SCORE@F Project

Test site perspective

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Place : DRIVE C2X @ simTD
(Friedberg, Germany)

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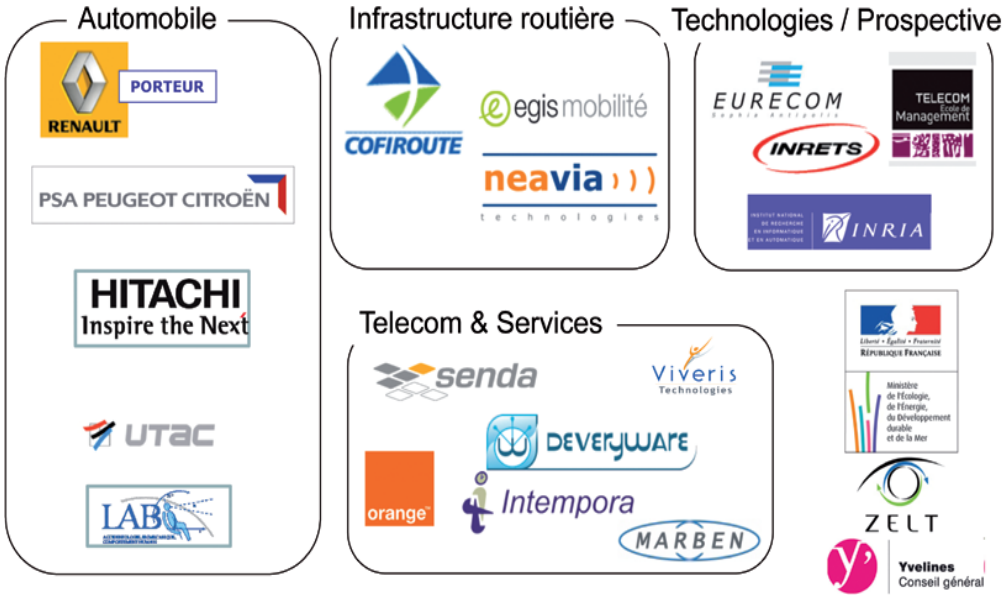
SCORE@F

Summary

- SCORE@F project summary and test sites
- General architecture and use cases
- Target systems
- Current status
- Interoperability with DRIVE C2X – Lessons learned

Project Summary

- Duration: 30 months since 1st September 2010
- Total funding/budget: 2.7 M€/5.6 M€ (French national and regional funding)
- Mission: to prepare the deployment of Cooperative systems
- Consortium: 20 partners (co-ordinated by Renault)
- Contributions:
  - Impact evaluations:
    - Technical evaluation (technologies, use cases, system architecture)
    - User acceptability / driver behavior
    - Social and economic values
    - Legal and organizational issues
    - Business model
  - Exploitation of results:
    - Deployment strategy (PPP)
    - System engineering (e.g. Validation)



Test sites

- Two types of test sites in Yvelines area and Orléan area:
  - Controlled test tracks (SATORY): for system validation and road safety applications
  - Natural test site: open traffic test in highway, urban/rural roads
- Other test facilities:
  - Laboratory test: 11p modem test bench
  - Simulation

