

SCOOP@F

SCOOP@F Consortium



- **The French Ministry of Environment, Energy and Sea (MEEM)**
- **Local Authorities :**
 - St Brieuc Agglomeration
 - Departments of Côtes d'Armor, Finistère, Ille et Vilaine, Isère,
 - Conseil régional de Bretagne
- **4 TEN-T road operators (3 non-toll roads ; 1 toll road)**
- **Automotive manufacturers : PSA, Renault**
- **Consulting firms, universities and research institutes**
 - CEREMA, IFSTTAR,
 - GIE PSA-Renault,
 - Université de Reims Champagne-Ardenne,
 - Institut Mines-Télécom ParisTech
- **New partners of SCOOP part 2:**
 - Telecommunication Operator : Orange
 - Provider of digital services for the security system : IDnomic
 - Testing partners for interoperability in Spain, Portugal, Austria

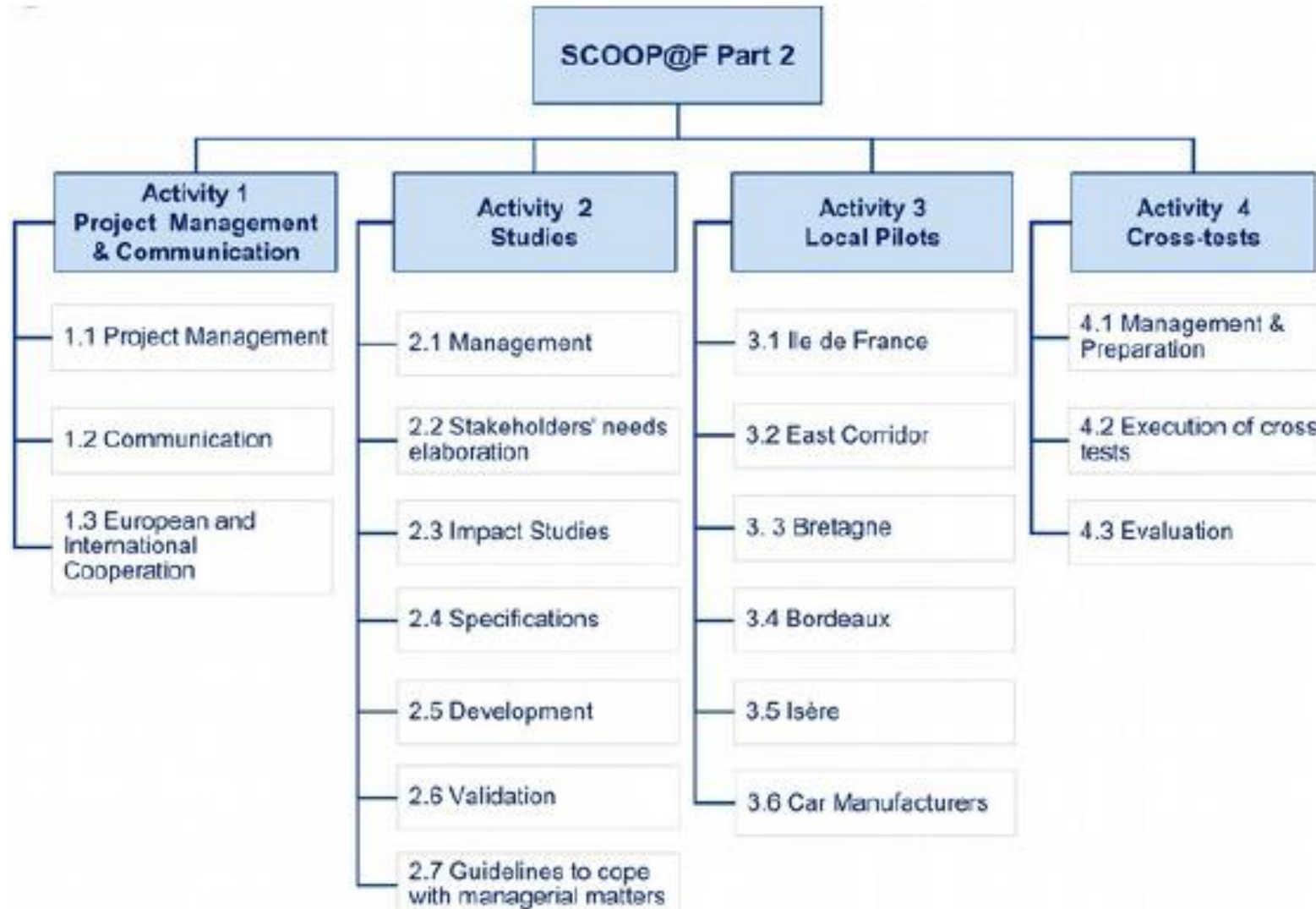


SCOOP@F responsibilities

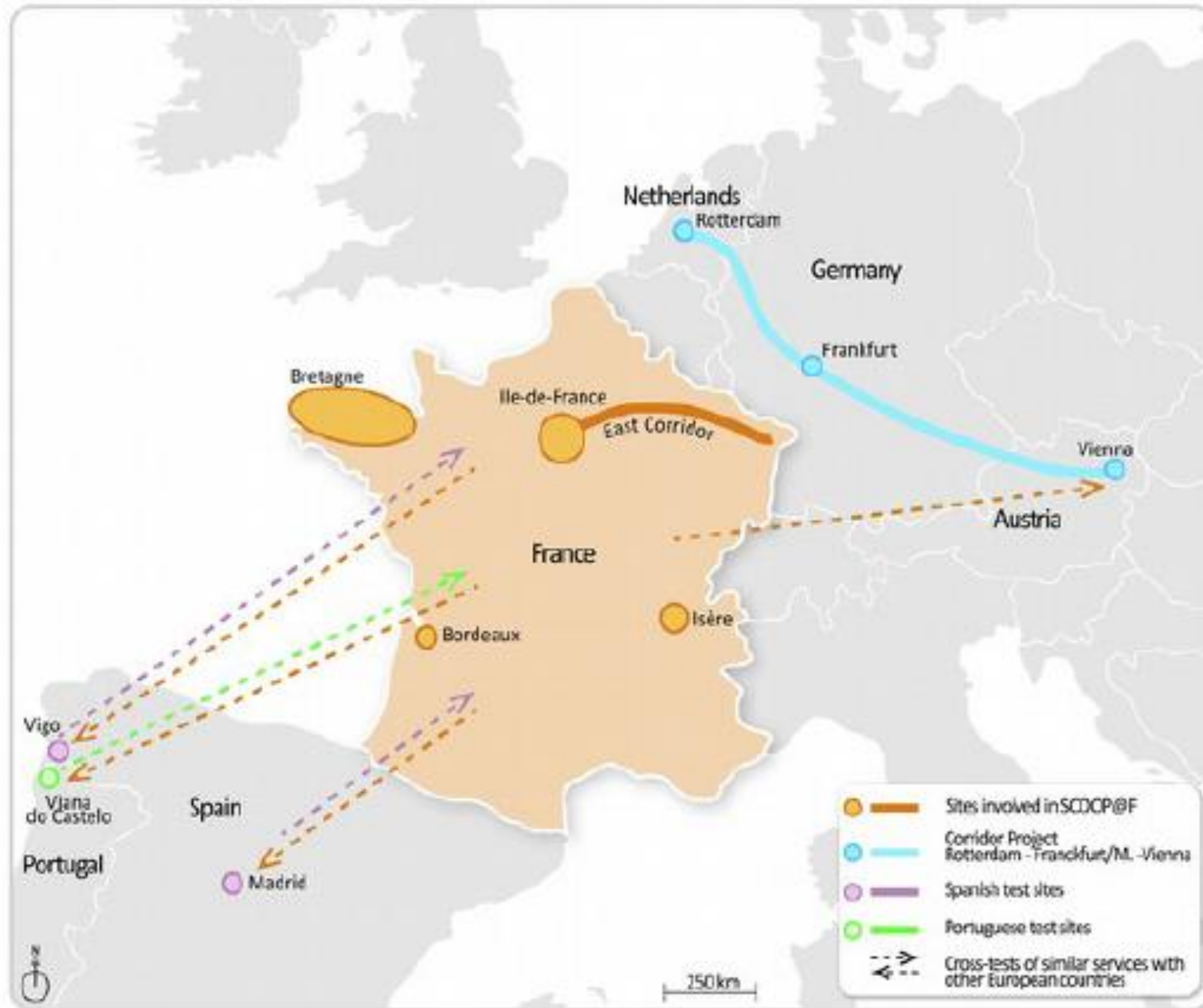
One project to address two main objectives:

