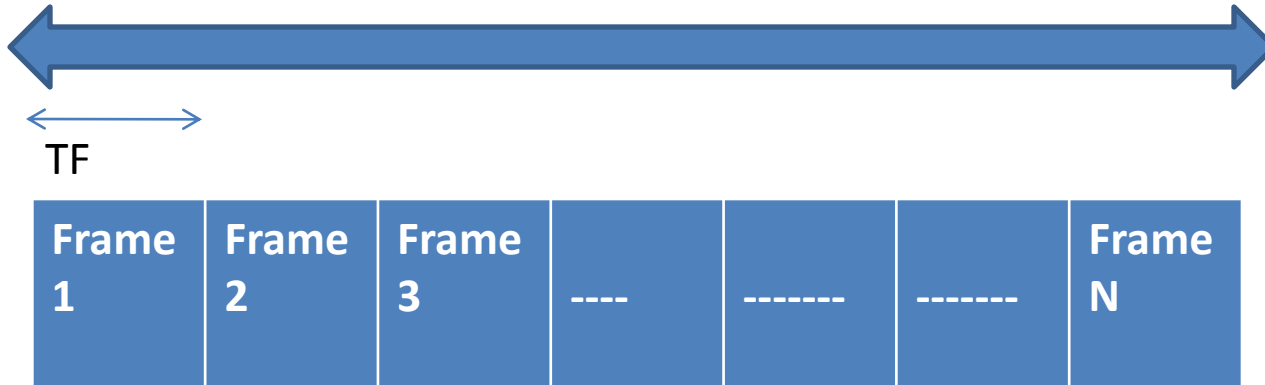


Unit 5

MULTIPLE ACCESS TECHNIQUE

ALLOWS INTERCONNECTION OF LARGE
NO OF EARTH STATION TERMINALS
SIMULTANEOUSLY VIA SATELLITE

TDMA super frame



Contt....

- Transmit timing Channel of the reference Burst position of the burst
- Management Channel Coordination of Traffic burst

TDMA BURST TIME PLAN

- Transmit Burst time plan
 - Receive Burst time plan
- A. MESSAGE DATA
 - B. BURST DATA
 - C. SUBBURST DATA

MESSAGE DATA

- Burst time plan identification
- Traffic station identification
- No of transmit burst
- No of receive burst

Burst data

- Burst identification
- Transmit –Receive flag
- Transponder Identification
- Burst position
- No of transmit –Receive subburst

subburst

- Transmit Receive subburst identification
- Subburst position
- Subburst length

FRAME acquisition and synchronization

- Transmit in the assigned time slot
- Receiving traffic meant for them
- Transmit frame timing(TFT)
- Transmit Burst Timing(TBT)
- Receive Frame Timing(RTF)
- Receive Burst Timing(RBT)

Contt...

- Receiver frame acquisition (RFA)
- transmit frame acquisition (TFA)
- Receiver frame synchronization (RFS)
- transmit frame synchronization (TFS)

Acquisition

- Acquisition process is required when traffic station enters or reenters operation
- Synchronization process is needed due to satellite movement in the orbit
- Perturbation caused by moon and sun
- Variation in satellite moment
- Variation in time delay between earth and satellite
- Error in burst position as they arrive in the transponder