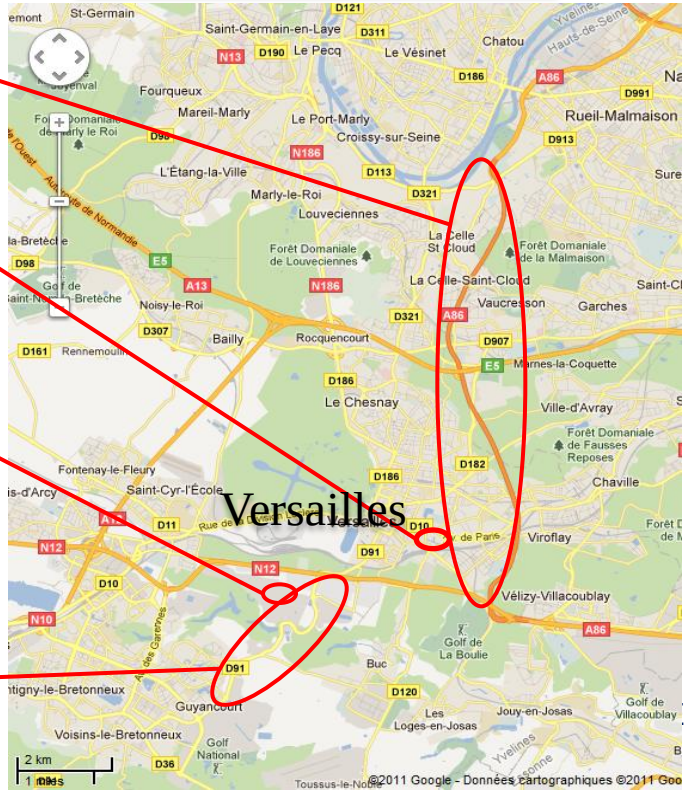
Versailles area

Highway A86:
10km tunnel
No RSU inside the tunnel

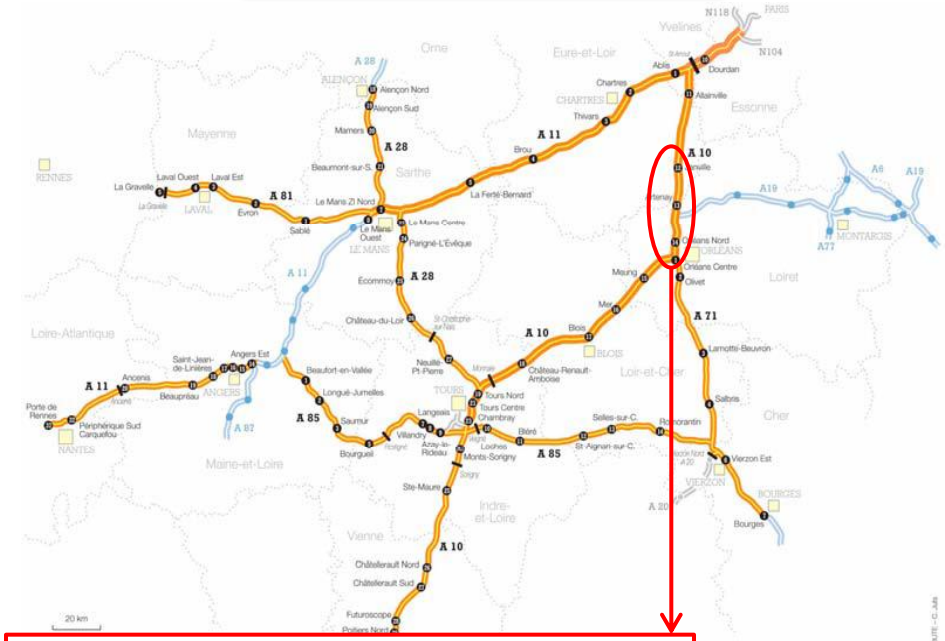
Urban road in Versailles: 5 intersections with traffic lights

Close test track: SATORY
3 tracks from 2-4km

Department road D91: 4.4km,
6 RSUs (main spot)



Orléan area



Highway A10 near Orléan (operated by Cofiroute):
13 km, 2x3lanes highway
Equipped with induction loop

