Welcome to the World of Standards

ETSI

World Class Standards

C-ITS TECHNICAL SPECIFICATIONS FOR INTEROPERABILITY STATUS AND ROADMAP

Compass4D Webinar 5.10.2016

Sebastian Müller, ETSI CTI

Outline

- ETSI's Role
- Interoperability Events (so called Plugtests)
- Plugtest Schedule
- Use Cases

ETSI : European Telecommunications Standards Institute - Sophia Antipolis

- ETSI produces globally-applicable standards for Information and Communications Technologies including fixed, mobile, radio, converged, broadcast and internet technologies
- The most famous ETSI standards are DECT, Smart Cards, electronic signatures..and **GSM** (3GPP)
- Today ETSI is famous for NFV.. and IoT/M2M developed in oneM2M and TC SmartM2M, part of ETSI « Connecting Things » cluster
- 800 member organizations, 64 countries and five continents

ETSI's Role

- Standards-making
  - Development of base communications standards
  - Development of conformance and interoperability test specifications
  - European Standards (ENs) are developed following a standardization request (mandate) from the European Commission (EC)/European Free Trade Association (ETFA)
- Supporting services
  - Specification of methodologies for standards writing and test development
  - Arrangement and management of interoperability testing events, called Plugtests™

Why do we need standards ?

- Enable **interoperability** of systems/services
- **Encourage innovation**, foster enterprise and open up new markets for suppliers
- **Create trust and confidence** in products and services
- **Expand the market**, brings down costs and increases competition
- Help to **prevent duplication of effort**
- Support greater **confidence in procurement**
- **Interchangeability** of system component suppliers

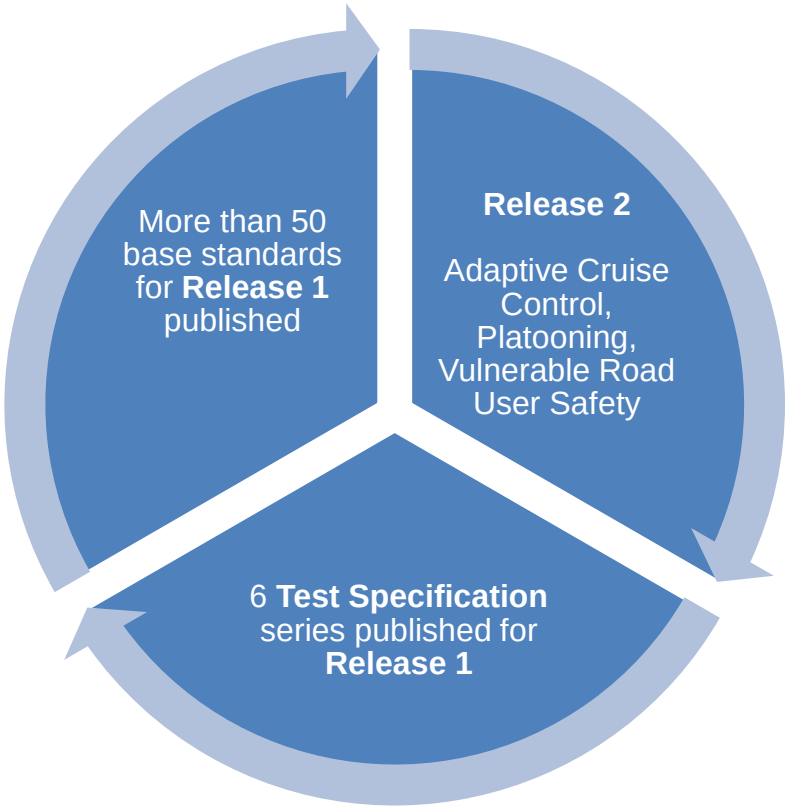
Marco Annoni, Telecom Itali S.p.A./TILAB – Service Platform Innovation – ITS & Logistics

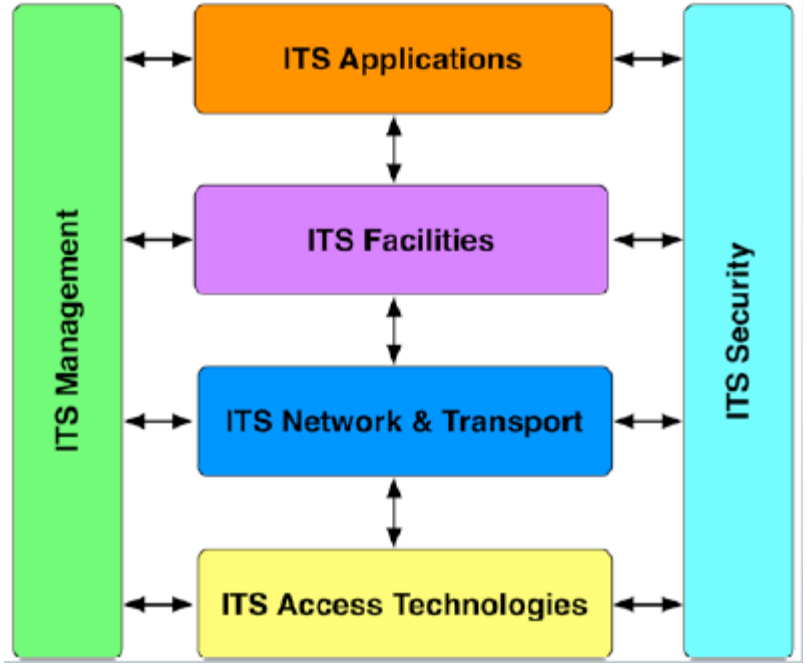
EU Policies

Transport White Paper 2011

- EC Roadmap to a Single European Transport Area
- Towards a competitive and resource efficient transport system
- To meet the challenges, transport has to:
  - Use less energy
  - Use cleaner energy
  - Exploit efficiently a multimodal, integrated and 'intelligent' network
- By 2050 reduce emissions by 60%, and 20% by 2020 (2008 level)
- By 2050 move close to zero fatalities in road transport, halving road casualties by 2020

