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Explained: How in-flight Internet works

Tata Group's Air India has announced the rollout of free in-flight Internet services on board domestic and international flights serviced by select aircraft in its fleet. Here is how this will work

Written by [Sukalp Sharma](#)

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6 min read



Wi-Fi will be offered free of charge on domestic flights operated by the select aircraft for a limited introductory period.

Air India rang in the new year by announcing the rollout of Wi-Fi Internet connectivity services on board domestic and international flights serviced by select aircraft in its fleet. This makes the airline the first in India to offer Internet connectivity on domestic flights.

Wi-Fi will be offered free of charge on domestic flights operated by the select aircraft for a limited introductory period. Over time, Air India plans to progressively offer the service on other aircraft in its fleet.

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On-board internet services are fast becoming a standard offering, particularly among major full-service carriers (FSCs) globally. Air India, which returned to the Tata Group three years ago, has big ambitions to be counted among the world's foremost airlines.

Which Air India planes currently have the onboard Wi-Fi offering?

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For now, Wi-Fi will be available on the airline's Airbus A350, Boeing 787-9, and select Airbus A321neo aircraft. The airline was already offering Internet connectivity on board international flights operated by these aircraft as part of an ongoing pilot programme.

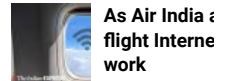
Apart from the new A350 aircraft, which Air India started operating in 2024, the other aircraft are understood to be those of erstwhile Vistara, which merged with Air India in November. All these aircraft are equipped with special hardware required to offer Internet connectivity on board. Vistara had been offering Internet on select international flights prior to the merger.

On board the Vistara aircraft, the service was facilitated by another Tata Group company — Nelco — in partnership with Panasonic Avionics Corporation. The same service is now being extended to select Air India's domestic flights, it is learnt.

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Passengers will have to enable Wi-Fi on their devices, and select the 'Air India Wi-Fi' network to access the Internet. They will then be redirected to the Air India portal on the device's default browser, and will need to enter their details, including PNR and last name. The device will then be connected to Wi-Fi.

What are the technologies available to provide in-flight Internet connectivity?

In-flight connectivity systems primarily use two kinds of technologies — ground-based cellular towers, also known as air-to-ground (ATG) technology, and satellite-based connectivity. Both require special antennae and other equipment to be installed on the aircraft.

In the former, an antenna — usually placed around the plane's belly, picks up signals from the nearest tower on the ground, or ground receiver, to provide connectivity on board the aircraft. In some senses, this is similar to how our devices access wireless Internet on the ground.

Unless the aircraft passes over a big body of water, deserted land, or sparsely populated areas without enough cellular towers, the connection should stay seamless and stable up to a certain altitude. That said, the availability of nearby towers on the ground is a fundamental limitation of this technology.

The other option, which is fast gaining popularity, is satellite-based connectivity. Put simply, Internet from ground stations is transmitted to aircraft through satellites, using antennae mounted on top of the aircraft's body. This form of connectivity offers wider coverage, and is particularly useful in providing connectivity when the aircraft is flying over regions without ground towers.

How does in-flight Wi-Fi work?

Multiple Wi-Fi antennae are located inside the aircraft cabin, which get signals from passengers' devices. From these in-cabin antennae, the signals are sent to an on-board server. Till this point, the process is the same for both ATG and satellite-based connectivity.

In the case of a satellite-based connectivity system, the signals are then transmitted through an antenna on top of the aircraft to a satellite, which relays them to a ground station or teleport. In response, signals are sent from the ground station to the satellite, which relays them to the aircraft. In ATG technology, the signals from the server on board the aircraft are transmitted directly to on-land cellular towers using the antenna underneath the aircraft. The towers then respond with signals to the aircraft.

In-flight Wi-Fi is typically much slower than on the ground. But this is changing with newer technologies entering this market.

How expensive is this technology for airlines and passengers?

Airlines have to bear the initial cost of installing antennae on aircraft. Some airlines have been of the view that it would be easier for them to have the equipment installed on their new aircraft rather than taking planes out of service for retrofitting.

For Air India, which is anyway undertaking a mammoth \$400-million retrofit programme to spruce up its legacy narrow-body fleet, it might make sense to equip its older planes with Internet connectivity equipment as part of that exercise. It is worth noting that the aircraft on which the airline is currently offering Wi-Fi are significantly newer than much of the carrier's legacy fleet, and came installed with the necessary equipment.

Globally, some airlines offering onboard WiFi offer a small volume of free Internet before asking the customer to buy a data pack, which is usually not cheap. Some carriers provide limited or unlimited Internet to members of their loyalty programmes, and business class and first class passengers.

For the time being, Air India is offering the Internet free for a limited introductory period. The airline has not specified when it plans to make the service chargeable.

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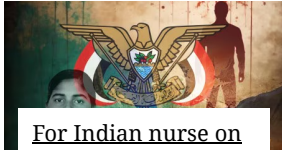
With the demand for in-flight Internet expected to grow, airlines are looking at it as a source of ancillary revenue. And since it is expensive for airlines to equip their planes to offer Internet connectivity, no-strings-attached complimentary Wi-Fi, particularly to economy class passengers, is unlikely to be a norm, at least in the near to medium term.

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