

## IFSM450 – Telecommunications

### ■ Communications

- ◆ Process that allows information to pass between sender and one or more receivers

### ■ Tele-

- ◆ Distant

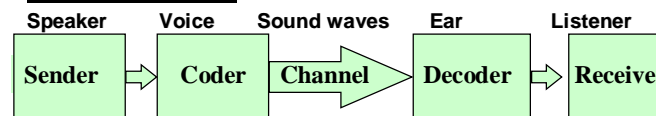
### ■ Definitions:

- ◆ Telegraph?
- ◆ Telephone?
- ◆ Telecommunications?

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## The Basic Communication Model

### Human Speech

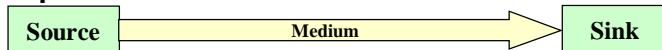


- Sender = Source
- Coder = Translator
- Channel = Medium or Media
- Decoder = Translator
- Receiver = Sink

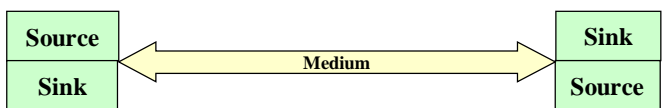
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## Transmission Modes (p.271-2)

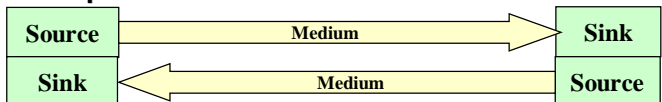
### ■ Simplex Transmission



### ■ Half-Duplex Transmission



### ■ Full-Duplex Transmission



## Early Communication Methods



- Human Speech
- Drums
- Smoke Signals
- Semaphore
- Flashing Light
- Telegraph (Wired)
- Radio (Wireless)

### Which One?

- Simplex Transmission
- Half-Duplex Transmission
- Full-Duplex Transmission

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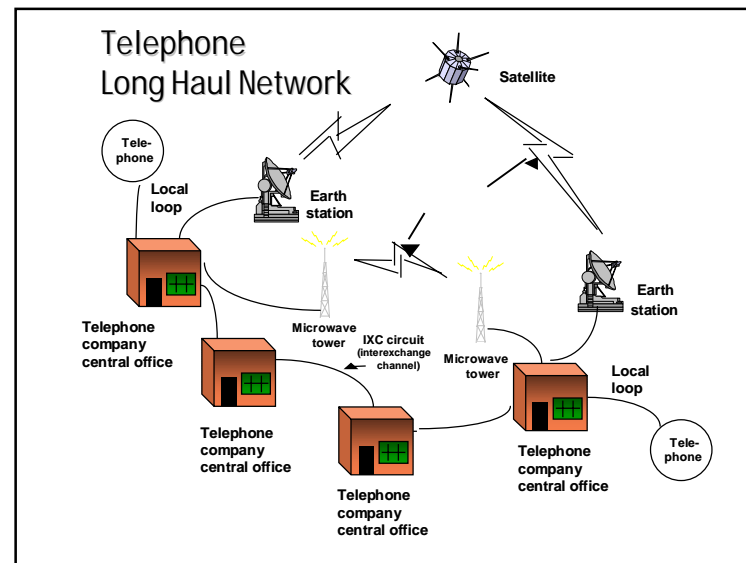
## Telephone Communications

```

    graph LR
      C1[Client 1] --> T1((Telephone))
      T1 -- Channel --> T2((Telephone))
      T2 --> C2[Client 2]
  
```

- Telephone converts sound to analog signal
- Channel
  - ◆ Telephone Lines
  - ◆ Central Office
  - ◆ A/D Send D/A Receive conversion
  - ◆ Long Haul Network
  - ◆ Routing through channel switching

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## Data Communications

- Data communications definition: *The movement of coded data and information from one point to another by means of medium.*
- Media Definition: *Electrical or electromagnetic devices, fiber-optical cables, or microwave signals.*
- Generally, Data is digital.

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## Data Communications Schematic

```

    graph LR
      T[Terminal] --> M1((Modem))
      M1 -- Channel --> M2((Modem))
      M2 --> C[Computer]
  
```

- Terminal (Client) or Computer
- Modem (Modulate, D/A)
- Channel (Telephone Transmission System)
- Modem (Demodulate, A/D)
- Computer (Server)

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## Telecommunications in Business

- **Melding Information Systems using telecommunications technology**
  - ◆ Database Client Server Structure
- **Timely Information Availability**
  - ◆ Decision Support Systems
- **Capture Business Operations Status**
  - ◆ Inventory control, sales, manufacturing
- **Remote Management of Operations**
- **Marketing**

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## Telecommunication Examples

- **Telephone Call**
- **Internet**
- **Airline Reservations**
- **Banking ATM**
- **Remote Monitoring**
- **Remote Control**
- **Computer Networking**
- **Can you think of other?**

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## Requirements for Data Communications Systems

- **Availability**
- **Reliability**
  - ◆ MTBF
  - ◆ MTTR
- **Online = Connection**
- **Realtime = Response time fast enough for human interaction**
- **Ease of Use and Ergonomics**
- **Flexibility and Growth**

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## Government Regulatory Environment

- **Ensure Compatibility**
  - ◆ Signaling and Infrastructure
- **Protect Companies**
  - ◆ Required for infrastructure development
- **Prevent Interference**
  - ◆ Bandwidth allocation
- **Federal Communications Commission**
  - ◆ Established 1934

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## AT&T = Ma Bell

### ■ Graham Act 1921

- ◆ AT&T became a government legitimized monopoly
- ◆ Not subject to Sherman Anti-trust Act
- ◆ Building of nationwide non-overlapping telephone network called Bell System

### ■ Benefits and abuse?

- ◆ Western Electric Manufacturing
- ◆ Owns End to End equipment

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## AT&T Deregulation

### ■ Modified Final Judgement 1984

- ◆ AT&T broken up
- ◆ Divestiture of the 22 local Bell Operating Companies (Baby Bells)
- ◆ AT&T retains Long Distance Operations, Network System Manufacturing, and Bell Laboratories Research and Development
- ◆ Induced Competition
  - ❖ Long Distance Carrier Competition
  - ❖ Telecommunications Equipment

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## International Telecommunications

### ■ International

- ◆ Most Countries had state-owned and run telecom providers
- ◆ Privatized and deregulation began in 1980s

### ■ International Carriers

- ◆ AT&T
- ◆ MCI
- ◆ US Sprint
- ◆ KDD

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## Project 1

### ■ Problems and Questions 1 and 2

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