ITM 1010
Computer and Communication Technologies

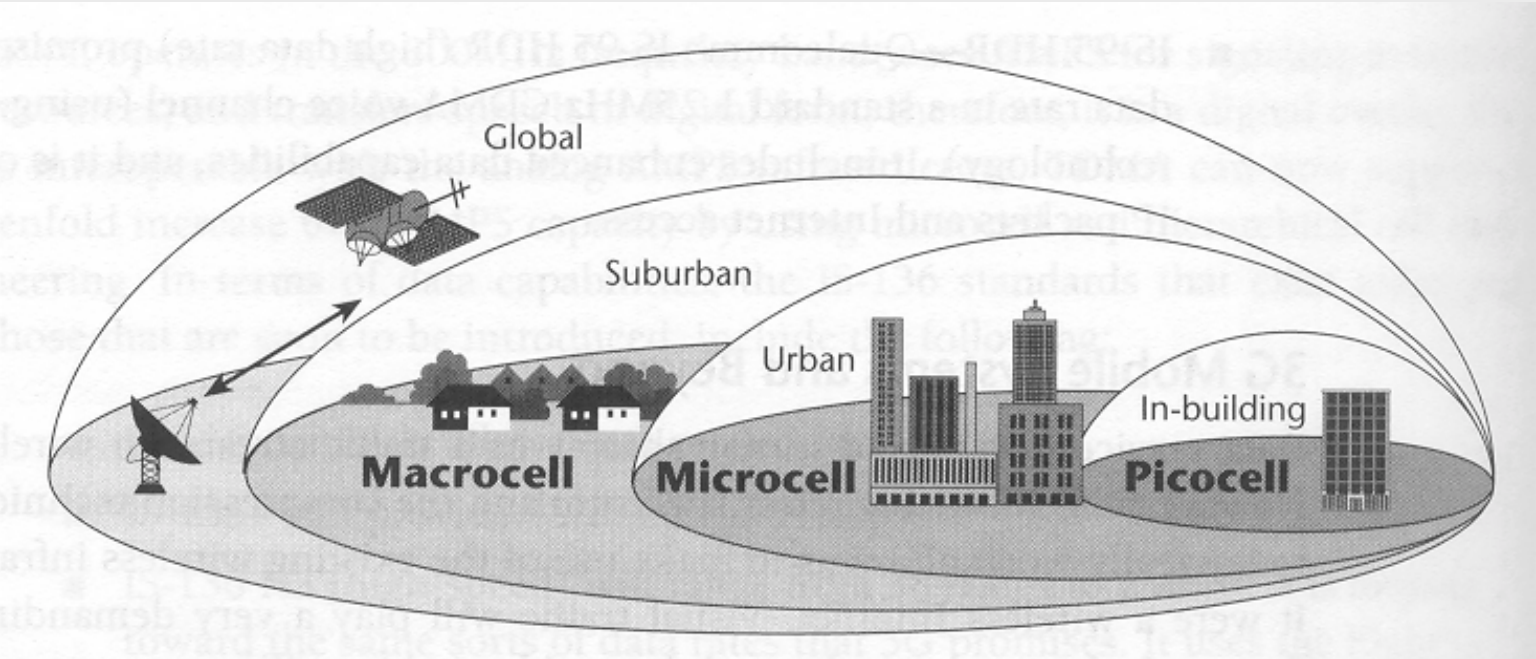
Lecture #19

Part II Introduction to Communication Technologies:

Next Generation Communication Systems

Personal Communications: 3G

- 3G = 3rd Generation wireless, under development
- 3G is designed for high speed multi-media data and voice communications.



A vision of 3G network

3G's objectives

- Support for messaging, Internet access, and high-speed multimedia
- Improved throughput and QoS support
- Improved voice quality
- Improved battery lifetime
- Support for position-location services
- Support for all current value-added voice services
- Coexistence with current infrastructures, including backward compatibility.
- Support mobile-commerce
- Advanced global roaming

3G System Capabilities

- **Capability to support circuit and packet data at high bit rates:**
  - 144 kilobits/second or higher in high mobility (vehicular) traffic
  - 384 kilobits/second for pedestrian traffic
  - 2 Megabits/second or higher for indoor traffic
- **Common billing/user profiles:**
  - Sharing of usage/rate information between service providers
  - Standardized call detail recording
  - Standardized user profiles
- **Support of multimedia services/capabilities:**
  - Fixed and variable rate bit traffic
  - Bandwidth on demand
  - Asymmetric data rates in the forward and reverse links
  - Multimedia mail store and forward
  - Broadband access up to 2 Megabits/second

