CHAPTER 7

Wireless Technologies and the Modern Organization

CHAPTER OUTLINE

7.1 Wireless Technologies

7.2 Wireless Computer Networks and Internet Access

7.3 Mobile Computing and Mobile commerce

7.4 Pervasive Computing

7.5 Wireless Security

LEARNING OBJECTIVES

- Discuss the various types of wireless devices and wireless transmission media.
- Describe wireless networks according to their effective distance
- Define mobile computing and mobile commerce.

LEARNING OBJECTIVES (continued)

- Discuss the major M-commerce applications.
- Define pervasive computing and describe two technologies that underlie this technology
- Discuss the four major threats to wireless networks.

Chapter Opening Case

Chapter Opening Case (continued)

Disconnect?

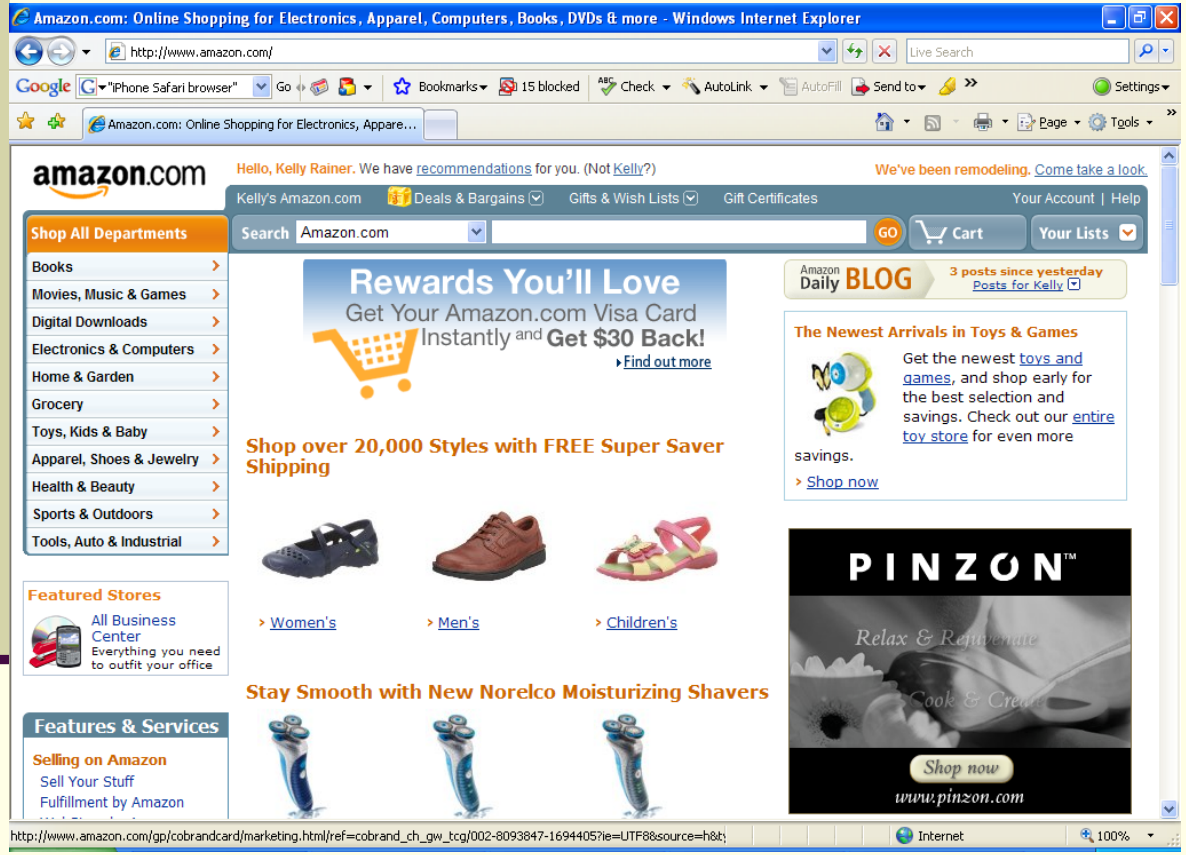
Manufacturers

Retailers

7.1 Wireless Technologies

- Wireless devices
  - Wireless Application Protocol (WAP)
  - Microbrowsers
- Wireless transmission media

Browser vs. Early Microbrowser



Deepfish

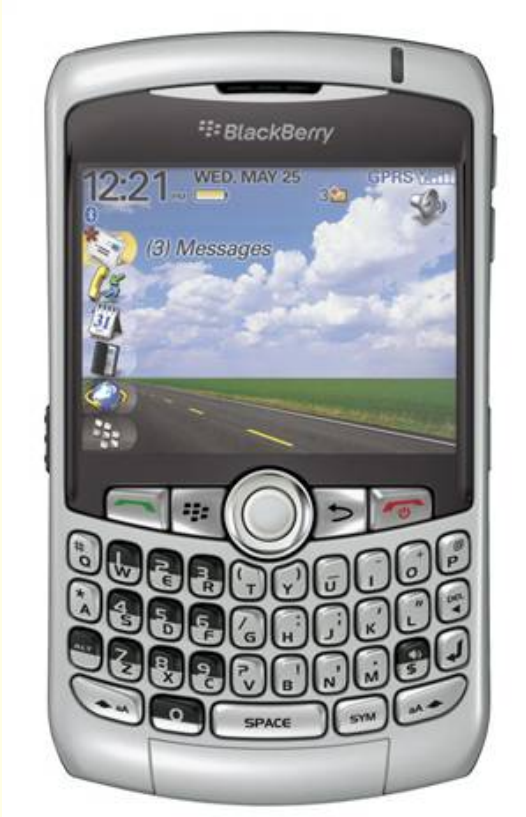
Deepfish is an advanced microbrowser from Microsoft Labs.

Apple iPhone with Safari browser

Capabilities of Wireless Devices

- Cellular telephony
- Bluetooth
- Wi-Fi
- Digital camera
- Global positioning system
- Organizer
- Scheduler
- Address book
- Calculator
- E-mail access
- Short message service
- Instant messaging
- Text messaging
- MP2 music player
- Video player
- Internet access
- QWERTY keyboard

Examples of today's wireless devices



Blackberry Curve

Treo 750

Examples of today's wireless devices (continued)

Motorola Q

Helio Ocean

Examples of today's wireless devices (continued)

Sony Mylo

Wireless Devices (continued)

Nokia N95

HTC Touch Dual

Wireless Devices (continued)

INFOBAR 2

Motorola
MOTO Z8

Wireless Devices (continued)

