Celtic-Plus Smart Connected World

EUREKA

Celtic-Plus Proposers Day on 28 October 2015 in Antwerp

Secure and accurate road weather services composed from vehicle and RWS data

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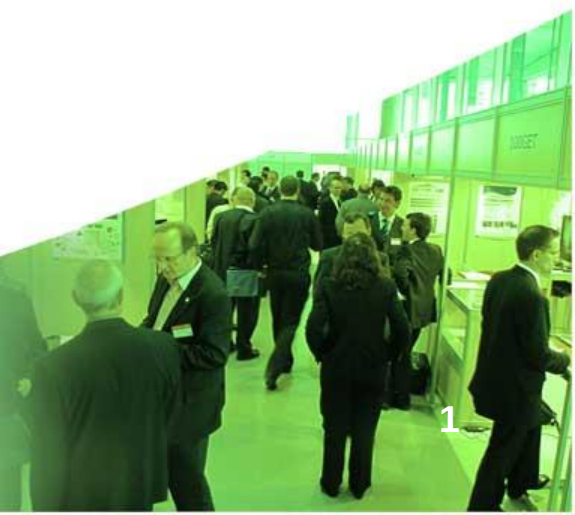
innovalia ASSOCIATION



Teaser

TECHNOLOGY TESTS

Carlink

- Principles of service provision
- Testing technology (GPRS worked perfectly, WLAN was not mature yet IEEE 802.11g was not suitable for V2I and V2I purposes
- The services were working with limited set of sensors

7/2006 – 3/2009

PROOF OF CONCEPT

WiSafeCar

- Proof of concept
- Further developed services (focus on road weather and dynamic carpooling)
- Comprehensive set of sensors used
- Both GPRS/3G and mobile WLAN (IEEE 802.11p worked properly
- Field tests showed good results
- Content Centric Networking solution was developed (perhaps the first in the world)

7/2009 – 3/2012

DEPLOYMENT

CoMoSeF

- Closer to market
- Focus in paving the way towards wider scale deployment of intelligen transport systems (ITS)
- LTE network to be used in addition to GPRS/3G and WLAN
- Vehicle Bus and sensors to be used as a source of data
- Wider scale piloting activities throughout Europe and in Korea
- Utlisation of the co-operative mobility standards
- Parallel activities with DRIVE C2, FOTsis, etc.
- In line with the objectives of EC's ITS Directive and ITS Action Plan

7/2012 – 6/2015

IoT TRUST FOR OPERATION

- Extend the progress done in CoMoSeF through additional information sources (RWS, advanced instrumentation in vehicles)
- Optimisation
- Big Data analysis
- Security and trust of communications and users
- Large and local prediction processing
- All vehicles benefitting (equipped and not equipped)

NEW PROJECT

Innovalia Group

- **Private Associated Research Lab** funded by an Industrial alliance of 7 technology-based SMEs with expertise in:
  - Cybersecurity solutions in Smart Cities, including critical Infrastructures: Hospitals, Airports, Ports, Smart Grids
  - Security in D2D communications
  - Big Data Analytics and HPC computing
  - Internet of Things (IoT) Test Beds
  - Network traffic analysis / Intrusion detection
  - Advanced Manufacturing
  - High Performance Connected CPS & Interoperability
  - Advanced 3D Data Analytics & Visualisation

