

A Guide to Summer Flight Delays

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by Charlie Page



What Causes Summer Flight Delays?

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Charlie Page is a Boeing 787 Dreamliner pilot. Each Saturday, his column addresses common questions about flying.

Summer flight delays are as British as Wimbledon and strawberries and cream.

It always happens that, after working hard all year for your summer vacation and managing to get the entire family (bags included) into a taxi at 4am, you arrive at the airport to find your flight has been seriously delayed. You had high hopes, but deep down you knew that the chances of this happening were pretty high.

So, why does this happen? Why is it that — come the most popular time of year to travel abroad — airports suffer from seemingly constant delays?

As you might imagine, the summer holidays bring increased demand for flights and with that comes inevitable problems. Air Traffic Control personnel are working harder; airline schedules run as tightly as they can manage; and bad weather in the form of summer thunderstorms all combine to create the perfect recipe for flight delays.

Air Traffic Controllers

Air Traffic Control (ATC) is responsible for ensuring the safe passage of aircraft as they fly along their route. Without them, flying around the world like we do these days would not be possible. They keep aircraft safely separated from each other and ensure they pass through their airspace as expeditiously as possible.



ATC have an incredibly important role in flight safety and punctuality (Image from nats.aero)

Yet, like the rest of us, they are only human. No matter how advanced the systems, there's a limit to the number of aircraft one controller can safely handle at once. They, too, are affected by staffing levels and how their airspace interacts with the airspace around them. They are also masters of the dreaded "slot" — a term synonymous with delays.

But what exactly is a slot and why does bad weather cause delays? To learn more about the world of ATC, I spoke to a friend of mine, Jamie, who is an Air Traffic Control Officer (ATCO) in the control tower at one of the UK's busiest airports. Jamie requested to use an alias because ATC officers are not authorized to speak publicly about their jobs.

"A slot is an airborne time from the point of departure, within which ATC are required to get the aircraft airborne," Jamie told *TPG UK*. "For pilots and ATC, this is represented in the form of a Calculated Take Off Time (CTOT), or 'slot'."

Airspace is divided into sectors, and controlled largely by the country over which the sector sits. The size of each sector depends on how busy that airspace is in terms of number of flights. The busier the sector, the smaller its size. These sectors will then be controlled by one or more ATCOs.

“Each sector has a limit to the number of aircraft [that] can pass through it in a given time,” Jamie explained. “This is dependent on airspace geography, number of intersecting airways and structure of adjacent airspace.”

Just as it is for us pilots, safety is the most important factor for ATC. When the workload reaches a critical level, steps are taken to ensure safety is not compromised.

“If too many flights are scheduled through a sector taking it above its declared capacity, then a regulation will be applied in order to keep it manageable and not put the air traffic controller into an overload situation.”

This is when a CTOT is generated. By keeping aircraft on the ground until a certain time, ATC can ensure that flight doesn't reach the limiting sector until they are ready. And this, quite often, can be an area several hours into the flight.

Missed Slots

If a slot time is missed, a new slot time has to be requested from the Central Flow Management Unit in Brussels,” Jamie explained. “This often leads initially to a big delay but comes down normally.”

Imagine a flight between Manchester Airport (MAN) and Santorini (JTR). This flight will pass through German airspace, but due to capacity issues there, the flight has a CTOT. Meanwhile, in Dublin, another flight is preparing to fly to Corfu International (CFU). They are also routing through German airspace and also have a CTOT.

If the Dublin flight is delayed because a passenger fails to make it to the gate on time, it could miss its slot. The Manchester flight, if ready, could be allocated that slot and leave earlier than expected.

This is why, as pilots, we prefer to board passengers onto the aircraft even if we have a long slot delay. Once all the doors are closed, we can tell ATC that we're ready and can then take advantage of someone else missing their slot.



A delay to a flight in one airport could enable a flight in another airport to go earlier. Photo courtesy of Stansted Airport.