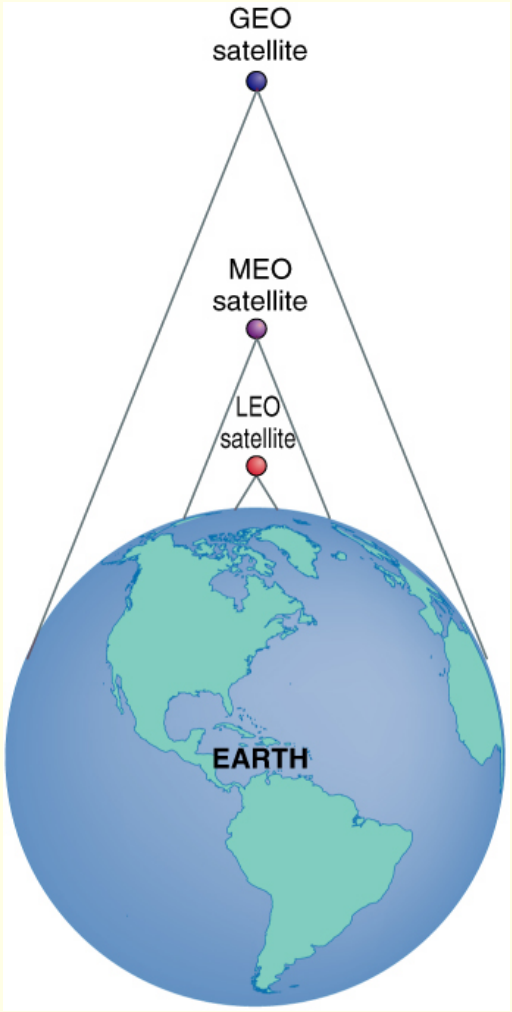
Samsung i620

Nokia E90

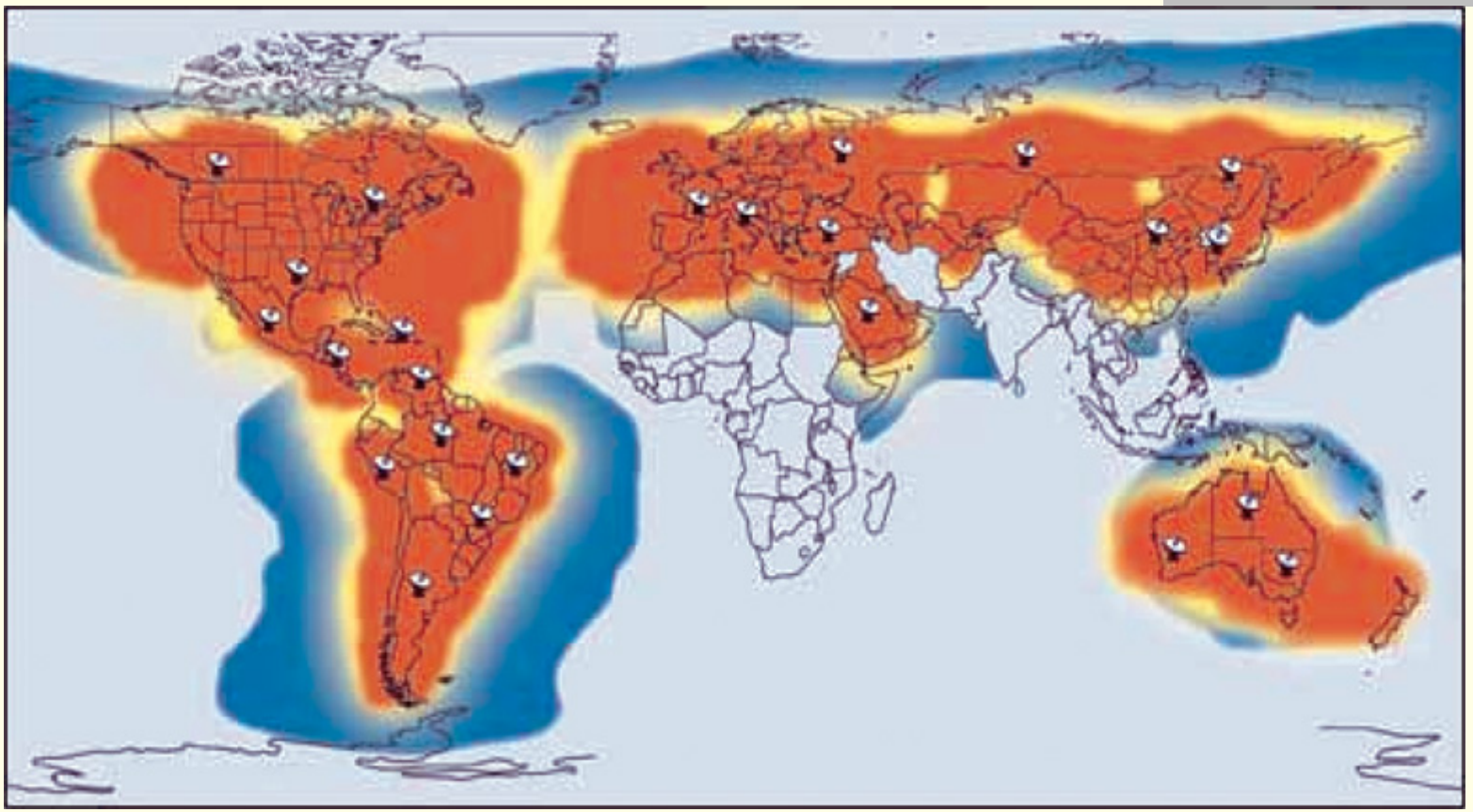
Wireless Transmission Media

- Microwave Transmission
- Satellite transmission
  - Geostationary Orbit (GEO)
  - Middle Earth Orbit (MEO)
  - Low Earth Orbit (LEO)
  - Global Positioning System (GPS)
  - Internet Over Satellite (IOS)

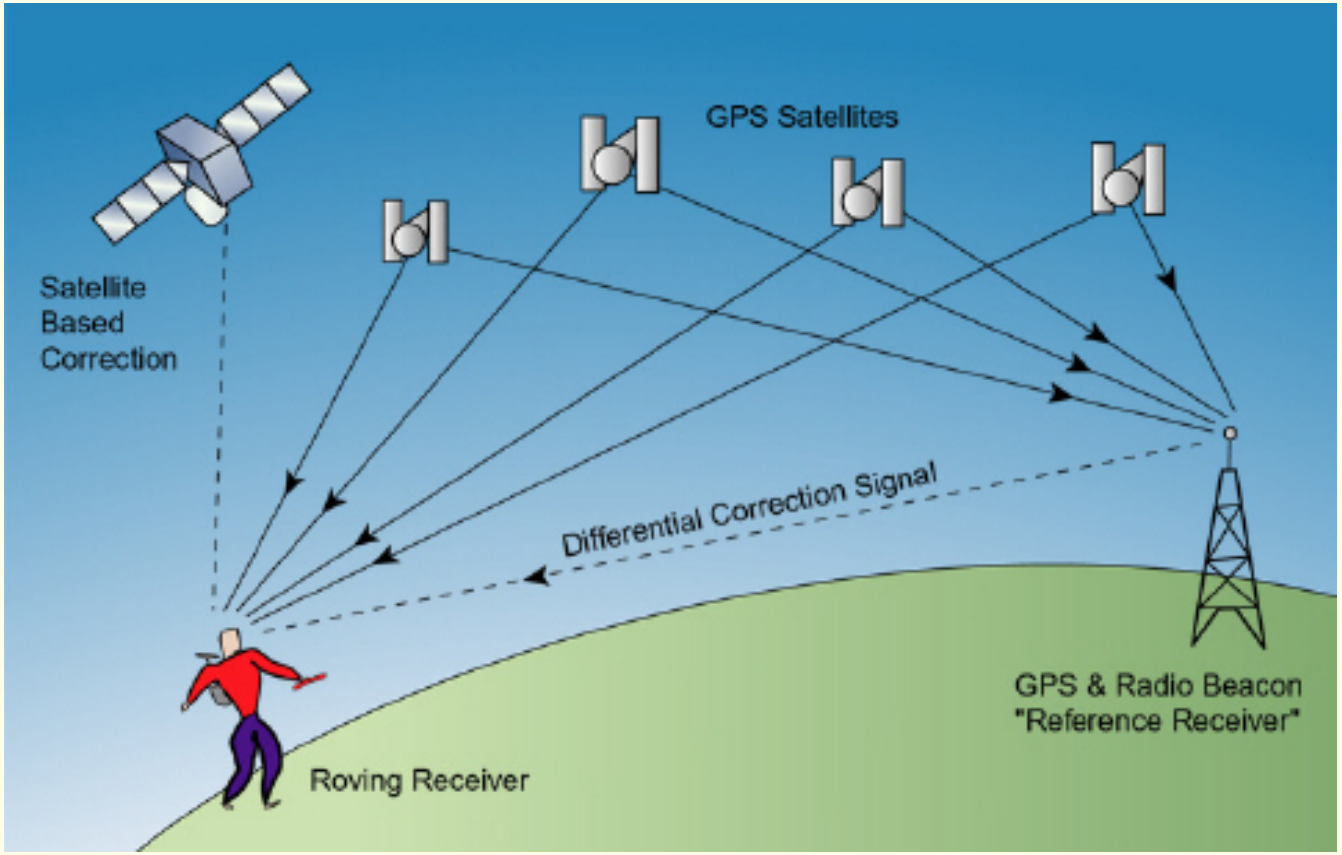
Satellite Footprint Comparison



Global Star LEO Coverage



How the Global Positioning System Works



GPS Systems

Smart phone and GPS system

Wireless Transmission Media (continued)

Radio

Satellite Radio

Infrared

A test to see if your TV remote control is working

7.2 Wireless Computer Networks and Internet Access

- Short range wireless networks
- Medium range wireless networks
- Wide area wireless networks

