Gulf routings set to ease up as Qatar blockade comes to an end

Diogene De Souza 20 January, 2021



After three and a half years of political stalemate, **the Gulf blockade against Qatar by Saudi Arabia**, **the UAE**, **Egypt**, **and Bahrain**, **is coming to an end**. These countries have restored diplomatic relations and opened their borders and airspace to Qatar – with Egypt also expected to follow suit shortly.

What does this mean for operators?

The biggest change seen will be for **aircraft registered in Qatar (A7-)** which will now be allowed to route via OEJD/Jeddah FIR and OMAE/Emirates FIR, and gain more efficient use of OBBB/Bahrain FIR – in addition to reinstated landing rights in those countries. This is as opposed to routing via OIIX/Tehran FIR, which incurs time and fuel penalties and in the worst cases requires a tech stop.

But this is also good news for **foreign operators.** For the past three years, foreign operators had been faced with various different restrictions if trying to fly to/from Qatar – they needed special permission from Saudi Arabia, Bahrain and the UAE if planning to overfly any of those countries, and Bahrain had banned direct flights from Qatar completely.

This has now changed. With Saudi Arabia, Bahrain and the UAE lifting their blockade against Qatar, they have cancelled a bunch of Notams which effectively means there are no longer any special requirements for foreign-registered aircraft flying to Qatar via Saudi/Bahrain/UAE airspace. In short, **more efficient routings are now available** if you are operating into, out of, and through the Arabian Gulf region.

Here is the current state of play as of **20 January 2021:**

Country	Non-QATAR registered	QATAR registered
		Ban on Qatar-registered aircraft lifted 11 Jan 2021.
Egypt (HECC)	No NOTAM'd restrictions.	(NOTAM A0027/21) Temporary RNAV route established for Qatar Registered aircraft between Beirut and North African Airports.
Bahrain (OBBB)	No longer any special requirements for foreign-registered aircraft flying to/from Qatar via Bahrain airspace. However, Bahrain publishes a Standard Routes Document as an AIP SUP which contains all the routes they want you to fly, depending on who you are, and where you are flying from/to. They also publish a bunch of Notams with corrections to this document. So be sure to check both the AIP SUP and the OBBB Notams before planning a route through Bahrain's airspace.	Ban on Qatar-registered aircraft lifted 10 Jan 2021. (NOTAM G1202/20) Establishment of temporary RNAV route for Qatar Registered Aircraft arriving Qatar Aerodromes.
Saudi Arabia (OEJD)	No NOTAM'd restrictions.	Ban on Qatar-registered aircraft lifted 4 Jan 2021.
UAE (OMAE)	No NOTAM'd restrictions.	Ban on Qatar-registered aircraft lifted 7 Jan 2021.
Oman (OOMM)	No NOTAM'd restrictions.	No NOTAM'd restrictions.
Kuwait (OKAC)	No NOTAM'd restrictions	No NOTAM'd restrictions
Iran (OIIX)	No NOTAM'd restrictions.	Various Traffic Orientation Schemes are NOTAM'd depending on your routing through the Tehran FIR. OIIX will not be publishing a AIRAC AIP amendment in January or February 2021, so watch for the plethora of NOTAM'd ATS route closures, amendments, or installations. Next AIRAC AIP amendment due 25 March 2021 OEID/Saudi NOTAM A0604/17 purports
Yemen (OYSC)	No NOTAM'd restrictions. See Safeairspace.net - there is ongoing conflict in the region. Risk Level One - DO NOT FLY. We strongly recommend avoiding this airspace entirely.	to be a NOTAM "On behalf of Republic of Yemen/Aden." "All aircraft registered in the State of Qatar not authorized to overfly Republic of Yemen airspace. Although it appears Qatar aircraft are not strictly adhering to this. No such NOTAM issued by OYSC FIR. See Safeairspace.net - there is ongoing conflict in the region. Risk Level One - DO NOT FLY. We strongly recommend avoiding this airspace entirely.
		DO NOT FLY. We strongly recomm avoiding this airspace entirely.

Remember: Qatar does not have its own FIR, and is nested completely under the OBBB/Bahrain FIR – any Qatar Notams are therefore published under OBBB. The Doha TMA extends SFC to FL245, above which is the Bahrain UIR.



If you have a question or have information to share, use our Slack channels! We are a community based on sharing information and resources to help each other – jump in!

Testing Times: More than just a stick up the nose

Chris Shieff 20 January, 2021



In the last few weeks, several major countries have announced that **pre-departure Covid testing** of all international passengers is now compulsory. And it is up to the operators to make sure that this happens.

It is now mandatory for anyone travelling to **the UK, Australia and Canada** from anywhere. **The US** will follow suit from January 26.

Covid testing is set to become a common part of our aviation landscape for the foreseeable future. Until a vaccine has had time to work, people will need to be tested to move around the world freely.

But what type of Covid test do I need?

Just google 'Covid test' and **prepare for confusion**. There are **different types of test** out there, and to make matters worse, there are **multiple confusing names for the same test**. Ask a passenger and the chances are that many will not understand why a rapid test at the airport isn't enough to board their flight.



