

# Wireless Multimedia Systems

Fall 2008 (Topic 1: Introduction)

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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:

### Reading

(S.2001) M. Satyanarayanan, " Pervasive Computing: Vision and Challenges " , IEEE Personal Communication Magazine, (August 2001), pp.10-17

(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

### 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

Multiple Radio Access

Multiple Division Techniques

Channel Allocation

Mobile Communication System

Existing Wireless System

Satellite System

Network Protocol

Ad Hoc and Sensor Networks

Wireless LANs and PANs

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

**Based on paper reading and handouts.**

**4. Grading**

40% Midterm

30% Final Exam

30% Homework & Attendance

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