Helping you fly when it’s Hot & High

OPSGROUP Team
18 May, 2021

Here’s a look at some of the hottest and highest airports out there, and the challenges you might want to think about if operating into them.

Airplanes like to play it cool

What is it about hot and high airports that our airplanes don’t like? The obvious one is the air density – engines like their air cold for better performance, and wings like air nice and thick for better lift.

What can you do to keep them happy?

- **Think about how you start the engines** – If it is hot out, the air is thin, and you start throwing things like tailwinds into the mix, then it is going to be a recipe for some grumpy engines
- **Consider towing** – move to a different start point for better air flow
- **Check that ground power unit** – You might want to ask the engineer to see if two might be better (they can over heat too!)
- **Check that take-off performance** – and check it early. If it is limited you’re going to have to throw some passengers or cargo off, or put less fuel on to keep the weight down
- **Watch you altitude constraints** – If you are particularly heavy your climb performance is going to suck and where the airport is high, there is often other high stuff to think about too
- **Once you’re in the air** – if you are struggling to meet restrictions then keep the speed back, make sure you’re using all the thrust available to you and if that still don’t work – let ATC know!

People like to play it cool

People get grumpy when they are stuck in a jam-packed, sweaty tube. And I am not just talking about your passengers. **Think about the poor F/O too.**

If you've sent them out into the sweltering heat to do the walk around then it might be kind to have an APU running and some cool air blowing for their return. It will help with the rest of the flight too – you probably don't want to be sat next to someone who is sweaty up a stinky storm for the next however many hours.

Jokes aside, it can be a safety thing too. A performance study by NASA showed operators in temperatures of **80°F (27°C) made approximately 5 errors an hour,** 29 errors over 3 hours. At **90°F (32°C) this increased to 60 in 1 hour** and 138 in 3 hours. So 1 mistake a minute. If you consider how many critical tasks a pilot carries out in that hour on the ground prior to departure that's concerning.

When your environment heats up above 95°F usual cooling methods like radiation and convection stop working. Your body's only option is to pump blood to the skin to release heat and get you to perspire. Up to 48% of your blood is pumped to the surface level, which means useful things like your brain which are less close to the surface are getting nearly 50% less than normal.

There are a few sorts of "hot" pilot we don't ever want to see

Brakes break

High OATs means hotter brakes, and longer cooling times. But it is the high elevation that really causes issues here because your groundspeed is going to be much greater for the same IAS. The result is much more work for your brakes which have to slow down that big hunk of metal.

If you are lucky enough to have brake fans then switch them on as soon as possible. If you don't, then **keep an eye on those temperatures**, especially during the taxi out.

How long it will take your brakes to cool down is dependent on your type of brakes, type of aircraft, how hot it is outside, how hot the brakes actually got. Aircraft will have their own max temperature for takeoff limit which is important because retracting your gear with hot brakes is an increased fire hazard, and aborting the take-off with already hot brakes is an even bigger hazard.

A (very) general rule of thumb is something like **2 degrees every minute** (at 15°C OAT) will give you a (very) rough estimate.

You're not going far with hot brakes and burst tires

Energy Management

Make sure you have some coffee and a snack. Oh, sorry, the airplane energy. Also worth thinking about because it is going to be harder to slow down and cranking out the old speed brake will have less affect with thinner air because, well, something to do with drag.

This can all get really critical really fast on the approach. A higher groundspeed also means a higher rate of descent, again making slowing down tough. Plan that configuration and manage the energy early.

At very high elevation airports (especially if they have terrain around) you might be trying to reduce your speed above your flap limiting altitude so keep an eye on your minimum clean speed and your flap operating limits.

FLARE!!

A higher ROD, reduced lift, turbulence from thermals can all mess with your flare. We aren't here to tell you how to fly, so will leave it at a "have a think about it before you get there" top tip. Especially if your FO is taking the sector and hasn't landed in these conditions before.

One more tip...

