

8 of the most challenging airport approaches for pilots

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Charlie Page



Whilst sat looking out of the window on landing, have you ever wondered what your pilot's take on it is? Whilst passengers get great views out the side of the aircraft, in the flight deck, there's far more going on than you could ever imagine.

Some airlines, like Emirates and Virgin Atlantic, provide a live feed of the view out the front of the aircraft, but it is what's going on behind the flight deck door which is often most interesting. Most passengers will be blissfully unaware just how much focus, thought and effort goes into what seems like the most straightforward of landings.

Whilst not a definitive list, here's my take on eight of the world's most challenging airports to land at.

1. Innsbruck, Austria (INN)

Situated in a valley surrounded by 9,000-foot mountains, Innsbruck is one of the most challenging airport approaches in Europe. Unlike most airports where traffic can be fed in by ATC from all directions, at Innsbruck, there's only one way in and one way out.

Depending on the wind direction, approaches start at one end of the valley. When the wind is coming from the west, pilots start the approach over the town of Rattenberg at the eastern end of the valley.

From here, they pick up the localiser beam, which leads them towards the runway. Due to the high terrain between Rattenberg and the airport, there is no vertical guidance beam (glideslope) to guide the pilots down to the runway.

Instead, they must use an artificial descent path programmed into the Flight Management Computer (FMC) to track their vertical profile. As the aircraft descends towards the runway, the pilots will then check their actual position and altitude against the expected values given on the approach chart.

When the wind is from the east, things get even more tricky. In this scenario, there are potentially two options available to the pilots. The first option is to fly the same approach to the westerly runway and at the later stages, break off the approach and fly past the airport. They must then pull a hard right turn in the tight space of the valley before lining up with the runway to land.

The other option now available to most aircraft is the RNP (AR) approach.

RNP (Required Navigation Performance) approaches allow aircraft to use their GPS position to fly an approach to land. AR (Authorisation Required) approaches require pilots to undergo regular special training in the simulator to ensure that their skills are up to speed with the intricacies of this type of approach.

Starting at the western end of the valley, the RNP (AR) approach guides the pilots down the valley and lines it up with the easterly facing runway. This can all be done in cloud, even if it comes down to 1,000 feet above the ground.

Read more: [Windshear: Why pilots learn to respect the weather](#)



Watch Video At: <https://youtu.be/kS6HMI3zHdo>

2. Mexico City, Mexico (MEX)

When planning for an approach, pilots identify the threats using “The 6 Ts” — terrain, thunderstorms, track miles, traffic, tailwinds and Air Traffic Control (yeah, the last one is a bit of a fudge!).

Whereas most airports will only have a few of these, Mexico City has them all.

Firstly, the airport is surrounded by some seriously high terrain on all sides, except to the north. This also includes the 17,800-foot active volcano, Popocatepetl. This means that the area in which aircraft can be directed in to land is extremely tight. Whereas most airports will have aircraft lined up with the runway around 12 miles out, at Mexico City, this only happens at five miles.

Thunderstorms can also pose problems at certain times of the year. As we try to avoid flying through them, any deviation from our prescribed route may take us toward the higher terrain. As a result, we must at all times be extremely vigilant of our position and how this relates to the terrain around us.

Traffic and ATC also can provide their challenges. Mexico City International Airport has two runways. As the airport is so busy, ATC often uses both runways for takeoff and landing. They also speak to local carriers in Spanish. The combination of the two requires pilots to be acutely aware of what’s going on around them.

Finally, as the airport is situated 7,400 feet above sea level, the air is a lot thinner. As a result, the aircraft must travel a lot faster over the ground to generate the lift needed to fly safely. This means we land at a much faster speed, often with a tailwind increasing this speed even further.

All in all, flying to Mexico City provides a challenging, yet ultimately rewarding day out.

Read more: [Missed approach: What happens during a go-around?](#)



Watch Video At: <https://youtu.be/RNctznfU1nQ>

3. Rio de Janeiro, Brazil (SDU)

Santos Dumont airport in Rio de Janeiro provides great views on landing for both pilots and passengers — [as enjoyed by TPG U.K.'s Dan Ross](#).

The area around Rio provides a number of challenges for pilots.

If you've been to Rio or have just seen photos of the city, you'll have noticed that the coastline is quite mountainous. Sugarloaf Mountain blocks a straight in approach to the northerly runways and there are hills up to 7,500 feet high within 30 miles of the airport. As a result, pilots must be acutely aware of their position in relation to the hills at all times, especially when the weather is bad.

When the northerly runways are in use, pilots must fly a curved approach keeping them tight inside Sugarloaf Mountain, as seen in the video below. When flying this approach, the weather must be good enough to keep visual contact with the ground. In addition to the spectacular mountains around the city, there are also five airports within 10 miles of each other. This makes the ATC situation incredibly complex and requires close attention to detail from the pilots. Under certain runway usage configurations, Santos Dumont and Galeao (Rio's main international airport) are so close that they are controlled as if they are a single airport.



Watch Video At: <https://youtu.be/Shd1tNSIHRo>

4. Gibraltar, U.K. (GIB)

Situated on the southern tip of Spain, Gibraltar is a British Overseas Territory, which means that it is under the jurisdiction and sovereignty of the United Kingdom. It is just 2.6 square miles in size.