- Prepare the deployment of **basic cooperative ITS services**:
 - Large scale testing of Day-1/2 services with more than 2000 serial vehicles, several hundreds of technical service cars from infrastructure providers and several hundreds of RSU
 - Granting services harmonization by basing all technical & functional specifications and developments on publicly available standards
 - Provisioning of an efficient security system
- Design and test **enhanced cooperative ITS services**
 - Elaborating a hybrid communication system (ITS G5 and cellular)
 - Enabling the evaluation of the long term infrastructure equipment strategy
 - Contributing to interoperability of cooperative ITS in the EU

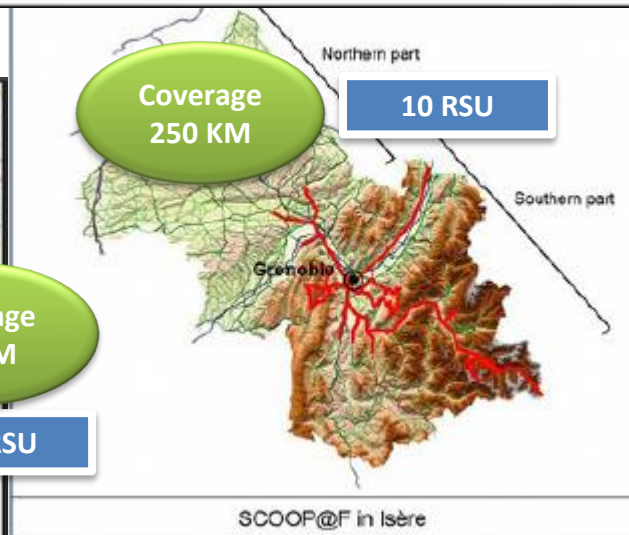
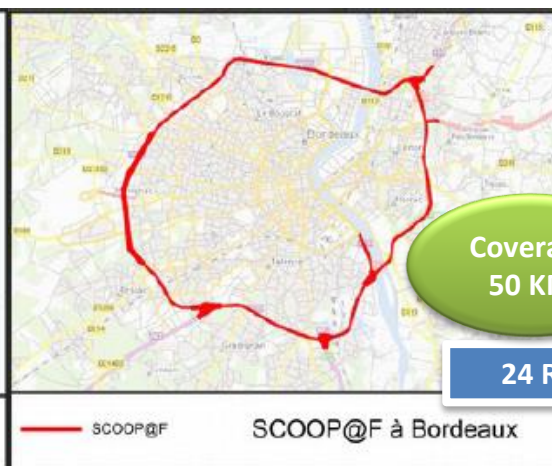
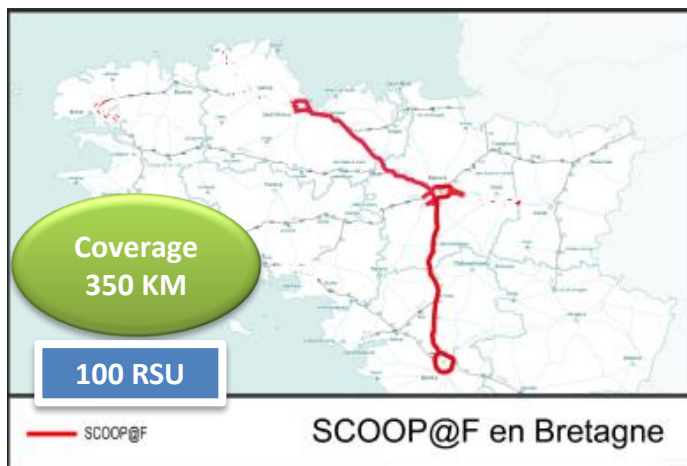
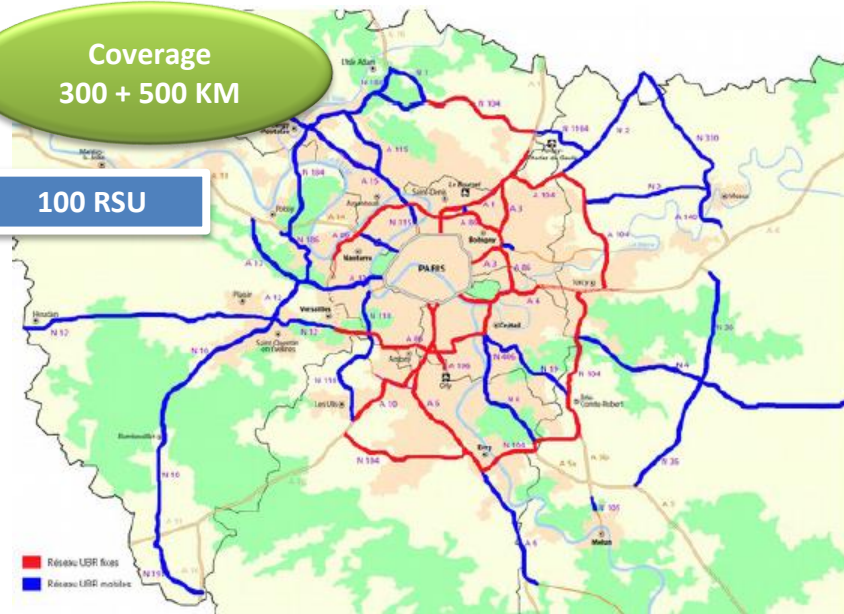
Activities structure



