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## “URBAN MOBILITY, ROADS NETWORK OPERATION AND ITS APPLICATIONS”

### SCORE@F : French project for cooperative systems (part 1/3)

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## Goals

The main goals of the French SCORE@F project (funded by the French Ministry of Industry) is to prepare the deployment of safety, mobility and comfort services based on information exchange between vehicles, road side unit (RSU), vulnerable users and traffic management centers.

Various communication protocols are used: broadcasting, Geocasting and point to point bidirectional communications. End users are drivers, car passengers, pedestrians and road network operators.

## Technical aspects

Overall architecture relies on 4 entities: vehicle (UEV), road side unit (RSU), traffic management centers (TMC) and nomadic devices (UND). RSU main function is bridging the gap between vehicles and traffic management centre. In addition, when equipped with sensors, RSU acts as event detector (e.g. sensors to detect traffic lights violation).

Figure 1 shows the relationship between entities and the communication link required:

- Direct communication from vehicle to vehicles (V2V) and from vehicles to RSU based on wireless short range communication media (IEEE 802.11p),
- Communication between RSU and TMC based on 3G cellular network and DATEX2 protocol,
- Communication between UND and TMC based on 3G cellular network or IEEE 802.11n media.

Each entity implements the ITS stack (ITSS) - a set of building blocks - which is a generic reference architecture defined by ETSI (Figure 2):

- **Access:** supports physical access to medias 802.11p, 802.11n and 3G/HSPA,
- **Network** combines IPv6 and Geonetworking routing. Geonetworking allows vehicles to be addressed according to their geographical location,
- **Facilities** provide a set of services that can be shared by applications. Typical services are: access to bus CAN and CAN message decoding, local dynamic map, localization and map-matching, interface to HMI etc,
- **Security** supports communication security and privacy,
- **Management** supports various communication profiles to adapt medias and protocol performance to the level required by applications.

