

## PhD student in communication for IoV (Internet of Vehicles) (M/F) in Versailles (78)

### DESCRIPTION OF THE INSTITUTE

The VEDECOM Institute is a French research and training institute dedicated to decarbonized and sustainable individual mobility that brings together public (universities, engineering schools, etc.) and private partners (manufacturers, equipment manufacturers, service companies, etc.). It has been selected as the Institute for Energy Transition (ITE) under the French Program of Investments for the Future (PIA).

VEDECOM aims to become a European leader in innovation in the areas of decarbonated, autonomous and connected vehicles.

### ACTIVITIES

Information Centric Network (ICN) has been proposed as one of the future Internet architectures. It intends to replace the current IP-based model with the name-based content-centric model and aims at providing better security, scalability, and content distribution. Moreover, it also intends to meet the requirements of new emerging services and applications. One such domain is Intelligent Transportation System (ITS) realized through Vehicular Ad hoc NETWORK (VANET). This latter is being revolutionized by the emerging of 5G and its capabilities to push forward autonomous driving. In this context, VANET is regarded as a potential field of applying ICN since vehicles are permanently exchanging information and content with each other and with the infrastructure.

On the other hand, several challenges are facing VANETs today that hinder the realization of successful vehicular networks.

These challenges are not only limited to the inherent characteristics of VANETs (dynamic topologies, host-centric model, and ephemeral nature of vehicular communication) but also span to the technological choices that have been made regarding the communication architectures.

In fact, many architecture have been proposed for VANET but each one of them presents a different point of view regarding the communication realization, resulting in non-compatible frameworks : IP (LTE, 5G) /non IP (ITS-G5, RFID, VLC).

To tackle these challenges, ICN is regarded as a potential framework that can offer a valuable architecture to enable hybrid V2X communications. In this context, **this PhD aims at providing a new architecture for IoV based on an ICN-NDN model approach.**

The main objectives are the following :

- Carry-out a state of the art on IoV and different proposed ICN architectures
- Study the challenges regarding using multiple communications technologies for V2X on ICN
- Propose a new ICN-based framework for V2X communications that takes into account this hybrid aspect for communication technologies.
- Develop a prototype implementation supporting the aforementioned new architecture.

**Keywords : Télécommunication, Vehicular communication, ITS, Protocoles, ICN, NDN, cloud, IoV, IEEE 802.11p, LTE, C++**

### REQUESTED PROFIL

- Master's Degree in the field of telecommunications.
- Strong knowledge of mobile networks and IP communications.
- Autonomy, synthesis, rigor.
- Ability to work in a team and to be proactive.
- Technical skills : C++
- French, English (spoken written)

### Additional information

Contrat	Thesis 36 months from January 2020
Manager	Oyunchimeg SHAGDAR
Localisation	23 bis Allée des Marronniers, 78000 Versailles

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