Geographical extension



5 main regions involved



Overview of standards & norms

ITS Norm	Reference	Version	
Access Layer			/!\ RED 2014/53/EU Update 1.2.1
Radio-Communications Equipment	ETSI EN 302 571	1.1.1	
Access Layer Specification	ETSI EN 302 663	1.2.1	
Communication Architecture	ETSI EN 302 665	1.1.1	
Harmonized Channel Specification	ETSI TS 102 724	1.1.1	
Mitigation techniques to avoid DSRC interferences	ETSI TS 102 792	1.1.1	
Transport Layer			Security
Vehicular Communications; Geo-Networking	ETSI EN 302 636-4-1	1.2.1	
	ETSI EN 302 636-5-1	1.2.1	
Facilities Layer			
Vehicular Communications; CAM	ETSI EN 302 637-2	1.3.2	
Vehicular Communications; DENM	ETSI EN 302 637-3	1.2.2	
Vehicular Communications; Geogr. Area of Definition	ETSI EN 302 931	1.1.1	
Users and Applications Requirements	ETSI TS 102 894-1	1.1.1	
	ETSI TS 102 894-2	1.2.1	
Applications			
Application Object Identifier (ITS-AID)	ETSI TR 102 965	1.1.1	
V2X Applications (RHS)	ETSI TS 101 539-1	1.1.1	
Vehicular Communications; Basic Set of Applications	ETSI TS 102 638	1.1.1	

Uses cases aligned with « DAY ONE » deployment

Typical V2V

Typical V2I / I2V

Hazardous location warning	✓	Probe vehicle data	✓
Slow vehicle warning	✓	Signal phase and time of traffic lights	
Stationary vehicle warning	✓	Road works warning	✓
Emergency brake light	✓	In-vehicle signage	✓
Emergency vehicle warning			
Motorcycle approaching indication			

2 message types:

CAM Cooperative Awareness Message

➔ permanently emitted by the car & UBR

DENM Decentralized Environmental Notification Message

➔ only emitted when an event, several emitters: customer car, service car, UBR

⚠ The use of **cellular communication** will be analyzed and if feasible deployed for:

- PKI certificate management
- Upload of technical and usage logs
- Extension of the coverage zone for services that do not need a high reactivity
- Introduction of multi-modal information services

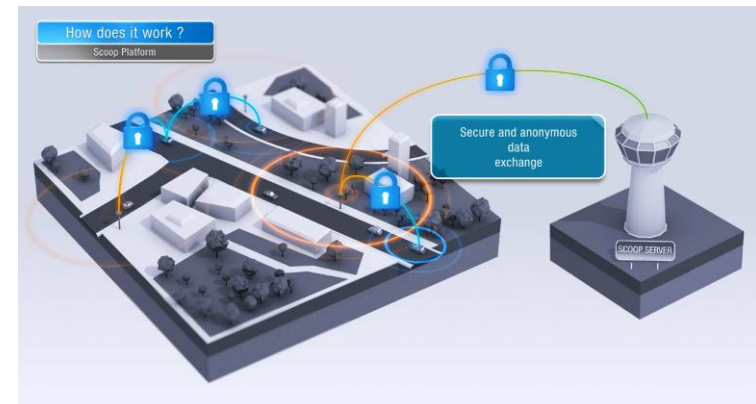
Some specific project choices

Commercial:

- **PSA** will sell 1000 serial cars to **private customers**
- **RENAULT** will sell 1000 serial cars to **fleet customers**

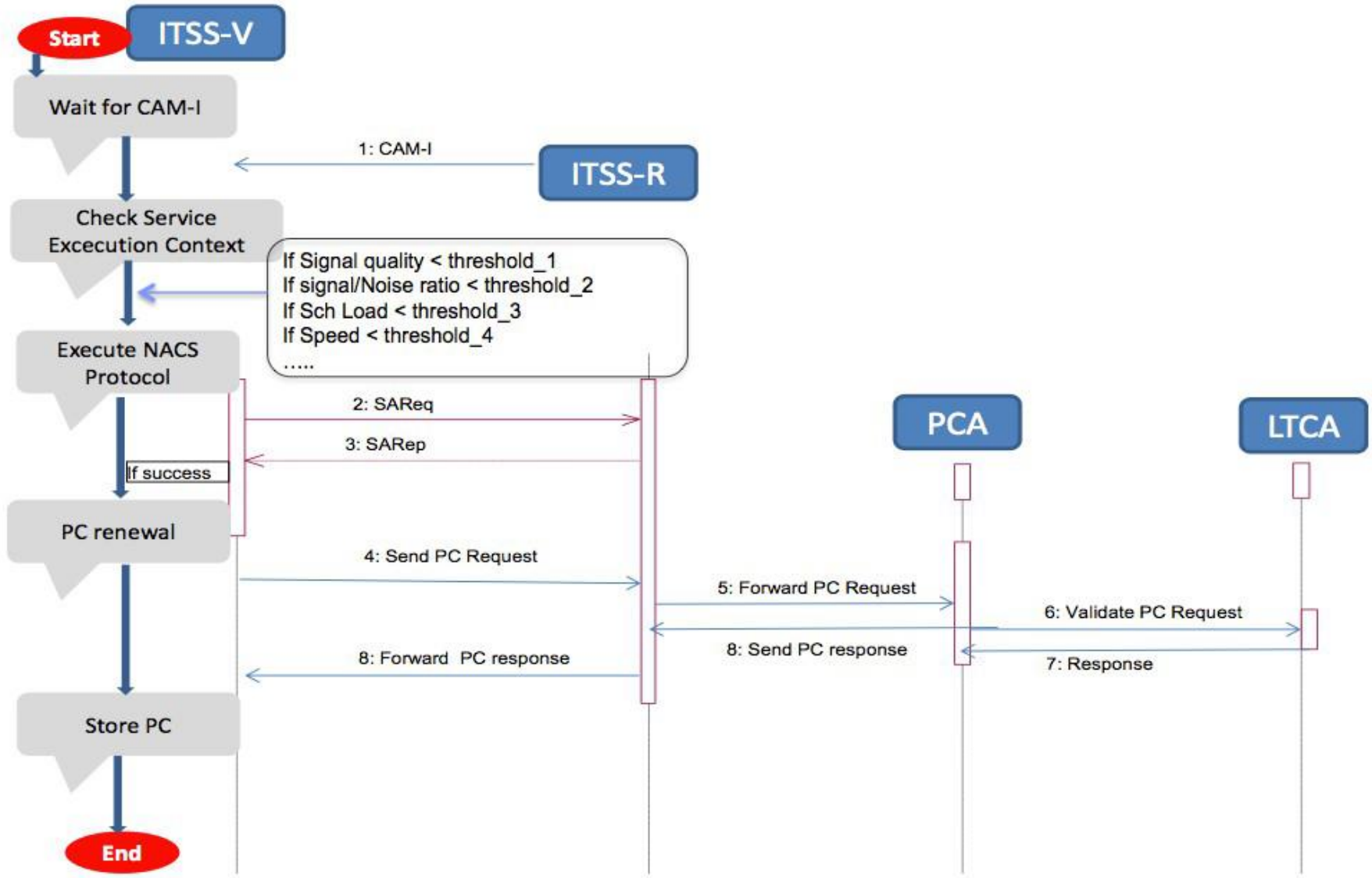
Technical:

- Road operator's cars will also be equipped with G5-TCU and participate actively to the eco-system → hybrid position between a vehicle (CAM&DENM) and a mobile RSU
- Some use cases will be declared manually by the driver → this is not foreseen neither in the standards nor in the C2C CC requirements but allows us to get more feedback on concrete cases
- Neither on-board road data basis nor (common) mapping will be used for some cars → position and orientation information could therefore be critical
- Some RSU with additional CAM functions: tolling station announcement, security certificate & logging data transit
- Operational PKI



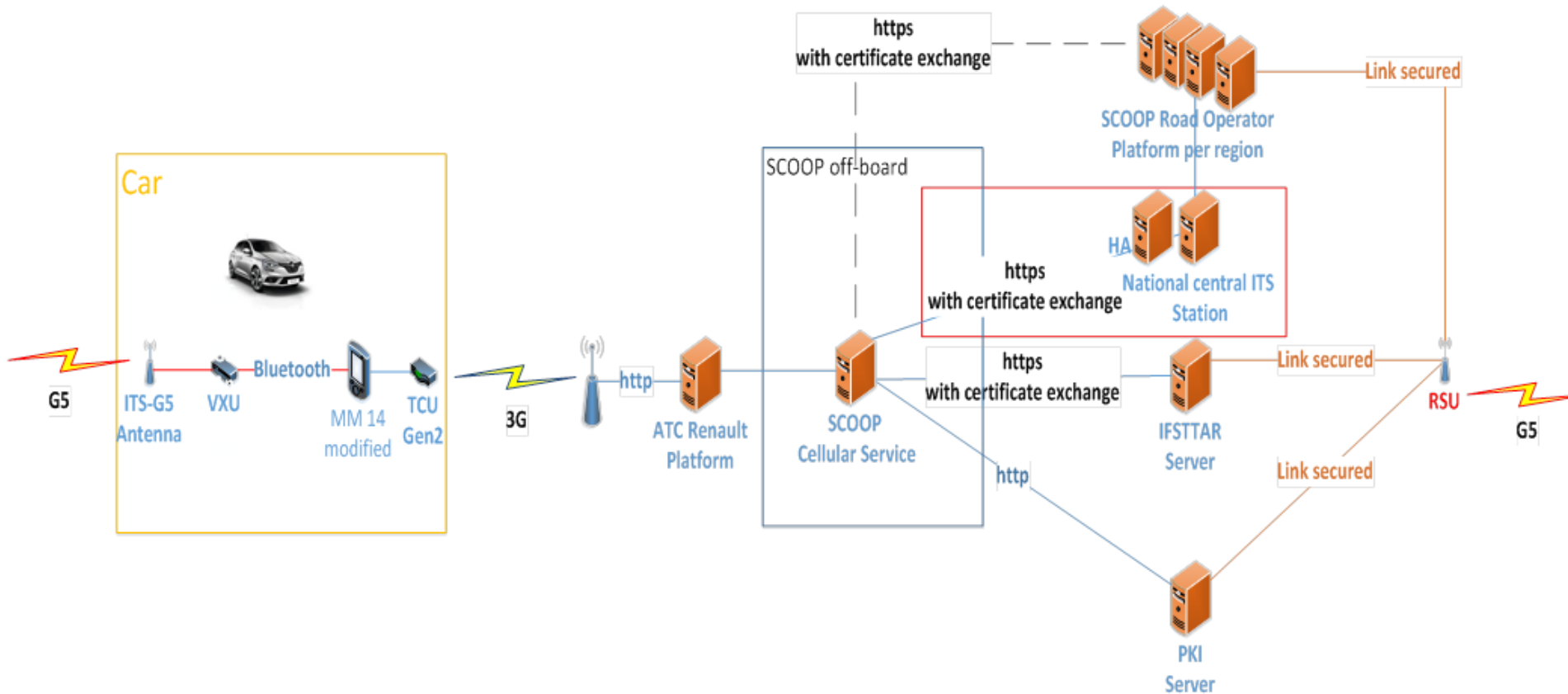


Renewal pseudonym certificates service



Renewal pseudonym certificates service

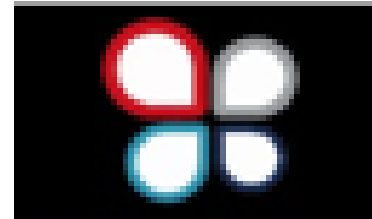
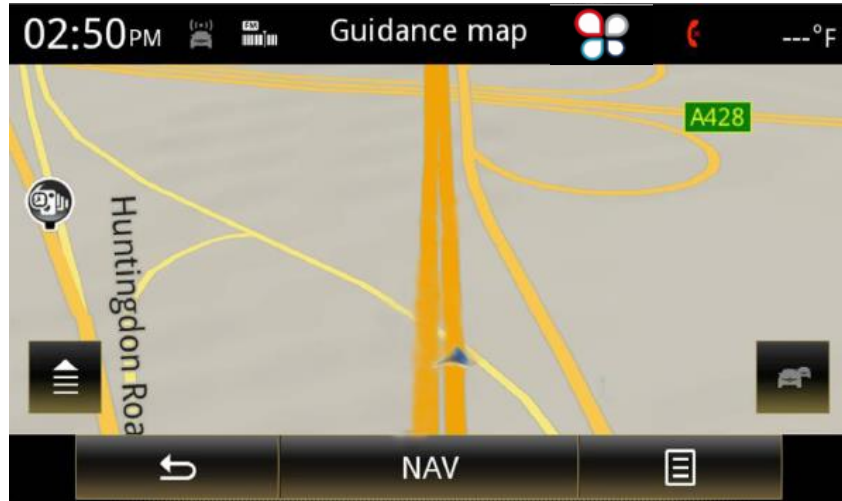
ALTERNATIVE OFF-BOARD ARCHITECTURE (EX. RENAULT)



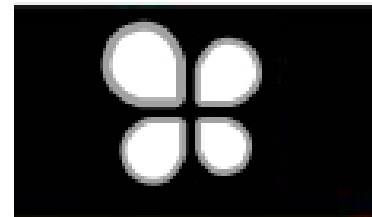
Hybridization via TCU / Renault Service Platform as fall-back solution:

- LOG (T&U) sent to IFSTTAR
- Pseudonym request and download via external PKI server (IDnomic)
- Up- and download of DENM messages in wave 2

Privacy requirements: Permanent signalization (ex. Renault)

