



## Fethi Filali, Ph.D.

**Q**atar, the richest country in the world in terms of gross GDP, has always been famous for possessing the large natural gas and oil reserve within the Arabian Peninsula. Ever since this country has been selected as the host nation for 2022 FIFA World Cup Football, the overall infrastructure development activities has accelerated to the highest level of excellence. And now, keeping pace with the global ITS revolution, Qatar can proudly present their country as the first nation within the Middle East to acclimatize with the advancements of connected vehicle technology. All credit goes to the Qatar Mobility Innovations Center (QMIC), a world class applied research center, located inside the Qatar Science and Technology Park (QSTP) at the heart of the capital

city, Doha. And the person who has been leading all these successful projects is Dr. Fethi Filali, the Head of Technology Development & Applied Research at QMIC.

At QMIC, Dr. Filali had an excellent team of researchers and



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R&D engineers working for more than three years to design, develop, deploy, and demonstrate the first regional standard-compliant devices and applications for vehicle-to-vehicle and vehicle-to-infrastructure communication. QMIC developed its own standard compliant V2X On-Board Unit (OBU) and Road-Side Unit (RSU). The system was implemented and integrated based on the latest International standards, from physical layer to application

layer. QMIC successfully participated in the three ETSI V2X Plugtests events and preparing to participate in the fourth one planned for March 2015. These events were a unique opportunity to test the conformance of QMIC's technology against

latest international standards, and also a unique occasion for testing

the interoperability of QMIC's V2X hardware and software prototypes with those of other key international technology suppliers.

Dr. Fethi Filali received his Ph.D. in Computer Science from the Université of Nice Sophia-Antipolis (UNSA)

in 2002. His doctoral research was conducted with the Planète research team at INRIA (The French Institute for Research in Computer Science and Control). Prior to that, he completed his bachelor's and master's degree from the National College of Computer Science (ENSI, Tunisia) concentrating in the field of networking and distributed systems. During 2003, he was an ATER (Attaché Temporaire d'Enseignement et de Recherche) at the Université of Nice Sophia-Antipolis (UNSA). From September 2003 to December 2009, he served as an Assistant/Associate Professor in the department of Mobile Communications at EURECOM in Sophia-Antipolis. He was involved in several European and French-funded (applied) research projects (Dipcast, Constellation, Rhodos, Cosinus, Airnet, WiNEM, Widens, Newcom, Daidalos, E2R, Multinet, Unite, Chorist, iTetris, Newcom++) during this period. In the context of some of these projects, he designed and developed an open, flexible, and efficient architecture for the support of



radio resources management in heterogeneous radio technologies. This architecture was integrated in EURECOM's wireless software-radio platform. In April 2008, he was awarded the "Habilitation à Diriger des Recherches" (HDR) from the University of Nice Sophia-Antipolis for his extensive research on wireless networking.

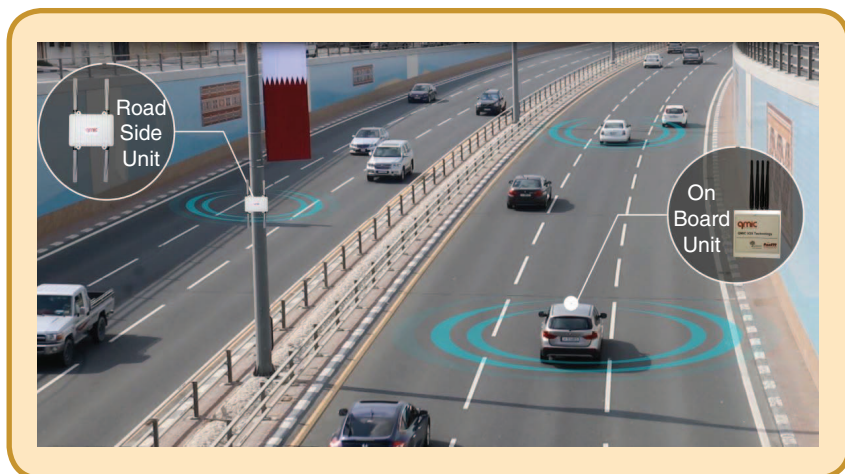
Dr. Filali joined QMIC as a Senior Research Scientist in January 2010. Since then he has served as Senior R&D expert, Manager or Technology Development and Planning and finally as the Head of Technology development and Applied Research. At QMIC, he has served as the technology lead for *Masarak*<sup>TM</sup>, *WaveTraf*<sup>TM</sup>, *Labeeb*<sup>TM</sup>, and several other projects related to ITS and connected vehicles.

