Service Efficient Network Interconnection via Satellite

EU Cost Action 253

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Preface

The use of satellites for the provision of services to remote and less-developed regions, where access by terrestrial fibre is not commercially attractive, is recognised as an efficient and economical means. The EU COST Action 253 was set up to study, define, model and simulate the inter-connection of local area networks through non-geostationary satellites for providing world-wide efficient interactive communication services.

This book summarises the results from activities carried out in COST253 during the past 4 years by a group of European experts in satellite communications. It covers a wide range of topics. The service-level aspects cover issues on traffic modelling, source modelling, service characterisation and geographic traffic modelling to incorporate the non-uniform traffic load in a Low-Earth-Orbit constellation. The radio transmission aspects cover modulation schemes, coding schemes, Doppler frequency shift correction and interference modelling. The network aspects incorporate results on routing strategies, reliability, discussions on multicasting and security. In addition, the challenges of Transmission Control Protocol/ Internet Protocol over satellite are also covered. A rather unusual chapter included in this book is the discussion on simulation tools and methodologies for satellite networks. It is hoped that this book can provide useful information for researchers in the field of satellite communications.

The advantages of COST (European Co-Operation in the field of Scientific and Technical Research) Actions are invaluable. With respective to the COST Action 253, a unique environment has been created to enablie several forms of collaborations:

- Sharing of expertise. The COST253 management committee consists of a mixture of industrial organisations and academic/research institutes; each contributes to different, yet complementary, expertise in the field of satellite communications. Sharing of knowledge and expertise is accomplished through technical meetings, presentations and workshops.
- Exchange of information and co-operative work through Short Term Scientific Missions (STSM)
- The STSM has proved to be one of the main advantages of co-operation. A network simulator, GALILEO, is developed through collaboration among different organisations under the support of STSMs, providing a constructive co-operation leading to the development of an open-source simulator platform.
- Facilitating the set-up of co-operative actions in other instances, including submission of proposals to other EU-supported frameworks.
- Facilitating opportunities to enhance knowledge of different technical aspects and in research interests/areas of different organisations. This Action offers the opportunity to pool resources

with other groups and individuals in the field of satellite communications for communal development of ideas, data and techniques.
- An opportunity for young scientists to present their work and get constructive feedback and comments, improving their skills with future benefit to industry, academia and research communities
- Providing, along with COST252 (which is concerned with the use of non-geostationary satellites for the provision of mobile and personal communication services), an international forum for satellite communications free from political and economical constraints, which is important for medium term research. The scientific interest and the potential future applications were the key factors in establishing COST253 Action.

The flexibility in the running of the Action enables in-depth technical contributions to be made without being bound to specific commitments. Additionally, co-operation and contacts have been established with university groups and industrial research laboratories through inviting their representatives in the WG activities in Workshops and Conferences. Presentations have been given by Matra Marconi Space, Alcatel Space Industries, ESA/ESTEC, Teledesic and Nortel resulting in fruitful exchanges of views. From the action, an initiative by some of the members was derived towards the issuing of a proposal named SEESAWS to the IST programme. This proposal was aimed at the development of a simulation environment for evaluating the performance of satellite networks. Co-ordination with other COST actions namely COST252 and COST255 has resulted in the set-up of a successful workshop in Toulouse, France (May, 1999).

A number of STSMs have contributed to exchanging information and know how among the research teams from several institutions: the Universidad Publica de Navarra, the University of Bradford, CNUCE/C.N.R., Ecole Nationale Supérieure des Télécommunications-Site de Toulouse, CSELT, DLR, Institut Jozef Stefan and Aristotle University of Thessaloniki.

To this end, we would like to acknowledge all the contributors and all the members of the COST253 Management Committee for their invaluable work, which serves as a basis for this book. We would also like to thank the chapter editors who have harmonised the submitted work from different workgroups to produce some meaningful outputs. Last but not least, we thank the European Commission for funding this COST activity.

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