Editorial: Special Issue on “Future Wireless Ecosystems (FWE)”

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The 19th Edition of Strategic Workshop (SW'17) held in, WESTIN DRAGONARA RESORT Dragonara Road, St. Julian's STJ 3143, Malta on May 29–31, 2017. The focus during the active 2-day discussion was, Future Wireless Ecosystems (FWE) addressing concept, innovation, systems, network security, and future strategy.

The theme of the workshop was “Future Wireless Ecosystems (FWE).” In addition to the technical presentations on FWE, a significant goal of the workshop was to speed up innovation and the path to commercialization of the relevant technologies and a strong partnership between industries and academia. We believed that these pervasive wireless ecosystems would become an integral part of our world in the near-future and beyond. In fact, enabling such a ubiquitous communication and computing infrastructure will only further drive this revolution to fruition. To meet this objective, we organized a dedicated Panel and Sessions in the area of Future Wireless Ecosystems (FWE). During this workshop, we aimed to engineer communication and computing system which is unique, and it is intricately tied to supporting various human-centered applications while at the same time appearing to be seamless and invisible to end-users. Regarding critical enabling technologies, the communications/networking challenge is that of designing hierarchical,

Selected Topics from the Strategic Workshop, May 29–31, 2017, WESTIN DRAGONARA RESORT Dragonara Road, St. Julian's STJ 3143, Malta.

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distributed, decentralized and adaptive protocols for dense wireless networks and integrating efficiently with the future Internet as a whole.

This Special Issue features selected Twelve papers that concentrate on a wide range of research challenges in Future Wireless Ecosystems (FWE) as well as addressing issues of application, services and security in coming wireless technologies and with this, technology-oriented innovative business models and standardization for Future Wireless Ecosystems and associated services.

The First Paper, “Co-tier Uplink Interference Management by Stackelberg Game with Pricing in Co-Channel Femtocell Networks”, by Chih-Cheng Tseng & Ching-Shun Peng.

This research paper has emphasized that the indoor signal quality of mobile communication has increased due to development of femtocell. Despite, as the femtocells are widely deployed, the uplink interference from different femtocells, i.e., the co-tier up-link interference, turns out to be a critical problem to jeopardize the performance of the entire network. The concept of Stackelberg game with pricing mechanism has discussed in this paper for solving this issue.

The Second Paper, “Deviceless Communications: Cloud-based Communications for Heterogeneous Networks”, by Flavio Meneses, Carlos Guimaraes, Tiago Magalhaes, Diogo Gomes, Daniel Corujo & Rui L. Aguiar.

This research paper depicts that mobile networks today see increasingly large numbers of connected User Equipments (UE), allowing users to go away voice calling and tap into costly online services. In this paper, authors proposed a device less communication approach. To support this, authors have presented a framework that explores and enhances Software Defined Network and Network Function Virtualisation concepts.

The Third Paper, “Performance Analysis of Space-Air-Ground Integrated Network (SAGIN) over an Arbitrarily Correlated Multivariate FSO Channel”, by Isiaka. A. Alimi, Akeem O. Mufutau, Antonio L. Teixeira & Paulo P. Monteiro.

This research paper is of the view that the Space-Air-Ground Integrated Network (SAGIN) system interconnect several networks to achieve a significant network topology that is capable of efficient sharing of global information and resources. However, support for drifting in the SAGIN system could be challenging for the FSO line-of-sight (LOS) links because of the requirement for alignment between the receiver and transmitter modules. In this paper, authors have considered the effect of arbitrarily correlated FSO channel on the system performance. To achieve this, authors employed exponential model for modeling the correlations between the apertures.

The Fourth Paper, “Virtualization approach for machine-type communications in multi-RAT environment”, by Liljana Gavrilovska, Valentin Rakovic & Aleksandar Ichkov.

This paper discussed about the virtualization approaches for MTC in a multi-RAT environment. Authors have also emphasized and discussed the benefits and practical aspects of MTC virtualization and evaluates the advantages and disadvantages of the Docker and OpenStack virtualization frameworks.

The Fifth Paper, “Research Challenges, Trends and Applications for Future Joint Radar Communications systems”, by Atilio Gameiro, Daniel Castanheira, Jéssica Sanson & Paulo P. Monteiro.

Dual functionality devices that integrate reflectometry and communication capabilities will be essential to reduce development costs through the reuse of modules and optimize the usage of radio resources namely spectrum. This paper is providing reviews for the main trends that push for the merging of radar type sensors and wireless communications (RadCom). It presents the most critical use cases that can currently be foreseen. It identifies

the leading technology trends and issues to reach a mature technology, namely focusing on OFDM type waveforms that will enable smooth integration with 4G.

The Sixth Paper, “Advanced Business Model Innovation supported by Artificial Intelligence and Deep Learning”, by Per Valter, Peter Lindgren & Ramjee Prasad.

Authors have depicted that BMs increasingly run autonomously by machines, businesses should expect to be able and capable to innovated BMs and operated BMs in new Business Model Ecosystems (BMES) in the future. Authors have addressed the exponential development of artificial intelligence technologies, efficient technologies and persuasive BMs in Business model innovation and introduce a conceptual model to future business model innovation and operation.

The Seventh Paper, “Radio Hardware Virtualization for Software-Defined Wireless Networks”, by Felipe A. P. de Figueiredo, Xianjun. Jiao, Wei Liu & Ingrid Moerman.