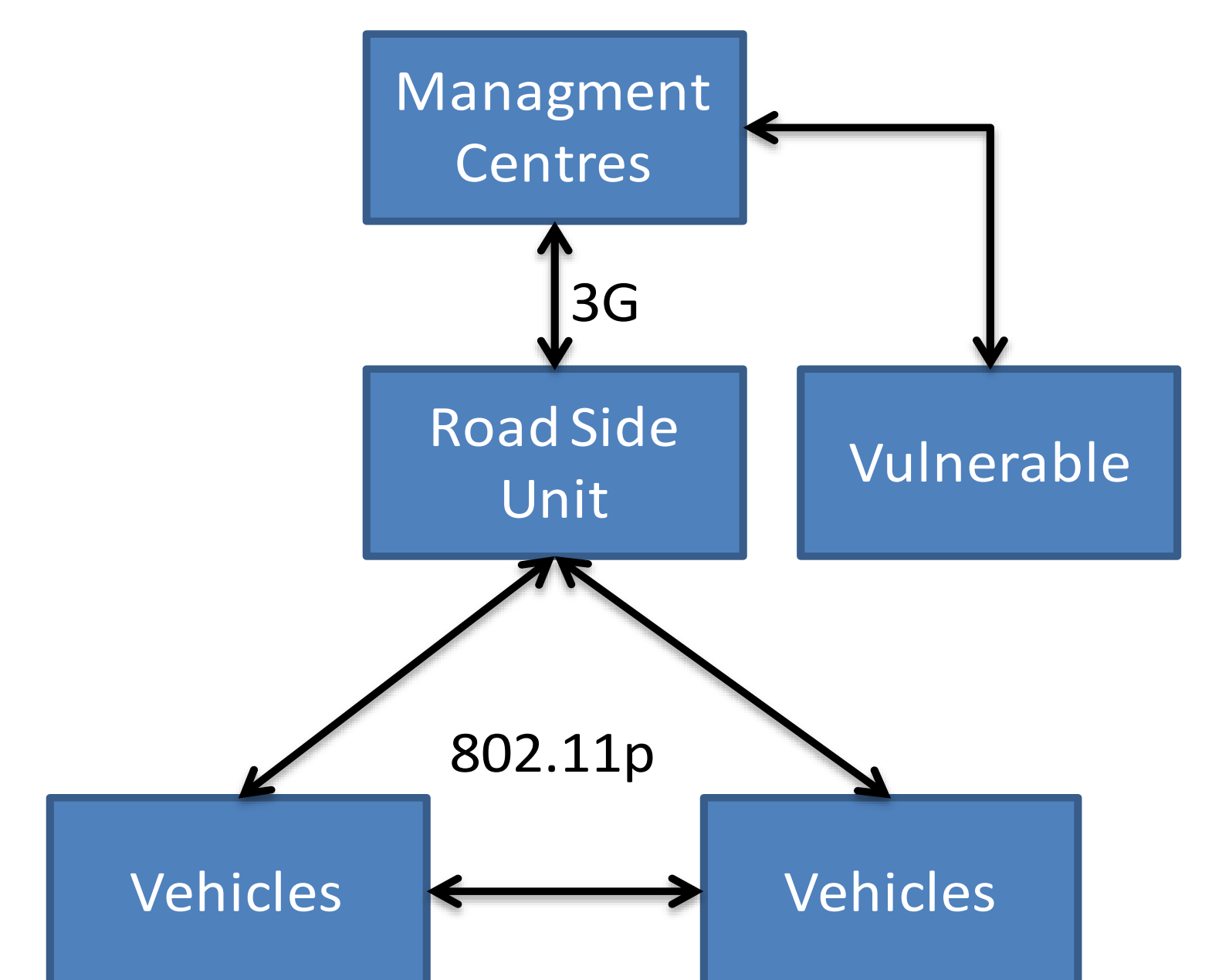


Fig. 1 Architecture

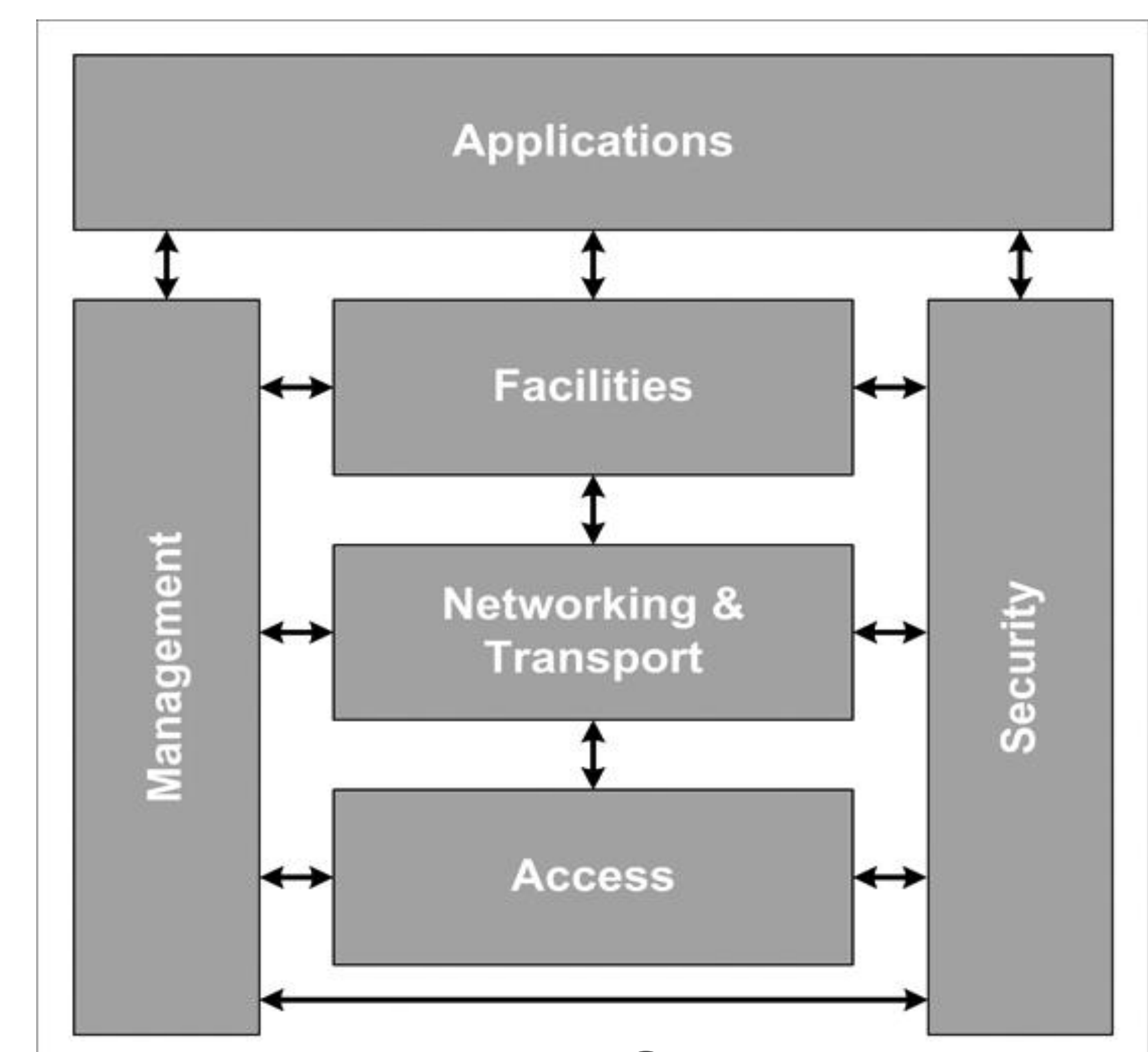


Fig 2. ITS station

## Evaluation

Evaluation was organized on two steps. First step could be considered as a pre-evaluation to detect problems associated with system ergonomics or assimilation and perform all eventual technical adjustments. Second step is performed in naturalistic driving conditions. The objective is to assess system usage, usability, acceptance and impact on driver behavior. It involves about 16 drivers during 4 weeks. They run over routes on which is deployed SCOREF infrastructure and uses-cases and use their own vehicles equipped with SCOREF ITS station.

### Partnership



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