

# Optical Communication

ECE 494

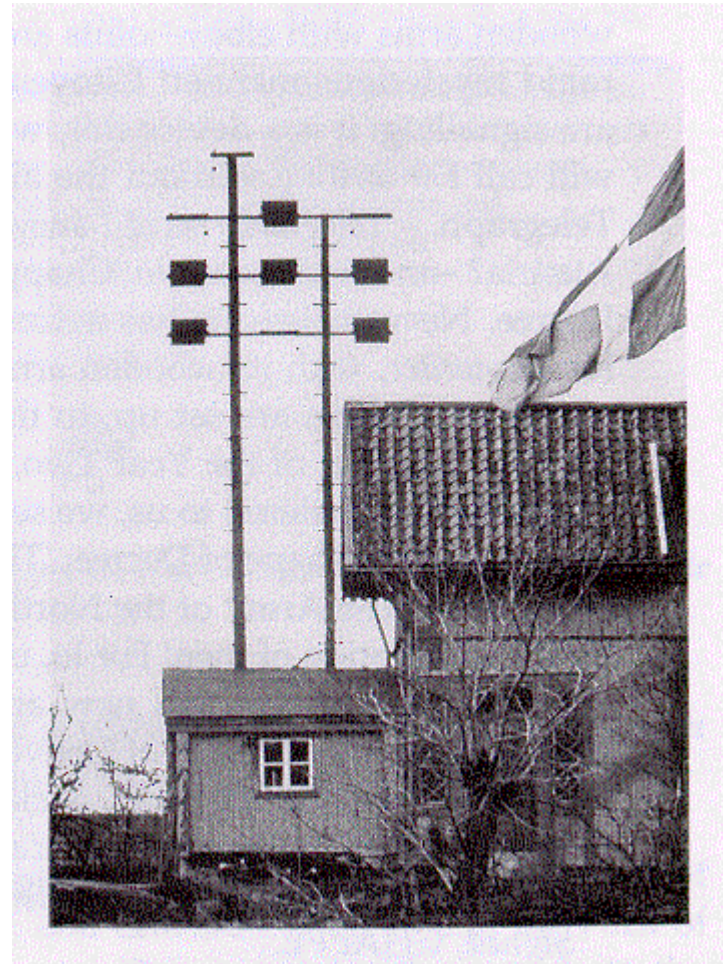
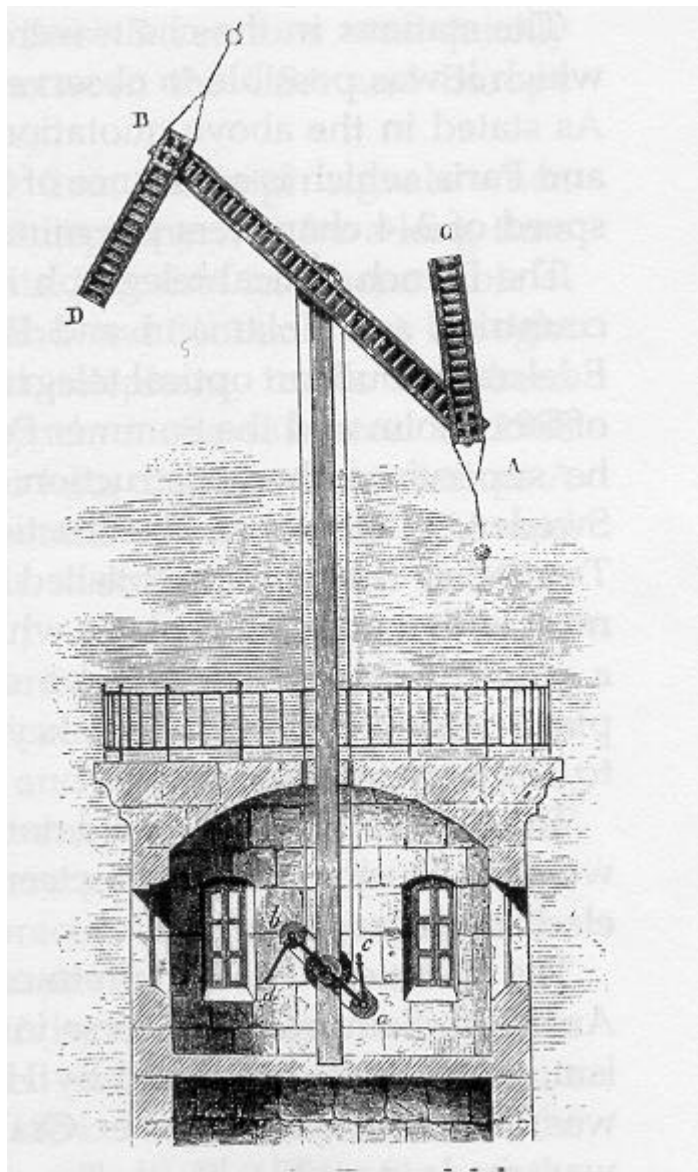
Presented By : Martins Innus