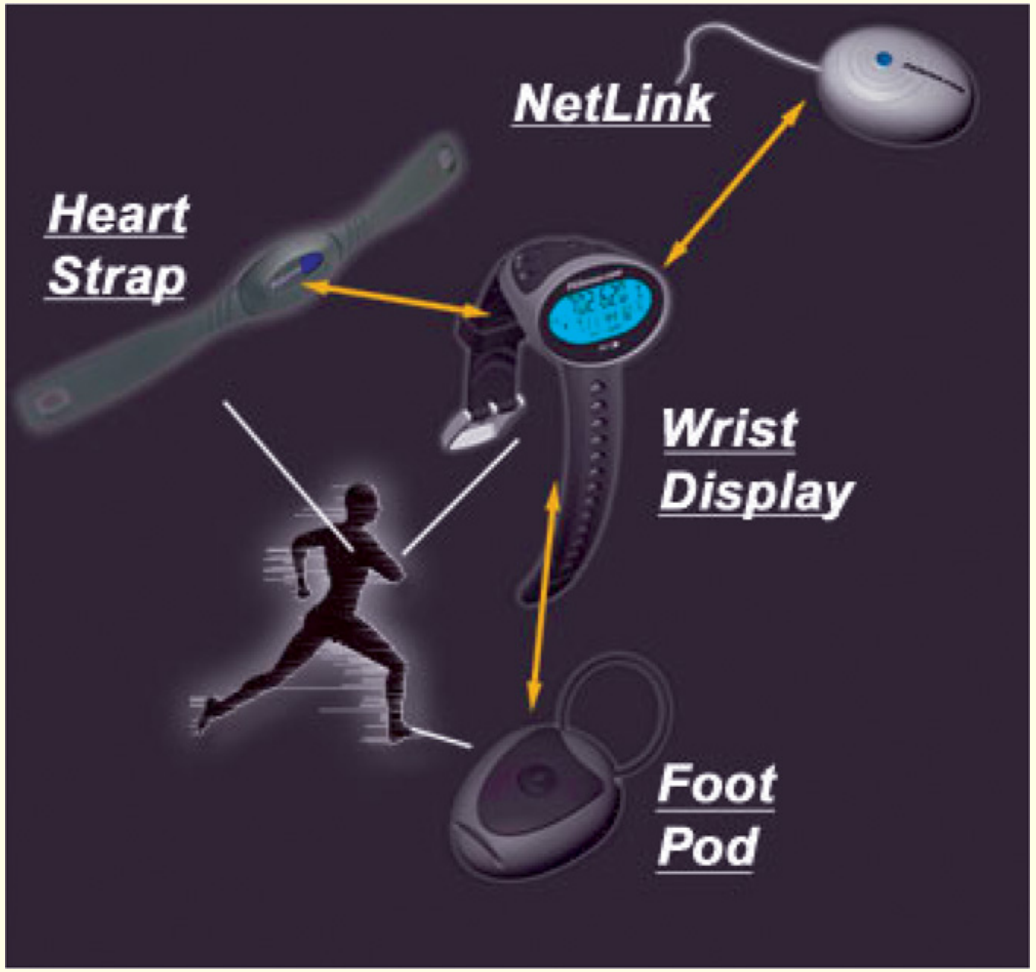
Short Range Wireless Networks

Bluetooth

Ultra-wideband

Near-field Communications

FitSense: A Personal Area Network



Bluetooth

Ultra-Wideband (UWB)

Ultra-wideband has many uses as you can see at the TimeDomain Web site.

TIME DOMAIN®

This article discusses the use of UWB in fire-fighting.

Near-Field Communications in action

The Nokia 6131 phone

NOKIA
CONNECTING PEOPLE

This video shows the Nokia 6131 phone in action.

The Nokia 6131 NFC-enabled phone, which is used in the video

Medium Range Wireless Networks

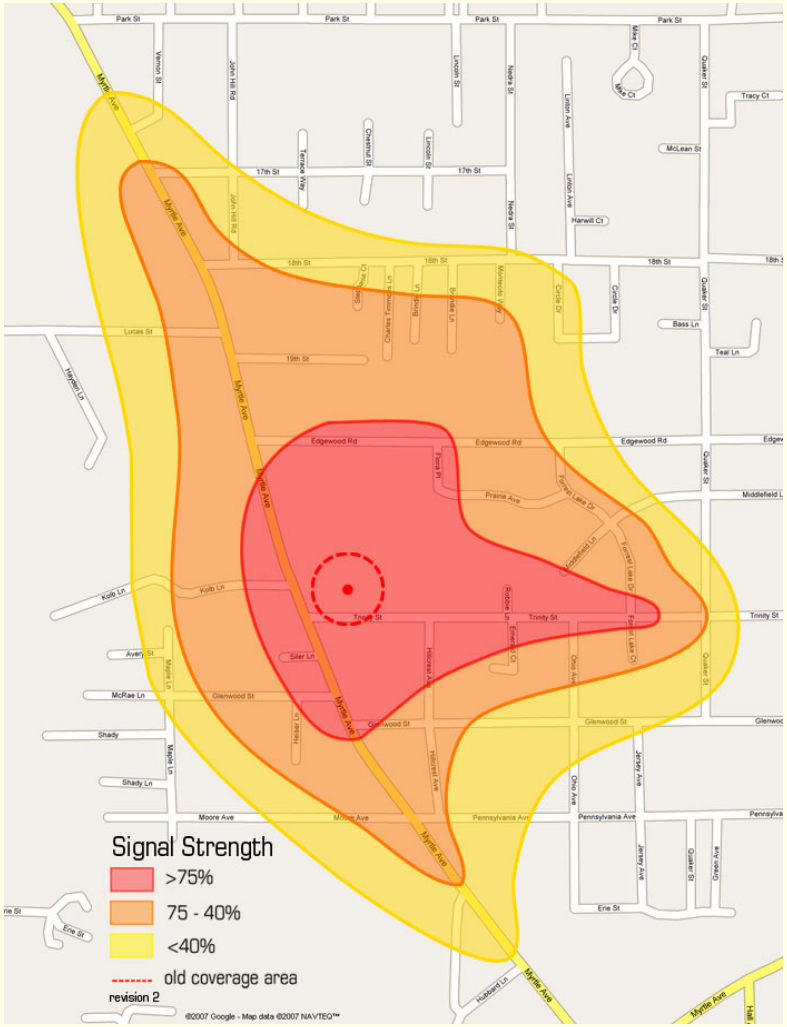
Wireless fidelity (Wi-Fi)