Celsius to Fahrenheit Formula: (°C x 1.8) + 32 = °F

Fahrenheit to Celsius Formula: (°F – 32) / 1.8 = °C

Which airports are highest on the list?

Topping the list is **ZUDC/Daocheng Yading Airport** which sits at a whopping **14,472ft**. ZUBD/Qamdo Bamda airport holds the number two spot at 14,216ft closely followed by ZUKD/Kangding airport at 14,042ft.

These airports are so high that the hot bit is less of a factor, but the altitude is a major one – **14,000ft is a limitation on some aircraft.**

Airports at these altitudes will have special procedures for take-off and landing and you are unlikely to be operating into them without prior training. **So, which should we pay attention to?**

Daocheng Yading Airport

The Hot and the High

FAOR/Johannesburg airport sits at an elevation of **5558ft**. Predominantly NW winds on the ground often lead to a tailwind for the approach to runway 03L/R which makes the energy management more challenging.The runways are 14,505ft and 11,171ft (so you have enough).

Johannesburg can heat up to the high twenties (80°F) in the summer.

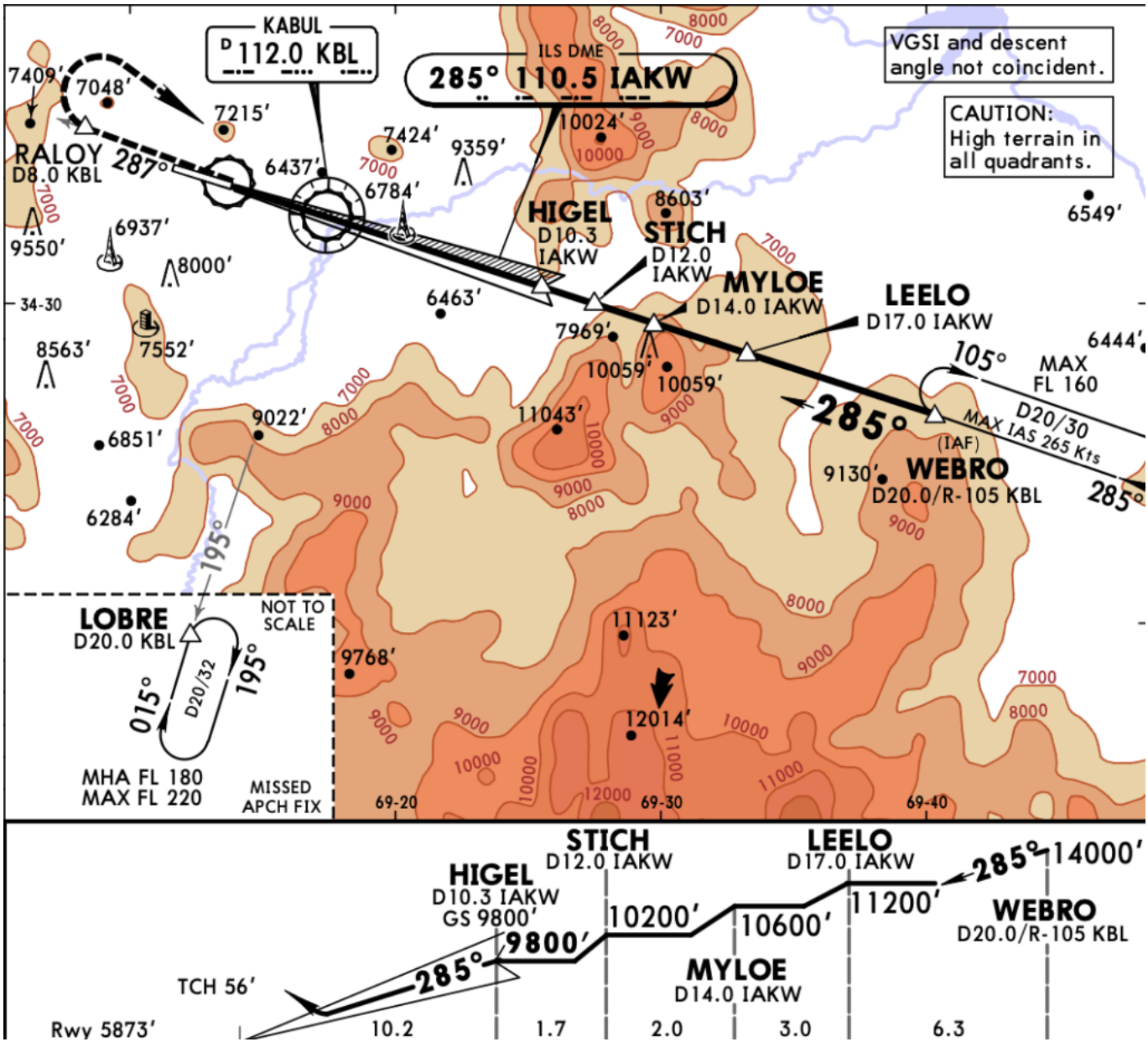
HAAB/Addis Ababa Bole airport has an elevation of **7625ft** and also some very high MSAs in the near vicinity. There are high altitude constraints for the departure due to close in terrain, and they need to be monitored (particularly if you are heavy and it is hot out). A challenging RNAV approach makes flight path and energy management more challenging.

