

Distinguish, differentiate, compare and explain what is the difference between Active and Passive Satellite. Comparison and Differences.

Difference between Active and Passive Satellite

1. Active satellites are a complicated structure having processing equipment called Transponder. A passive satellite only reflects received signals back to earth.
2. Examples: An active satellite act as a repeater. A passive satellite can be a natural satellite or an artificial satellite for example moon is the natural satellite of earth.

During the early 1950s, both passive and active satellites were considered for the purpose of communications over a large distance. Passive satellites though successfully used in the early years of satellite communications, with the advancement in technology active satellites have completely replaced the passive satellites.

What are Passive Satellites ?

The principle of communication by passive satellite is based on the properties of scattering of electromagnetic waves from different surface areas. Thus an electromagnetic wave incident on a passive satellite is scattered back towards the earth and a receiving station can receive the scattered wave. The passive satellites used in the early years of satellite communications were both artificial as well as natural.

Although passive satellites were simple, the communications between two distant places were successfully demonstrated only after overcoming many technical problems. The large attenuation of the signal while traveling the large distance between the transmitter and the receiver via the satellite was one of the most serious problems. The disadvantages of passive satellites for communications are:

1. Earth Stations required high power (10 kW) to transmit signals strong enough to produce an adequate return echo.
2. Large Earth Stations with tracking facilities were expensive.
3. Communications via the Moon is limited by simultaneous visibility of the Moon by both the transmit and the receive stations along with the larger distance required to be covered compared to that of closer to earth satellite.
4. A global system would have required a large number of passive satellites accessed randomly by different users.
5. Control of satellites not possible from the ground.

What are Active Satellites ?

In the active satellites, which amplify and retransmit the signal from the earth have several advantages over the passive satellites.

The advantages of active satellites are:

1. Require lower power earth station
2. Less costly
3. Not open to random use
4. Directly controlled by operators from the ground.

Disadvantages of active satellites are:

1. Disruption of service due to a failure of electronics components onboard the satellites.
2. A requirement of onboard power supply.
3. A requirement of larger and powerful rockets to launch heavier satellites in orbit.

World's first active satellite SCORE (Satellite Communication by Orbiting Relay Equipment) was launched by US Airforce in 1958 at an orbital height of 110 to 900 miles.