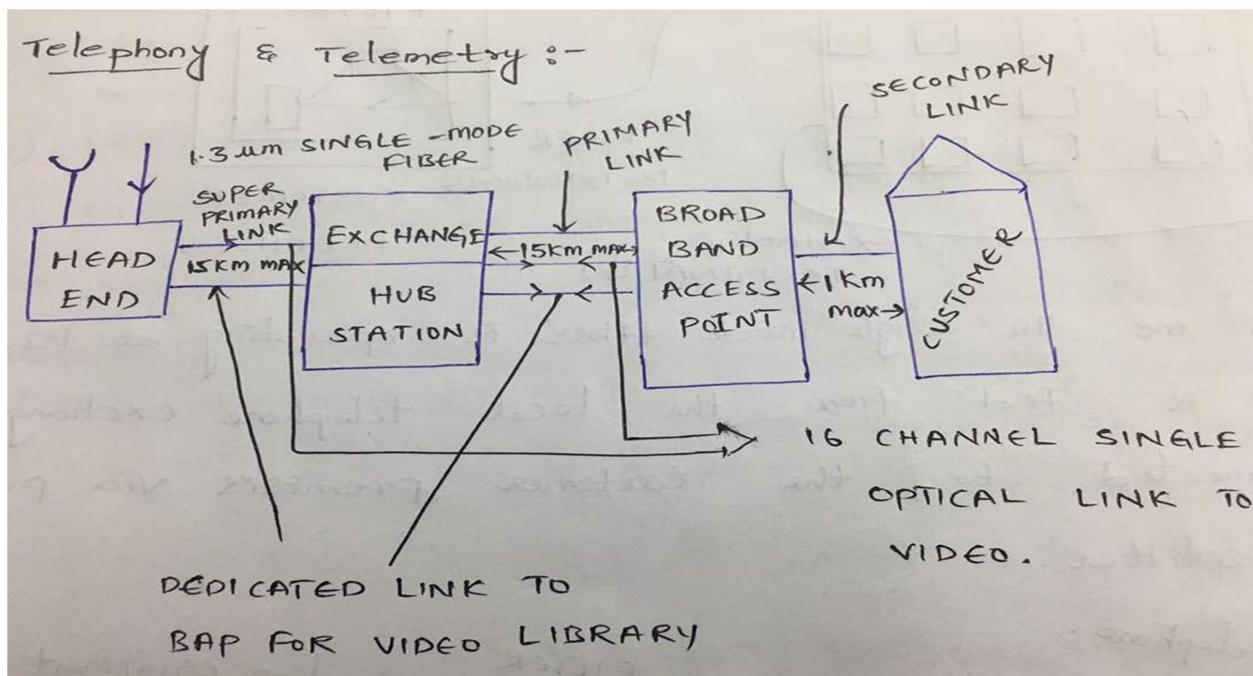


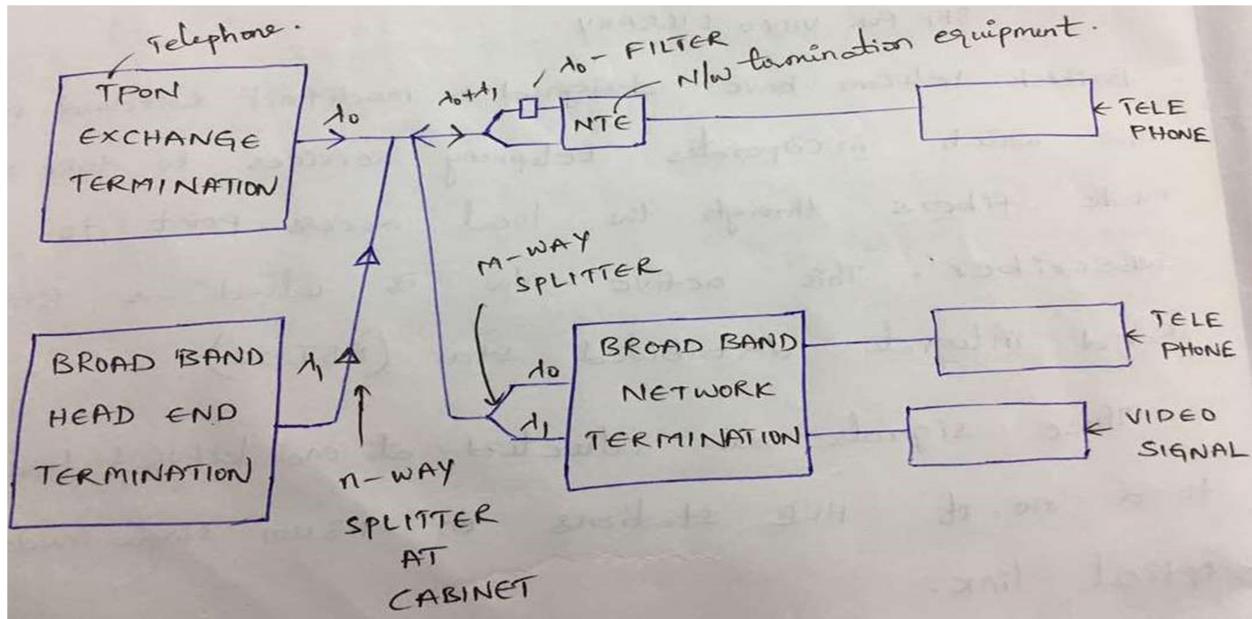
## UNIT-V

### OPTICAL COMMUNICATION APPLICATIONS

#### TELEPHONY & TELEMETRY:

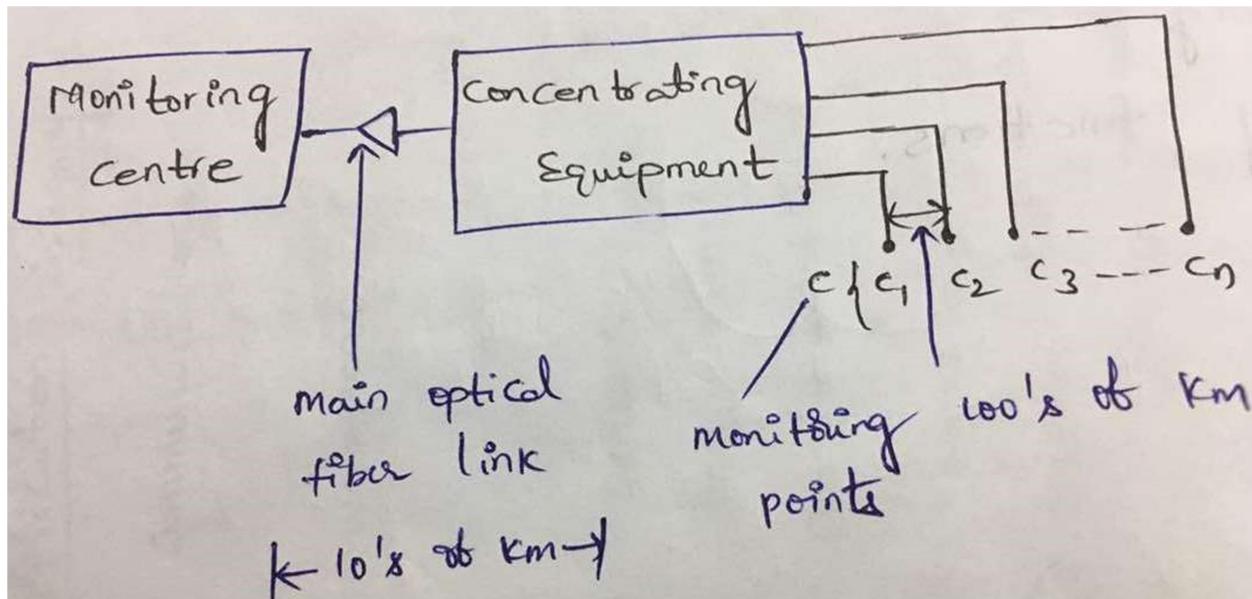


- BBIDS was developed by British telecom and modified as a switched star network which incorporates telephony services by using single mode fiber.