The radar at Addis is fairly intermittent so you are going to have watch that terrain avoidance and energy management yourself.

MMMX/Mexico City This spot has an elevation of **7297ft,** and MSAs of 19,400ft, 14,800ft and 12,100ft. The terrain surrounding the airport means some interesting arrivals and departures and the need for some accurate tracking. The tight arrival also means some low platform altitudes. The ILS for the 05 runways are slightly steeper (3.1°) adding to your energy management concerns. We've also heard that **ATC sometimes keep you fast until 5000′**, which can make slowing down last minute more tricky.

OAKB/Afghanistan I know what you're thinking – there are probably bigger threats at this airport than the elevation, but despite the security risks here, it is a fairly frequented airport. Kabul tips the big three boxes – it has an elevation of **5877ft**, an **MSA of 17,500ft** and it can get toasty warm in the summer months. The ILS for runway 29 starts from 14,000ft and the need to keep aircraft high due terrain can mean you suddenly find yourself diving down, while trying to slow down, with not many track miles to go.

You will probably want to keep you speed back on the departure to meet the minimum climb rate of 450ft per 1nm.



OAKB/Kabul approach starts from 14,000ft (Credit: Jeppesen)

The just plain high

SLLP/La Paz Ok, we will add this one because its a fairly major international airport. The Bolivian airport has a **13,124ft runway which lies at an elevation of 13,314ft** making this an Overall Top Ten winner. The surrounding terrain (it sits in the Andes Mountains) means MSAs up in the flight levels – FL220, FL230 and a paltry 18,000ft.

Your **TAS here is going to be around 25% higher than your IAS.** The high elevation means it is generally cooler, but the density is still going to be low leading to lower performance.

The just plain hot

Basically anywhere in the Middle East in the middle of summer is going to tick this box.

OMDB/Dubai has been known to hit temperatures of 50°C. Hot means bumpy – you can expect some crazy thermals on the approach and an easy tendency to mess up the flare and float when that thermal catches you at 30 feet. Some airports (Dubai being one of them) temperature correct the ILS to account for the extra heat, so if you are doing height checks be aware of the discrepancy because of temperature.

OEJN/Jeddah is another spot known for getting very hot. It is also a very large airport with looooong taxis so keep a good eye on those brake temperatures for departure.