The dominating feature of Gibraltar is “the rock”, standing 1,400 feet high. Right next to the rock, on its north side, is Gibraltar International Airport.

Due to the limited space available, the runway is short — just 1,500 metres long.

It also starts abruptly by the shore at the eastern end and sticks out into the sea at the western end. To make things even more interesting, the main road that connects Gibraltar to Spain runs across the middle of the runway.

Before a flight lands or takes off, barriers come down to shut the road off and a vehicle sweeps the crossing to make sure there is no debris that could damage the aircraft.

The rock also provides challenges for pilots. When the wind blows over the rock at a certain speed, extreme turbulence can be experienced on the approach to land. This can get so bad that it can become impossible to land. In these situations, the pilots will perform a go-around and divert to the nearest suitable airport, usually Malaga.



Watch Video At: <https://youtu.be/7B8LEjK6UN4>

5. Mahe, Seychelles (SEZ)

One of the most beautiful approaches in good weather becomes one of the most challenging in bad weather.

The terrain of the island of Mahe in the Seychelles is what gives it its beauty. However, it also means that when the wind is blowing from the south, pilots are unable to make a straight in approach.

To avoid the terrain but still line up with the runway on a suitable vertical profile, like Innsbruck, there is an RNP (AR) approach that pilots can fly. This brings the aircraft in from the north, pointing directly at the hills ahead.

At the last moment, the aircraft turns left and lines up with the runway. All this can be done with a visibility of just over a mile and the cloud as low as 500 feet.



Watch Video At: <https://youtu.be/yugAFnpcCkw>

6. San Francisco, U.S.A. (SFO)

Another airfield constrained by numerous other nearby airports, SFO is famous for its parallel approaches. Most large airports have pairs of runways facing the same direction. Normally one is used for takeoff and one for landing. At SFO, however, things are done slightly differently.

To maximise the number of aircraft that can land in a space of time, simultaneous parallel approaches are conducted. This means that two aircraft can make an approach, almost side by side, with a distance of just 750 feet between them.

In order to do this, the two aircraft fly slightly different approaches. The aircraft to the south (the one from which the video is filmed below) flies a normal straight in approach. The aircraft to the north flies a slightly angled in approach, just behind the other aircraft.

As the trailing aircraft nears the runway, it must have visual contact with the leading aircraft by a certain point. If it achieves this, it is then clear to turn a few degrees to the right and line up with their runway to land.

If at any point the minimum lateral distance between the two aircraft is compromised, the ATC will instruct the aircraft to go-around to ensure that safety is not compromised.



Watch Video At: https://youtu.be/X5gGSWg_KcE

7. Funchal, Madeira (FNC)

Situated in the Atlantic Ocean, 300 miles off the northwest African coast, Madeira is an autonomous region of Portugal. Known for its popularity with European holidaymakers, it's also famous for its windy conditions making for exciting approaches for landing aircraft.

The airport is situated on the side of the island, and like in the Seychelles, terrain blocks a straight in approach to one end of the runway. Once again, an RNP (AR) approach is available, allowing pilots to safely guide the aircraft past the hills and down to the runway.

Whilst the terrain provides its challenges, situated out in the Atlantic, the airport is prone to extremely strong winds. As these roll off the surrounding hills, like in Gibraltar, it can make for some fairly hair-raising turbulence.



Watch Video At: <https://youtu.be/nyDfE-b1c7E>

8. London City, U.K. (LCY)

Tucked away in the heart of London's financial district, London City Airport not only has one of the shortest runways in Europe, but also one of the steepest approaches.

Most runway approaches are set at 3 degrees, allowing aircraft to fly gently down to the runway whilst maintaining their approach speed. However, because LCY is located amongst the skyscrapers of the Docklands, a normal 3 degree approach would bring aircraft too close to the buildings.

To get around this problem, the glide path to both ends of the runway is set at an eye-watering 5.5 degrees. Whilst this keeps the aircraft well separated from any obstacles, it provides a few challenges for pilots.

Firstly, they must work harder to stop the aircraft speed from accelerating. If the speed is too high on landing, there's a very real risk that the aircraft could run off the end of the runway.

Larger aircraft, like the A318, use a special flight control mode, which leaves the spoilers on the wings partially deployed. This helps the pilots control the speed, ensuring that they touchdown safely.

The secondary effect of the steeper approach means that a far greater control input is required just before the aircraft touches down. As the aircraft nears the runway, the pilots pull back on the control stick, raising the nose slightly. This is known as the “flare”.

On a normal 3 degree approach, only a slight squeeze back is required. However, because the aircraft is coming down at a much steeper angle at LCY, a more positive flare is required to arrest the rate of descent.



Watch Video At: <https://youtu.be/jod3XeUzRXM>

Bottom line

All airports have their own unique challenges to pilots, no matter how many times they have flown there. There is no such thing as a standard day. That said, some airports have greater challenges than others.

By planning ahead and briefing the main threats on the approach, we ensure that we are well-prepared for the most likely of situations. By using the “6 Ts”, we have a way of assessing the threats of airfields, particularly if we haven’t flown there before.

All that said, it’s approaches like the ones mentioned above that pilots enjoy the most. The more thought and focus that goes into an approach, the more enjoyment we get out of it.

Featured photo by AlexeyPelikh/Getty Images