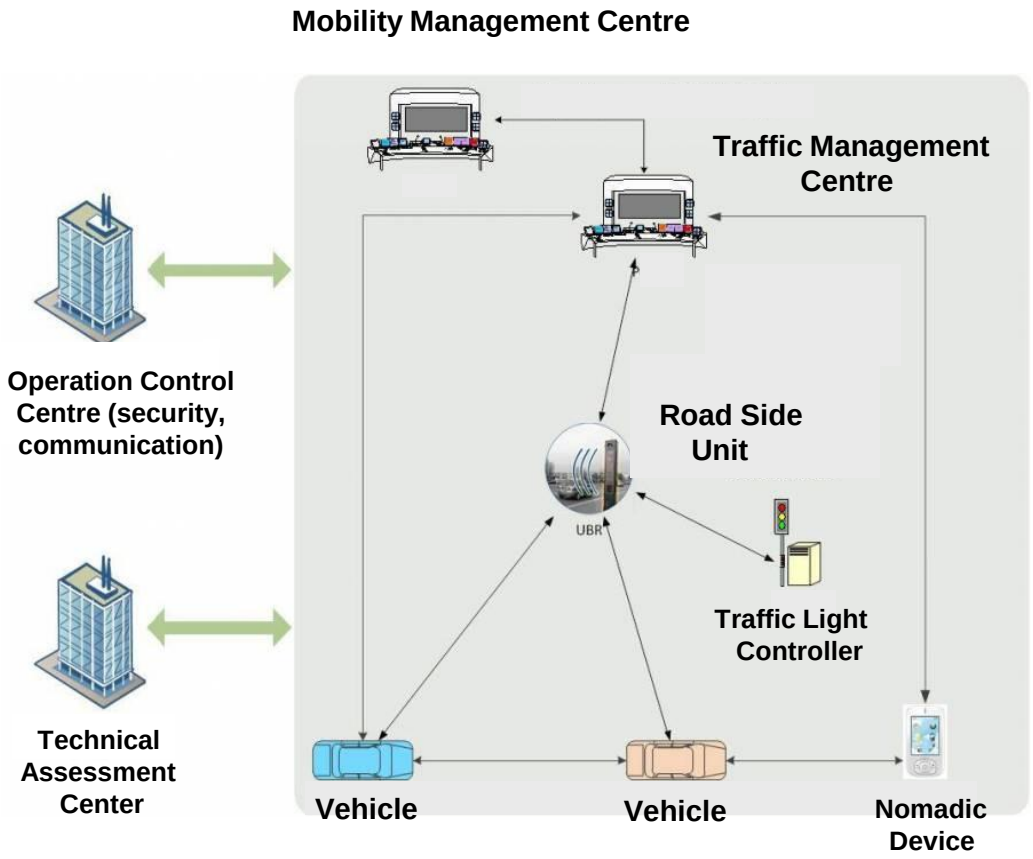
Overall architecture

Use cases:

- Road safety
  - Road hazards information (cooperative awareness)
  - Longitudinal collision risk warning
  - Intersection collision risk warning
- Traffic management:
  - Road traffic information provision (e.g. speed limit, in vehicle signage)
  - Green light advisory speed
  - Vehicle data collection
- Client services:
  - POI information
  - Personalized navigation service
  - Mobility services: e.g. EV charging service, multi-modality

