REPORT: 5G AND FLIGHT DISRUPTION

What you need to know

January 2022

Plans by telecommunications companies AT&T and Verizon to roll out new 5G mobile services across the U.S. has caused concern in the aviation and travel industry, even though 5G has already been rolled out in Europe and Asia. This new report considers the issues surrounding 5G deployment in the U.S.

What's the issue?

Concerns about flight safety

Industry groups raise concerns

Airline industry group Airlines for America (A4A) petitioned the U.S. Federal Communications Commission to delay the January 5, 2022 initiation of 5G service at around 135 airports.[1] A4A is concerned that 5G signals may interfere with sensitive aircraft instruments, and radio altimeters in particular, resulting in 345,000 passenger flights being delayed or cancelled annually. A4A cites a report from radio standards non-profit group RTCA, which claims that radio altimeters may not function correctly if experiencing interference from wireless broadband operations in the 5G C-Band. The chances of this happening increase at lower altitudes. A4A wants flight manuals amended to prohibit certain operations requiring radio altimeter data when 5G interference is likely.

The importance of radio altimeters

Pilots consult radio altimeters during approach and landing as they provide more accurate measurement of heights above terrain than barometric altimeters. Furthermore, automated landing systems may also rely on radio altimeter data, which is also used to detect hazardous wind shear air currents.

The issue is serious enough for the U.S. Federal Aviation Administration (FAA) to have issued airworthiness directives on December 7, 2021, on the basis that radio altimeters cannot be relied on to perform their intended function if experiencing interference from wireless broadband operations.[2]

The issue lies with 5G C-Band, which operates in the 3.7-3.98 GHz frequency range. Altimeters operate in the 4.2-4.4 GHz range, and it's feared that the 5G frequencies are too close to this range.[3] Higher frequencies mean faster service, so 5G operators are keen to operate at this level.

Airlines are concerned

U.S. airlines are also concerned by the rollout of 5G.

United Airlines' CEO Scott Kirby believes the use of the C-Band spectrum for 5G wireless services could result in the delay, diversion or cancellation of around 4% of daily flights, potentially impacting hundreds of thousands of passengers.[4] Kirby claims 5G could prevent airliners using radio altimeters at around 40 of the largest airports in the U.S. In the event of bad weather or heavy cloud cover, pilots may only be able to do visual approaches. Operating in poor visibility is not the only issue; a number of modern safety systems

[1] BTN, Jan. 3, 2022
[2] Cirium, Dec. 22, 2021
[3] Reuters, Jan. 18, 2022
[4] Reuters, Dec. 15, 2021

onboard aircraft may also be affected. Some aircraft types seem to be more impacted than others, particularly widebody types such as the Boeing 777.[5]

Southwest Airlines' CEO Gary Kelly has also weighed in, describing 5G implementation threatening a "significant setback" to its operations.

Aircraft makers express concerns

Airframe makers Boeing and Airbus have also expressed concern about 5G implementation, citing potential interference with onboard radio altimeters.

Why it's not been an issue elsewhere

Europe set different standards

Lower frequency bandwidth

As opposed to the 3.7-3.98 GHz range being used by 5G in the U.S. and the 4.2-4.4 GHz used by altimeters, the European Union has limited its 5G frequencies to a 3.4-3.8 GHz range, which is less likely to interfere with aerospace systems.[6] This bandwidth has been in use with most member states without issue.

The European Union Aviation Safety Agency (EASA) claims 5G risks are confined to the U.S., with no unsafe interference identified in Europe.

South Korea uses a similar 3.42-3.7 GHz range and has also reported no interference of radio waves, even though wireless stations are operating near airports.

Other actions can reduce the impact of 5G

As well as the difference in 5G bandwidth, there are other actions that have reduced the impact of 5G on aviation in countries outside the U.S. These include tilting radio antennae downwards to reduce potential interference to flights (restrictions that do not apply to the U.S. deployment) and taking a different approach to locating antennae when in the vicinity of airports.

Wireless industry responds

In defense of 5G

The wireless telecommunications industry has defended 5G technology, which it claims operates safely and without causing harmful interference to aviation operations in nearly 40 countries worldwide, including Austria, Denmark, Finland, Ireland and New Zealand. Many use the C-Band and transmit in the same range that the U.S. wireless carriers intend to use, it claims. Cellular trade industry group CTIA has accused aviation of fearmongering, relying on completely discredited information and deliberate distortions of fact.

Aviation and wireless industry working together

A4A is working with CTIA and the Aerospace Industries Association to enable 5G deployment, while preserving aviation safety. 5G operators will look to adopting precautions to mitigate interference with aircraft systems.