Synchronization

- Synchronization is achieved by introducing transmit frame delay

$$D_N = MT_F - \frac{2d_N}{C}$$

T_F is the frame period

d_N is the distance between the satellite .N

C is the velocity of light

M is the smallest integer chosen such as $D_N \geq 0$

for all d_N

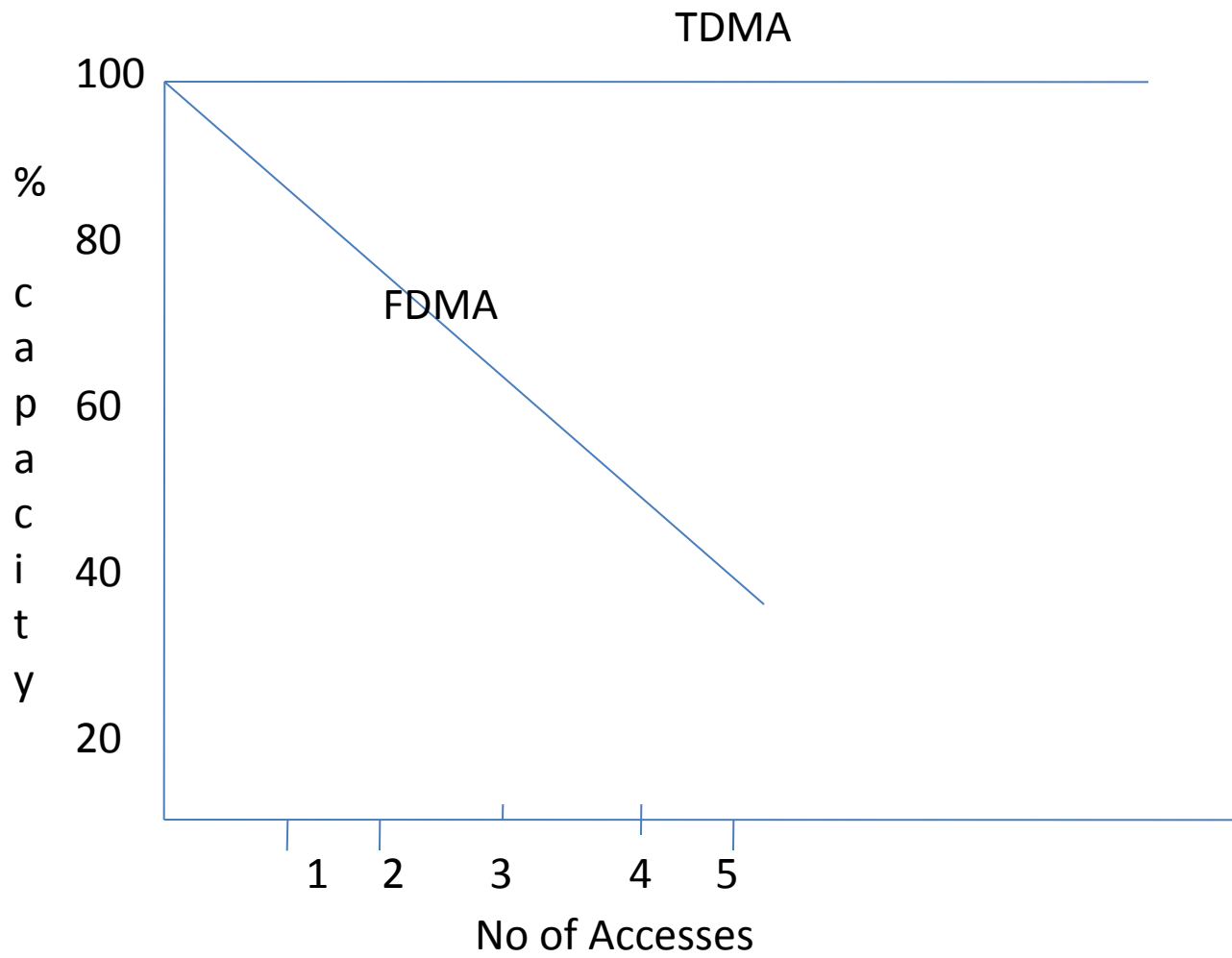
synchronization

- CLOSED LOOP
- OPEN LOOP
- Closed loop: station observes the position of its own burst by measuring time interval between the reference burst unique word and traffic burst unique word computes the error
- $D_n(i+1) = D_n(i) - E_n(i)$

- Open loop : control system listen to the bursts and sends instruction back to the transmitting station
- INTELSAT TDMA system, control station transmits Dn values to all network members once every 32 multiframes

FDMA vs TDMA

S.No	FDMA	TDMA
1	Not suitable for the increased system traffic Due to inter modulation products	Intermodulation distortion is avoided
2	As no of access increases the ,capacity decreases significantly	Capacity decreases a little
3	Modify the capacity is difficult	Easily modified by changing the duration and position of each burst