ETSI TC ITS – Minimum set of standards for interoperability

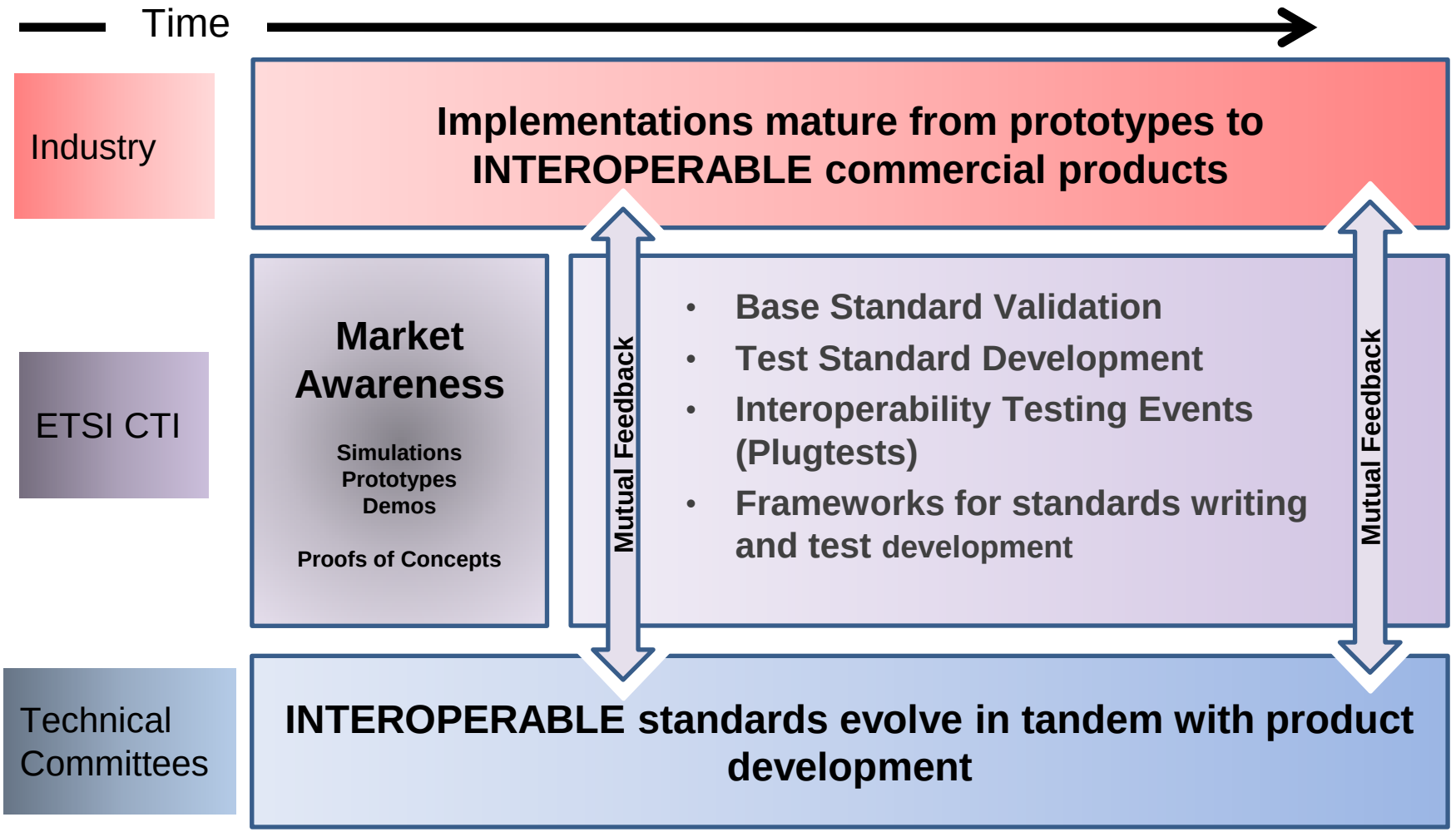




ETSI TC ITS – Major Achievements

Release 1	• ETSI TR 101 607
Facility	• ETSI EN 302 637-2 Cooperative Awareness • ETSI EN 302 637-3 Decentralized Environ Notification • ETSI TS 103 301 Infrastructure Services
Transport/Network	• EN 302 634-4-1 Geo Networking
Access	• IEEE 802.11p profile • Congestion Control
Security	• ETSI TS 103 097 Security Header and Certificate Formats

Centre for Testing and Interoperability (ETSI CTI)



What is a Plugtests™ event?

- A test event
  - Organized and run by ETSI (as neutral body) in collaboration with industry partners
  - Scope, test infrastructure and test plan based on standards
  - Feedback to the ETSI technical group
  - A tool for the ETSI technical group to validate and enhance the quality of their standards
- An opportunity for implementers
  - To validate their understanding of the standard
  - To test with (many) other real implementations
  - To debug their implementation: early bug fixing, saving time
- An opportunity for the community
  - To promote the technology and the eco system
  - To demonstrate end-to-end interoperability

Previous Plugtests editions

Event Date & Location	Companies	Test Scopes
1st Plugtests Nov. 11-18, 2011 Helmond, Netherlands (Hosted by TNO)	ITRI, SIEMENS, HITACHI, DENSO, CohdaWireless, VTT, HONDA, NEC, PEEK, vector, Q FREE, QUWIC, CTAG, nordsys	
2nd Plugtests Jun. 11-15, 2012 Versailles, France (Hosted by IFSTTAR)	ITRI, SIEMENS, HITACHI, TNO, DENSO, CohdaWireless, MARBEN Products, kapsch, NEC, QUWIC, INRIA	
3rd Plugtests Nov. 25-29, 2013 Essen, Germany (Hosted by Cetecom)	ITRI, Unex, Autotalks, HITACHI, DENSO, CohdaWireless, qmic, NEC, kapsch, SIEMENS, MARBEN Products, vector, Fraunhofer ESK, commsignia	
4th Plugtests Mar. 17-27, 2015 Helmond, Netherlands (Hosted by Tass International)	ITRI, Unex, Autotalks, HITACHI, DENSO, CohdaWireless, qmic, NEC, TNO, kapsch, SIEMENS, MARBEN Products, Vialis, nordsys, YoGoKo, commsignia, CTAG	

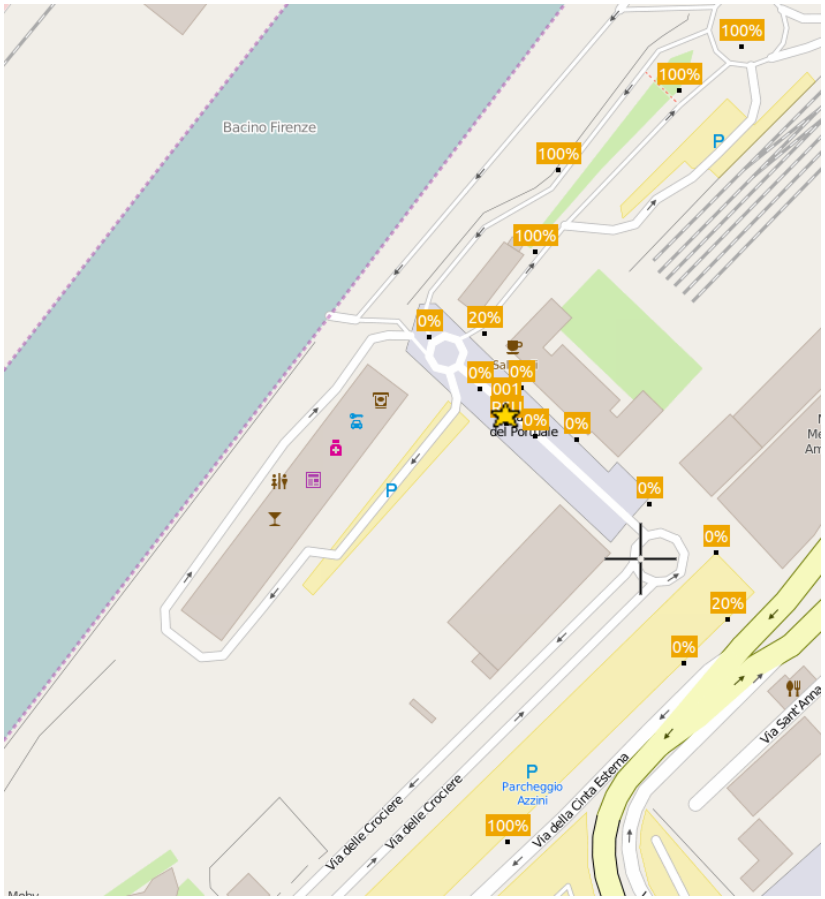
Plugtest Schedule

- Phase 1: Test Track Design
  - Livorno-Florence highway
  - IoT testbed
  - Test track through the port of Livorno
- Phase 2: Pre-qualification of Device Under Test (DUT)
  - Conformance Testing
- Phase 3: Connecting all participants
  - Remote labs
  - Traffic Control Centre of Autostrade (Datex Node)
  - RSUs in harbour and highway test track
- Phase 4: Testing !
  - 1 week lab test in Cruise Terminal
  - 1 week of field tests on test track