Wireless access point →

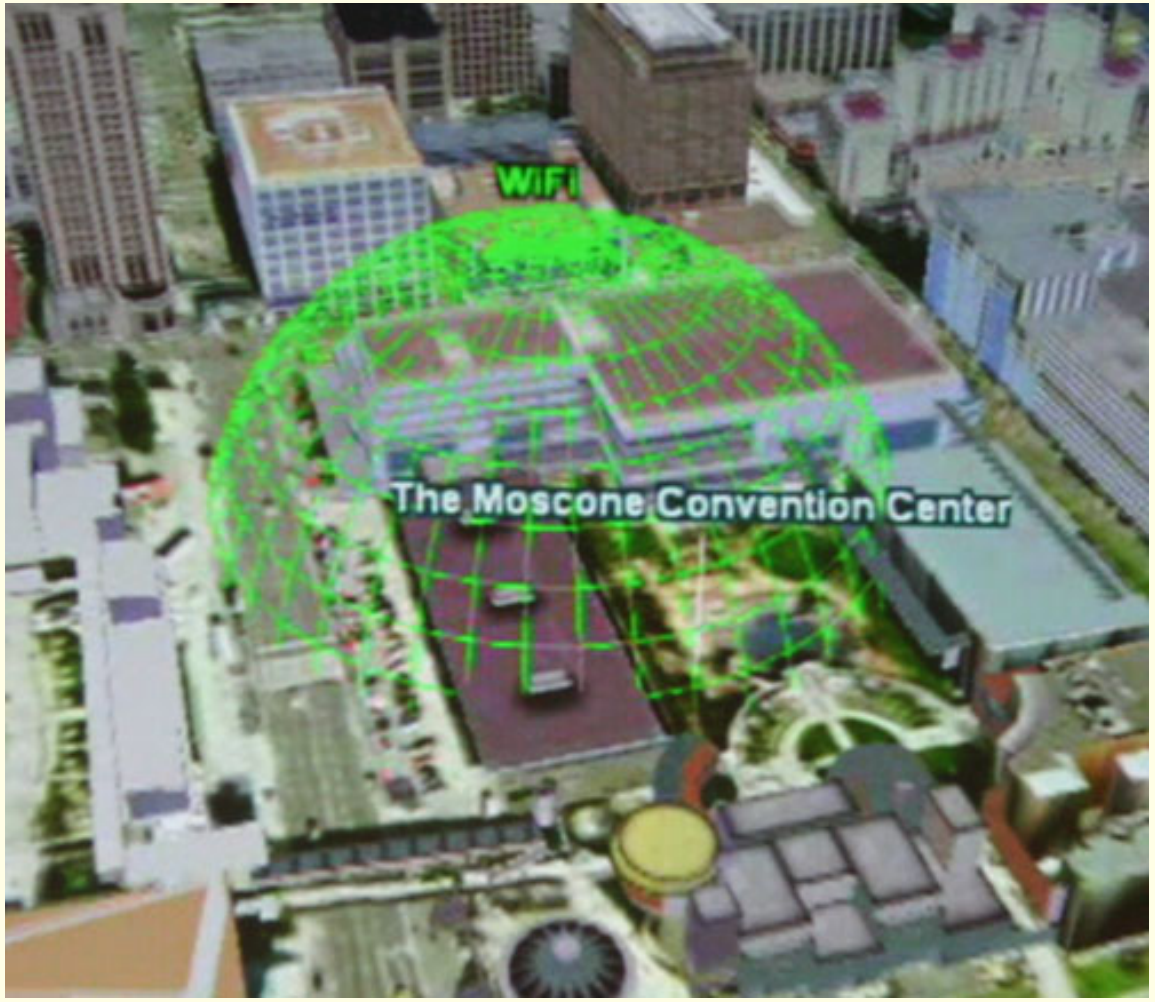
Hotspot

Wireless network interface card →

Diagram of wireless hotspot



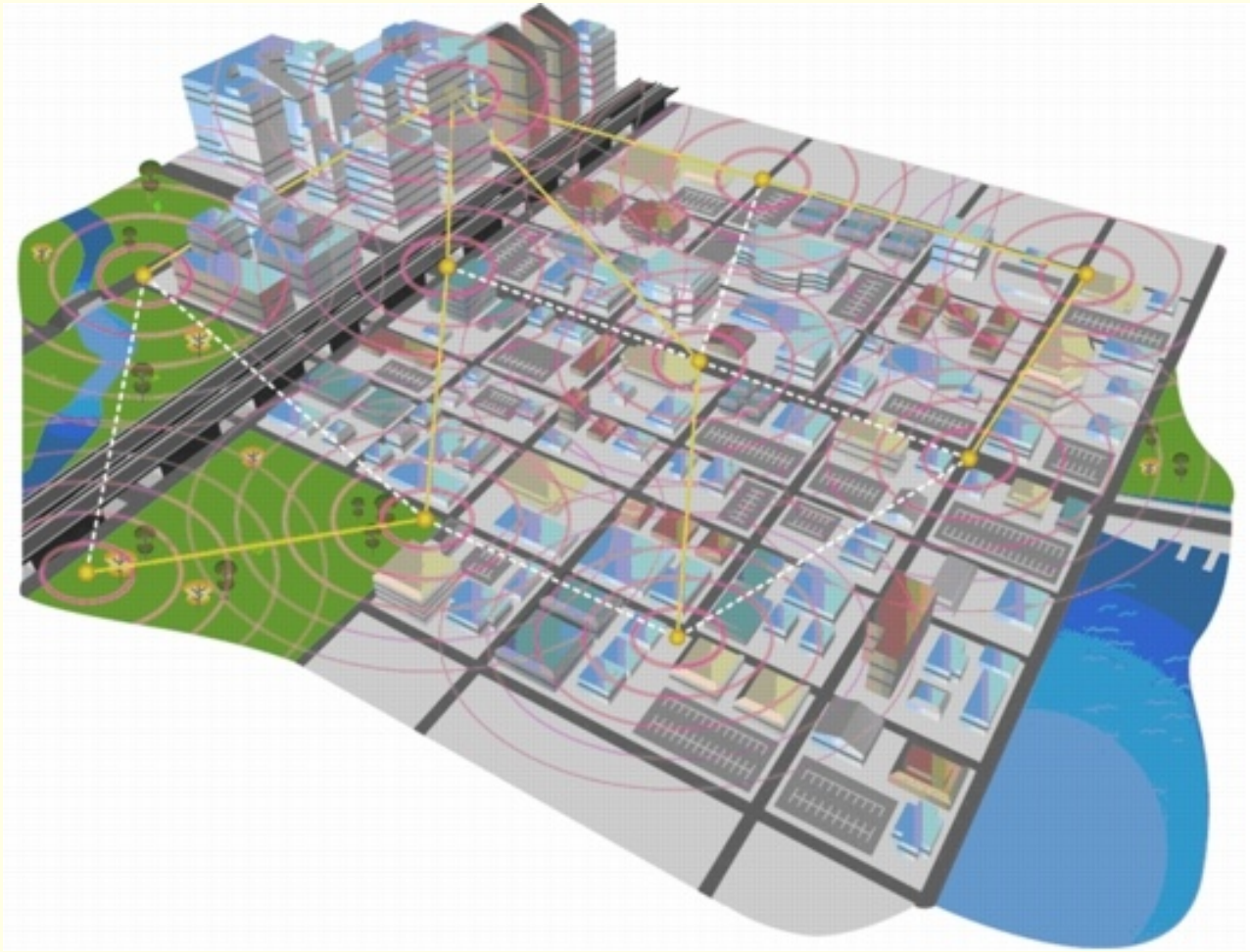
A Wi-Fi Hotspot



Wi-Fi at Starbucks

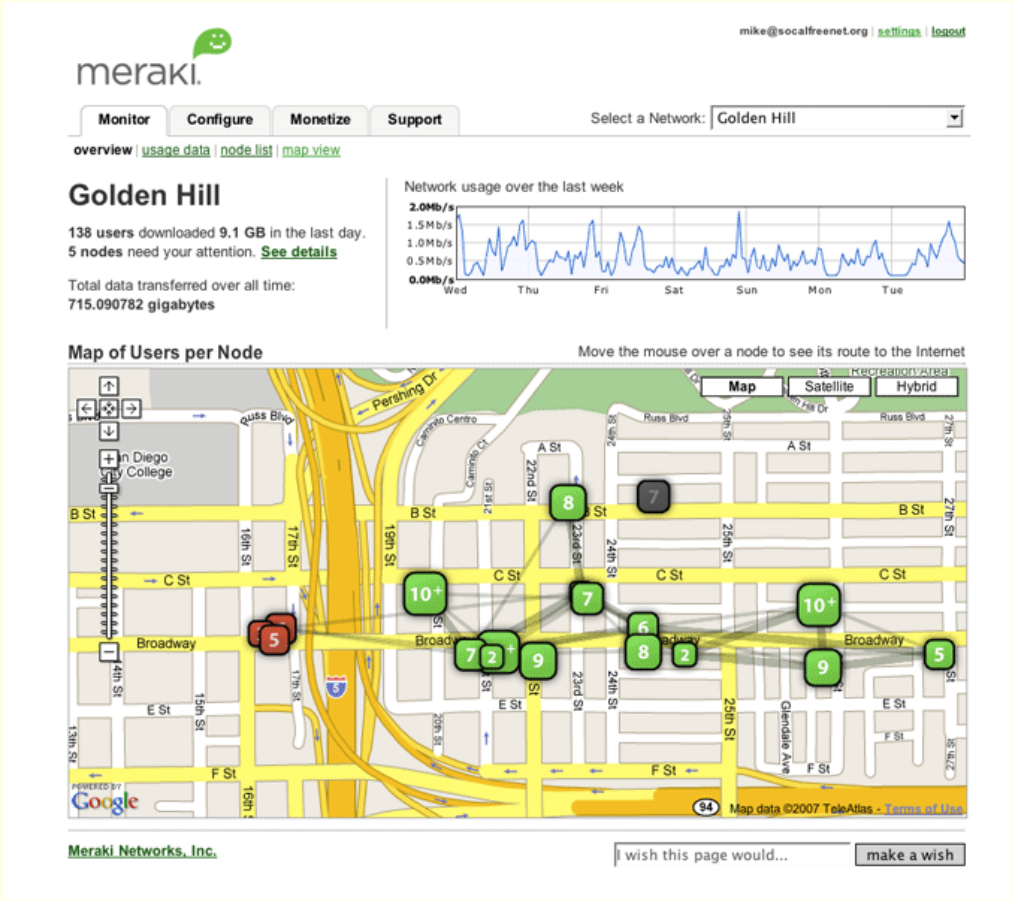
Wi-Fi at McDonalds

Wireless Mesh Networks



Example of a mesh network

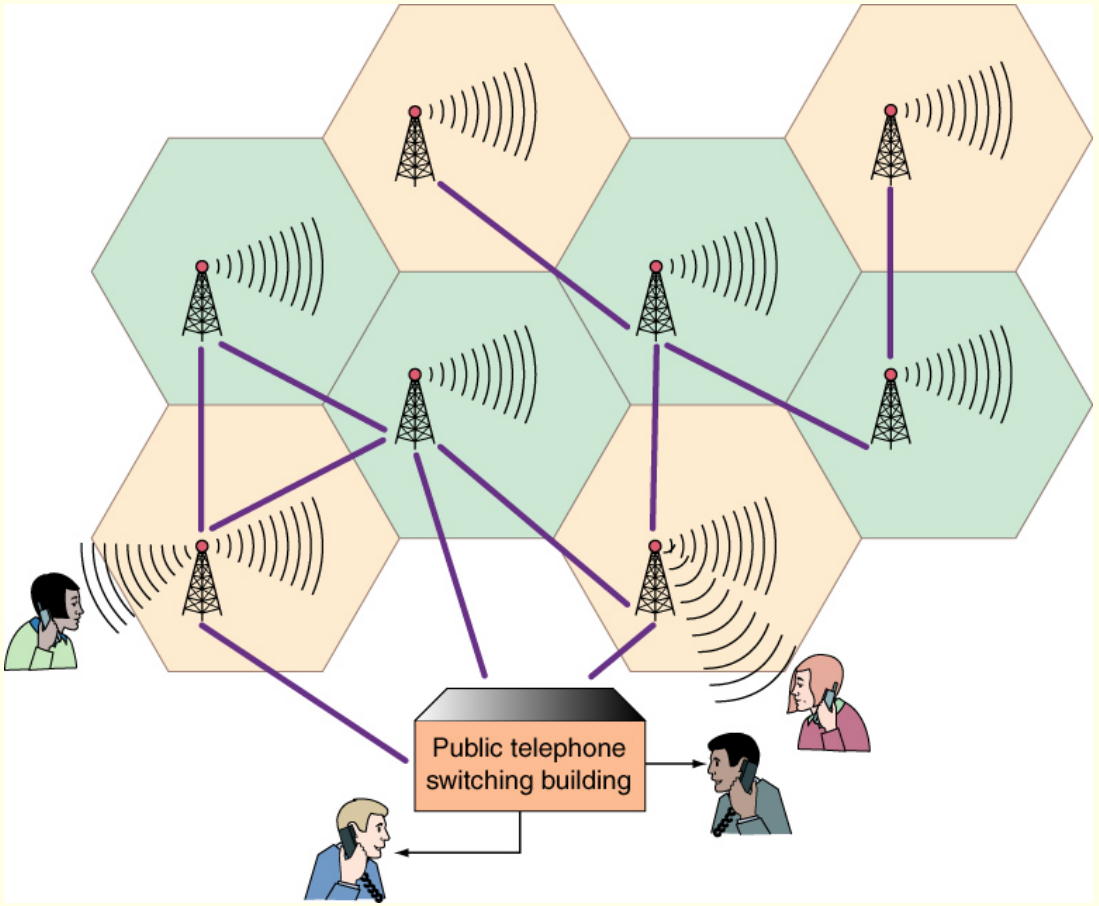
