

# Wireless Multimedia Systems

Fall 2010 (Topic 0: Overview)

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<http://wmlab.csie.ncu.edu.tw/course/wms>

**Notice:** (\*you can not miss two classes without notice in advance)

(\* no late homework will be accepted).

## 1. Today's topic:

(Bi2001) Qi Bi, George I. Zysman, and Hank Menkes, "Wireless Mobile Communications at the Start of the 21 Century" , IEEE Communication Magazine (January 2001), pp. 110-116

(Heusse 2003) M Heusse, F Rousseau, G Berger-Sabbatel, A Duda –"Performance anomaly of 802.11" IEEE INFOCOM, 2003

(Guido 2010) Guido R. Hiertz, Dee Denteneer, Lothar Stibor, Yunpeng Zang, Xavier Perez Costa, Bernhard Walke, "The IEEE 802.11 Universe". IEEE Communication Magazine January 2010, pp 62-70.

### a) Overview of the class

*What is going to be covered, new wireless technology trend*

### b) Mobile Computing/Pervasive Computing

*The evolution of Computing: Personal Computing-> Network Computing -> Mobile Computing  
Unification of Computing and Communications*

### c) Wireless Communication Systems

- (i) *Wireless Mobile Communication System*
- (ii) *Wireless Broadband Communication System*
- (iii) *Satellite Communication Systems*

### **Comments:**

#### **Modern Wireless Communication Systems:**

- Mid 1990s, the cellular communication explosive growth
  - 600 million users in 2001, 2 billion by the end of 2006 (30% of the world's population).
  - 1800~2000 MHz frequency bands: TDMA/FDD (GSM), CDMA/FDD (WCDMA)
  - the success of cellular leads to the development of newer wireless systems:
- Next generation cellular network for high speed data communications traffic (multimedia)
  - 2G-> 2.5G -> 3G -> 4G
- Wireless Replacement:
  - allow wireless networks to replace fiber optic or copper lines between fixed points several kilometers apart (fixed wireless access)

**LMDS** (Local Multipoint Distribution Service, 802.16 WMAN)

One solution to provide last mile broadband solution

Fixed wireless communication systems are able to take advantage of the very well-defined, time-invariant nature of the propagation channel between the fixed transmitter and fixed receiver (LOS, line-of-sight)

**Satellite** Communication for broadband Solutions

**WLANs** (Wireless Local Area Networks, 802.11)

Replacement for wires within homes, buildings, and office settings

**PAN** (Bluetooth, Ultra-wideband short range communication)

Replace troublesome appliance communication cords within a person's personal workplace

■ Fast Deployment/Flexibility Ad hoc Network/Mesh Network

From Packet Radio Network (for military usage) to Bluetooth/WLAN ad hoc connection (for connecting to the printer and video conference)

***d) Fundamental Problems***

*(a) System Configurations (Cellular & Ad Hoc, Centralized & Distributed)*

*(b) System Layer Function Box*

**2. Other Topic:**

*Propagation Channel Model*

Channel Coding

The Cellular Concept/3G, HSDPA

Multiple Radio Access

Multiple Division Techniques

Channel Allocation

Mobile Communication System/Wimax

Existing Wireless System

Satellite System

Network Protocol/Mobile Multicast/Wireless TCP

Ad Hoc and Sensor Networks/Vehicular Ad Hoc Network

Wireless LANs and PANs

**3. Text Book and Reading Assignment:**

**Based on paper reading and handouts.**

**4. Grading**

40% Midterm

30% Final Exams

30% Homework & Attendance

**5. Next Topic: Mobile Radio Propagation (Slow Fading and Fast Fading)**