



AIRCRAFT TO GROUND WIRELESS COMMUNICATION

Broadband Direct Air to Ground Communications (DA2GC)

Currently, a plane can be connected to the Web via satellite (Ku band), or via terrestrial mobile services 3g, 4g, (available only in the U.S.). Both of these technologies used today to connect planes to the Internet have significant limitations in terms of speed and latency of the link. If you've tried to use the Wi-Fi on board available on some aircraft, you probably have experienced the difference compared to your Wi-Fi at home. No video streaming, no fast browsing, no Skype calls...

We believe that a customer should have the exact same experience in the air that he has at home, and we have a technology that makes that possible cost effectively. Fluidmesh is the company that brought real broadband to high-speed trains that were plagued with unreliable and slow on-board Internet connections.

Now, we are bringing that same capability for on-board Wi-Fi to the airlines.

How does (DA2GC) work?

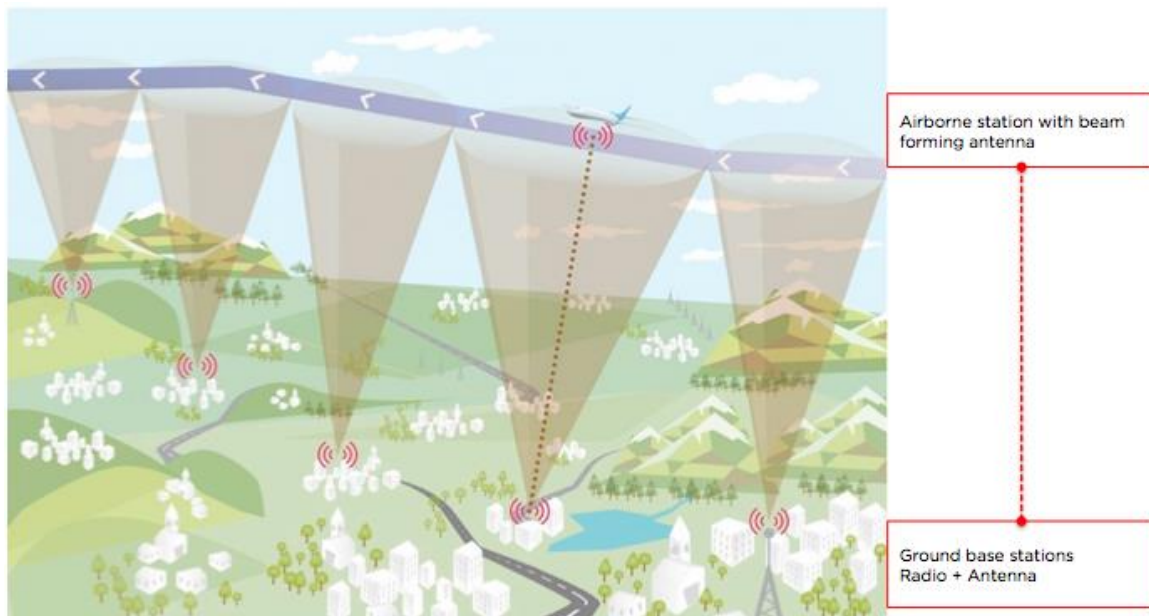
It's called Broadband Direct Air to Ground Communications (DA2GC) and it's pretty simple: our radio base stations on the ground (Terrestrial Ground Stations) are connected to a beam-forming antenna placed on the lower fuselage of the aircrafts, transmitting data up to 100 Mbs while the aircraft is flying at an altitude up to 45,000 ft. Then the signal is distributed in the aircraft using Wi-Fi access points. Leveraging our cost effective Ground Stations (GS), we are able to turn airways into Smart and Connected Airways. The name is pretty self explanatory: when a plane is on a Smart and Connected Airway that has terrestrial base stations on the ground, the airplane is able to provide its passengers with broadband Internet at up to 100 Mbit/sec. The goal is that passengers should have the same quality Wi-Fi experience on an aircraft that they have at home. Our terrestrial technology enables a real airborne broadband experience. Moreover, airlines can leverage the network for operational applications. For instance a 747 generates up to half a terabyte of data for each flight? With a constant broadband connection, data can be downloaded on the ground for safety and preventive maintenance applications. That's the Internet of Things on aircrafts!

Ground stations (GS) have a very small form factor compared to a cellular 3G/4G base station (BTS) and can be easily installed along the major airways and connected to an IP broadband Internet connection. One Ground Station (GS) every 50-100 Km provides a broadband coverage in the sky up to 45,000 ft.

Broadband Direct Air to Ground Communications technology is designed based on the most recent European directives and can operate in the 5855-5875 MHz range as specified by the most recent ETSI technical reports (ETSI TR 101 599 v1.1.3 2012-09 “System Reference Document on Broadband Direct-Air-to-Ground Communications System employing beam-forming antennas, operating in the 2.4 GHz and 5.8 GHz bands”) and Electronic Communications Committee ECC Report 214.

Ground Stations (GS) operate at 5.8 GHz and are able to cover a very large portion of airways by leveraging beam-forming and beam-switching proprietary technologies that simultaneously employ multiple antennas and Fluidmesh patented fast-roaming Fluidity protocols based on MPLS. Thanks to our patented fast roaming technology, passengers will not lose connection while the aircraft station (AS) roams from one Ground Station to another. Video and voice streaming are also not interrupted during the flight.

Fluidmesh **DA2GC**



The sky is (not) a limit

The application of Broadband Direct Air to Ground Communications (DA2GC) is not limited to passenger Wi-Fi and entertainment. With Broadband Direct Air to Ground Communications (DA2GC), telemedicine would also be possible in the event of a medical emergency on-board with a professional medical team monitoring, in real time, the patient's condition. As Internet of Things and Industrial Internet applications move to airborne equipment on airliners and business jets, Smart and Connected Planes are required to leverage the intelligence that these solutions can bring to airlines and business jet operators. Preventive maintenance at the right time can save lives and also save the airlines million of dollars. A major airline, for example, has saved millions of dollars in fuel costs by simply changing the use of flaps by tracking the typical usage patterns of their pilots. Similarly, weather and traffic data at altitude can be shared among different aircraft providing more accurate forecasts of cloud formation and turbulence. However, satellite links have a very high per bit cost compared to Broadband Direct Air to Ground Communications (DA2GC) and, in the long term, terrestrial DA2G technologies will enable a much larger set of applications due to the lower latency and cost per bit.

The Airborne Internet of Things is already bringing millions of dollars of efficiencies and savings to airlines. Broadband Direct Air to Ground Communications is a critical enabler to most of these intelligent applications that unlock incredible efficiencies and operational improvements.

Main Applications

For passenger entertainment:

- Fast Wi-Fi on board
- On board entertainment
- Voice communication through fem-to-cells



For airplane security and operational efficiency

- Video surveillance with live streaming
- Internet of Things Applications
- Real-time engines and avionics data streaming and analysis

- Life sharing of information other aircrafts (e.g. weather) and with ground stations
- Streaming of big data from aircraft avionics, engines and passengers to improve safety and efficiency
- Telemedicine and epidemics prevention



Don't miss the chance to meet Fluidmesh at the

3rd International Conference

IFE & Connectivity



Advanced IFE Systems – Wireless Internet Connectivity – Certification Challenges

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