Guest Editorial

IJSC Special Issue on ASMS2003

Industrial and scientific interest is growing anew in the field of mobile satellite communications, after the downturns at the end of the last millennium and the consequent unavoidable difficulties for the entire sector. In the year 2001, the Task Force on Advanced Satellite Mobile Systems (ASMS-TF) was founded at the initiative of the European Commission (EC) and of the European Space Agency (ESA), to foster this industrial segment and ensure that the upcoming market and business opportunities are exploited to their fullest. The ASMS-TF works on several fronts, including market studies, research and development, test and demonstration, regulatory and standardization issues, along with public relations and publicity. Indeed, to the end of disseminating to the widest possible audience the culture and the new findings in the field of mobile satellite communications, the ASMS-TF has organized the ASMS2003 conference, which was held at the ESA/ESRIN premises in Frascati (Italy), on July 10–11, 2003. This special issue of the International Journal of Satellite Communications collects the extended versions of some of the best papers presented at this conference.

In order to place the special issue into context, the introductory paper is devoted to a description of the ASMS-TF. It is authored by G. J. King and the undersigned, and dwells upon the objectives, vision, and structure of the ASMS-TF, which enjoys a fast growing membership, now counting up to more than sixty entities, encompassing all sectors of the mobile satellite value chain.

The following five technical papers address themes that span across all communication layers, starting from physical layer technologies, and then up to access control and scheduling, routing, transport protocols and system architecture considerations.

The first technical paper, entitled ‘Layered Coding for Satellite-plus-Terrestrial Multipath Correlated Fading Channels’, by A. Levissianos, G. Metaxas, N. Dimitriou and A. Polydoros, focuses on a layered-coding approach for a meshed GEO-satellite and terrestrial system providing multicasting multimedia services. Through a mathematical formulation of the problem, based on information theory, and numerical simulations, the Authors test several layered-coding structures with different sets of constituent codes, particularly focusing on the trade-off between performance, throughput and complexity.

The second paper, ‘Packet scheduling for the delivery of multicast and broadcast services over S-UMTS’, by M. Karaliopoulos, P. Henrio, K. Narenthiran, E. Angelou, and B. G. Evans, is concerned with packet scheduling management for broadcast/multicast satellite networks over terrestrial UMTS, as developed in the IST project SATIN. Two known packet scheduling approaches are adapted for use in the proposed system. Their performance is evaluated via simulations in terms of ability to meet the packet-level QoS requirements of individual flows, fairness with respect to different flows, handling priority, and efficiency with respect to the system resources.

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The third paper by G. Kandus, A. Svigelj and M. Mohorcic, is entitled ‘The Impact of Different Scheduling Policies on Traffic Class Dependent Routing in Intersatellite Link Networks’. The Authors analyse different traffic classes in a non-geostationary network with intersatellite links (ISLs) by means of a discrete event driven simulator. They first derive an expression for packet delay and average data throughput to be used as performance metrics. Then they show how, by applying traffic class dependent routing and fair scheduling policies, significant performance improvements can be obtained for all traffic classes.

The fourth paper, ‘TCP Hybla: a TCP Enhancement for Heterogeneous Networks’, by C. Caini and R. Firdincieli, proposes a collection of modifications to the standard TCP protocol to be used in connections that incorporate a high latency link, such as that through a satellite transponder. The key element is the modification of the standard rules for congestion window increase, here described with an analytical model. The Authors show, through simulations, that the proposed modifications improve the goodput of the wireless connections, preventing the huge starvation experienced when the standard TCP protocol is considered. Fairness and friendliness issues are taken into account in order to guarantee efficient network resource exploitation.

The last paper, ‘System Design, Capacity Dimensioning and Revenue Estimation for Aeronautical Communications via Satellite’, by M. Werner, L. Battaglia, M. Holzbock, investigates several aspects related to commercial aeronautical communications. Frequency bands, description of the aeronautical channel, on board system design, as well as issues related to the satellite constellation choices are some of the technical points addressed in the paper, while the considerations about service profile and traffic modeling are at the basis of the revenue estimations provided in the last part of the paper. The authors perform their analysis by means of a global flight database combined with a specific multiservice traffic model.

In closing, the Guest Editor would like to thank all individuals and organizations that made this issue possible, including ESA, the European Commission, the ASMS-TF, Wiley Interscience, the ASMS2003 technical committee and reviewers. In particular, we are grateful to Prof Barry Evans, the Editor in Chief of the International Journal on Satellite Communications, who first conceived the idea of this special issue and kindly invited us to conduct the editorial process.

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