The U.S-based Aerospace Industries Association (AIA) believes the mitigation measures proposed so far by 5G service providers are not enough to ensure the safety and economic vitality of the aviation industry. It has called for base stations to be relocated.

---

[5] Reuters, Jan. 17, 2022
[6] Reuters, Jan. 18, 2022

Implementation delayed

5G implementation delayed

Following a request from U.S. Transportation Secretary Pete Buttigieg, wireless carrier companies AT&T and Verizon agreed to postpone the rollout of C-band 5G for two weeks until January 19, 2022. As the situation was not fully resolved during this period, the two companies then temporarily deferred the activation of a limited number of transmission towers around certain airport runways for an unspecified time period.[7]

Mitigations offered

The two companies also agreed to reduce the power of their 5G networks in buffer zones around 50 airports for six months, allowing time to study potential aircraft system interference. Such mitigating measures are similar to those used in some European operating environments, such as France. The U.S. Federal Aviation Administration (FAA) believes such mitigations could substantially reduce disruption to air operations. However, even the FAA concedes that such buffer zones will only provide protection during the last 20 seconds of flight, compared to 96 seconds in the buffer zones around French airports.[8]

Concerns remain

As the delayed January 19 implementation approached, U.S. airlines once again warned of the consequences of 5G C-Band deployment.[9] A4A warned that the vast majority of the traveling public will be essentially grounded unless major hubs are cleared to fly. Airlines want a ban on 5G within 2 miles of airport runways at some key airports.

The FAA expects some altimeters will be too susceptible to 5G interference, and it will prohibit aircraft equipped with them from performing low-visibility landings where 5G is deployed. By January 16, based on the radio altimeter models installed, the FAA had cleared around 45% of the U.S. commercial aircraft fleet to perform low-visibility landings at many of the airports where 5G C-Band was due to be deployed from January 19. But this still left 55% of the fleet and many large airports without clearance.

By January 20, 78% of the U.S. fleet had been cleared, as the FAA issued new approvals for further aircraft types. It has now cleared 13 altimeters for operation covering all Boeing 717, 737, 747, 757, 767, 777, 787, MD-10/-11 aircraft; all Airbus A300, A310, A319, A320, A330, A340, A350 and A380 models; and some Embraer 170 and 190 regional jets.[10]

Airlines had expected some disruption, with United Airlines claiming it faced significant restrictions on the operation of Boeing 737s, 777s, 787s and regional aircraft in major cities like Chicago, Houston, Los Angeles, Newark and San Francisco.

Airlines react

As a precautionary measure, some airlines flying to the U.S. implemented contingency measures, swapping out aircraft or cancelling services operated by Boeing 777 and 747-8s, whose systems are believed to be vulnerable to 5G interference.

British Airways cancelled some departures to New York JFK, Chicago and Los Angeles and changed the aircraft operated on some flights. Lufthansa swapped out Boeing 747-8s due to fly from Frankfurt to Chicago, Los Angeles and San Francisco, replacing them with Boeing 747-400s. It also cancelled its Miami service. Neither Air France-KLM nor Virgin Atlantic report cancelling any services.

---

[7] BBC, Jan. 18, 2022
[8] FAA, 5G and Aviation Safety
[9] Reuters, Jan. 18, 2022
[10] FAA, Jan. 20, 2022

Emirates, claiming to have only become aware of the 5G situation on January 18, is a large user of the Boeing 777, and it cancelled services to nine U.S. destinations on January 19. However, the disruption proved to be temporary.

After the US Federal Aviation Administration and Boeing issued formal notifications lifting previous restrictions on aircraft operations, Emirates was able to announce the restoration of full scheduled operations to all U.S. destinations by January 22.[11] It reinstated Boeing 777 operations to Chicago, Dallas Fort Worth, Miami, Newark, Orlando and Seattle on January 21. Flights to Boston, Houston and San Francisco, which had been switched to Airbus A380 operations, could now switch back to Boeing 777 operation.

Gulf rival Qatar Airways was unaffected by virtue of operating a more diverse fleet than Emirates.

Note

The information presented in this report represents the latest view as at January 21, 2022. We have carefully researched and checked the information contained. However, we do not guarantee or warrant the correctness, completeness or topicality of this article and do not accept any liability for any damage or loss as a result of the use of the information contained within this article.

Do you have questions or comments regarding this report?
Please email mike.eggleton@bcdtravel.co.uk to share your thoughts.

[11] Emirates, Jan. 20, 2022