3G Standards

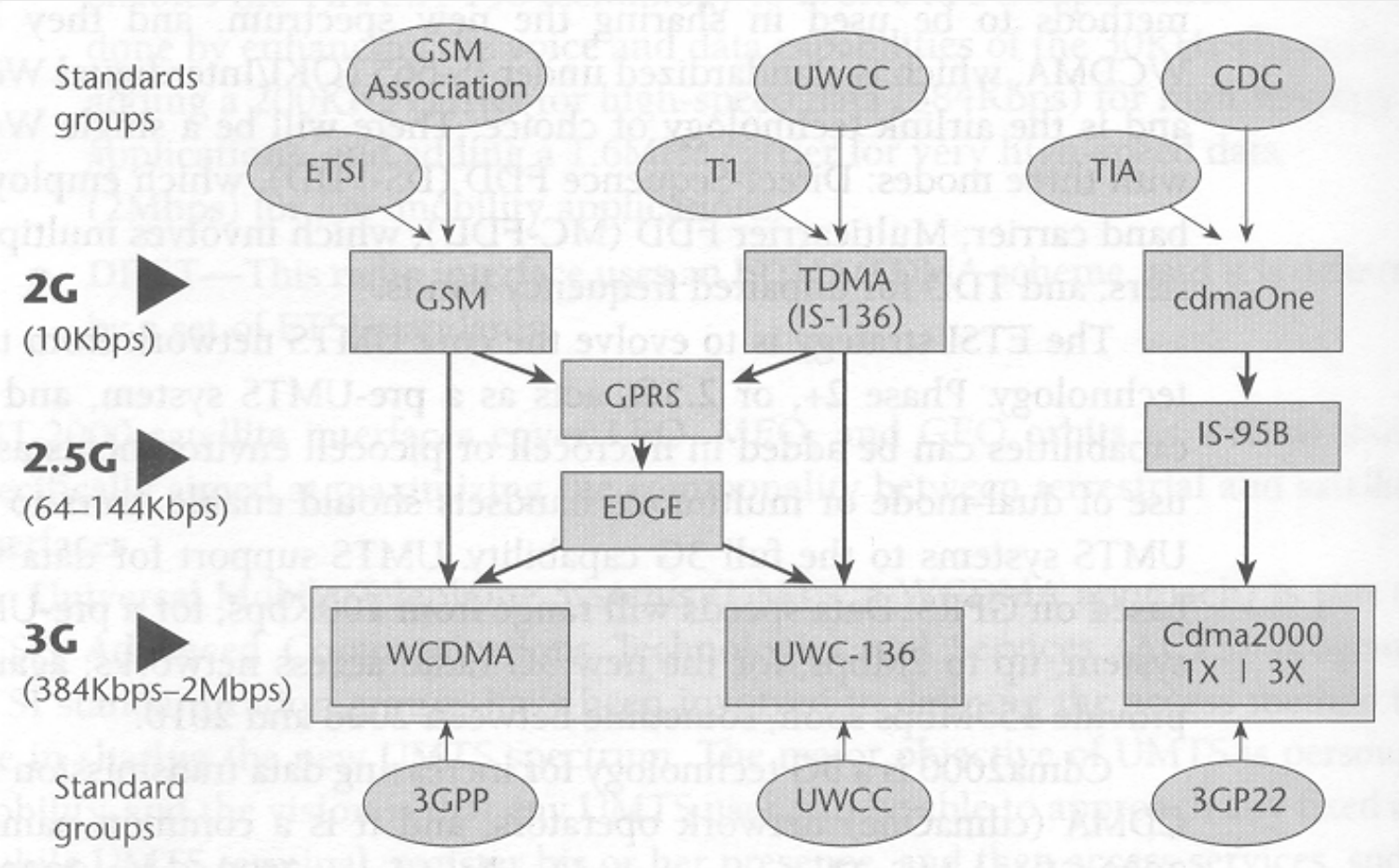
Defined in International Mobile Telecommunications 2000 (ITM-2000), 3G promises to offer the following data rate:

- Voice – 8Kbps to 64 Kbps
- Audio service - 64Kbps to 384Kbps
- Text - 8Kbps to 64Kbps
- Image services – 8Kpbs to 64Kbps
- Video – 64Kbps to 1,920Kbps

Radio Interface Standards:

- WCDMA
- CDMA2000
- UWC-136
- TD-WCDMA

3G Technology Evolution



3G Products

Gigabit Internet & Beyond

- The Gigabit (1 gigabit per second = 1000 megabits per second) Internet network is built based on IP-over-fiber technologies.
- Gigabit Internet transmits and receives data to and from the Internet at speeds up to one billion bits per second. Because this is such a high speed, it cannot be carried more than a few hundred feet over copper wires. This is why fiber optics are so important to this technology.
- 10 Gigabit Ethernet is finally here – giving the world yet one more reason to make Ethernet the global data transport technology standard. The 10 Gigabit Ethernet Alliance facilitates and accelerates the introduction of 10 Gigabit Ethernet into the networking market. The alliance supports the activities of the IEEE 802.3 Ethernet Committee, fosters the development of the 802.3ae (10 Gigabit Ethernet) standard and promotes interoperability among 10 Gigabit Ethernet products. For additional information, visit www.10gea.org.

Network Enabled Services

- Traditionally network is mainly for information transmission, publication and presentation
- New network equipped with gigabit speed will deliver services: network enabled services, with real-time interactive capabilities and more
- Examples include:
  - Telesurgery
  - Teleoperated home healthcare
  - Network enabled home automation
  - Network enabled security system with interactive actions
  - tele-assisted learning and training
  - Teleoperated assembly, manufacturing and production
  - Teleoperated soldiers and battles, etc

Broadband Home