A mesh network from Meraki and one node



Wide-Area Wireless Networks

- Cellular Radio
  - 1st Generation
  - 2nd Generation
  - 2.5 Generation
  - 3rd Generation
- Wireless Broadband or WiMax

Cellular Radio Network

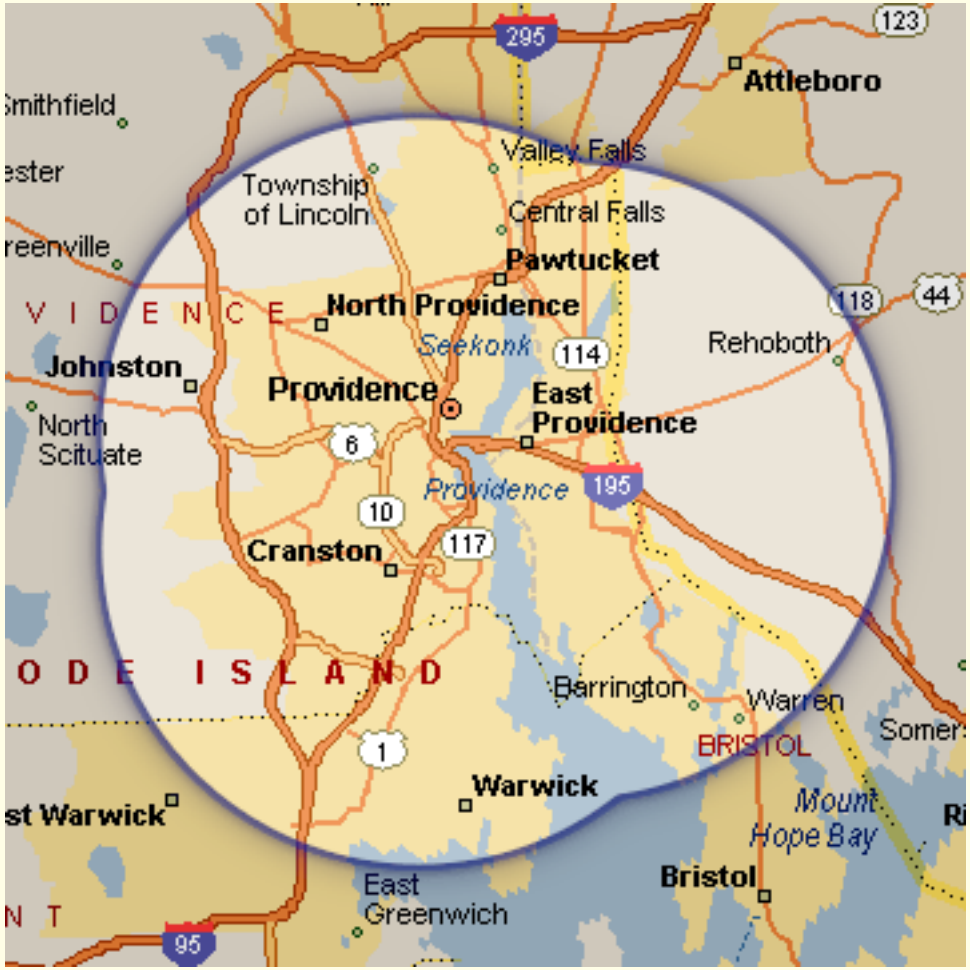


University of Phoenix stadium
(IT's About Business 7.1)

A Wi-Max Hotspot

Wi-Fi and Wi-Max in Rhode Island

(IT's About Business 7.2)