Inclement Weather

The weather, too, has a significant effect on flight delays. This can come in all forms, but in the summer, it's mainly thunderstorms that cause flight delays. There can also be fog, which increases the spacing required between landing aircraft and slows down the departure rate. And strong winds mean aircraft are flying slower over the ground so fewer can land per hour.

When it comes to convective summer weather, cooperation between pilots and ATC is key. To keep our passengers safe and comfortable, we want to avoid the worst of the clouds by deviating from our route. This minimises the turbulence experienced by all on board. Whilst this approach works for us, it's not so convenient for ATC.

"Weather is [a] hugely restrictive problem for ATC," Jamie said. "Pilots requesting a deviation from the route that the air traffic controller has planned on can cause an enormous reduction in capacity in a sector in order to make it safe."



Deviating well off course to keep clear of bad weather. Great for pilots and passengers, not so great for ATC.

By "safe," Jaime is referring to keeping aircraft separated from each other. Depending on the type of airspace and aircraft, this could mean 1,000 feet of vertical distance and several miles laterally.

“Providing radar vectors around dangerous weather cells often requires an enormous amount of telephone coordination with adjacent sectors,” Jamie added. “If significant weather is forecast in a sector then a regulation will be applied pre-tactically in order to manage a deteriorating situation.”

It’s in situations such as this where slots can be generated, and the resultant delays can occur.

However, it’s not just conditions along the route that can cause problems. Weather around the departure airfield can also cause delays as aircraft try to avoid the worst of the clouds in the first few minutes of the flight. If the requests create too high a work load for ATC, they may even stop all departures heading in that direction until the clouds have cleared.

Aircraft Rotation

For most of us, our cars sit on the driveway or street for most of the day and night, only used for a couple of hours a day. However, when your vehicle costs several million dollars, having it sit around for just doesn’t make financial sense. Aircraft are only earning money when they are flying.

Planning for the summer season, between May 1 and Oct. 31, begins over a year beforehand. Airlines try to predict the demand for flights and the number of aircraft and manpower required to support the operation. Obtaining new aircraft takes some serious lead time, so the flying program is planned around the number of aircraft available in the airline during the summer period.



Aircraft work incredibly hard over the summer period (Photo by Alberto Riva/TPG)

In order to maximise the flying program, airlines want to utilise their assets to their full potential. Long-haul aircraft often fly for 22 hours in a 24-hour period. For short haul aircraft, that's typically around 18 hours in a day. Breaks are built into the schedule to carry out routine maintenance at regular intervals to ensure the aircraft are always safe to fly (more on this in a future article).

During the summer, the increase in demand for flights means many of the extra flights around Europe take place during the night. As a result, aircraft will often be working around the clock. This is fine when things go according to plan, however, if a delay occurs on one flight, this often has a cascading effect. It's not uncommon for flights several days later to still be running late as a result.

Technical Issues

Like all machines, aircraft suffer from technical issues and it's more common than you may think. That said, this is expected, and contingencies are put in place to make sure they are absolutely safe to fly.

Imagine if anytime you had a minor issue with your car, you had to get it fixed before you could drive it. Low tyre pressure, a dent in the body, a chip in the windscreen, the radio not working — you would never get anywhere. If this was the same with aircraft, almost every single flight would be delayed. As a result, aircraft manufacturers have a plan.

Commercial aircraft are designed to not only be safe, but also to have a good dispatch reliability (that's the percentage of flights that leave within a certain timeframe).

Technical faults would impact this, so aircraft are designed with backup systems. In some cases there are backups for the backup systems. This means that if one system fails, another system is ready to take over.



Aircraft can fly safely, even with some systems not working (Photo by Scott Barbour/Getty Images)

Aircraft are designed to be able to fly safely with fewer elements to a system than are actually fitted to the aircraft. Every aircraft type has an inventory of items it's legally and safely able to fly without, called the Minimum Equipment List (MEL). If an aircraft system is unserviceable, pilots and engineers look it up in the MEL to deduce whether or not the aircraft can dispatch without it.