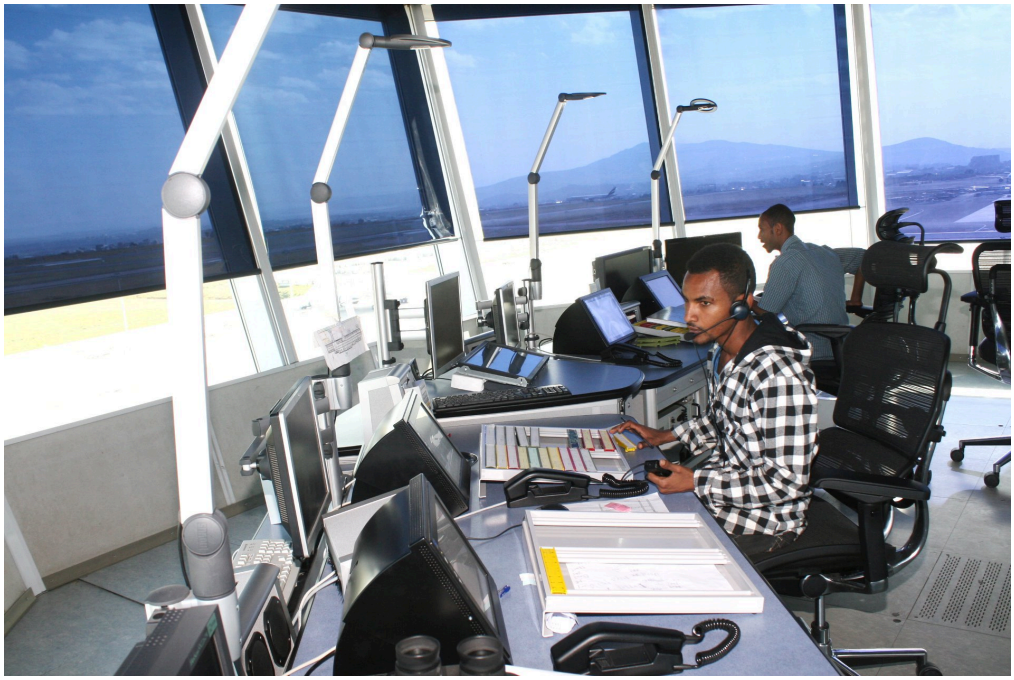
Where else?

Let us know any airports you think deserve to be on this list! Leave a comment or send us an email.

OPSGROUP members can check out AirportSpy – we have started to add Airport Lowdowns in here which cover the big threats (like hot and high!)