- The signals collected at the head end transmitted to number of Hub stations through single mode optical fiber.
- Each optical fiber is capable of carrying 16 TV channels. The signals are being transmitted at a rate of 140 Mbps.



- In the recent past various digital switching networks are developed to satisfy telephone and telegraph services.

### VIDEO DISTRIBUTION:



The techniques used for video broadcasting are

- (1) Baseband intensity modulation
- (2) Sub-carrier intensity modulation

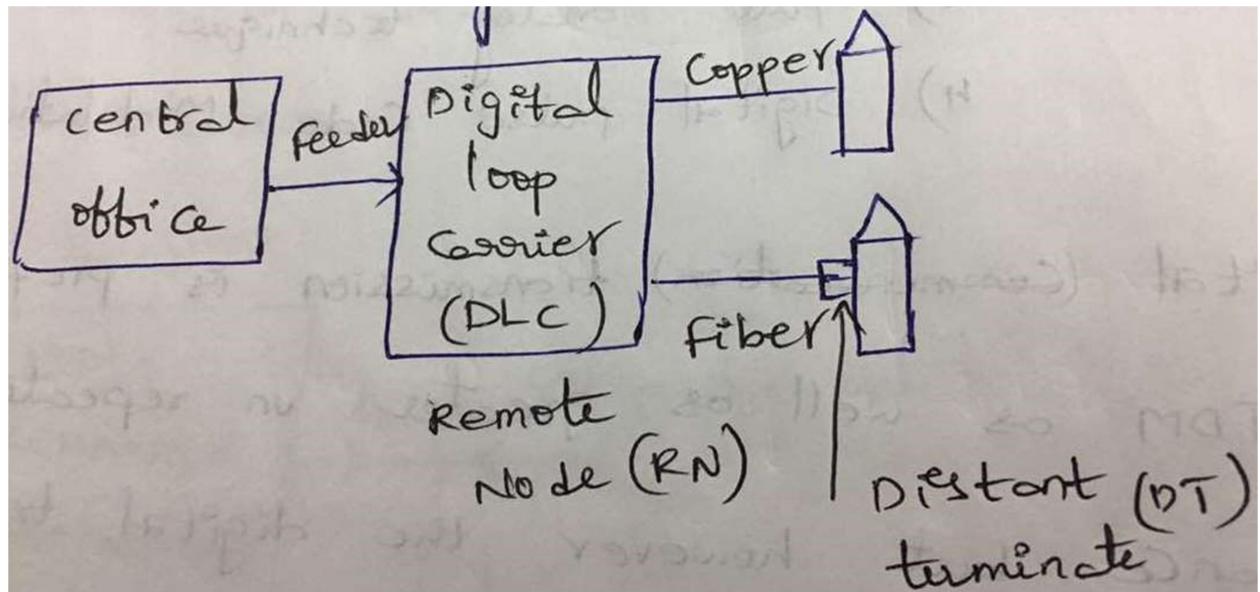
(3) Pulse-analog technique

(4) DPCM

Generally digital transmission is preferred, because it allows TDM with long distance transmission.

Implementation cost is less and less complexity.

The video signal from camera at monitoring point collected and given to the concentrating equipment.