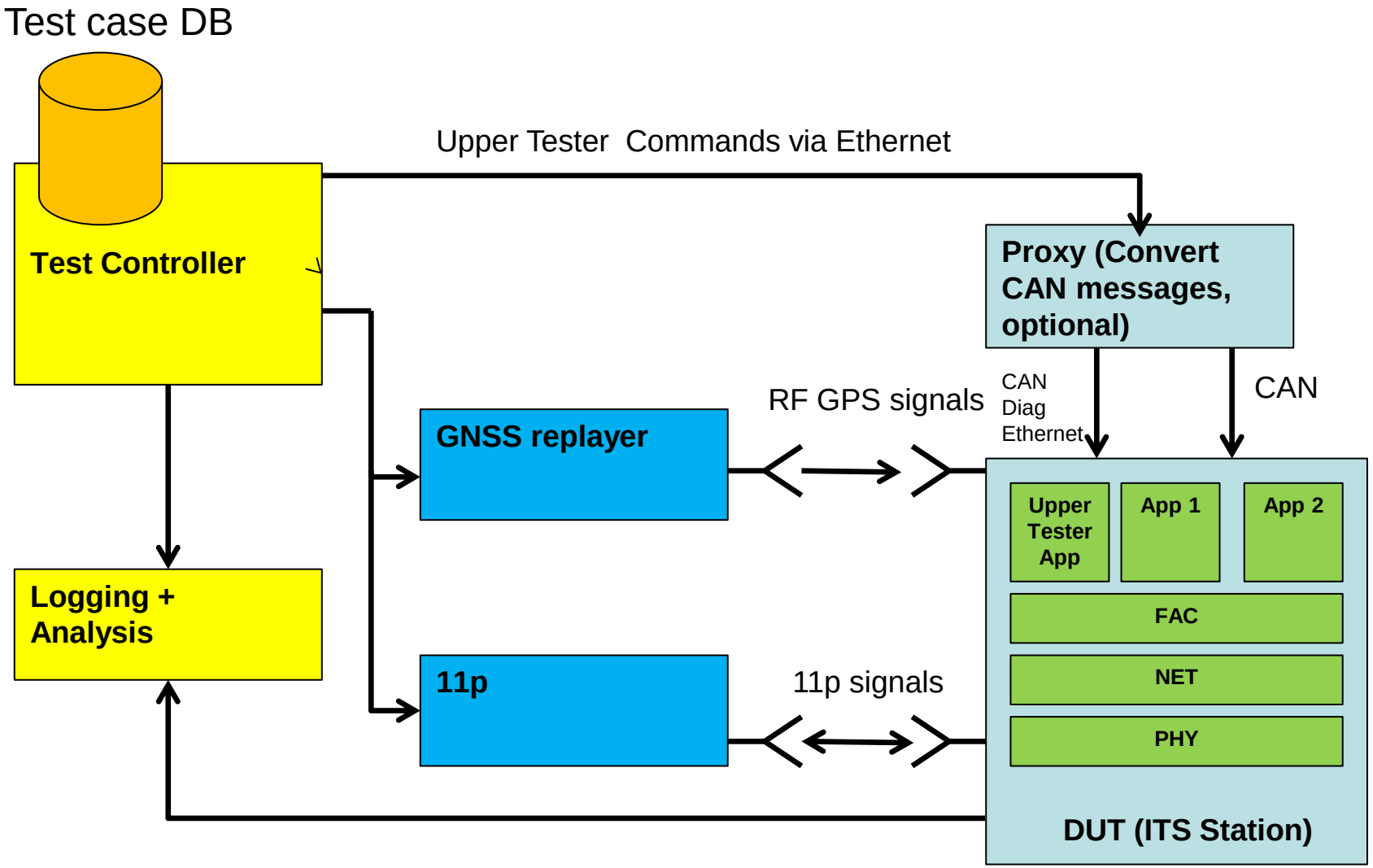
Phase 1: Test Track Design

- Definition of the principal route
  - 2,5 km in harbor
  - 10 km on Fi-Pi-Li highway
- Identification of possible RSU installation points
  - 11 potential RSU locations
- Identification of Urban Canyons and Radio Coverage Measurements
  - 4 RSU locations selected
- Recording
  - GPS recording of the vehicle path
- Design of Use Cases
  - Zones, Traces, Stop lines, Reference Points, Relevance Areas

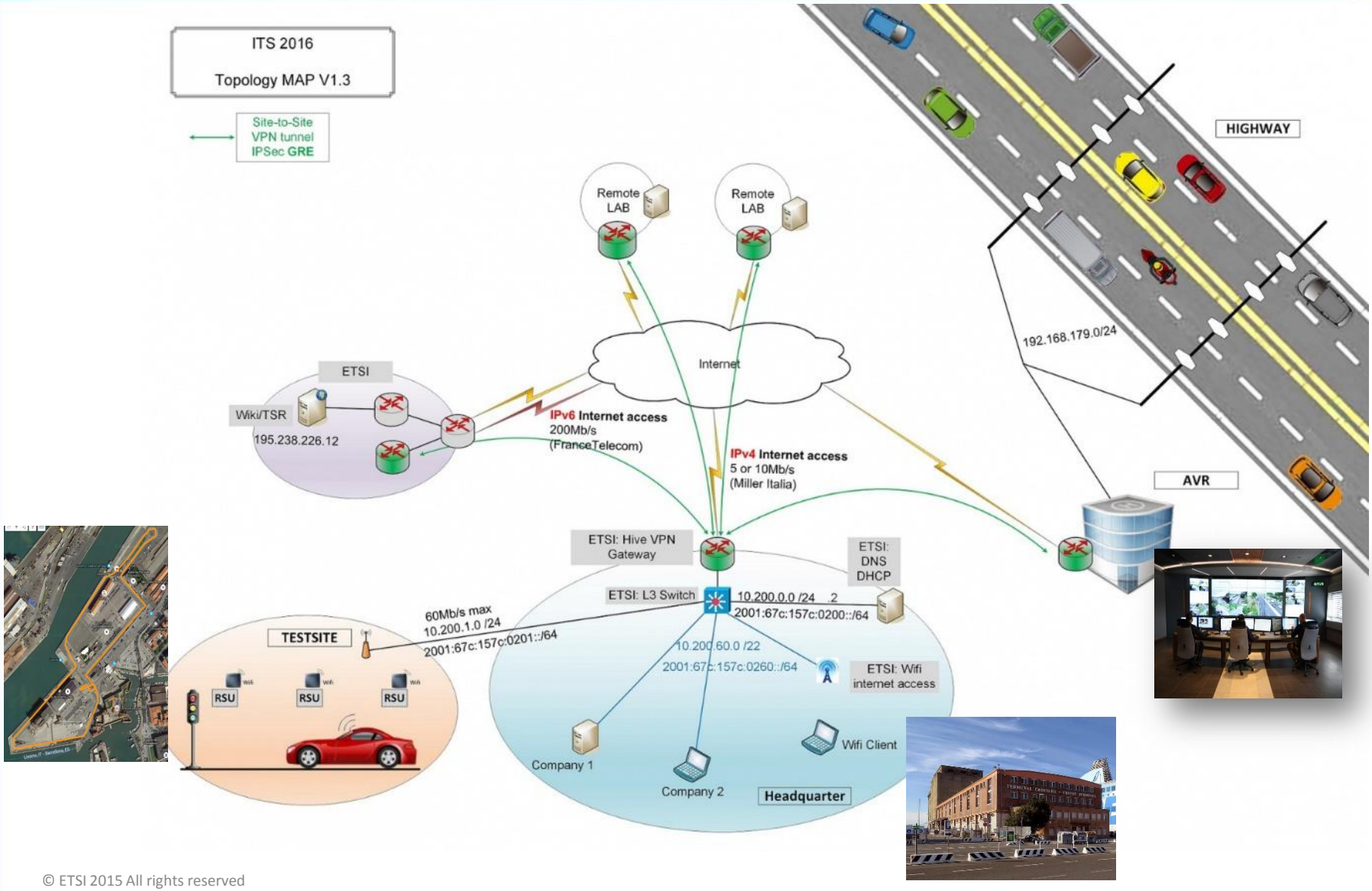
Phase 1: Test Track Design



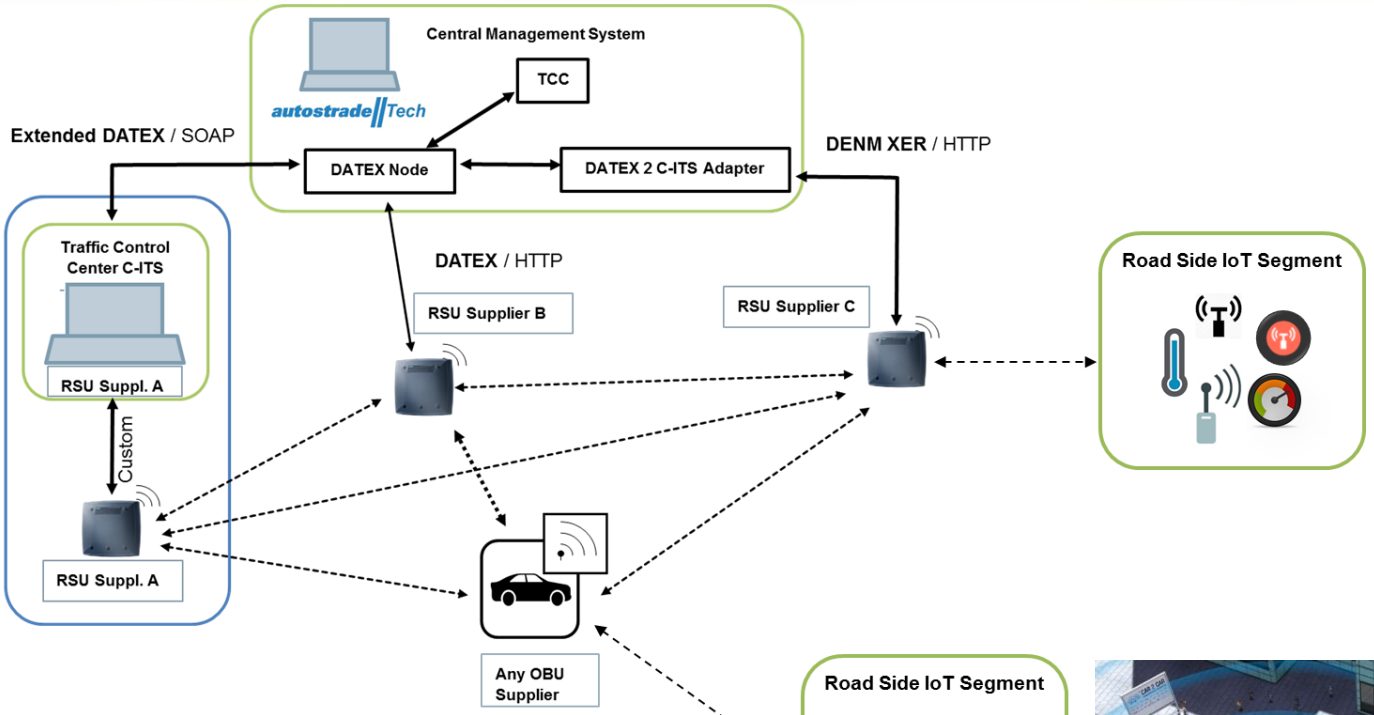
Phase 2: Pre-qualification of DUTs



Phase 3: Connecting all participants



Phase 3: Connecting all participants



Phase 4 : Testing !
(Participants – Status 15.Sep 2016)

