

Lecture 26



PRINCIPLES OF SATELLITE COMMUNICATION

SPECIAL PURPOSE COMMUNICATION SATELLITES

IMPORTANCE OF SATELLITES IN LIFE



- ESSENTIAL PART OF TODAY'S TECHNOLOGY
- WE RELY ON SATELLITE IN MANY WAYS-
 - ✓ SATELLITE TELEVISION OR DIRECT BROADCAST
 - ✓ GLOBAL POSITIONING SYSTEM
 - ✓ GALILEO SYSTEM
 - ✓ COMMUNICATION SYSTEM SUCH AS INMARSAT, SURVEYING AND WEATHER MONITORING SATELLITE

DIRECT BROADCAST SATELLITE



- **VERY POPULAR**
- **PROVIDES HIGH LEVELS OF BANDWIDTH**
- **USES HIGH FREQUENCY**
- **CARRIES LARGE NO OF CHANNELS**
- **ONE SYSTEM COVERS LARGE AREA OF GLOBE**
- **FOR BROADCAST - LARGE NUMBER OF HIGH POWER**

CONTINUES ...



- SO FOR HIGH LEVEL POWER, LARGE SOLAR CELLS ARE REQUIRED ALONG WITH LARGE BATTERIES
- LARGE NO OF ANTENNA SYSTEMS
- DIFFERENT ANTENNAS ON SAME SATELLITE MAY HAVE TOTALLY DIFFERENT FOOTPRINT.

DBS SYSTEM



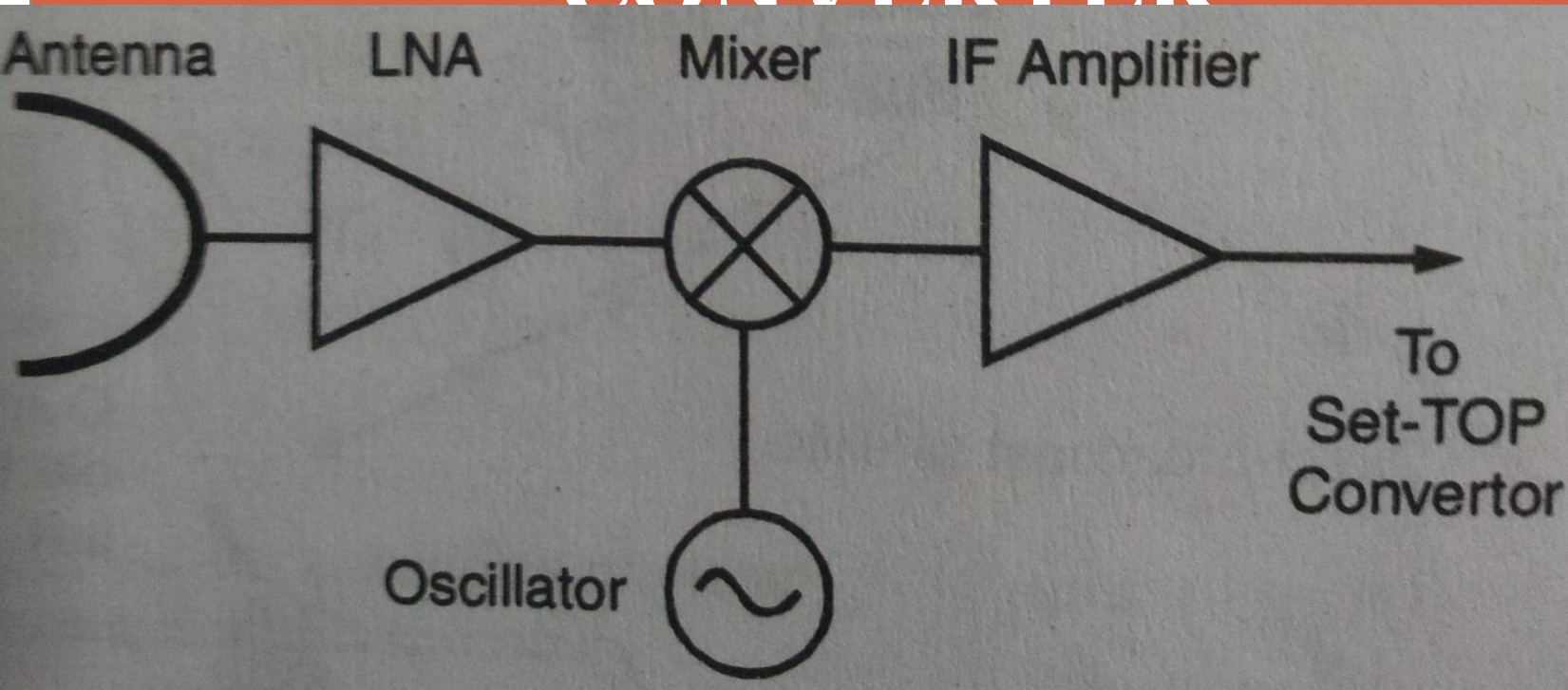
- TV SIGNAL RECEIVED BY LNB (LOW NOISE BLOCKCONVERTER)
- CONVERTS SIGNAL IN INTERMEDIATE FREQUENCY
- FURTHER CONVERTED BY SET TOP BOX WHICH IS ALSO CALLED SET TOP CONVERTER WHERE IT SPLIT INTO VOICE AND PICTURE
- e.g. C BAND 4 GHz & Ku BAND 12 GHz

CONTINUE



- LNBs SPECIFICATION ARE NOISE FIGURE & ASSOCIATED GAIN
- NOISE FIGURE FOR SENSITIVITY OF THE RECIEVER & ANTENNA SIZE
- FOR CLEAR PICTURE RECEPTION – AN LNB NF IS 2.0dB OR LESS
- GAIN REQUIREMNET FOR AN LNB BETWEEN 50 TO 65 dB (with 55 ± 3 dB being a common specification)

DBS LOW NOISE BLOCK CONVERTER



FOUR COMPONENTS –

- 1) LNA – LOW NOISE AMPLIFIER
- 2) MIXER
- 3) OSCILLATOR
- 4) IF AMPLIFIER

INMARSET



- British satellite telecommunication company
- Offers Global Mobile Service
 - Telephony
 - Data services

Via portable or mobile terminals which communicate to ground stations through eleven geostationary telecommunication satellite.

- Founded in 1979
- Named as *INTERNATIONAL MARITIME SATELLITE ORGANISATION (INMARSET)*

CONTINUES



- THE ONLY PURPOSE WAS TO ESTABLISH NETWORK FOR MARITIME COMMUNITY AND NAMED AS *IMO*
- AIM WAS SAFETY OF LIFE AT SEA
- LATER CONVERTED IN ACRONYM “INMARSET”
- PROVIDE SERVICES TO AIRCRAFT & PORTABLE USERS WHICH INCLUDES TRADITIONAL VOICE CALLS, LOW LEVEL DATA TRACKING SYSTEM & HIGH SPEED INTERNET etc.

RECENT SERVICES OF INMARSET



- GPRS TYPE SERVICES AT 492Kbit/s via BROADBAND GLOBAL AREA NETWORK (BGAN)
- ISDN SERVICES LIKE VIDEOPHONES
- **SATELLITE USES DIGITAL TRANSPONDERS –**
 - ✓ RECEIVE DIGITAL SIGNALS
 - ✓ REFORM PULSES
 - ✓ RETRANSMIT TO GROUND STATIONS
- **GROUND STATIONS –**
 - ✓ MAINTAIN USAGE & BILLING DATA
 - ✓ FUNCTION AS G/W TO PSTN & THE INTERNET