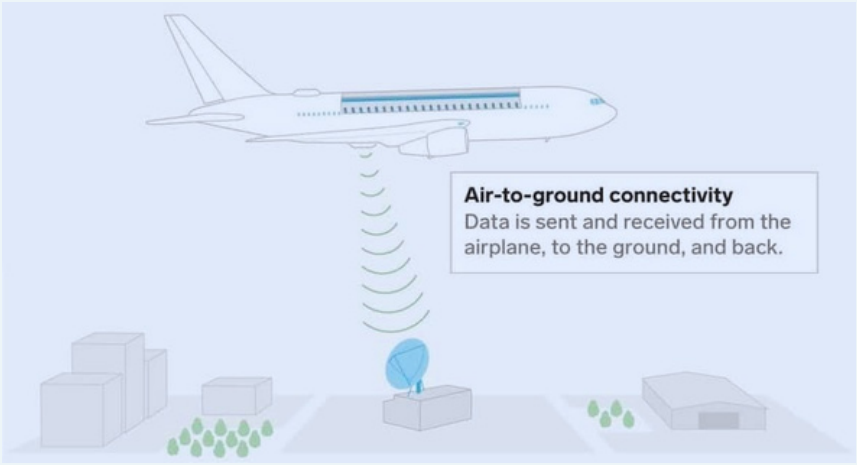
EION ByTES

In-Flight Wi-Fi

How does In-Flight WiFi System Works?

Similar to our mobile network, In-.flight Wi-Fi connectivity requires a base station to send and receive signals. It works in two modes; Ground-based connectivity and Satellite-based connectivity.

1. Air to Ground (ATG) - Ground-based Connectivity



Ground-based connectivity also known as Air to Ground connectivity works exactly like our conventional mobile network. It has a base station on the ground with antenna arrays facing upwards to maintain signal connectivity to moving airplanes.

A network of base stations is required to cover a large geographical area. A transceiver antenna module will be installed on the belly of an airplane.

Gogo, one of the in-flight internet providers will use their 5G network with 250 base station towers around the United States. According to Gogo, they will be able to provide network speed up to ten times higher than current systems using their 5G network.

Advantages of Air to Ground Connectivity

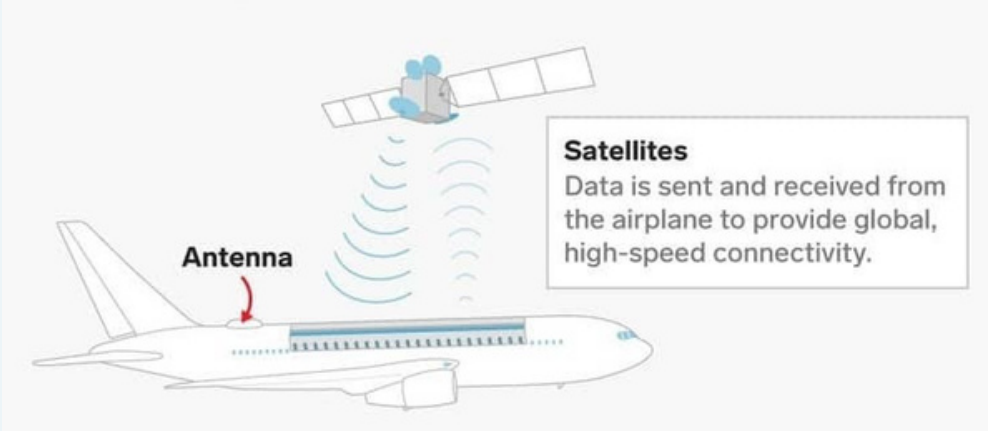
- Latency is lower since the airplane is only 3500 feet above the ground (average approximation)
- Less complex compared to a satellite-based system
- Operators can make use of the existing network for this task
- Cost-effective solution and infrastructure
- Easy to maintain the system

Disadvantages of Air to Ground Connectivity

- Requires a large number of base station towers to maintain connectivity to cover a large geographical area
- Signal quality is affected by atmospheric changes (heavy rain, fog etc...)
- Not feasible option in mountainous areas, oceans and deserts
- Switching from one base station to another could cause interruptions and delay in connectivity
- Network load will affect the quality of service

2. Satellite-based Connectivity

Satellite-based connectivity uses a network of satellites dedicated to providing data connectivity to moving airplanes. The transceiver antenna module will be installed on top of the airplane.



Advantages of Satellite-based Connectivity

- Each satellite can serve more number of aircraft at the same time
- Fast network using higher bandwidth signals compared to a ground-based system
- More immune to atmospheric changes

Disadvantages of Satellite-based Connectivity

- High latency signals due to the distance from the airplane to the satellite are longer than the distance from the airplane to the ground
- Higher cost for implementation and maintenance
- Often need spectrum license to operate
- Complexity is high (not all operators own satellites)
- Requires expensive transceiver units on airplanes and often airplanes need to be grounded for many days (for installation and maintenance).

Visit our website