7.3 Mobile Computing and Mobile Commerce

- Mobile computing
  - Mobility
  - Broad reach

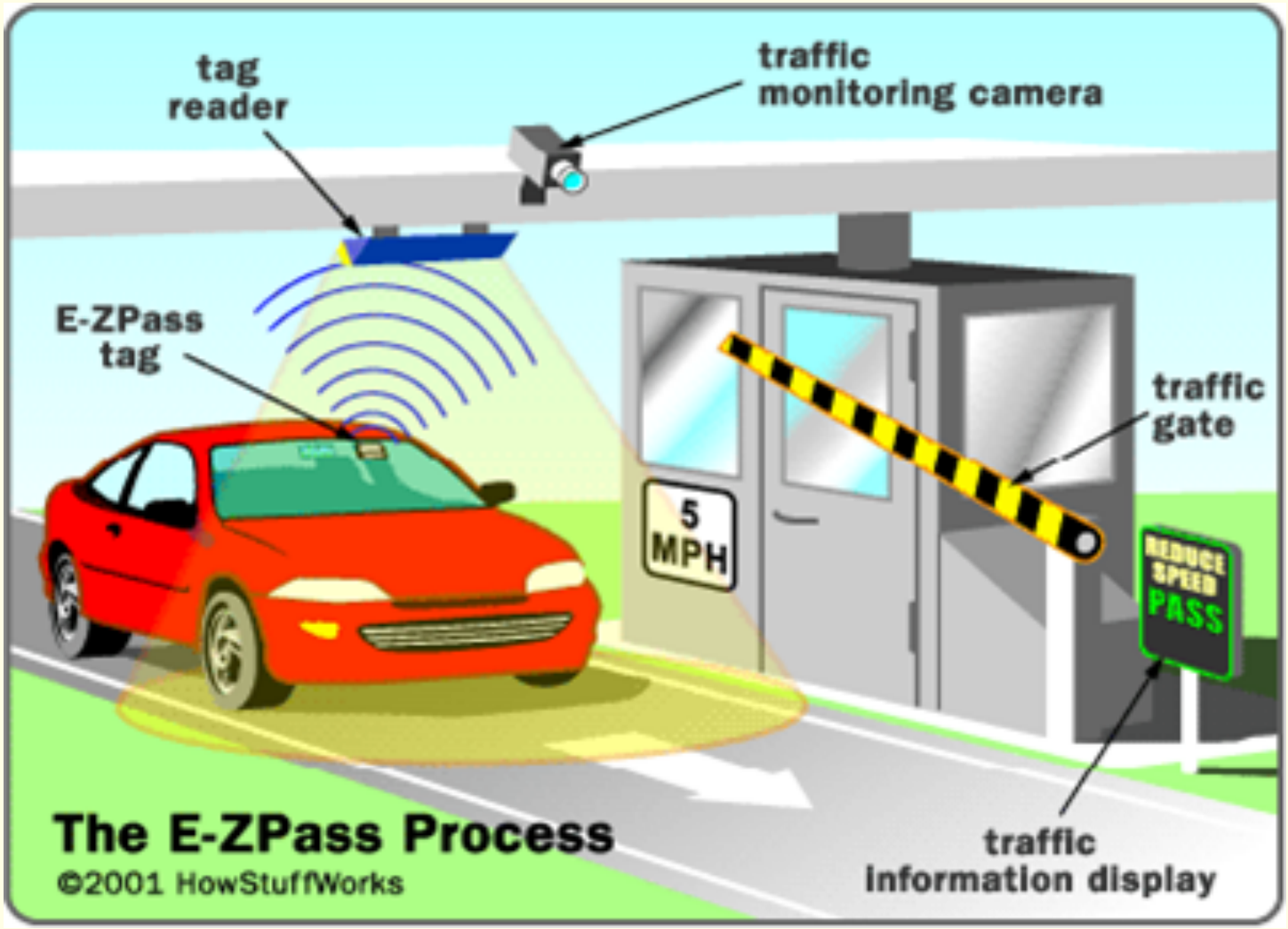
Mobile Computing

- The characteristics, mobility and broad reach, create five value-added attributes that break the barriers of geography and time:
  - Ubiquity
  - Convenience
  - Instant connectivity
  - Personalization
  - Localization of products and services

Mobile Commerce

- Mobile Commerce
- The development of m-commerce is driven by the following factors:
  - Widespread availability of mobile devices
  - No need for a PC
  - The “Cell phone culture”
  - Declining prices
  - Bandwidth improvement

Example of Mobile Commerce



Example of mobile commerce

Car key and the Speedpass

Mobile Commerce Applications

Financial Services

- Mobile Banking
- Wireless Electronic Payment Systems
- Micropayments
- Mobile (Wireless) Wallets
- Wireless Bill Payments

Intrabusiness Applications

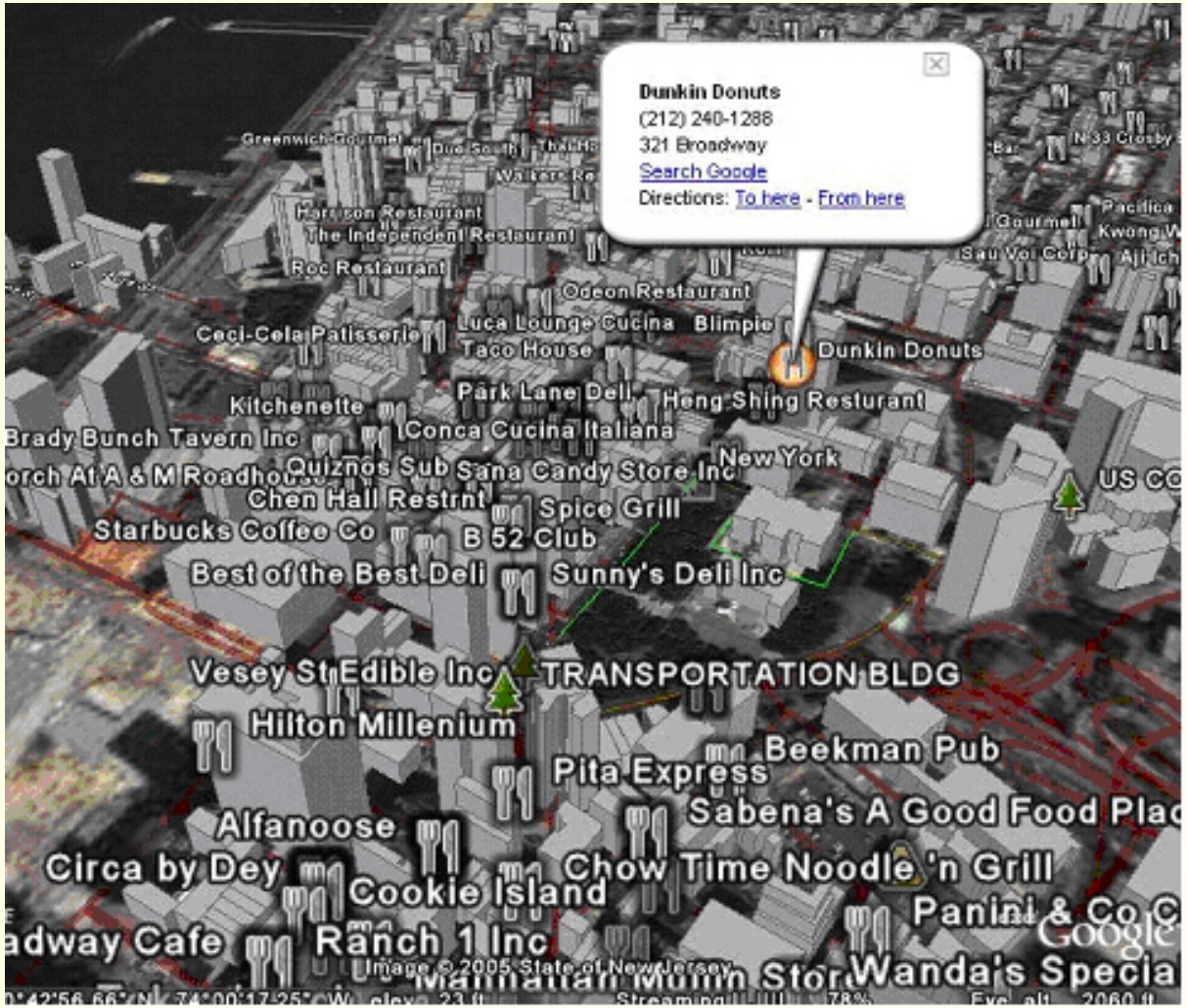
Accessing Information

- Mobile Portal
- Voice Portal

Location-Based Applications

- Shopping from Wireless Devices
- Location-based Advertising
- Location-based Services