Innovalia Group

Objectives

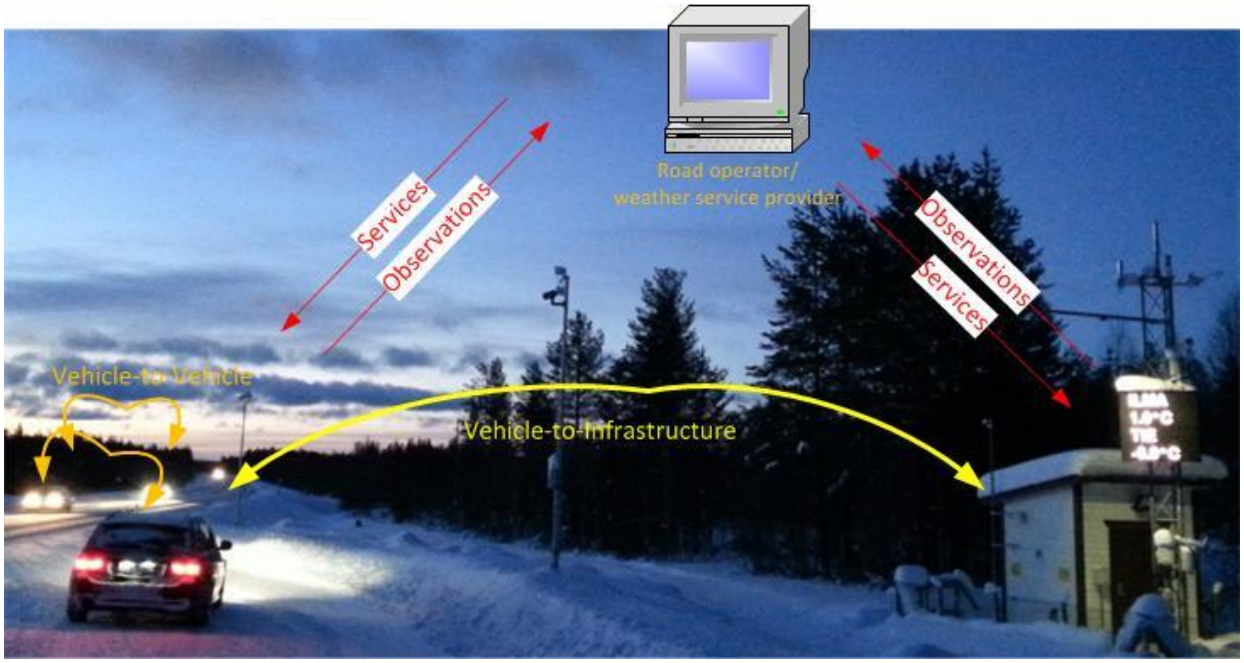
- In suburban road areas, there are some **dangerous hot spots** depending on **dynamic weather conditions** → local large predictions needed
- **Sources**
  - Roadside units (RSU) and combined roadside units
  - Road weather stations (RSU/RWS)
  - Additional instrumentation in vehicles
- **All vehicles could take benefit**, including the ones not equipped with CAN-bus readers, OBUs or Internet access.
- A **system allowing to warn any driver** with practically any kind of on-board instrumentation
- **Security mechanisms in place** (user privacy and content protection to unauthorized access and modification)

Architecture

- We place several RSU/RWSs before, after and on the hot spot. A **single master RSU** is directly **connected to Internet**
- **Some RSU/RWS are equipped with sensors**, depending on the danger
- **Equipped vehicles can send their measures to RSU** (e.g. slipperiness/friction)
- **Data from vehicles and RSU** as well as those provided by meteorological models **are fused and alerts are sent** towards Internet and to all RSU of the hotspot (**Big Data** techniques)
- An arriving vehicle can be warned either by using a **smartphone app** or by using **an OBU**
- Road authorities receiving the alert can send a technical team to the hotspot to remove snow, spread salt etc.

Scenario

- **Vehicles sense**/observe different **conditions**; icy road, slippery road, fog, accident
- Same observations from road weather stations/roadside units
- When the **treshold level** is achieved, special weather condition observation validated, and **warning delivered** to vehicles through RWS or directly



Involved partners

- Spanish partners: NEXTEL, ENEO, INNOVALIA, SQS, CBT
  - Secured access control to sensitive information, private data protection
  - Network monitoring, intrusion detection
  - IoT testing methodologies
  - Big Data analysis
  - Road incident detection, service delivery to vehicles

- Finnish Meteorological Institute
  - Ice detection from RWS and vehicles, fog/rain detection from RWS
  - Wireless data delivery

- Heudiasyc (Université de Technologie de Compiègne/Centre National de la Recherche Scientifique)
  - OBU & RSU, distributed framework
  - V2X communication
  - Distributed data fusion

Partners needed

- Vehicle manufacturers / Vehicle OEM manufacturers
- Sensor manufacturers
- Cities
- Road authorities
- Network operators
- Meteorological specialists both for large prediction and for computing local prediction using various vehicles and RSU data combined with large predictions.
- School bus companies and truck operators.

Contact

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