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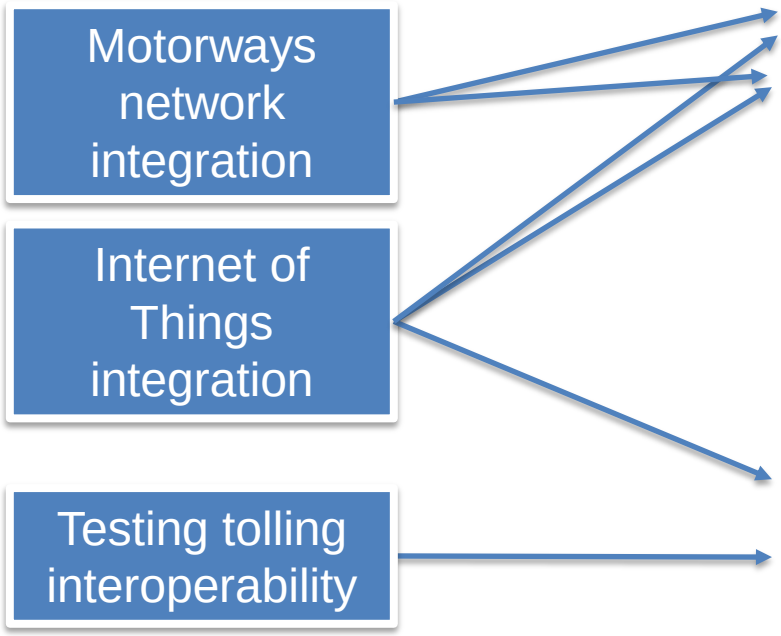
austriatech
Autorità Portuale di Livorno
autostrade Tech
Autotalks
avr È domani.
cnit consorzio nazionale interuniversitario per le telecomunicazioni
CohdaWireless
commsignia
CTAG Centro Tecnológico de Automoción de Galicia
DATA CH TECHNOLOGIES
DENSO
escrypt Embedded Security by ETAS
ETSI
European Commission
iPgallery Converged Communications
工業技術研究院 Industrial Technology Research Institute
kapsch challenging limits
SIEMENS
LeghornGroup Tampering Prevention Since 1978
MARBEN
NGS srl New Generation Sensors
nordsys NORDDEUTSCHE SYSTEMTECHNIK
NXP
Q FREE
REGIONE TOSCANA
RENESAS
SAVARI™
SECURITY INNOVATION
SPIRENT
swarco
SystemX INSTITUT DE RECHERCHE TECHNOLOGIQUE
TIM
Unex

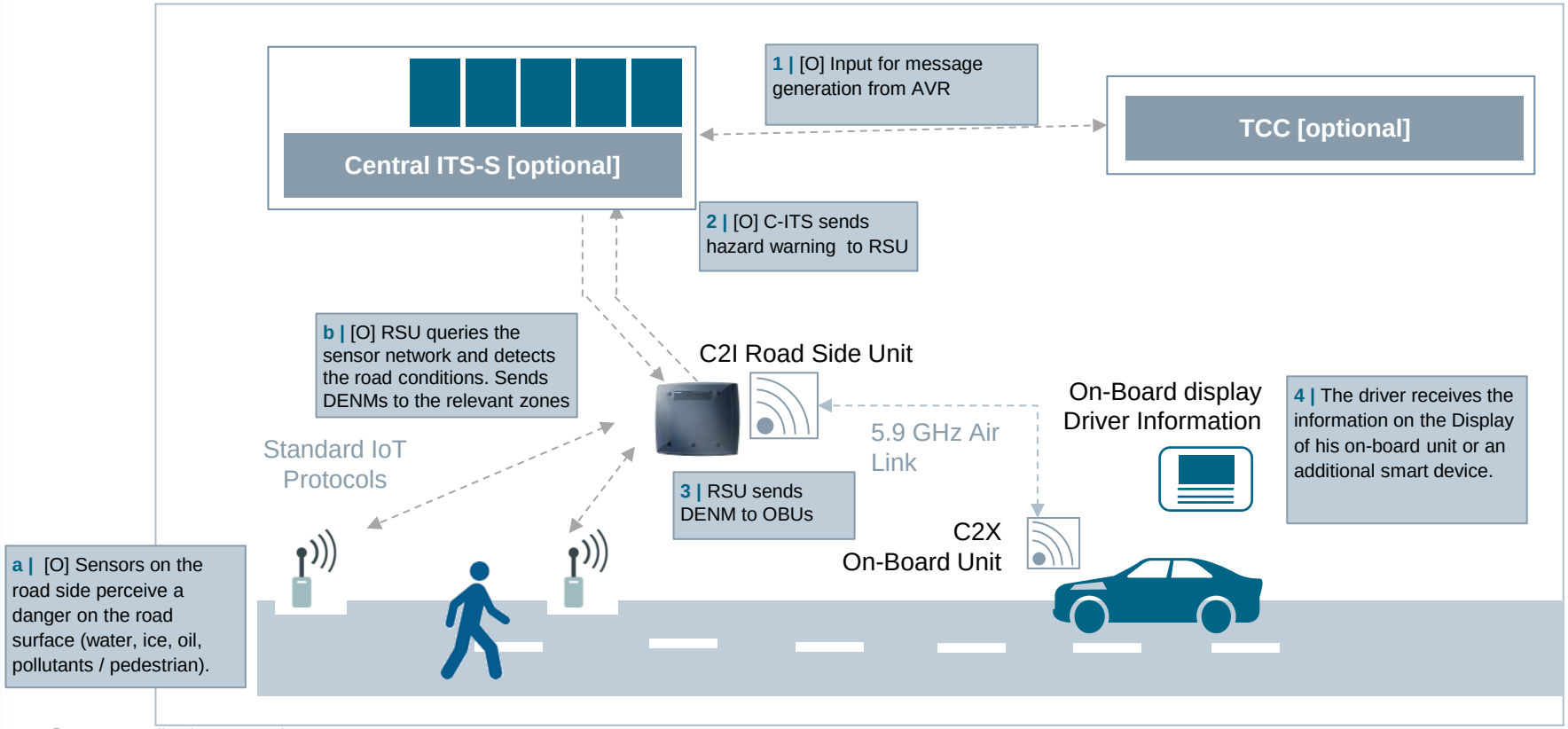
Field Interoperability trials



- UC-01 **Road Hazard Signalling**
- UC-02 **Distribution of Road Hazard Signals**
- UC-03 Time To Green / Traffic Sign Violation
- UC-04 Vehicle Data Aggregation
- UC-05 In-Vehicle Signage
- UC-06 Intersection Collision Risk Warning
- UC-07 Longitudinal Collision Risk Warning
- UC-08 **Loading Zone Management**
- UC-09 **Tolling**
- UC-10 Authorization Tickets Reloading