Authors have discussed that the Current SDWN implementations are mainly using customized firmware, such as Open-WRT, running on an embedded application processor in commercial WiFi chips, and restricted to layers above lower Media Access Control (MAC). This limitation comes from the fact that radio hardware usually requires specific drivers, which have a proprietary implementation by various chipset vendors. Hence, it is difficult, if not impossible, to achieve virtualization on the radio hardware. Authors are investigating the necessity and feasibility of extending the virtualization of wireless networks towards the radio hardware. An SDR architecture is presented for radio hardware virtualization to facilitate SDWN design and experimentation.

The Eighth Paper, “Impact of Interference Between Neighbouring 5G Micro Operators”, by Kimmo Hiltunen, Marja Matinmikko & Matti Latva-aho.

Authors have proposed the concept of micro-operators with local spectrum micro-licensing that is needed to complement the traditional models based on networks deployed and operated by the mobile network operators. While evaluating the applicability of the proposed micro operator concept, one crucial aspect is to assess the impact of the inter-operator interference on the performance of the victim network when deployed in the same or adjacent channel. This paper proposes a deployment scenario including two neighboring buildings, propagation models for connections both within a structure and between the buildings, and criteria for the required minimum separation distance based on the observed throughput loss.

The Ninth Paper, “Impact of 5G Technologies on Industries 4.0”, by Sriganesh K. Rao & Ramjee Prasad.

The authors have presented the evolution of the Industrial Revolution and the technologies that have impacted their growth. The proposed features of 5G technologies are listed and described how these functions influence the Industries of the future, leading to Industries 4.0. 5G promises to be a key enabler for Factories of the future, providing unified communication platform needed to disrupt with new business models and to overcome the shortcomings of current communication technologies.

The Tenth Paper, “Impact of 5G Technologies on Smart City Implementation”, by Sriganesh K. Rao & Ramjee Prasad.

In this paper, authors discussed proposed features of 5G technologies and described how 5G could be the best answer for successful, implementation of Smart Cities. It lists down a few Smart City Use Cases which are enabled by 5G. 5G will act as the backbone of IoT and pave the way for the development of Smart Cities.

The Eleventh Paper, “WM-SIMA: A System-Level Simulator for the Downlink of LTE-A”, by Alberto Carreras, Francisco J. Martn-Vega, Isabel M. Delgado-Luque, Gerardo Gomez, Mari Carmen Aguayo-Torres & J. Tomas Entrambasaguas.

In this paper, authors have presented a novel and efficient data-ow oriented simulation platform for the DownLink (DL) of Long Term Evolution Advanced (LTE-A). As a case of study, authors have investigated the performance of cell-offloading for different deployments of Small Cell Base Stations (SBSs) that differ in the distance towards their nearest Macro Base Station (MBS) under File Transfer Protocol (FTP) type traffic.

The Twelfth Paper, “Framework for Future Telemedicine Planning and Infrastructure using 5G Technology”, by Sadia Anwar & Ramjee Prasad.

In this paper, authors have suggested that there is a need to sketch a framework and plan before introducing any telemedicine service. The telemedicine services should be user-friendly and have the ability to integrate all stakeholders to pursue a system which is sustainable and acceptable for all. A framework has proposed which is proactive, open in various dimensions with flexibility, gives chances to industries for public–private partnership and practice value-based business models.

Dr. Ramjee Prasad is a Professor of Future Technologies for Business Ecosystem Innovation (FT4BI) in the Department of Business Development and Technology, Aarhus University, Denmark. He is the Founder President of the CTIF Global Capsule (CGC). He is also the Founder Chairman of the Global ICT Standardization Forum for India, established in 2009. GISFI has the purpose of increasing the collaboration between European, Indian, Japanese, North-American and other worldwide standardization activities in the area of Information and Communication Technology (ICT) and related application areas. He has been honored by the University of Rome “Tor Vergata”, Italy as a Distinguished Professor of the Department of Clinical Sciences and Translational Medicine on March 15, 2016. He is Honorary Professor of University of Cape Town, South Africa, and University of Kwa-Zulu-Natal, South Africa. He has received Ridderkorset af Dannebrogordenen (Knight of the Dannenberg) in 2010 from the Danish Queen for the internationalization of top-class telecommunication

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Marina Ruggieri is Full Professor of Telecommunications Engineering at the University of Roma “Tor Vergata” and therein member of the Board of Directors. She is IEEE 2018 Chair, TAB Strategic Planning Committee; 2017 Vice President, Technical Activities; 2014–2015 Director of IEEE Division IX; 2010–2011 President of the IEEE Aerospace and Electronic Systems Society. She is arbitrator of the Italian Industries Federation for Aerospace, Defense and Security (AIAD). She has been member of the Technical-Scientific Committee of the Center for Aeronautical Military Studies and Vice President of the Roma Chapter of AFCEA. She is co-founder and Chair of the Steering Board of the interdisciplinary Center for Teleinfrastructures (CTIF) at the University of Roma “Tor Vergata”, that belongs to the CTIF global network, with nodes in USA, Europe and Asia. She is Principal Investigator of the 40/50 GHz TPD#5 Communications Experiment on board Alphasat (launched on July 2013). She is recipient of 1990 Piero Fanti International Prize; 2009 Pisa Donna

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