Ethiopia risking flight safety to cover up ATC strike

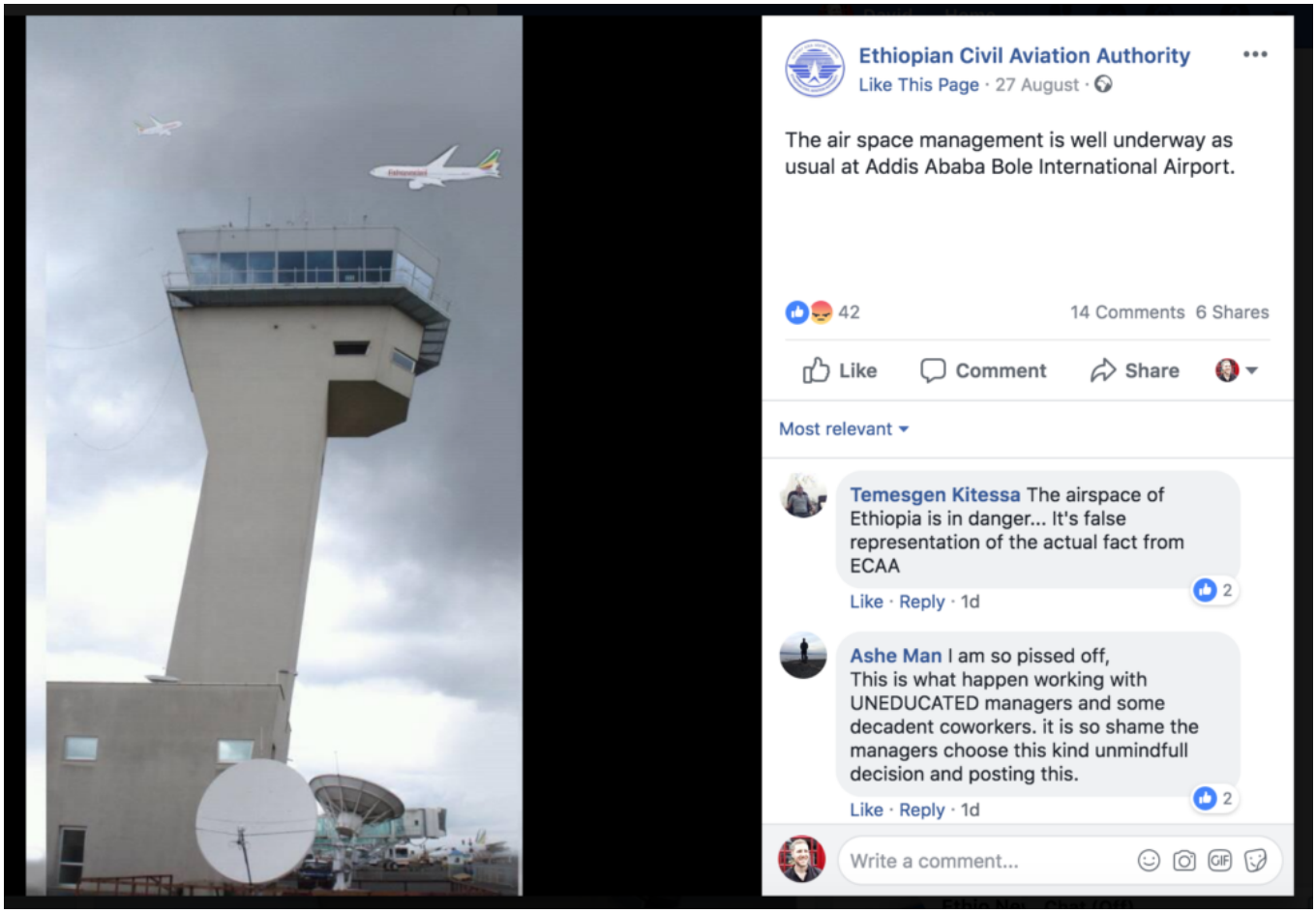
Mark Zee
18 May, 2021



- **Ethiopian ATC on strike, no Notams, government hush up**
- **OPSGROUP alert for the Addis Ababa FIR**
- **Airspace risk – unrated controllers, some foreign and unfamiliar**

Air Traffic Controllers are on strike in Ethiopia, and Ethiopia would prefer that you don't know this. We, as OpsGroup, would prefer that you do.

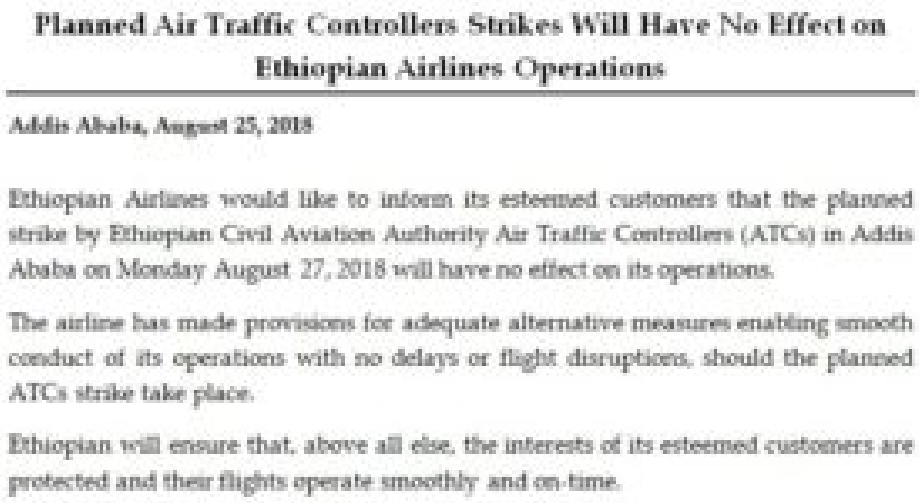
Ethiopia would also prefer that it has no impact on the flight operations of its national carrier, Ethiopian Airlines. Therefore, they have drafted in foreign controllers to replace the strikers, issued no Notams, hushed any publicity, and proactively declared 'operations normal' (complete with bizarre, hand drawn airplanes).