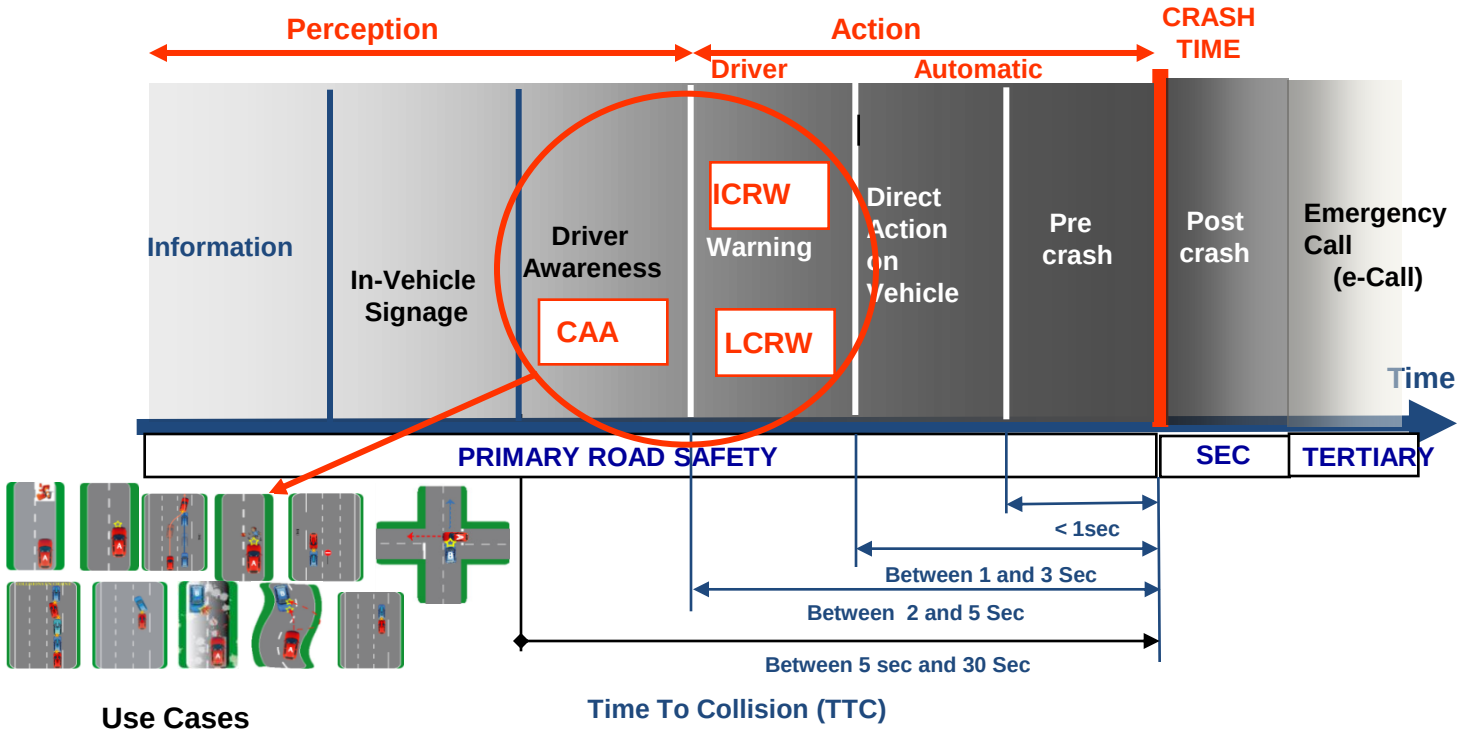
Communication technologies:

- ITS G5 (CCH and SCHs)
- 2G/3G
- WiFi 802.11n



Zoom in road safety applications

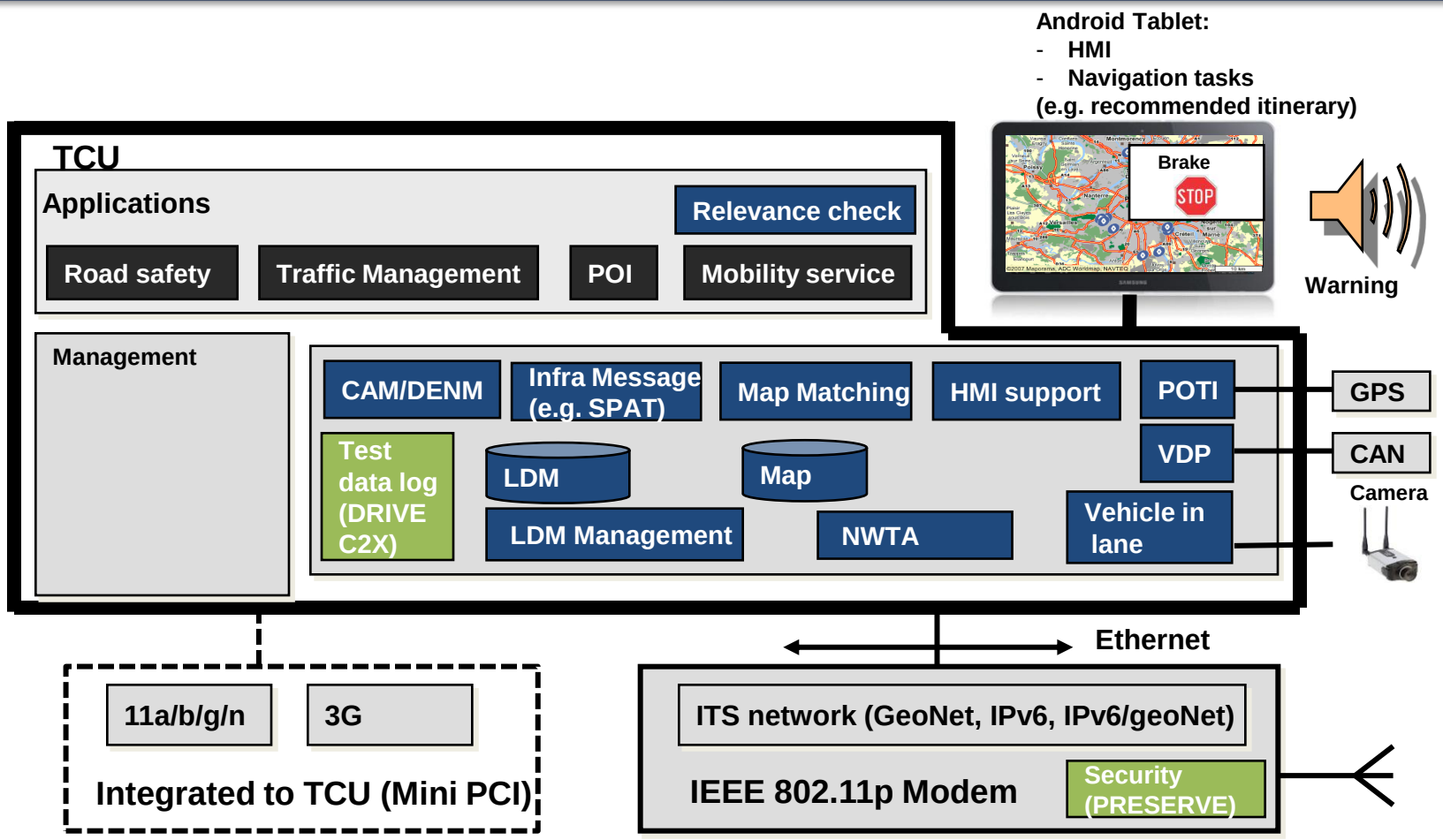
Reference: Road Safety Applications (ETSI TC ITS)



- SCORE@F tests not only driver awareness (information based), but also collision avoidance applications (warning based).
  - The collision avoidance applications are tested in a controlled environment.
  - Additional functional/performance requirements:
    - Lane information
    - Positioning accuracy
    - Application design

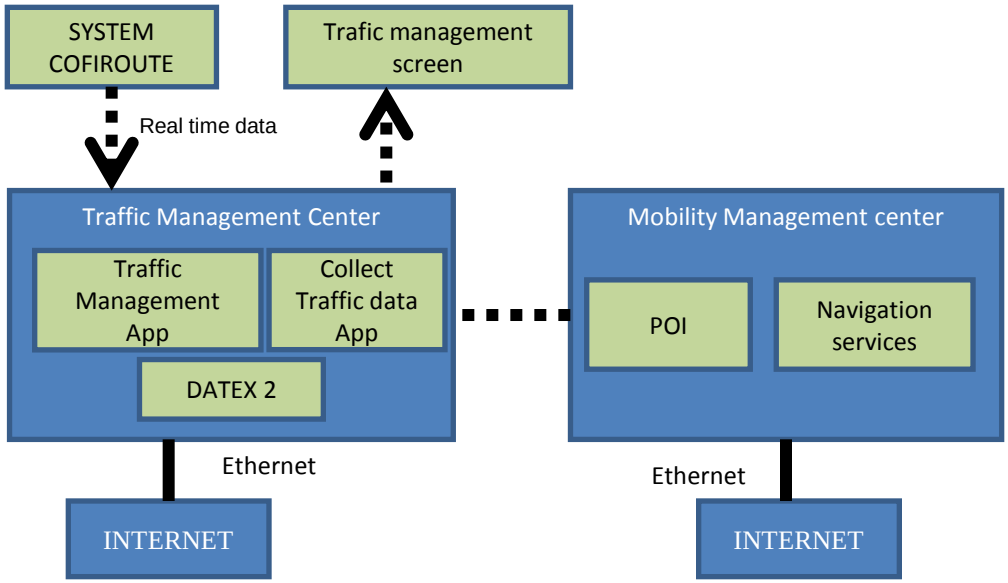
SCORE@F

Target system (OBU)