# Outline

- History of Optical Communication
- System Description
- Channel Comparisons
- Descriptions of Channels
- Modulation
- Detection
- Amplification

# Background

- Early Systems
- Beacons
- Colonial Times
- Optical Telegraph
- Alexander Graham Bell



# Basic System Configuration

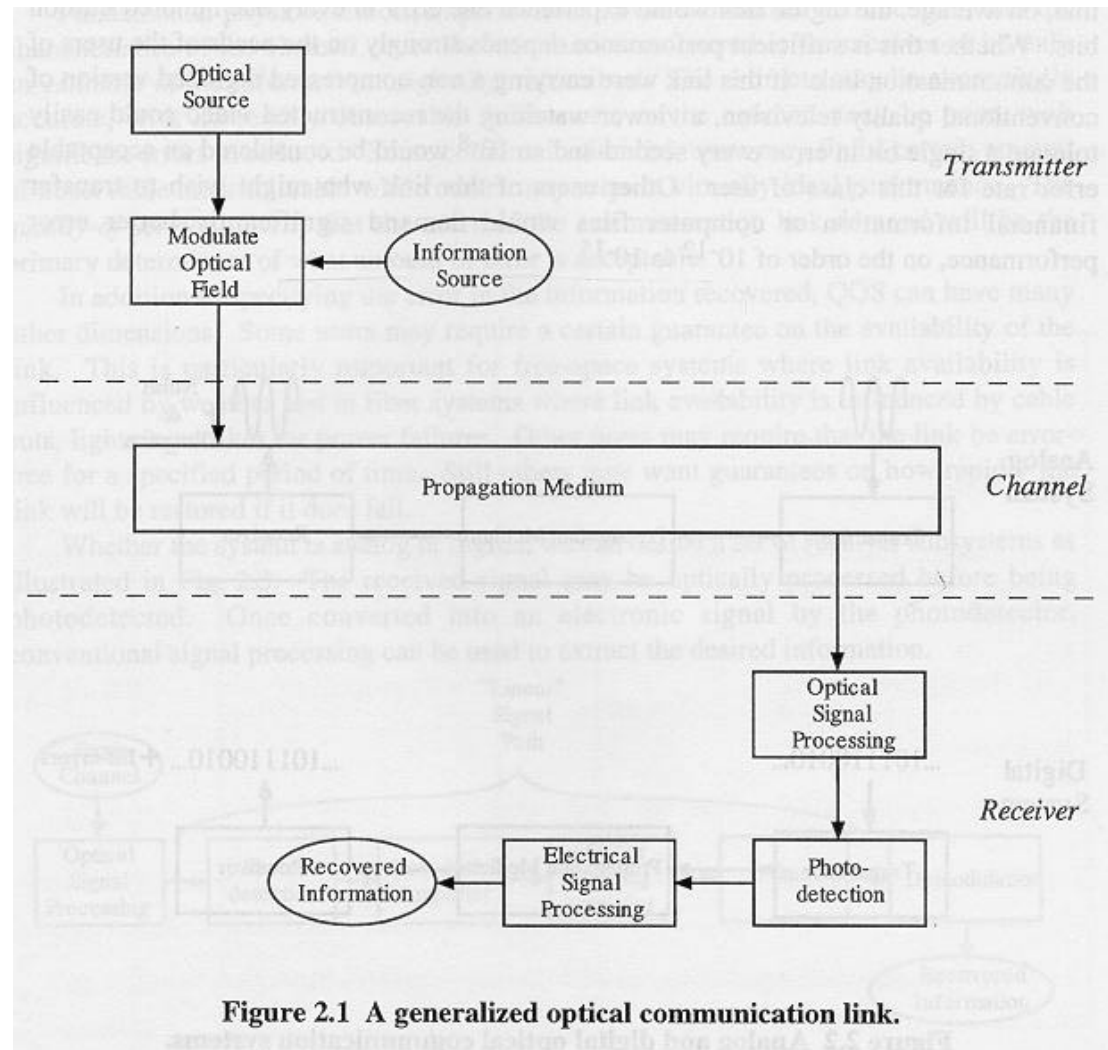


Figure 2.1 A generalized optical communication link.