In digital transmission Digital loop carrier (DLS) place a vital role

Because it provides

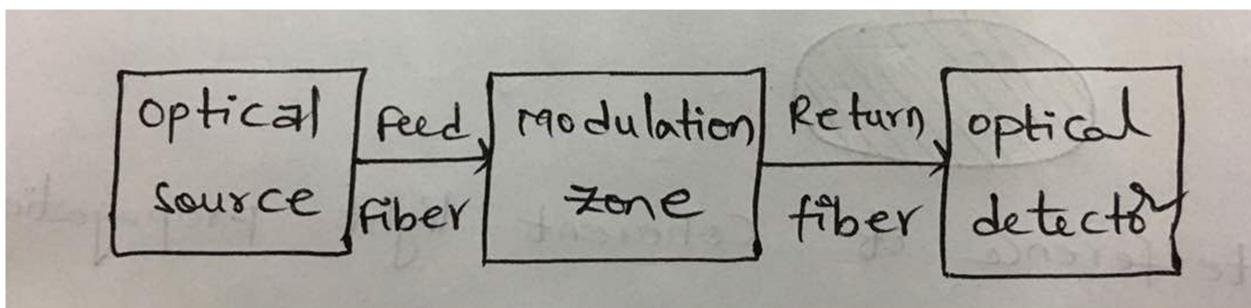
- (1) Suitable battery
- (2) over voltage protection
- (3) ringing
- (4) signaling
- (5) coding
- (6) testing function
- (7)

## MILITARY APPLICATIONS:

Application Category	System	Benefits of Fiber
Communications	<b>Intrusion Detection</b> <b>Optical Communications (IDOC) System</b>	<b>Allows nonencrypted system</b> <b>EMI/EMP immunity</b> <b>Improved security</b>
Weapons	<b>FOG-M</b> <b>AAWS-M</b> <b>FOG-S</b> <b>PDAMS</b>	<b>EMI/RFI immunity</b> <b>High data rate</b> <b>Reduced vulnerability of launcher</b>
Sensors		
Nuclear testing	<b>High pressure sensor</b>	<b>Ability to sense in particle generation phase</b> <b>Ranges in excess of 10 kbar</b> <b>Accurate tracking of impulses</b>
Image probes	<b>Combustor flame probes</b>	<b>Compactness</b> <b>Reliability</b> <b>Ability to withstand high temperature</b>
Surveillance		
Submarine	<b>Ariadne Program</b>	<b>Ability to hold up in corrosive sea environment</b> <b>High sensitivity</b>
UAV	<b>R&amp;D stage</b>	<b>Covert operation</b> <b>EMI/EMP immunity</b>
Airborne Platform		
Avionics	<b>Fly-by-light system</b>	<b>EMP/EMI immunity</b> <b>Weight/space savings</b>
Radar	<b>Phased array</b>	<b>Weight savings</b> <b>Capability to exploit parallelism of array</b>
Aircraft stress monitoring	<b>R&amp;D stage</b>	<b>Light weight</b> <b>Small size</b> <b>Facilitation of maintenance</b> <b>Real-time monitoring</b>

Application Category	System	Benefits of Fiber
Optical computing	Neural networks	<b>Massive parallelism</b>
Shipboard	Information system Damage control system (in tandem with sensor network)	<b>Weight/space savings</b> <b>Low cost</b> <b>EMI/RFI immunity</b> <b>Ability to hold up in corrosive sea environment</b> <b>High data rate</b> <b>No spark hazard</b> <b>Ability to service live cable</b>
Navigation	Fiber optic gyroscope (FOG)	<b>Small size</b> <b>Light weight</b> <b>Low power</b> <b>Ruggedness</b> <b>Potentially modest cost</b> <b>Potentially great accuracy</b>

## SENSORS:



Sensors are classified into two types

- (1) Active or intrinsic sensors
- (2) Passive or extrinsic sensors

### (1) Active or intrinsic sensors:

In this type physical parameter to be sensed are acting directly on the fiber to the corresponding modulation in the transmitted physical parameters.

