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Ifiok Otung · Prashant Pillai
George Eleftherakis · Giovanni Giambene (Eds.)

Wireless and Satellite Systems

8th International Conference, WiSATS 2016
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Proceedings

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Preface

There is an exciting range of activities around the world to develop smart, resilient, and innovative wireless and satellite communication systems with capabilities to finally deliver the dream of "broadband anytime, anywhere on earth" and cope with the upcoming data transmission deluge arising from smart homes and cities, driverless vehicles, connectivity for countless billions of sensors and functional items and assets – the so-called Internet of Things (IoT) – and data-rich multimedia services to billions of small mobile devices and fixed larger units anytime anywhere.

The inherent capacity of satellites for broad area coverage makes them an indispensable component of the suite of communication technologies required to achieve truly ubiquitous broadband connectivity by the next decade and satisfy the on-going exponential growth in data consumption around the world. An approach that is both technically sound and economically feasible will have to build on existing telecommunication infrastructure to create a seamless integration of 5G wireless terrestrial networks and smart satellite systems, augmented by wire-line links (including power-line, digital subscriber loop, DSL, cable modem and optical fiber) that provide timely ample-speed data delivery tailored to each service. Such a fully satellite-integrated global telecommunication network will enable smart mobile devices to remain always connected anytime anywhere on earth by automatically switching between Wi-Fi in hotspots, mobile data in areas with adequate terrestrial communication provision, and satellite data in remote or inaccessible locations such as mid-air or mid-ocean. Imagine that passengers on the ill-fated Malaysia Airline Flight 370 that disappeared on March 8, 2014 were able to send text and video messages during their flight. The mystery of what happened to the aircraft might have been easier to solve.

There are, however, significant challenges, not least of which include overcoming the digital divide that still exists within nations and across geographical regions, and delivering broadband services in extreme-latitude regions that are invisible to geostationary satellites and uneconomic by terrestrial means. Furthermore, innovative solutions are needed to facilitate super-efficient utilization of the radio spectrum, security and reliability, use of radio frequencies above Ka-band and dealing effectively with the attendant increased propagation impairments, design of intelligent link-adaptable transmitters, building high-throughput satellite (HTS) systems with capacities approaching one terabit per second (Tbps), interference mitigation, energy efficiency and resource management, and so on.

The 8th International Conference on Wireless and Satellite Systems (WiSATS 2016) was held during September 19–20, 2016, at Hotel Novotel Cardiff Centre, Cardiff, UK; to explore the aforementioned challenges and discuss some of the emerging technical solutions. WiSATS 2016 brought together new and experienced researchers, developers, and leaders of thought within academia, industry, and regulatory bodies in Europe, India, and Japan to cross-fertilize ideas and discuss new work and innovative techniques and solutions that advance the state of the art in wireless and satellite

systems. The technical program of WiSATS 2016 was rich and varied, with one major talk to kick off each day followed by technical paper presentations spread across both general and dedicated sessions. Day one of the conference opened with a keynote speech on 5G wireless systems delivered by Prof. Rahim Tafazolli, Director of the Institute of Communication Systems (ICS) at University of Surrey, UK. This was followed by two general technical sessions featuring presentations of various new developments in wireless and satellite systems, and then two special sessions dedicated to the specific areas of "Communications Application in Smart Grid" (CASG) and "Wireless, Computing and Satellite Systems Security" (WCSSS). The day concluded with a conference dinner. Day two began with a talk on the latest developments in mobile satellite communications given by Kyle Hurst, Director of Maritime Business at Iridium, Stevenage, UK. Punctuated with coffee and lunch breaks, the rest of the day was then devoted to various paper presentations and discussions within two general technical sessions. The conference concluded with an awards ceremony for best paper and outstanding contributions to WiSATS 2016.

This publication is a collection of revised articles from the most significant peer-reviewed full papers presented within the two special and four general technical sessions of WiSATS 2016. The articles cover a broad range of related state-of-the-art topics in antennas and mobile terminals, symbol precoding and network coding schemes, energy-efficient strategies in satellite communication and cloud radio access networks, smart grid communication and optimization, security issues in vehicular ad-hoc networks (VANET) and delay-tolerant networks (DTN), interference mitigation in high-throughput geostationary and non-geostationary satellite systems, etc. We hope that this represents a timely contribution to ongoing research and development efforts toward the realization of a fully ubiquitous heterogeneous broadband communications network.

Any international conference on the scale of WiSATS 2016 owes its success to the dedicated work of a great team. We would like to thank all the many volunteers who contributed in various ways to bring WiSATS 2016 to fruition. In particular, we thank members of the conference Organizing and Technical Program Committees and all session chairs and speakers for their invaluable contributions, which helped to make WiSATS 2016 a fantastic, stimulating, enjoyable, and enriching experience for all participants. We are immensely grateful to the reviewers, who gave freely of their time to evaluate submitted papers and make suggestions for improvement. We are also hugely indebted to the contributing authors who submitted high-quality papers and responded positively to reviewers' comments. A final thank you goes to the University of South Wales for their in-kind support and to the European Alliance for Innovation (EAI) for their excellent administration and management of WiSATS 2016.

February 2016

Ifiok Otung
Prashant Pillai
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