- SCORE@F specifications follow the ongoing standardization activities
- SCORE@F targets at interoperability with DRIVE C2X reference system
- SCORE@F shares common specifications with DRIVE C2X where possible

Target system (Infrastructure)



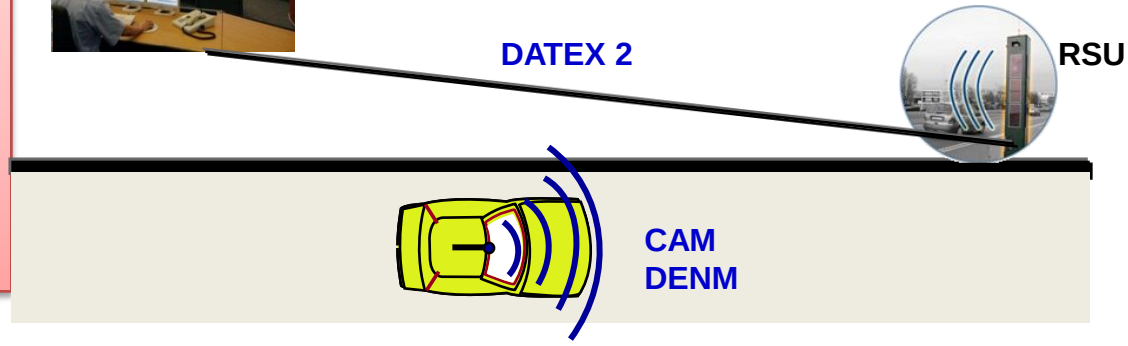
- SCORE@F develops traffic management center and mobility service center
- SCORE@F makes use of existing systems available at partners by including required functional extensions
- SCORE@F targets at implementing DATEX II standard for communication between RSUs and center.

Main functions of RSU:

