

## Seminar

Thursday, Jan. 22nd, 10 am, Room 4164 Harold  
Frank Hall (ECE Conference Room)

# Digital Audio Broadcasting and 4G Cellular Convergence

Carl-Erik W. Sundberg

President and Chief Scientist, SundComm, Chatham, New Jersey, USA  
Visiting Scientist, DoCoMo Communications Laboratories, Palo Alto, CA, USA

**Abstract:** The move to digital is a natural progression taking place in all aspects of communications and broadcasting. This is no less true for audio radio broadcasting. This has taken a unique development path in the United States. A combination of regulatory and migratory (from analog to digital) requirements unique for the U.S. market has heavily influenced the developments of standards in this area. In this talk we will outline the resulting systems for terrestrial digital audio broadcasting in the existing AM and FM bands. Digital modulation methods, channel coding designs as well as audio coding methods will be discussed. At first, hybrid in-band on-channel or IBOC methods will be used simultaneously with analog AM and FM transmission. Later, analog broadcasting will gradually be phased out and all-digital IBOC methods with increased capabilities will be used.

The IBOC systems (or the so called HD Radio systems) are so far unique for the U.S. market. In this talk we will also briefly discuss other methods for digital audio radio broadcasting, DAB, such as satellite systems, Eureka 147, DMB, ISDB-T and DRM.

Looking into the future, it has been suggested that there will be a convergence between digital broadcasting and 4G digital cellular (It is already happening with 3G actually). This topic will also be briefly discussed in this talk.

**Biographical Sketch:** Dr. Carl-Erik W. Sundberg received his education in Sweden with a Ph.D. at Lund University. The main parts of his teaching and research career are a 7 year Research Professorship at Lund University followed by being a Distinguished Member of Technical Staff at Bell Labs, New Jersey, USA for 21 years. After retiring, he is now a consultant through his own company SundComm with consulting activities in wireless systems. He has written 3 books, over 100 journal papers, over 150 conference papers and he has over 100 patents. Among his accomplishments beyond the academic are modulation methods used in GSM 2G wireless, Tailbiting decoding used in 2G TDMA wireless and channel codes used in HIBOC/HD Radio US terrestrial digital audio broadcasting. He is a Fellow of the IEEE.

**Department Host:** Jerry D. Gibson, [gibson@mat.ucsb.edu](mailto:gibson@mat.ucsb.edu)