*Masarak*<sup>TM</sup> is a suite of Intelligent Transportation, Logistics/Telematics Management, and Road Safety services fully developed by QMIC in Qatar. *Masarak* relies on collecting real-time traffic data from various sources then passes the traffic raw data through the back-end platform than runs many algorithms and (big) data analytics systems, developed by Dr. Filali's group at QMIC, to provide meaningful traffic, safety and fleet information in real-time. This information is used by the many applications and services in *Masarak*, such as *QTraffic* (traffic management), *iFleet* (intelligent fleet management), and many others. *Masarak* is being adopted by several entities and enterprises in Qatar such as Qatar Rail for traffic/fleet/safety management during the construction phase of the 300 km four-line Doha metro project. *Masarak* is currently collecting daily multi-million of raw records from its three data sources (GPS tracking devices, *WaveTraf* QMIC's traffic sensor, QMIC's *iTraffic* mobile application).

*WaveTraf*<sup>TM</sup> is a traffic sensor device, fully designed and built by Dr. Filali's group at QMIC, for detecting and monitoring traffic information on the local roads of Qatar. *WaveTraf*<sup>TM</sup> sensors spot Bluetooth devices in pass-



Dr. Filali's research team at QMIC.



RSU and OBU designed and developed by QMIC.



QMIC developed collision avoidance application using V2X communication.

ing vehicles and send associated information to a central server. Based on the real-time traffic data collected

from the passing cars in conjunction with the advanced algorithm developed by QMIC, *WaveTraf*<sup>TM</sup> is able to

*WaveTra<sup>f</sup>™ is a traffic sensor device, fully designed and built by Dr. Filali's group at QMIC, for detecting and monitoring traffic information on the local roads of Qatar.*

compute the real-time traffic speed and display it on a user-friendly map through many of QMIC's applications. As of February 2015, 270 solar-powered WaveTra<sup>f</sup> sensors have been deployed in Qatar road networks, which is most probably the densest deployment of Bluetooth-based traffic sensor in the world. Collected data is also being used to compute, using in-house developed algorithms, meaningful information about the journey time and origin-destination matrix in Qatar which are vital for urban planners, traffic engineers, and researchers in the area of ITS.

*Labeeb™* is an Internet of Things (IoT) platform fully designed and developed by Dr. Filali's team at QMIC. It collects data from several types of sensors of different verticals and stores it in a scalable platform. It allows the user to easily define the data model of his sen-

sors, manage them and get access to the stored data. Additionally, it provides rich set of open APIs for the creation of web/mobile vertical-specific applications that makes use of the processed data as well as the additional data analytics Labeeb toolkits. The platform integrates the most advanced open source systems for distributed data management, computing, and interactive visualization.

Apart from these QMIC funded projects and initiatives, Dr. Filali has served as PI/Co-PI for a number research projects funded by Qatar National Research Fund (QNRF) under the National Priority Research Projects (NPRP) program. Some of these projects include- CopITS ([www.copits.org](http://www.copits.org)), CosMob ([www.cosmob.org](http://www.cosmob.org)), CellCar ([www.cellcar.org](http://www.cellcar.org)), Qatar SmartGrid, CoCoDi, etc.

Dr. Filali's current research interests include the design, development, and performance evaluation of communication protocols and systems for: ubiquitous networking, V2X/DSRC communications for intelligent transportation systems, sensor and actua-

tor networks (SANETs), and wireless mesh networks (WMNs). He is the inventor/co-inventor for seven European patents. He has authored/co-authored six book chapters and over hundred peer-reviewed technical articles published in reputed journals and top conferences. Some of his exemplary research includes his classic articles on vehicular mobility models and VANET simulators that had been cited over thousand times within the scientific literatures. As of now, he has supervised seven Ph.D. students in the area of computer networking, wireless sensor and mesh networks, vehicular communications, and mobility management. He has also mentored 42 student projects in several institutions. He was a member of the ETSI ITS Technical committee. He also represented EURECOM in the Car-to-Car Communications Consortium. He served as TPC and reviewer of several international conferences and journals. He is a senior member of IEEE and active member of IEEE ITS Society and IEEE Communications Society.

ITS

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