: 116
          unique identifier over ITS-G5 or cellular
        detectionTime: 1848354d0c00 [bit length 42, 6 LSB pad bits, 0001 1000 0100 1000 0011 0101 0100 1101 0000 1100 00.. .... decimal value 417162671152]
        referenceTime: 1848354d0c00 [bit length 42, 6 LSB pad bits, 0001 1000 0100 1000 0011 0101 0100 1101 0000 1100 00.. .... decimal value 417162671152]

```

## IVI hybrid:

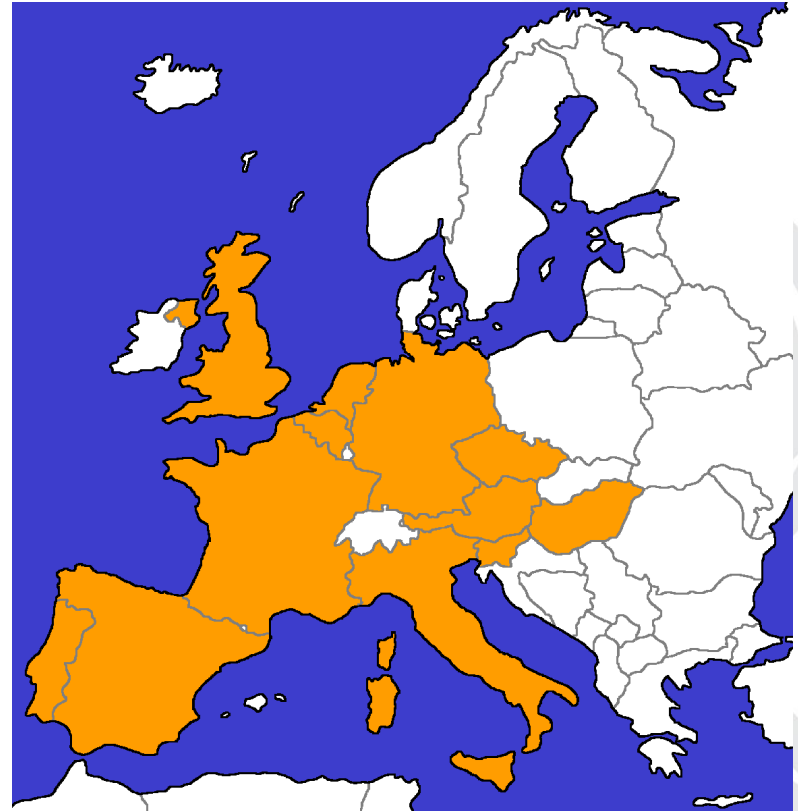
```

❑ ETSI TC-ITS (IVI)
  ❑ 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
          unique identifier over ITS-G5 or cellular
        timeStamp: 18626e6e6780 [bit length 42, 6 LSB pad bits, 0001 1000 0110 0010 0110 1110 0110 1110 0110 0111 10.. .... decimal value 418922477982]
        validTo: 18626e81ef80 [bit length 42, 6 LSB pad bits, 0001 1000 0110 0010 0110 1110 1000 0001 1110 1111 10.. .... decimal value 418922497982]
        iviStatus: new (0)

```

# C - Roads

- 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!