European airlines – and frustrated passengers – will watch with great interest, thanks to their own ATC strike woes: regular stoppages by French, Italian, and Greek controllers have this summer, once again, been the source of massive cancellations, reroutes, and delays. Has Ethiopia found the golden elixir, the magic solution to a long-running problem? **Is this how to handle a strike by your nations' Air Traffic Controllers?**

It absolutely is not. It is a catastrophic misjudgement, creating a safety risk in the Addis FIR and at Ethiopian Airports for pilots and passengers alike. Ethiopian airspace, this week, is most definitely not 'operations normal' – it is unpredictable and unsafe, staffed by unrated, inexperienced controllers, many from abroad – evidenced already by alarming reports of close calls from adjacent Area Control Centers – read on.

The facts are this: faced with an upcoming strike by ATC, Ethiopian Airlines – now Africa's largest airline – formed what in the boardroom might have seemed a workable plan: Recruit a bunch of controllers from other countries, fly them in to Addis, and have them do the work of the striking staff.



Planned Air Traffic Controllers Strikes Will Have No Effect on Ethiopian Airlines Operations

Addis Ababa, August 25, 2018

Ethiopian Airlines would like to inform its esteemed customers that the planned strike by Ethiopian Civil Aviation Authority Air Traffic Controllers (ATCs) in Addis Ababa on Monday August 27, 2018 will have no effect on its operations.

The airline has made provisions for adequate alternative measures enabling smooth conduct of its operations with no delays or flight disruptions, should the planned ATCs strike take place.

Ethiopian will ensure that, above all else, the interests of its esteemed customers are protected and their flights operate smoothly and on-time.

The first batch of foreign controllers came from the Democratic Republic of the Congo, a small group described by the local controllers, unsurprisingly, as mercenaries. When the strike started at 7am this past Monday morning, they were ready to go. Not content with stopping there, the requests from ECAA – the Ethiopian Civil Aviation Authority – for more external controllers went out thick and fast, like an Ambien fuelled shopping spree on Amazon. 30 requested from Sudan, 24 from Kenya. More from Zimbabwe, Malawi. Finding those requests rejected, and resistance from other ATC agencies, the biggest request yet: 120 controllers from ASECNA.

The plan, commercially, is understandable. The wish to keep their airplanes flying is not endemic to Ethiopian Airlines. British Airways, Ryanair and Easyjet, have all made very public their frustrations with ATC strikes. An association, A4E, was formed to fight the problem at European level.

But here's why the Ethiopian solution doesn't work.

And as a former Air Traffic Controller, and Airline Pilot, I can tell you why.

Air Traffic Control is complex. That's not a secret. On average, it takes a controller three months to gain a 'rating', or qualification, for a specific piece of airspace; that's how long it takes to become comfortable with the 4D picture in front of you to provide a flawless ATC service. More complex airspace could take six months.

You have to learn each corner of your bit of sky. Learn the rules of the sector, learn the agreements you have with other centres about how you will receive and present traffic at the boundary. But the most important thing you learn is **how the traffic flows**.

ATC is not an aerial traffic battle whose landscape changes each day. It is not a web of complex contrails that, seen from the ground, appear to merge and diverge at random. The traffic flow is a largely predictable set of events, where the same airlines are operating on the same routes – providing a basis for us, as controllers, to learn the patterns of the flow, and to learn a trick for every trajectory.