# Fiber Systems

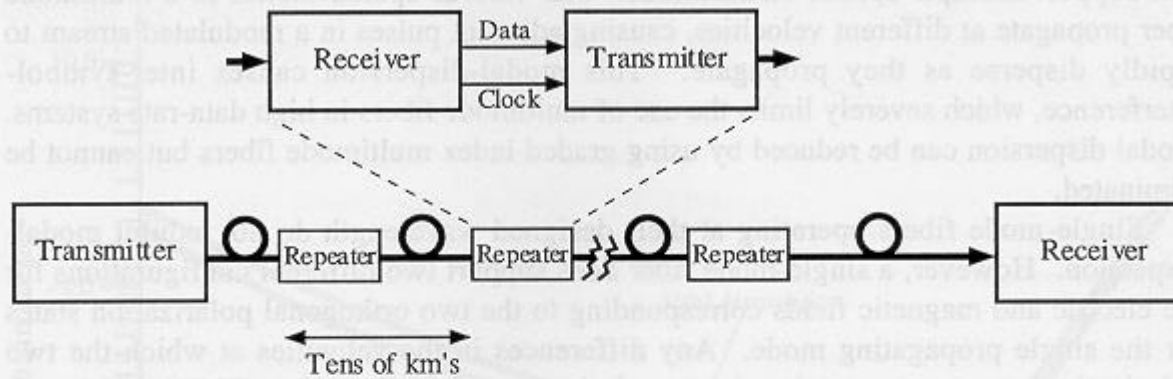
- Advances
- Low Loss
- High Data Rate
- Size
- Disadvantages

# Free Space Systems

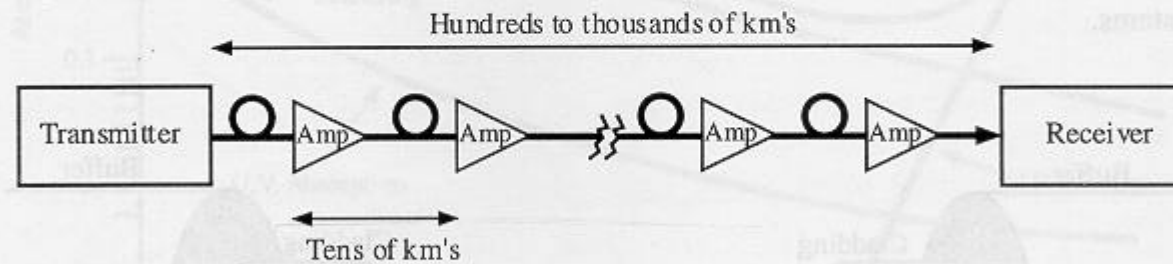
- Compared to EM
- Available Spectrum
- Beam Size
- Disadvantages

# Fiber Characteristics

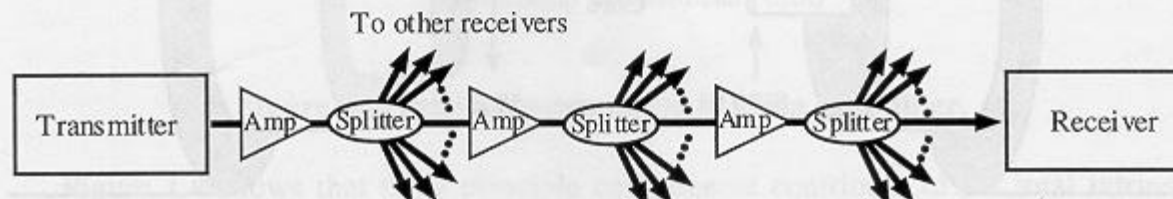
Long-Haul using repeaters:



Repeaterless Long-Haul:



Broadcast:





# Free Space Characteristics

- Satellites
- Uses For
- Acquisition and Tracking

# Optical Amplification

- Forced Stimulated Emission
- SLA
- Pump
- Addition of Noise
- Representation

# Modulation and Detection

- FM, PM, AM, IM, PLM
- Coherent or Direct Detection
- Noise in Detection

# Summary

- Advantages to Optical Communication
- Choice of Systems
- Analogies to traditional systems
- Caveats