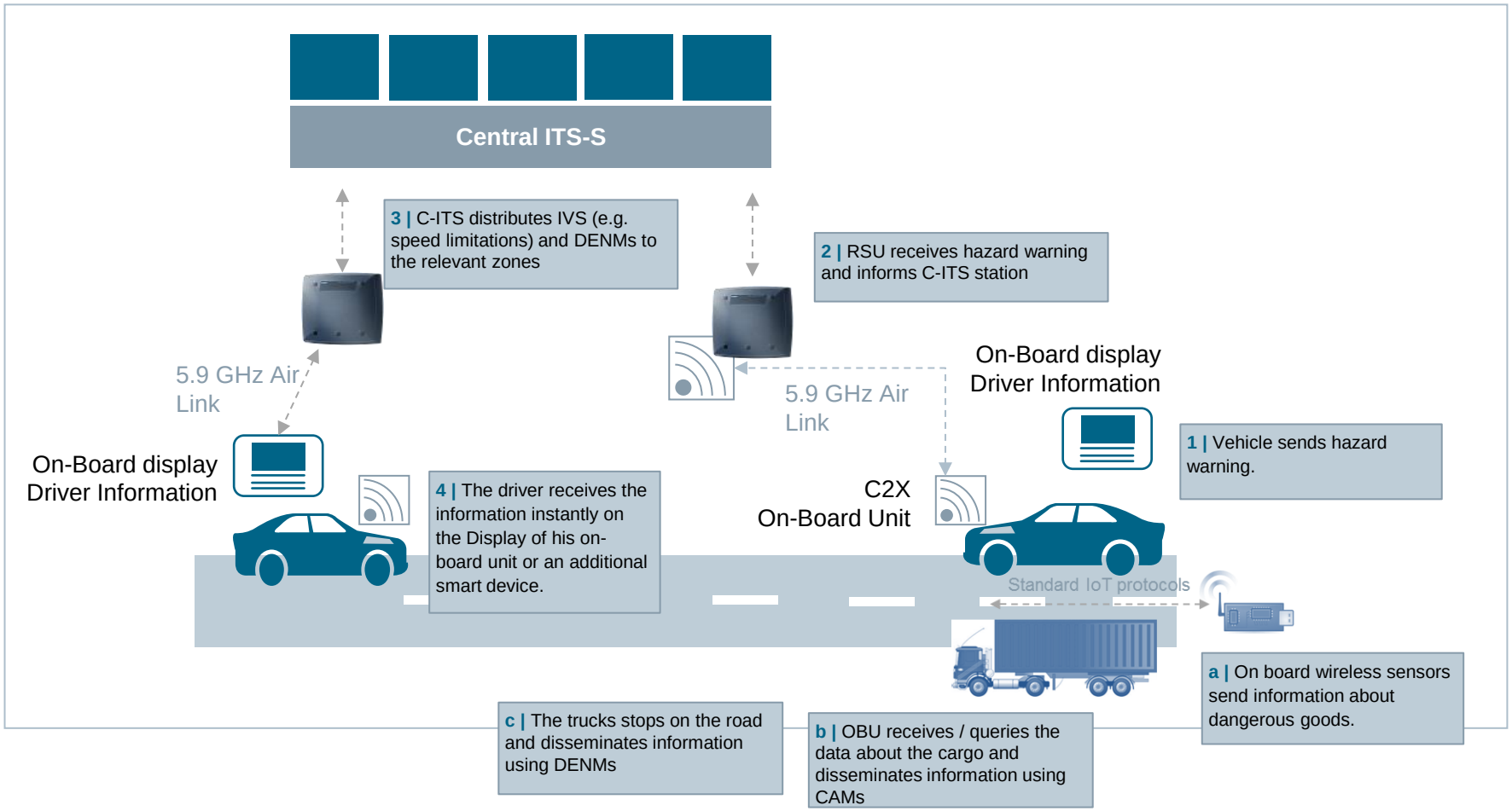
Use Case #1 Road Hazard Signalling

- AVR Control Center provides input for message generation (DENM)
- RSUs which cannot connect to C-ITS send pre-defined messages
- Project related Data elements can be send, e.g. Wrong Way Driving, Weather Condition, Hazardous Location, Traffic Condition, Emergency Vehicle Approaching



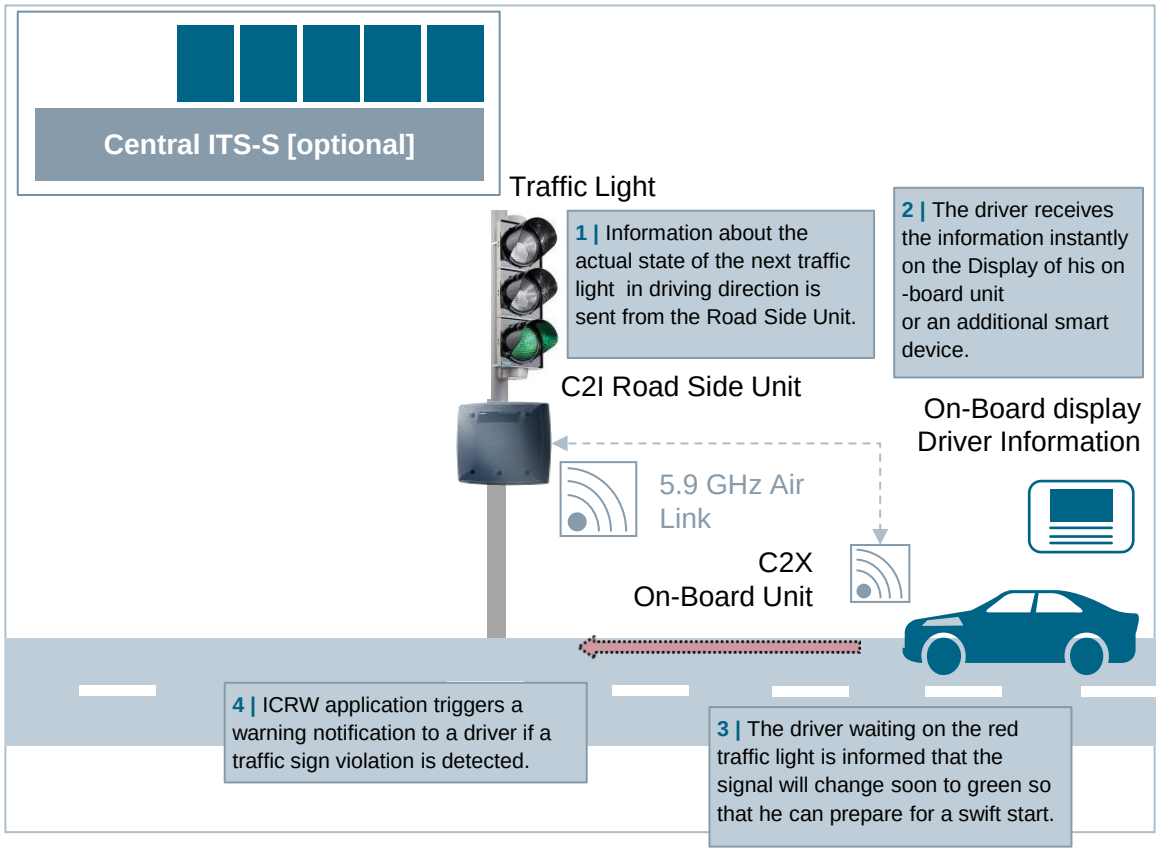
Use Case #2
Distribution of locally detected Hazard Warning

- A vehicle sends a Traffic Hazard/Stationary Vehicle Warning
- A RSU receives the warning and sends the information to the C-ITS station
- C-ITS station distributes information



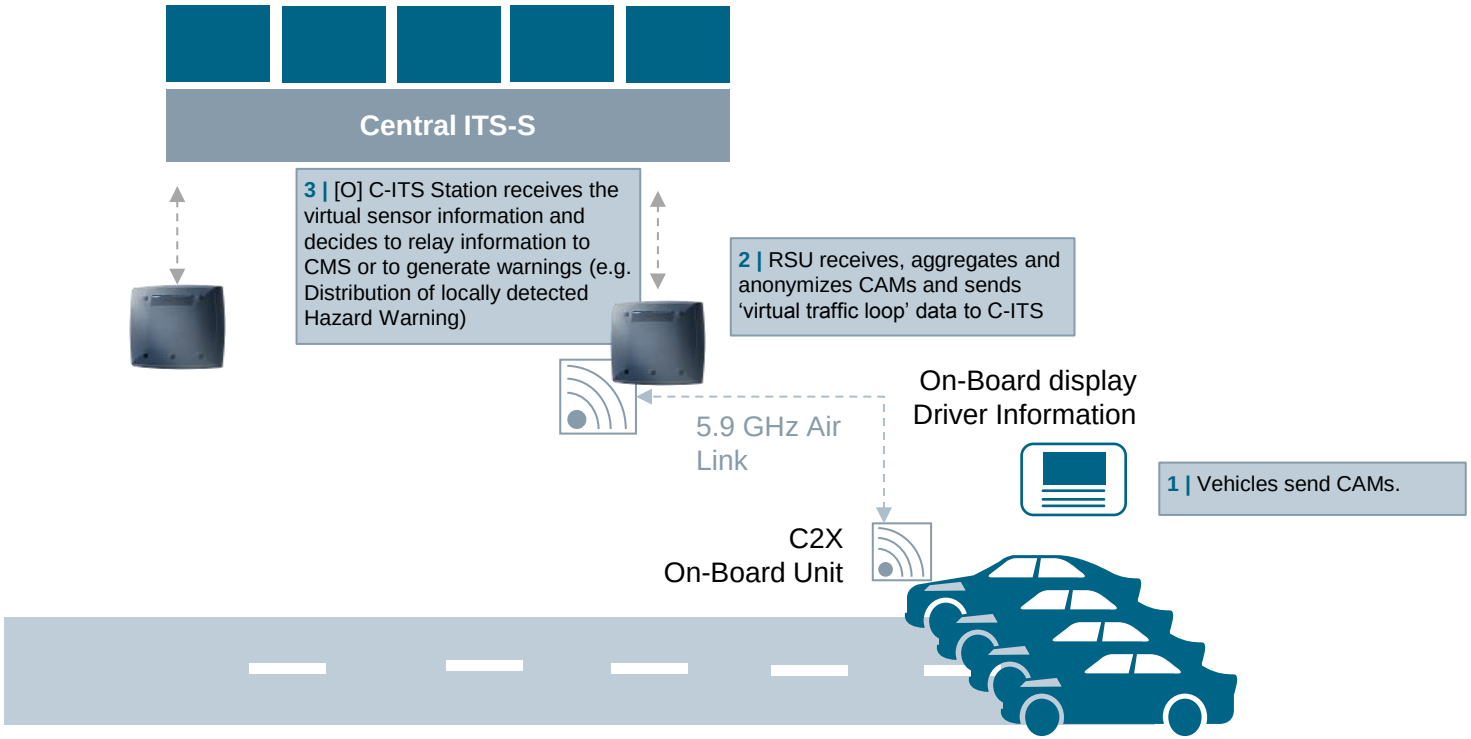
Use Case #3
Time To Green / Traffic Sign Violation