Using Google Earth in location-based advertising



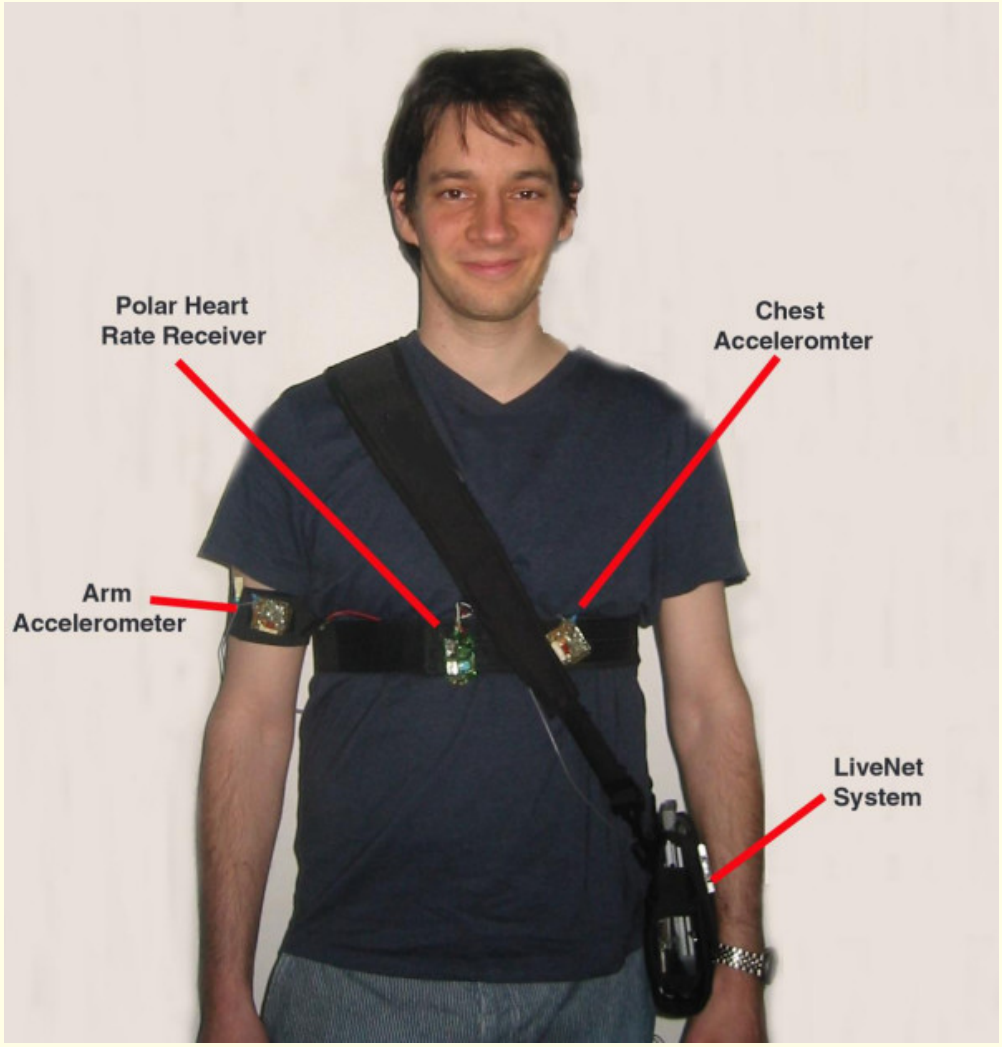
Telemedicine

Telemedicine predicted in 1924 and today

Telemetry Applications

- Technicians can use telemetry to identify maintenance problems in equipment;
- Doctors can monitor patients and control medical equipment from a distance;
- Car manufacturers use telemetry for remote vehicle diagnosis and preventive maintenance.

Medical Telemetry



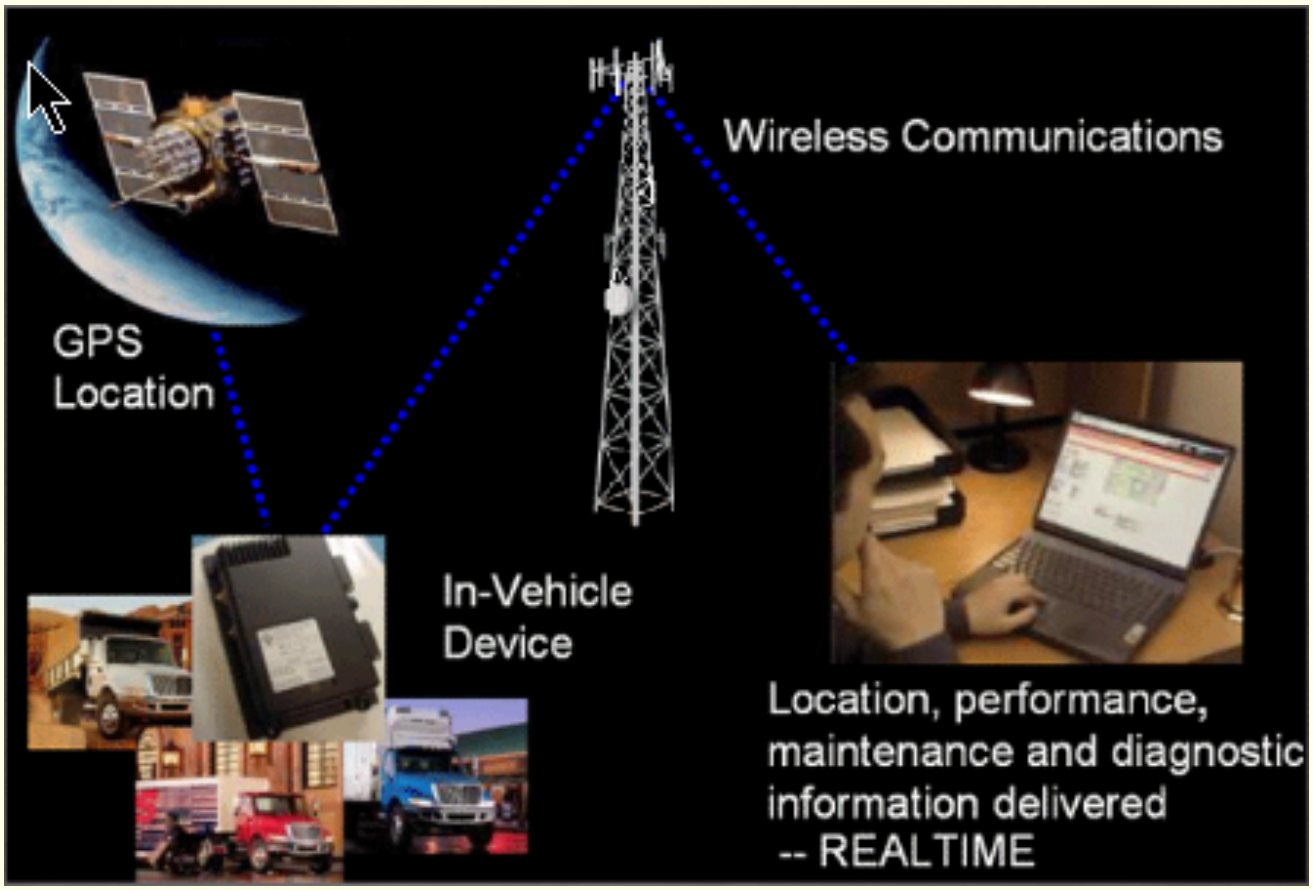
LiveNet

Automotive Telemetry

The OnStar system from GM

The Aware System (IT's About Business 7.3)

Telemetry in the trucking industry

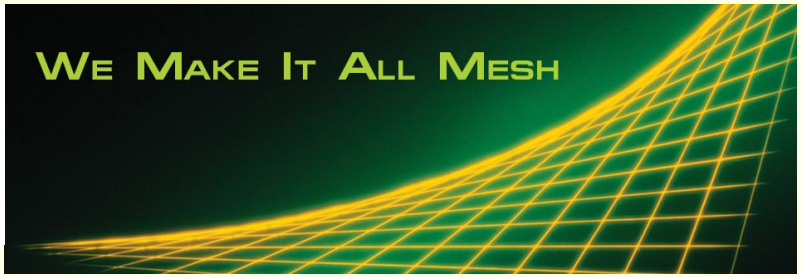


7.4 Pervasive Computing

Pervasive Computing (Ubiquitous computing)

