Projet SCOOP
véhicules et routes connectés
connected vehicles and roads

Information letter No 7

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Why is Sanef participating in the SCOOP project?

Sanef was solicited by the Ministry in charge of Transportation and Renault to participate in the SCOOP project. Sanef believes that the success of a cooperative system requires that infrastructure managers and automobile manufacturers cooperate fully in the development and testing of such systems. Our stakes are to improve real time traffic knowledge and to inform and warn drivers over traffic conditions and incidents that concern them (accidents, traffic jams, obstacles, objects on the road, broken down vehicles) for safer driving.

What is Sanef's role in this project?

Sanef participates in studies, specifications, in development monitoring and in implementation of a pilot site on its network. Today the SCOOP project covers 2000 km of roads, including more than 400 km for Sanef on the A4 motorway Paris-Strasbourg. To do this, we have installed thus far 20 Road-Side Units (ITSS-R) and equipped 10 service or operator vehicles. The plan is to equip 10 other vehicles during 2018.

What does the road infrastructure provide to cooperative systems?

The information provided by the road infrastructure makes it possible to increase the scope of connected vehicles' field of perception compared to other vehicles and therefore provide better events anticipation: reduced speed, lane changes, increased safety headways, etc. If the information is broadcast sufficiently in advance, the driver can also change his itinerary, take a break at a rest area or even change his mode of transport. We believe that the right solution involves implementing a dual communication infrastructure: ITS-G5 type WiFi, with ITSS-Rs installed, especially on motorways and high speed roadways and cellular, via the telecommunication operators to cover the entire territory. This would provide technical redundancy on the highest traffic arteries and a lower cost of coverage on the other arteries.

And for autonomous vehicles?

We believe that autonomous vehicles will firstly be connected vehicles driving on the motorway and that the infrastructure will provide them the safety margin they need. To illustrate this, we just participated in the tests and demonstrations carried out by the Renault Symbioz demo-car on the A13 motorway with the implementation of two use cases: passing through a work zone and passing through a tollgate in autonomous mode. The ITSS-Rs installed by Sanef on the test section broadcast the work zone position (start, end, lanes affected, and speed limit) and the open tollbooth lanes with the possible payment modes. This way the Renault Symbioz demo-car was able to anticipate its lane change before the work zone and to choose an electronic toll lane operating in non-stop mode.

How can you guarantee the systems' security?

A national security system based on a public key infrastructure (PKI) has been developed to protect users' personal privacy and protect the system against hacking. This security system, which must be interoperable across Europe, is implemented in the context of the SCOOP project and will be tested across Europe as part of the INTERCOR project on the SCOOP infrastructure. These tests, which will be organized by the University of Reims-Champagne Ardenne, will take place in Reims in April 2018 and will use the ITSS-Rs installed by Sanef on the A4 motorway.

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SCOOP, traffic management tool

The knowledge of real-time traffic conditions on the road network constitutes a challenge for the SCOOP project, both for users and for the operators of this network. Through its ability to establish a direct link between the operators (who have verified information) and the equipped vehicles (called On-Board Units or OBU), SCOOP represents a future traffic management tool. In other words, SCOOP added value lies in the integration of a connected and innovative traffic management system with a traditional system, thereby making it possible to increase the reliability of information.

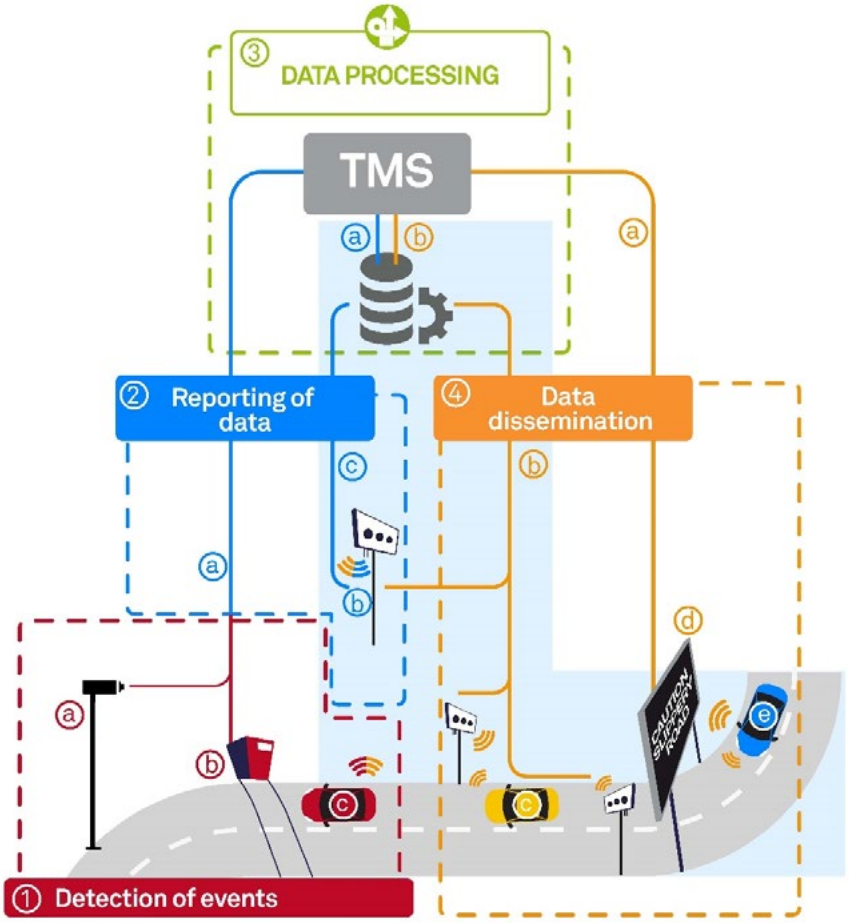
1.a : Events detected automatically by the cameras.

1.b : Traffic conditions detected by the counting stations.

1.c : Events detected by the OBU (manually by the user or automatically by the vehicle). The OBU then generates a message in DENM format and sends it to the ITSS-R (Road-Side Unit) in ITS G5 WiFi (V2I Transmission).

2.a Information is directly reported to the TMS (Traffic Management System), which uses it to optimise the collection and broadcasting of events, thereby improving the management of road information.

2.b : The ITSS-R translates the DENM message received in DATEX II v2.3 format (language used in traffic management). The ITSS-R sends the translated message to the SCOOP platform via the operator's network.



3.a : The platform processes the received messages in order to send verified messages to the TMS. As TMS, there are as many platforms as partner operators of the SCOOP@F project (DIRA, DIRO, DIRIF, Sanef, Isère).

3.b : The TMS cross-checks all the reported information . For example, as part of a «Slippery road» event, the TMS generates an event to broadcast to users. In the context of SCOOP, the message is sent to the platform.

4.a : The message is sent to the VMS (Variable Message Panels).

4.b : The message is sent from the platform to the ITSS-Rs concerned by the event.

4.c : The ITSS-Rs translate the DATEX II messages received in DENM format, then broadcast them in their zone via a WiFi ITS G5 connection (I2V Transmission).

4.d : The OBUs broadcast the message received in their zone via a WiFi ITS G5 connection (I2V Transmission).

4.e : If necessary, the OBU informs the driver via an integrated HMI in the vehicle.