- The traffic light sends a pre-defined sequence of SPAT+MAP messages
- Based on GPS positioning and the Intersection Information, the in-vehicle application can provide different intersection assistance functionalities such as Fast preemption of traffic due to traffic light signal change (red to green)
- RSUs which cannot generate SPAT/MAP messages send pre-defined messages



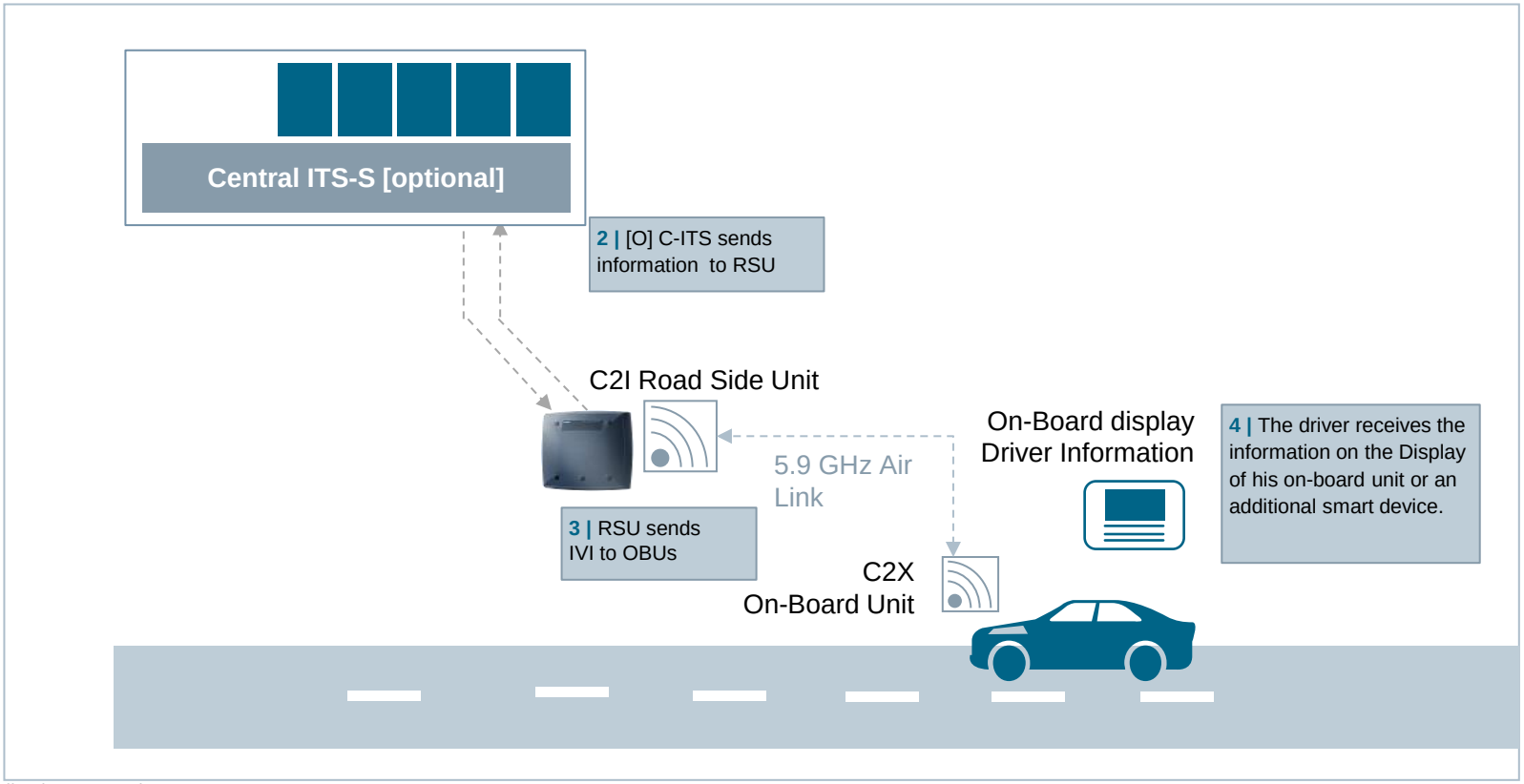
Use Case #4
Virtual Traffic Loop (Data Aggregation)

- Virtual Traffic Loop functionality implemented by RSU
- RSU aggregates CAM data from multiple vehicles and provides information to C-ITS