Multiple beam / (satellite switched) TDMA satellite system

- Zone beam
- Spot beam
- Narrowing the satellite beam

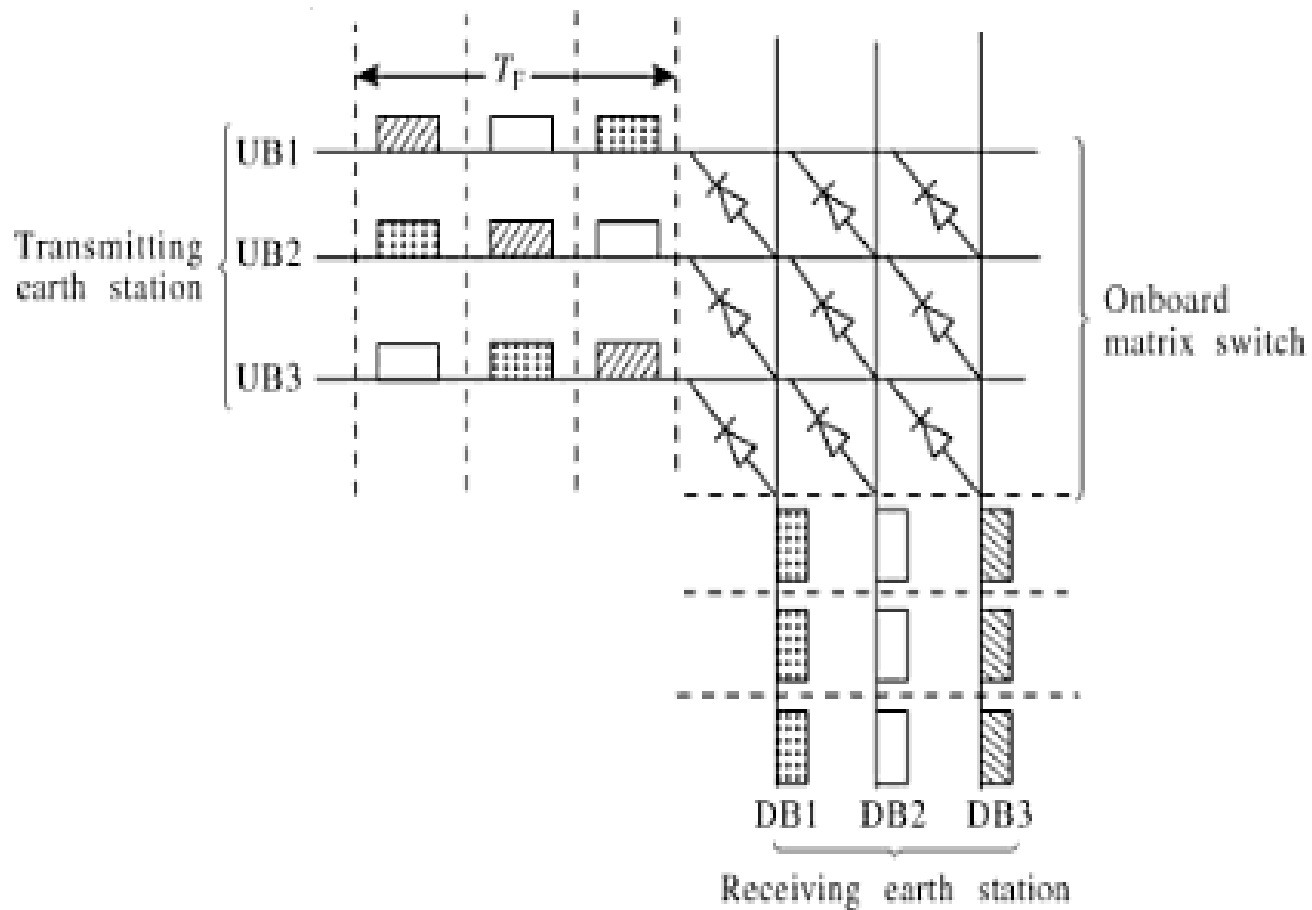
width \uparrow communication capacity

High gain for the coverage area

Power saving in uplink & downlink

Same frequency can be reused many times

- INTELSAT VI multi spot beam concept
- Six up beams (UBs)
- Six down beams(DBs)
- Interconnectivity
- On board switching technique(satellite switching)
- SSTDMA– microwave satellite switch on board



SS-TDMA concept used in INTELSAT-VI.