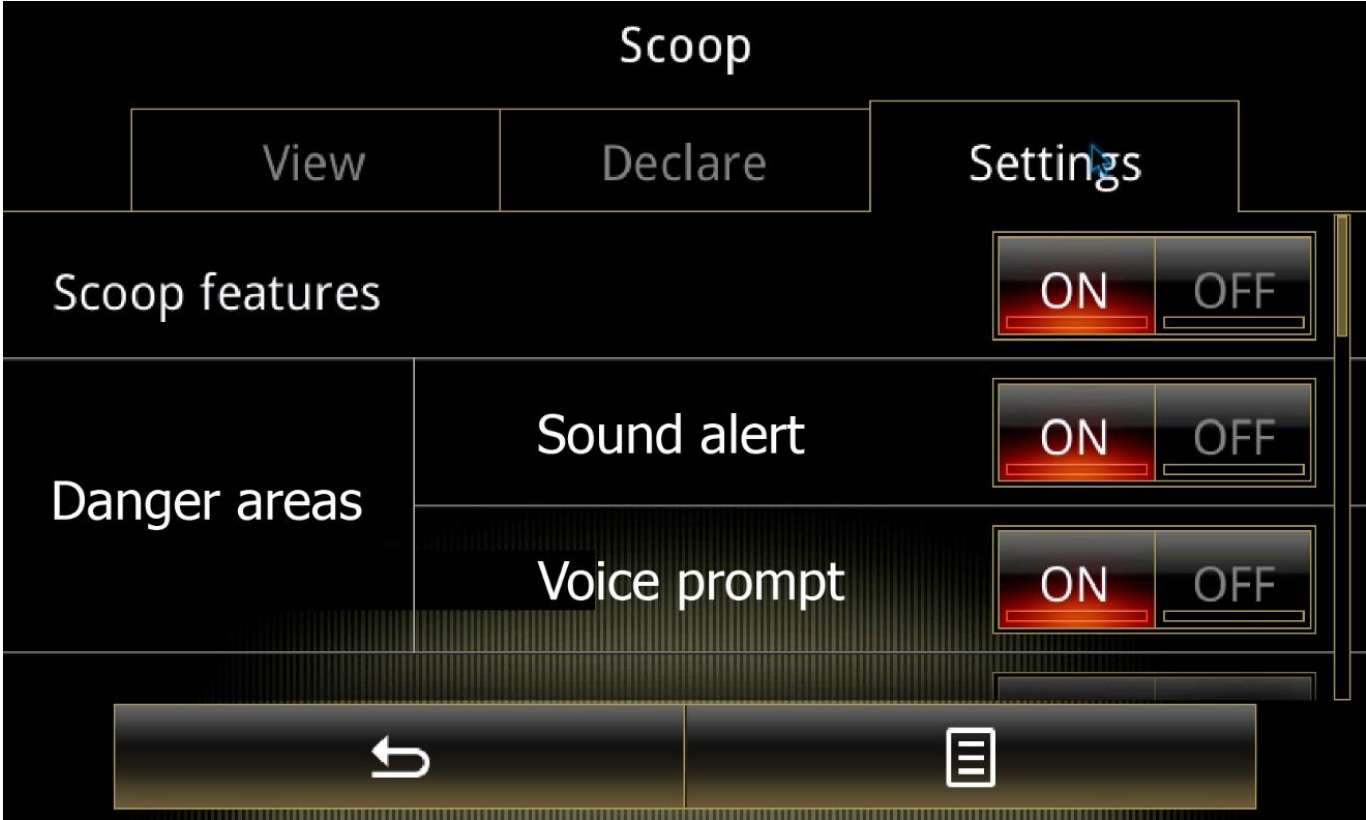


Logo SCOOP colored = Activation



Logo SCOOP grey tone = Deactivation

Privacy requirements: Direct menu access (ex. Renault)



First feedbacks – seen by Renault

Organizational:

- **Technical and functional specification period much longer than expected** due to different approaches between road operators and car manufacturers
- **Human resources:** difficulties to get experienced people on-board
- **Public tenders:** less flexibility to adapt specifications step by step within an iterative process; lack of publicly available C2C CC BSP
- **PKI:** missing governance and certification policy on an European level
- **Privacy:** on-going negotiation with the customer protection agency

Technical:

- Road operator's cars will also be equipped with G5-TCU (kind of retro-fit solution with dedicated HMI-pad) but the variability of car types is too large for deeper integration
- Operational PKI needs to charge certificates through RSU; no standardized process available yet
- C2C CC triggering conditions are less adapted to other roads than highways
- Further optimization of TCU functionalities and performances will be required

Compliance Assessment:

- Lack of available ETSI or other test case descriptions especially for V2I / I2V, Datex and CAM-I services
- Improvement of professional equipment necessary
- **Final phase of technical validations for SCOOP Consortium currently running → 5.9GHz DSRC technology mature enough**

Commercial:

- Positive attitude from commercials even if the business model is not defined yet

Outlook – seen by Renault

Organizational:

- **Technical and functional specification:** European-wide harmonization towards C-ROADS
- **PKI:** Involvement in governance and certification policy on an European level
- **Privacy:** alignment with the customer protection directives from WG29

Technical:

- **Protection** of RLAN / ITS should be the right way by **robust implementation of mitigation techniques** in favor of ITS and their road safety critical applications. Any channel splitting should be avoided.
- **Automotive industry is preparing for deployment** (GM starts in 2016 in US, VW in 2019, C2C CC MoU foresees serial launches in 2019 in Europe). Completely new architecture will be necessary in case of re-channelization.
- Re-channelization as proposed by Qualcomm will require a **significant update of DSRC spectrum regulation** that is already in place in Europe ECC/CEPT and US for several years.
- The **DAA (Detect and avoid) approach** (Cisco proposal) could be implemented without any changes in DSRC regulations and helps to speed up the implementation of a new regulation for U-NII devices in the 5GHz band.
- **Intelligent complementary hybridization to be analyzed – especially in perspective of sensor raw data exchanges** (ex. 1000 MHz at 63 GHz)

Compliance Assessment:

- Work on-going

Commercial:

- Business model to be finalized with respect to C2C CC MoU engagement from 2019 onwards