Hit the Brakes

A good example of this on the 787 Dreamliner is actually the braking system. The aircraft has eight main wheels, each of which has a brake unit. However, the aircraft is legally and safely allowed to depart with up to two of these units not working. In a situation like this, engineers and pilots have special procedures to follow.

The engineers will ensure the brake unit is safely disconnected and write it up in the aircraft's technical log for future crews to be aware of. The pilots adjust their take off performance to account for the inactive brake unit and then leave the gear down for two minutes after take off to allow the wheel to spin down naturally.

This engineering process takes a fraction of the time that it would to change the entire brake unit. When the aircraft then has a scheduled break for maintenance, the brake unit will be replaced.

However, if a technical problem doesn't allow the aircraft to dispatch under conditions listed in the MEL, a serious delay can occur. Whilst this is hugely frustrating for passengers, if an aircraft isn't safe to fly, it simply will not take off. As much as airlines

would love to have spare aircraft just sitting around in the case of a long technical delay, it just does not make economical sense to do so.

Crew Hours

The human element is also a large factor in the flying operation. Pilots can take up to six months to become fully operational at a new airline, and cabin crew members can require a couple of months. So, some serious forethought and planning is required.

Due to the irregular working patterns, nights spent out of bed, consecutive early starts and the impact of jet lag, the hours that flight crew can work are closely monitored.



The hours which crew can work are strictly regulated (Photo by MICHAEL BUHOLZER/AFP/Getty Images)

In Europe, pilots and cabin crew are limited to working 2,000 hours in a 12-month period. However, restrictions also apply in smaller time windows. In a 28-day period, the limit is 190 hours; in a 14-day period, it's 110 hours. During a seven-day stretch, pilots and cabin crew cannot exceed 60 hours. With proper planning by airlines, these limits normally do not have an impact on flight punctuality. Where issues do arise, though, is on an individual duty.

As soon as crew report for a duty, the clock is ticking. Depending on what time of day they report and how many flights they are scheduled to conduct, there is a maximum Flight Duty Period (FDP). This is to ensure they are not too tired to safely perform their duties.

For example, a crew reporting at 04:45 planning to do four sectors, or flights, have a maximum duty of 10 hours. This means they are not allowed to be performing critical duties onboard the aircraft after 14:45. Conversely, a crew planning to fly a single long-haul sector reporting at 06:15 can fly for up to 13 hours.

If a long technical delay occurs once the crew have reported for duty, the first thing they will do is check at what time they go "out of hours." This isn't a way to get out of doing the flight, but rather to make sure they remain compliant with the law. If an incident occurred and the crew were found to be over their FDP, the legal consequences would be severe.

Once this "out of hours" time has been established, normally the time by which the aircraft must leave the gate with the expected flight time in mind, it becomes a race between this and getting the aircraft fixed.

Once that zero-time has been reached, it's game over. That crew can no longer legally operate that flight, as it could leave them dangerously tired when it comes to the most critical part of the flight: landing. A new crew must be sourced to operate the flight. This normally leads to even greater delays and sometimes even cancellations if the airline has no spare crew.

Bottom Line

As pilots, we are ultimately there to ensure our passengers are kept safe at all times. Whilst delays are frustrating for everyone involved, they are often caused by factors outside of our control.

ATC have an incredibly important job to do and we are just one tiny piece in their massive global jigsaw. And when it comes to technical issues, we will only accept the aircraft for flight when we are satisfied that it is safe to do so. Remember, all of us have our own families we want to come home to.

Feature photo by bunhill / Getty Images.

[Charlie Page](#) Charlie Page is an airline pilot flying the Boeing 787 Dreamliner. Each Saturday he gives you a 'behind the cockpit door' insight to life in the flight deck. News and deals straight to your inbox every day.

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