Germany/Portugal/Romania  
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October 8 at 2pm, Heidelberg, Germany  

I presented a 90-minute lecture titled “Next-Generation Broadband”. The lecture was hosted by Dr. Heinrich Stuettgen, Vice President, NEC Laboratories Europe. There were about 40 attendees for this lecture. There was a lively question and answer session after the lecture. According to Dr. Stuettgen, the lecture was well received.

October 9 at 10 am, Lisbon, Portugal  

I presented a 90-minute lecture titled “Next-Generation Wireless Broadband”. The seminar was hosted by Professor Luis M. Correia, Technical University of Lisbon. About 60 people from both academia and industry attended this seminar. Many attendees were interested to become members of the IEEE Communications Society and they took away a number of complimentary IEEE Comsoc publications (provided by Professor Correia) after the lecture.

October 10 at 9 am, Bucharest, Romania  

I presented a 90-minute lecture titled “Next-Generation Broadband”. The seminar was hosted by Professor Ion Banica from the Politehnica University of Bucharest. There were about 100 participants: 15 professors, 5 representatives from telecom operators, while the rest are mostly students. There was a lively question and answer session after the lecture. Professor Banica received reactions from the different participants and they have well appreciated the presentation.

Abstract for Lecture: Next-Generation Broadband  

Broadband wireless access is viewed by many telephone and cable operators as a “disruptive” technology and rightly so. The broadcast nature of wireless transmission offers ubiquity and immediate access for both fixed and mobile users, clearly a vital element of quadruple play services involving voice, video, data, and mobility. Unlike wired access (copper, coax, fiber), a large portion of the deployment costs is incurred only when a subscriber signs up for service. The first part of this lecture will provide a comparative assessment of the key standards and technologies underpinning promising broadband wireless access solutions. Key standards include 802.16 (Wi-Max), 3G/4G/LTE, mobile digital TV broadcast, and 802.22 (wireless regional area network). Key technologies include multimedia support, multiple antenna transmission, cognitive radio, and fixed-mobile convergence.

Wireless LAN applications have blossomed tremendously over the last few years. What started out as cable replacement for static desktops in indoor networks has been extended to fully mobile broadband applications involving moving vehicles, high-speed trains, and even airplanes. Wi-Fi data rates have also
continued to increase from 2 to 54 Mbit/s with the current 802.11n draft topping 600 Mbit/s. This development may eventually render wired Ethernet redundant in the enterprise network. An increasing number of municipal governments around the world and virtually every major city in the U.S. are financing the deployment of Wi-Fi mesh networks with the overall aim of providing ubiquitous Internet access and enhanced public services. In addition, cheap phone calls using Wi-Fi voice over IP may become one of the biggest benefits of a citywide municipal network. This has led some technologists to predict that eventually we are more likely to see meshed Wi-Fi cells that are linked together into one network rather than the widespread use of high-powered WAN handsets cramming many bits into expensive and narrow slices of radio spectrum. The second part of the talk focuses on emerging Wi-Fi technologies. Specifically, it will cover mesh networks, Wi-Fi/cellular interworking, security, QoS, new applications, and emerging 802.11 standards and research.

Many service providers must deal with peer-to-peer applications (e.g., Skype and Bit Torrent) and other popular but bandwidth-intensive applications such as Sling Media. Currently, peer-to-peer traffic occupies over 80% of backbone Internet traffic. However, the star topology that is common in many broadband access deployments creates a local bottleneck at the central headend when handling such applications. Another key challenge facing operators with legacy access networks (e.g., DSL, cable) is the bandwidth crunch associated with video transmission. Despite the efficiency of new video compression standards such as MPEG-4/H.264 AVC, many cable operators in the U.S. are migrating towards a switched digital video architecture that send channels only to set-top boxes (STBs) that tune in to them, thereby conserving network bandwidth by not broadcasting signals to all STBs all the time. The last part of the talk will focus on intelligent bandwidth management and optimized video transmission of emerging broadband cable networks.