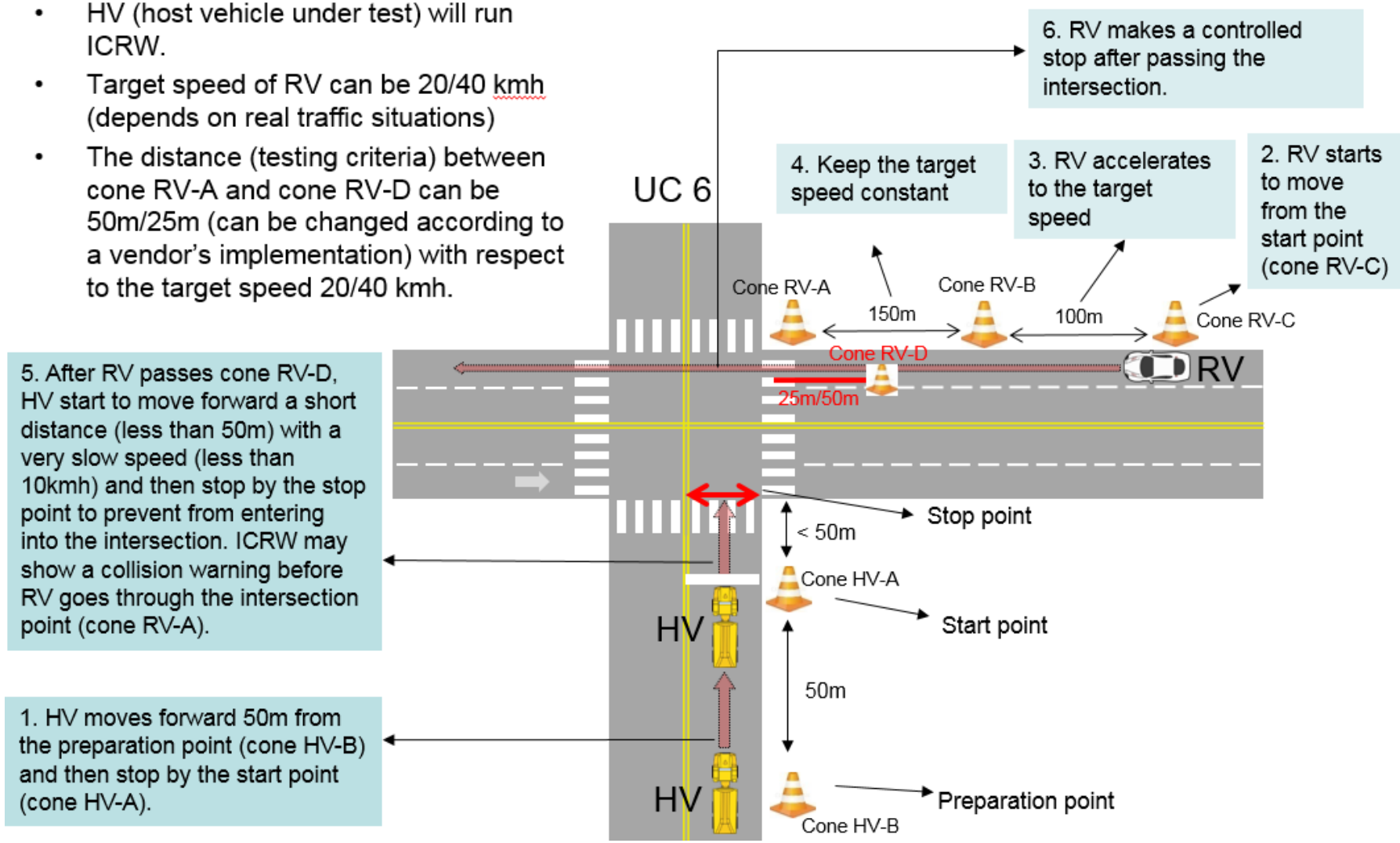
Use Case #5 In-Vehicle Signage

- Message generation of IVI
- RSUs which cannot connect to C-ITS send pre-defined messages



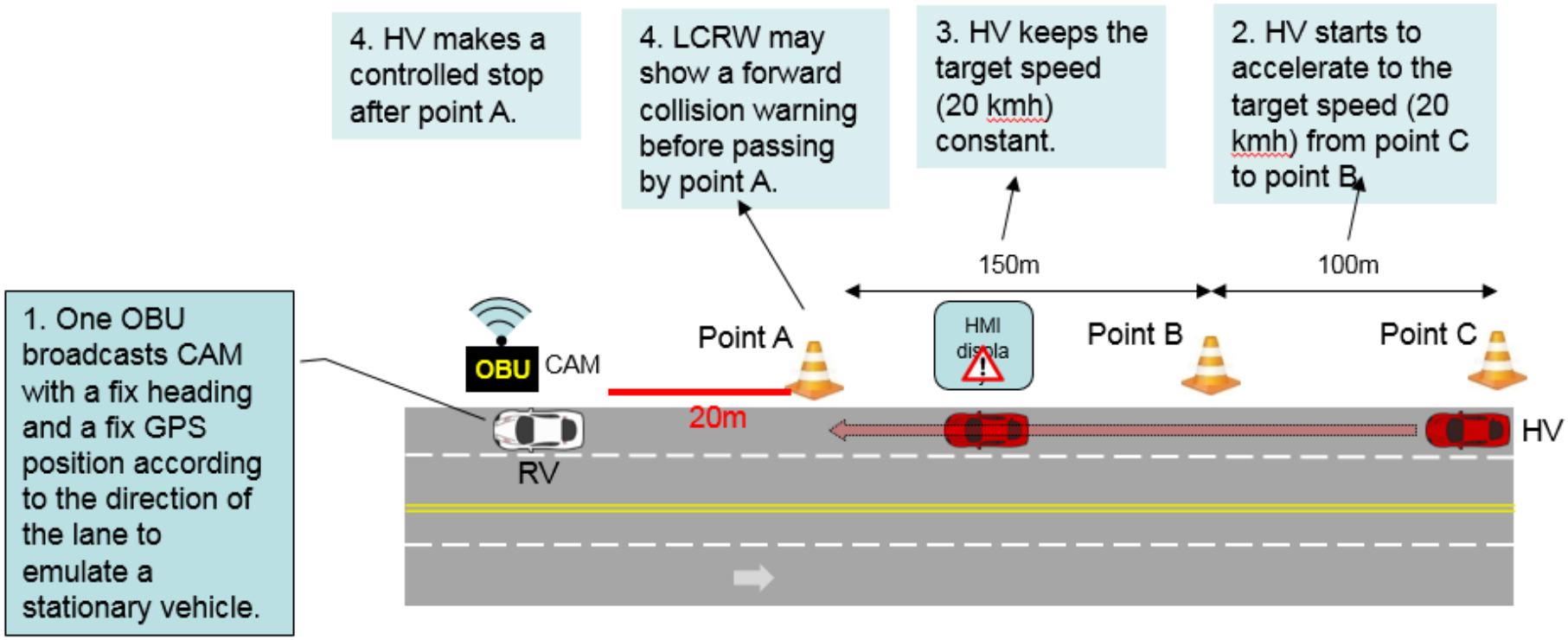
Use Case #6 Intersection Collision Risk Warning – (Stop and Go Scenario)

- HV (host vehicle under test) will run ICRW.
- Target speed of RV can be 20/40 kmh (depends on real traffic situations)
- The distance (testing criteria) between cone RV-A and cone RV-D can be 50m/25m (can be changed according to a vendor's implementation) with respect to the target speed 20/40 kmh.



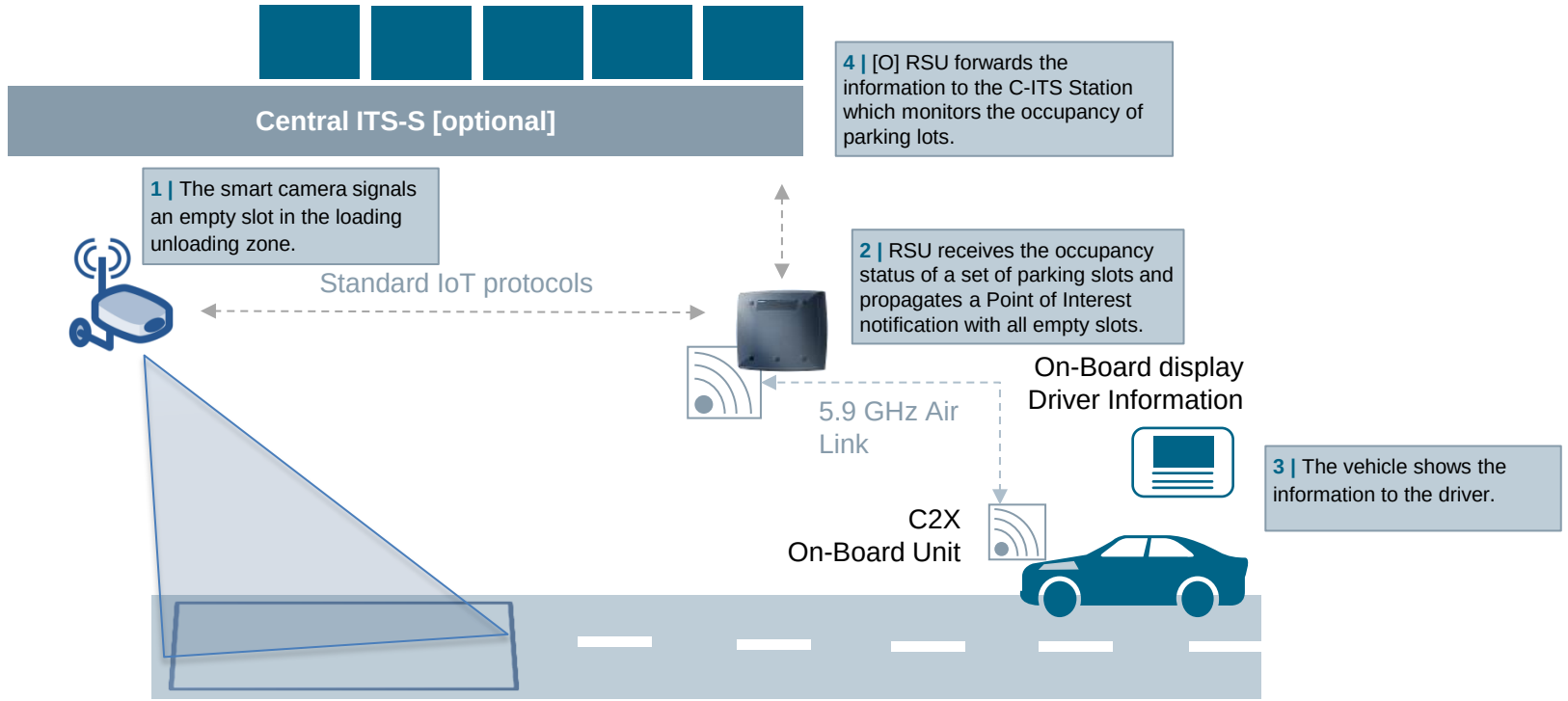
Use Case #7 Longitudinal Collision Risk Warning – Stationary Vehicle

- HV (vehicle under test) will run LCRW
- The distance (testing criteria) between the point A and the emulator is 20m (can be changed according to a vendor's implementation).