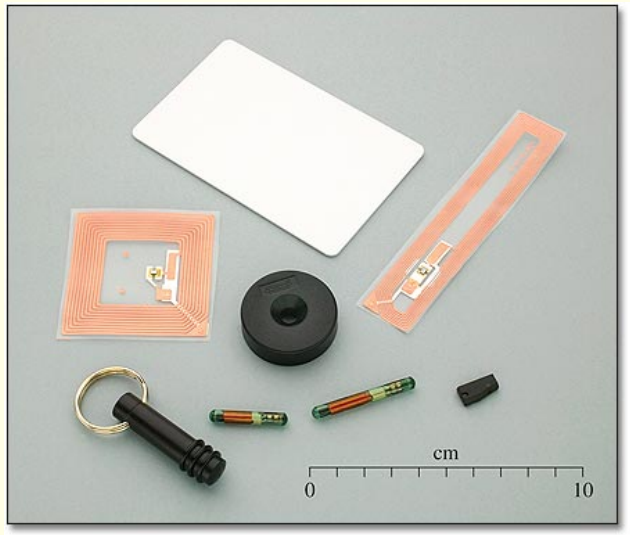
Radio frequency identification (RFID)

Wireless sensor networks (WSNs)



Anatomy of a Bar Code

Various RFID Tags



RFID Dust by Hitachi

Human hair

RFID and Your Privacy

RFID tracking tag from the movie "Mission Impossible"

Product with bar code and RFID tag

RFID tag

Bar code

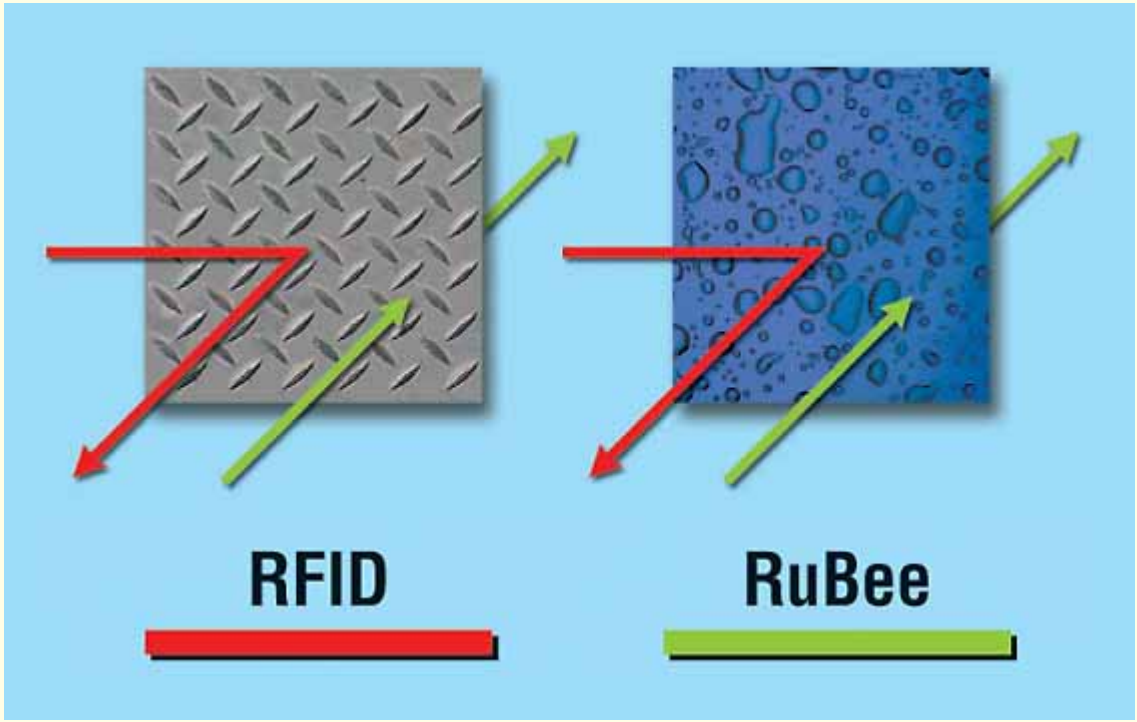
Small RFID Reader and Tag

Small RFID Reader and Tag

Large RFID Reader

RuBee

A RuBee tag



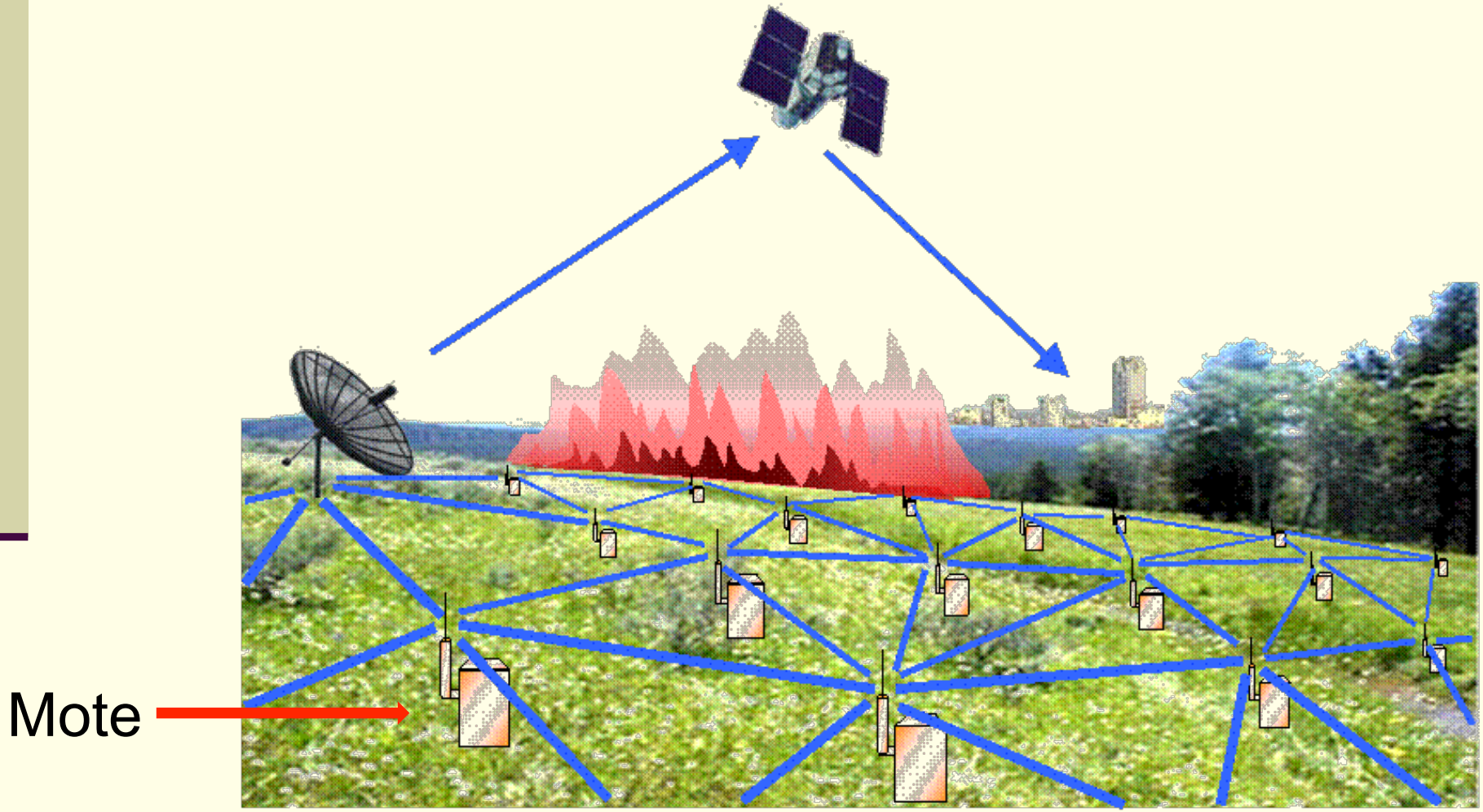
RuBee signals will go through metal and liquids, where RFID signals will not

RFID at Selexyz (IT's About Business 7.4)

RFID tag on book

RFID reader at Selexyz

Wireless Sensor Networks (WSNs)



Inrix traffic system

7.5 Wireless Security

Four major threats

- Rogue access point
- War driving
- Eavesdropping
- RF (Radio frequency) jamming

Chapter Closing Case

Washington State Department of Natural Resources

Webster Forest Nursery

Growing Trees For Tomorrow