Based on modulation used the sensors are classified in to

- (a) Intensity modulated sensors
- (b) Phase modulated sensors
- (c) Polarization modulated sensors
- (d) Wavelength modulated sensors

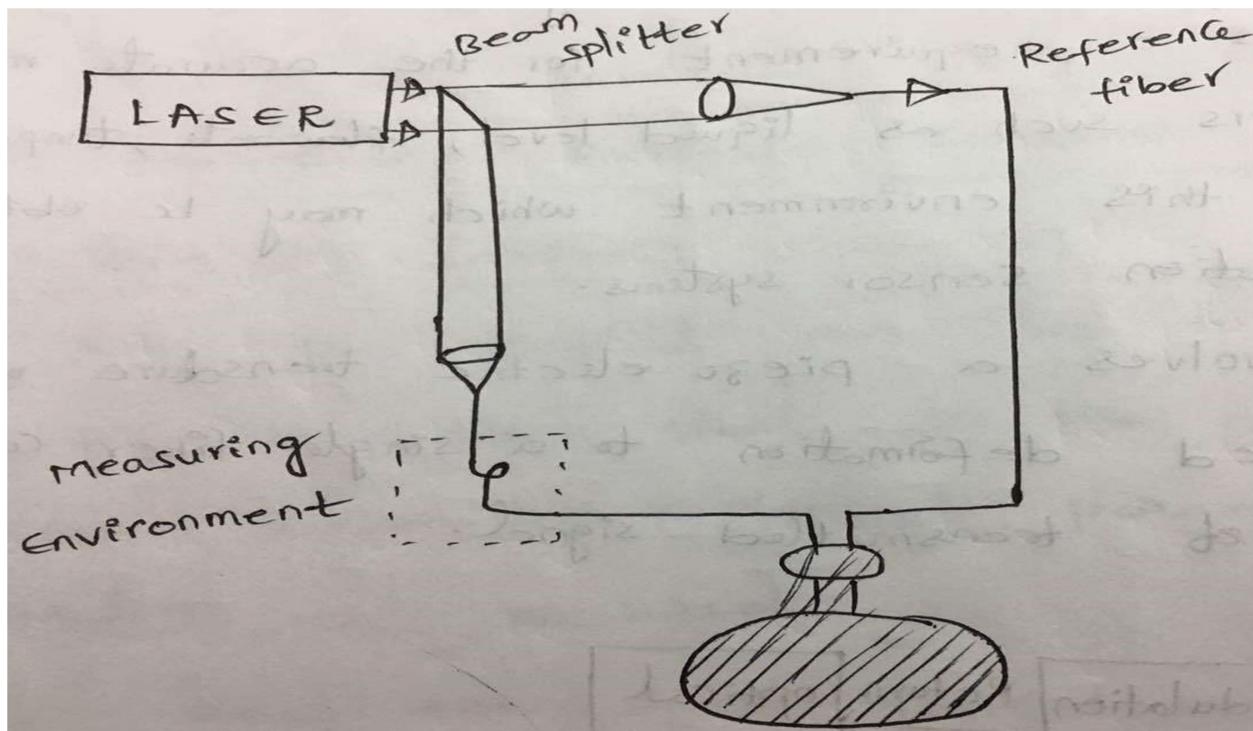
## (2) Passive or extrinsic sensors:

In this separate sensing elements and optical fibers are used as guiding media.

The modulation of the light transmitted through the fiber is carried out externally either by induced or environmental changes. Thus the modulated signal is transmitted through a second fiber

In passive sensor the fibers are used only as a transmission media.

### PHASE & POLARISATION SENSOR (MZI):



In this sensors inferrometer plays a vital role to measure the physical parameter and directly calibrate on it.

The calibration of inferrometer depends on measuring environment .

The effect of measuring environment (strain,temperature,pressure etc.) are sensed and send the information to the inferrometer.

A common single mode fiber is used to connect light source, measuring environment and inferrometer by the use of beam splitter.

The difference produces a phase shift which can measure by inferometric technique in order to obtain rotation.

Measurement based on comparison is also called as coherence measurement.