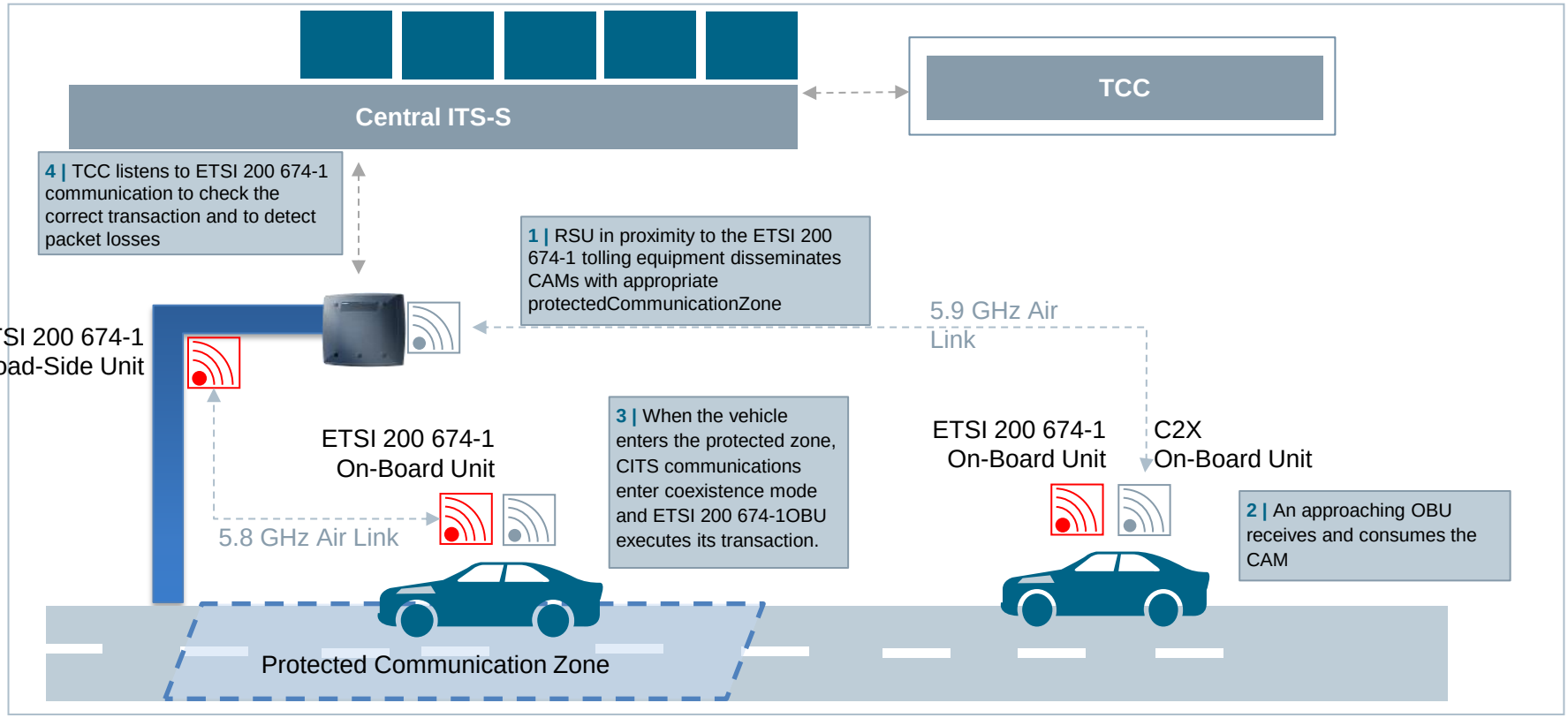
Use Case #8
Monitored loading/unloading zone

- A network of smart camera or presence sensors monitors the occupancy of a loading zone
- A RSU is able to receive the information and to propagate Point of Interest notification for each free parking slot

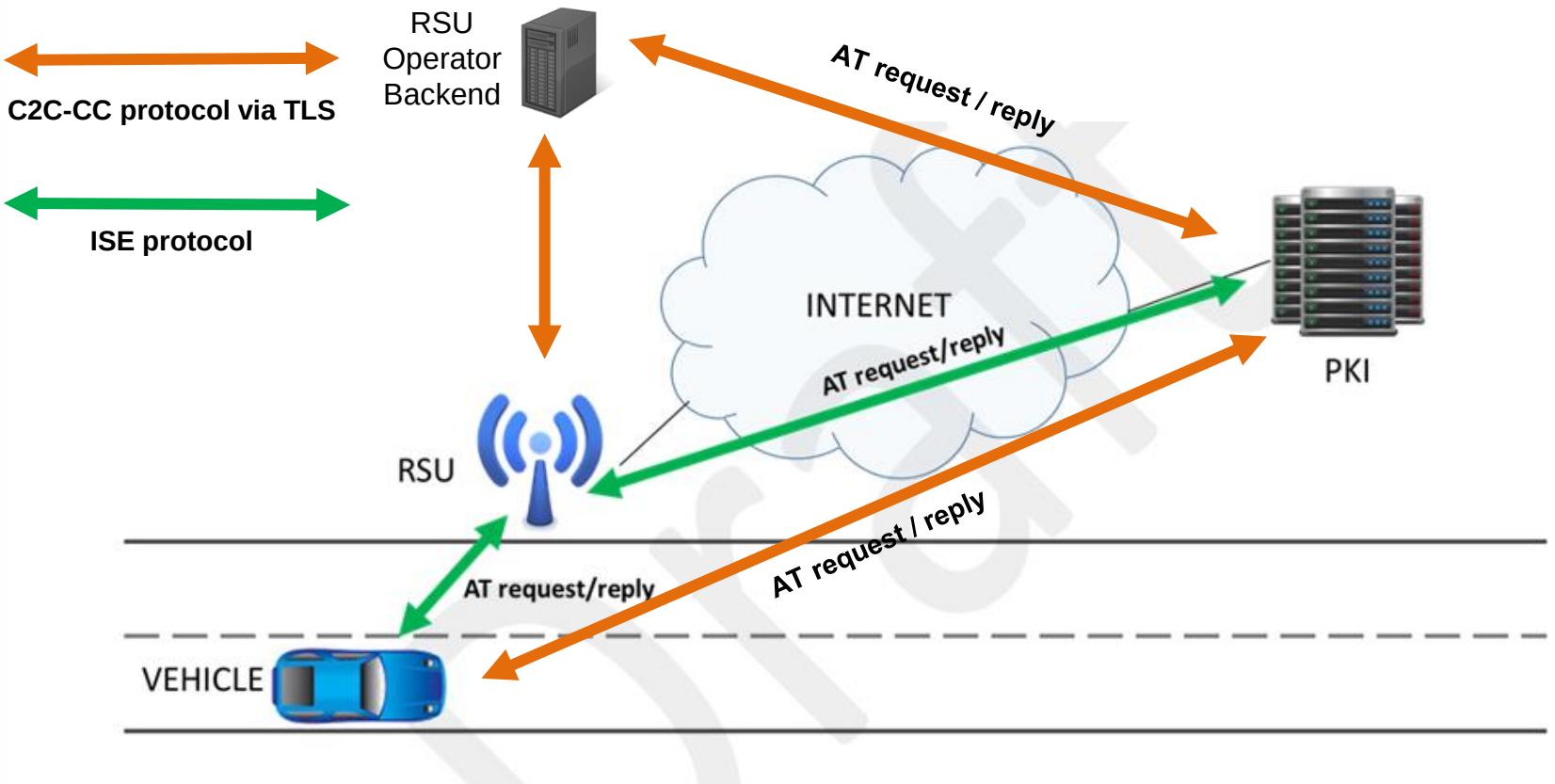


Use Case #9
Mitigation of interferences with tolling equipment

- A tolling equipment for testing purposes is deployed, ETSI ES 200 674-1 compliant
- A RSU is able to send CAM with an appropriate ProtectedCommunicationZone content, to protect the tolling zone
- Approaching OBUs are able to receive and consume the CAMs following the procedures defined in ETSI TS 102 792
- The vehicle, having also on board ETSI 200 674-1 OBU, enters the tolling protected zone and applies mitigation techniques
- The ETSI 200 674-1 DSRC transaction is executed with no interferences and no packet loss perceived by the ETSI 200 674-1 RSU



Use Case #10
Authorization Tickets Reloading



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http://www.etsi.org/news-events/events/1054-plugtests-2016-itscms5

Thank you!