

# Broadband Satellite Systems: A Network Perspective

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For several years now, the continuously booming multimedia market has been challenging the capacity of telecommunication networks. The communication satellite market has seen a considerable expansion with the development of TV Broadcasting services since the late '80s. Broadband satellite systems have also an important role to play in the delivery of multimedia applications. Broadband satellite networks have to be considered in this respect as a complement to terrestrial facilities in order to build up the Global Information Infrastructure and not as a stand-alone network.

Many proposals have been made to national and international regulatory agencies for allocation of spectrum for broadband applications using low earth orbit satellites, medium earth orbit satellites, and geo-synchronous (GEO) satellites. In this tutorial we will concentrate on GEO based satellite networks. GEO based systems deliver continuous services to a specific region with a single satellite. They play an ever-increasing role in the public and private Internets, due mostly to their large geographic coverage, inherent broadcast capabilities and fast deployment. They are attractive to support data, audio and video streaming; bulk data transfer such as software update or dissemination of Web caches; and applications involving limited interactivity such as distance learning. They are also attractive to provide broadband access to users who are either beyond the reach of the terrestrial network, or have particular needs for broadcast/multicast applications or fast deployment.

The tutorial will present the next generation of broadband satellite systems with a focus on their characteristics and applications. It will then present the technical challenges and risk areas, in particular the following topics will be discussed in some detail: architectures, resource management, on-board processing, terminal as well as protocol and service adaptation. The remainder of the tutorial will focus on IP and discuss problems such as IP routing, MPLS and TCP/IP.

## Biography of Dr. Catherine Rosenberg

Born in France and educated in France and in the USA, Dr. Rosenberg has worked in several countries including USA, UK, Canada, France and India. In particular, she worked for Nortel Networks in the UK, AT&T Bell Laboratories in New-Jersey, USA, Alcatel in France and taught at Imperial College, Purdue University (USA), University of Montreal (Canada), University of Jussieu-Paris (France) and the Indian Institute of Sciences at Bangalore (India).

Dr. Rosenberg joined the faculty of the School of Electrical and Computer Engineering at Purdue University in the fall of 1999. A specialist in broadband multimedia telecommunications networks, she previously headed the Department of Broadband Satellite Networking for Nortel Networks in Harlow, U.K. and was Visiting Professor at Imperial College, London, U.K.

Dr. Rosenberg is an Associate Editor for IEEE Communications Magazine, IEEE Communications Surveys and Telecommunications Systems. She has been and is involved in many conferences including IEEE Infocom, International Teletraffic Congress (ITC) and IFIP Broadband Communication. She chaired a Panel on "Multimedia Networks in the Sky: Reality Behind the Propaganda" at Infocom'99. She gave a tutorial on "IP Satellite Networking" at Infocom'00 in Tel Aviv in March 2000. She was the Chair of the Mini Conference on "Broadband Satellite Networking" that was held in Paris in May 19, 2000.

She has authored over 50 papers on broadband networking and traffic engineering and has filed several patents. Her research interests are in Broadband Networks: IP, ATM, etc.; in Broadband Satellite Networks (GEO or LEO based): Architecture, Resource Management, Service and Protocol Adaptation (IP), Multicast, etc.; in Traffic Engineering: QoS, Charging, Dynamic Provisioning, Network Design, Routing, etc.; and in Wireless Networks.