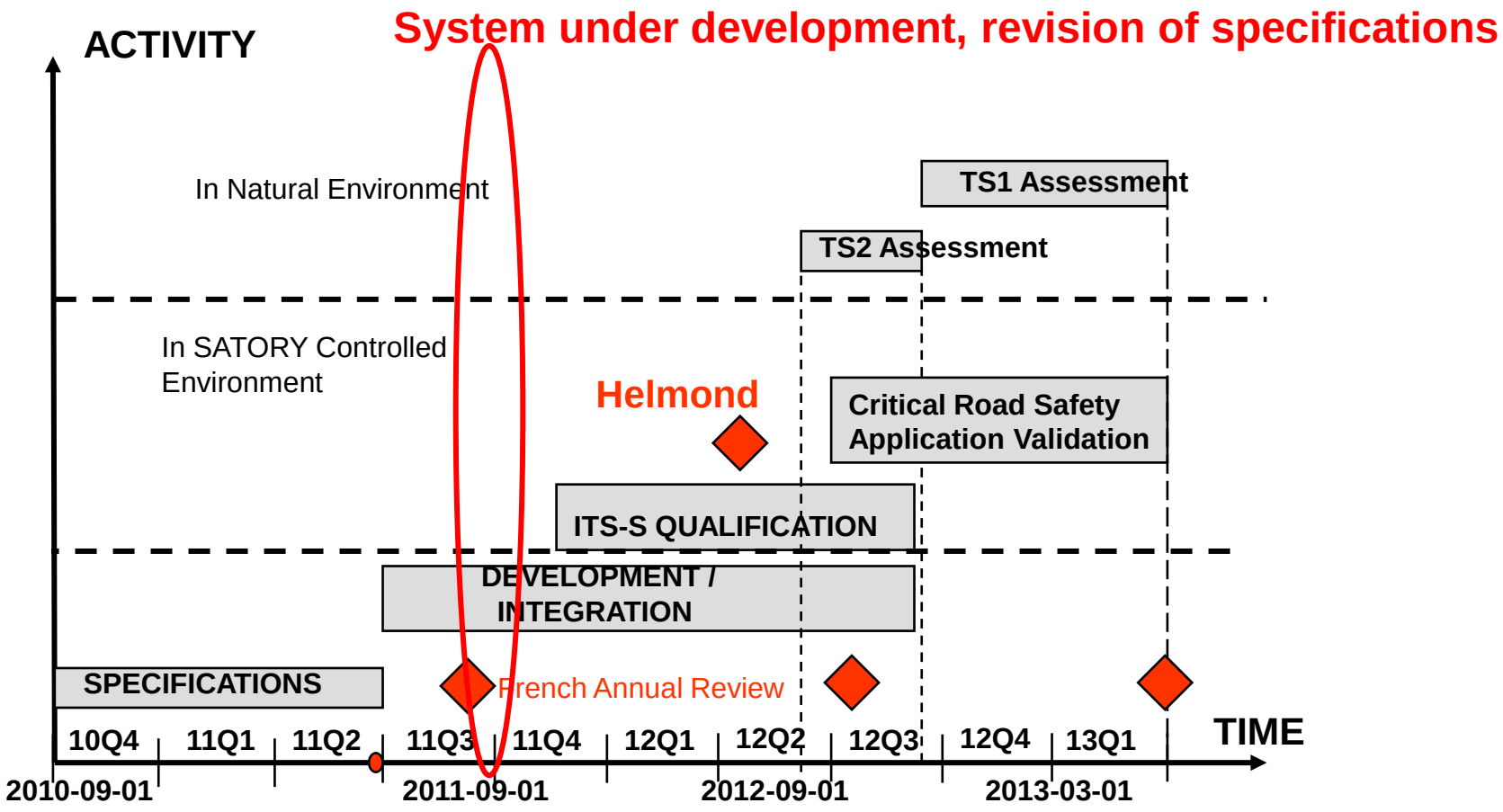
- Participating to the road safety application from road side
- Providing infrastructure/traffic information to vehicles (e.g. SPAT, topology, speed limit)
- Collecting and aggregating vehicle data (from received CAM/DENM)
- Providing Internet access services (access point to mobility services)

Traffic Management Center

- **Transfer pre-processed CAM & DENM**
- **Contextual Speed Limits**
- **In-Vehicle Signage**
- **Traffic Info & Recommended Itineraries**



Current status



DRIVE C2X interoperability: lessons learned

- Not the same approach for road safety applications development
  - DRIVE C2X mainly focus on CAA applications
  - SCORE@F extends CAA with collision avoidance applications

  therefore
  - → *Not the same CAM & DENM Standard version: SCORE@F will implement the version 2 of CAM/DENM (e.g. lane information in CAM, alacarte container in DENM)*
  - → *Not the same requirements to the facilities components*
    e.g. POTI, camera usage (lane level positioning), LDM, CAM transmission rate
  - → *Not the same application software design*

Conclusion: DRIVE C2X reference system may be suitable to test a subset of the SCORE@F applications

DRIVE C2X interoperability: lessons learned

- Communication interoperability with DRIVE C2X:
  - Message Format:
    - Different CAM/DENM versions (but retro compatibility implemented by SCOREF with version 1)
    - Common message format: SPAT, Topology
    - Specific Message in SCORE@F: speed limit message , in vehicle signage message (feedback to CEN TC 278)
  - Communication profile
    - SCORE@F tends to set different SCH for different message transmissions/reception, with the combination of service announcement message (SAM)

Conclusion: Cross check on specifications is needed to ensure the communication interoperability

DRIVE C2X interoperability: lessons learned

- OK for the DRIVE C2X data collection system. Adding collect of video for driver behavior analysis.
  - Common testing architecture with DRIVE C2X
  - Discussions for adaptation needs are ongoing between SCORE@F and DRIVE C2X
  - Detailed data to be collected is to be defined and harmonized with DRIVE C2X

Conclusion: Discussions with DRIVE C2X are needed for a common application evaluation scheme!!!

Thank you

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