This is key. It's been 15 years since I worked the North Atlantic flow in Shannon, but I remember the callsigns, the flows, and how to handle them, like an indelible challenge and response game in my mind.

"*Shamrock 37J*, airborne Shannon" : "direct to Strumble, climb him to 270".
"Belfast departure for Tenerife" : "stop him low, get him under the NAT traffic".
"Two converging at LIFFY" : "Drop the Speedbird, he's for Manchester".

Humans learn patterns. This is how ATC works. We fill a bucket full of "stuff we've seen before", leaving us free to concentrate on the few things we haven't. This is the flow. If you watch 737's fly up the Hudson on a hot summer morning, this is the La Guardia flow. Not an inch left or right. Heading into Amsterdam?

“Direct to Pampus, down to FL70”. One after another.

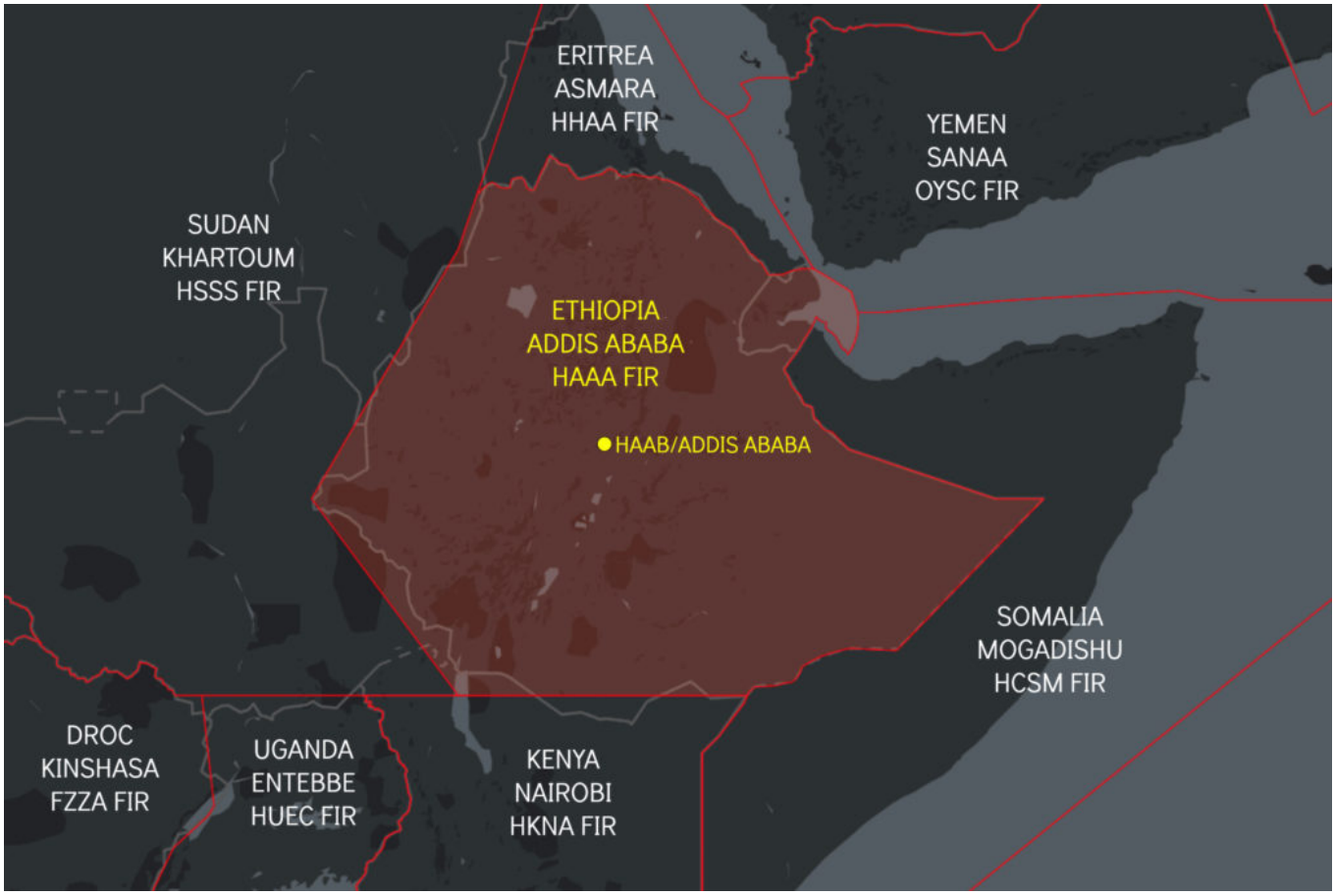
This is why we need three months to learn the airspace. For the flow. And this is why, when I found myself in New Zealand, learning to operate as an Air Traffic Controller far away from Shannon, I was floundering, like one of those dreams where you running but standing still. **I am a controller, but I can’t control**. I don’t know the airspace, and I don’t know the flow. Slowly, over the months, geography takes shape, traffic patterns show themselves, situations become seen. I start to get a sense of distance and time on my scope – or scopes, because New Zealand is long and thin I have to reorientate my thinking north-south, rather than east-west, as in Shannon. Out of the mist of training, I am a controller again, but it takes time. A lot of time.

Ultimately, I can reach the point where I can do my job – the real job of an Air Traffic Controller – to be familiar enough with the airspace and traffic that I have “the picture”. The full situational awareness, with most climbs, descents, speeds, and vectors being routine and familiar, means I can spot the something that’s off, wrong, going to develop into a conflict, and do so intuitively, like a sixth sense. Air Traffic Control is an art, it’s a dance. You don’t do it by complex calculations in your head, you don’t need a computer. It’s the visual in front of you – radar or tower – coming to life in your brain, you feel it, and the solution becomes instinctive.

And this is why you can’t bus in a set of replacement controllers, shuffle them down the corridor into the radar room, and up the stairs to the tower, and expect a safe, efficient, and orderly flow of traffic.

Controllers know the power of the strike. In most countries, it is used rarely, and fairly. They understand the impact on airlines and passengers. There are many other forms of industrial action a controller can take – like a training ban, an overtime ban – before reaching the point of actually stopping work.

Commerce will always find a way to continue. **Safety is different, and delicate**. It must be nurtured and protected. When the two collide head on – the commerce of keeping an airline flying, vs. the safety of an established, effective Air Traffic Control system – safety must take precedence. Here, safety means accepting the strike, as is – and working with the controllers, quickly, to find a solution. Let them be heard.



We'll keep this page updated with the latest situation on the Ethiopian ATC strike. Reports that we have received so far are as follows:

- Controllers in adjacent ACC's are reporting lack of adherence to Letters of Agreement – seeing aircraft with 4 minutes instead of 10 minutes separation.
- RA reported by Kenya ATC between two airlines on Wednesday.
- Kenya and Sudan reported loss of separation and poor coordination and transfer of traffic at their FIR boundaries with Ethiopia.
- Retired and Management controllers, who appear to have never rated or validated in position, are also being used, though unqualified for Addis.

We were first alerted to this issue by **a Fox**. Many of you know that we are Fixing Notams. The lack of Notams in this situation, is an exceptionally clear example of point 1 in the "Why" of the Notam Problem. Sometimes, we can't trust the state to tell the truth. And this is a clear example.

Thankfully, our network of Foxes – undercover ATCO's, pilots, and dispatchers – is growing, and reporting on things just like this, so that we can tell you what's really going on. Keep reporting.

Further reading

- Tell us anything additional we should know – **news@ops.group**
- Monitor #ops-alerts in your member Dashboard, and Slack.
- Contact the author: Mark Zee.