Rapid testing at the airport is convenient, but it may not be enough to get you in when you arrive.

So here is a super basic breakdown of the types of tests out there and how they work...

Covid Test 101

Covid tests can do two things:

- 1. They can tell you've had it in the past by looking at your blood (Antibody test), or -
- 2. They can detect if you actively have the virus by looking at your mucus or saliva (**Diagnostic test**).

Antibody tests = Cannot tell if you are actively sick and contagious. So for travel, they are pretty much useless.

Diagnostic tests = There are a bunch of highly technical names floating around out there but the good news is that there are only a couple of types – **Molecular tests (PCR)** and **Antigen Tests.** (The bad news is you're getting a stick up the nose either way.)

- **Molecular tests (PCR).** The gold standard in testing. These tests are super accurate and work by detecting the nucleic acid left behind by the virus. This is what most countries require. The downside is the results take much longer and it is difficult to test a whole bunch of people quickly. There are home kits available but most of the time you'll need a lab to test you.
- Antigen Tests. When people say 'Rapid Test' this what they mean. These tests are quick,

cheap and work by looking for a piece of coating on the virus. You still get swabbed but the results come back far quicker. They are what you see in airports. So what's the issue? They're not as accurate and can return false negatives. In most cases borders just won't accept them.



Is this a PCR or Antigen test? They both look exactly the same to passengers.

So what's the issue with antibody tests?

All they do is look for anti-bodies in your blood and your body has to build up those defences. It can take up to 14 days after you first catch the virus before they can be detected. You can be sick and contagious before the test will even detect them. To make matters worse there is no evidence you can't catch Covid again even if you have already had it. So what's the point of them? They help authorities work out just how far the virus has gone out there.



An anti-body test. No anti-bodies, but you might have had Covid already for two weeks...

Moving Forward...

With rapidly changing testing rules around the world it will become super important to make sure you and your passengers get **the right kind of test**. Most of the time the one you will need is a **PCR test**. Rapid testing at airports is convenient and looks the same but in most cases just won't cut the mustard.

Brexit is here: What's the impact to ops?

OPSGROUP Team 20 January, 2021



The UK officially left the EU on Jan 1st, 2021. Although it's **still a part of Europe** (the continent), it's **no longer part of the European Union** (the trade and political bit). Whereas before, the UK fell under EASA and all their rules and regulations, **the UK CAA is now in charge** of all things aviation in the UK...

So, what does that mean?

It means a **raft of changes to the rules for operators flying between the UK and EU states**. A new agreement has been drafted which applies from Jan 1. Here are the main changes:

- Essentially UK operators will **no longer be considered as EU carriers**, and will instead be 'third country' carriers, meaning they will lose their special treatment. Flights between the UK and EU will continue, but **passenger cabotage flights will no longer be allowed**. Or in more human terms, UK operators will not be able to carry fare paying pax between two EU states (and vice versa). **Cargo cabotage will still be okay** as long as the two countries involved have an agreement.
- Both sides will still have **the right to overfly each other's territory**, make technical stops, and to operate third- and fourth-freedom passenger and cargo flights between any point in the UK and any point in the EU. The fifth-freedom rights beyond the EU will continue, but only for a five-month period and with a new capacity cap.
- UK and EU airlines can also **continue codesharing**, and UK airlines can continue providing wet-leasing operations.
- There are other changes coming too, which EBAA cover here.

Freedoms of the air	The right to
First freedom	Flying over a foreign country without landing.
Second freedom	Refuel or carry out maintenance in a foreign country without embarking or disembarking passengers or cargo.
Third freedom	Fly from the home country and land in a foreign country.
Fourth freedom	Fly from a foreign country and land in the home country.
Fifth freedom	Fly from the home country to a foreign country, stopping in another foreign country on the way.
Sixth freedom	Fly from a foreign country to another foreign country, stopping in the home country on the way.
Seventh freedom	Fly from a foreign country to another foreign country, without stopping in the home country.
Eighth freedom	Fly from the home country to a foreign country, then on to another destination within the same foreign country.
Ninth freedom	Fly internally within a foreign country.

All the freedoms

But what about laws, licences, rules and regulations?

All existing EASA certs, approvals and licences valid for UK registered aircraft **will be good for another two years**. For UK operators of EU-registered aircraft things are more complicated. The UK CAA have set up a useful website to help you get your head around what you need to do to stay compliant elsewhere in Europe, and it's a great place to start. There is also a helpful flow chart to keep things simple.

With Brexit complete, the UK CAA is now in charge of setting the rules, but they've basically said that they'll be sticking to pretty much all of the aviation law, rights and obligations that were in place before. You can read that statement, and a bit more, on the UK CAA's main regulations site.

The heads-up for passengers

Things may get complicated. UK citizens will likely lose their special EU travel privileges which means it may become harder to move around Europe thanks to everyone's favourite elephant in the room, Covid.

As a general rule, pax from the UK to Europe will need to **make sure their passport has at least six months validity** in it if they want to visit any EU country, Iceland, Liechtenstein, Norway or Switzerland. They will also need to **check their health cover** – the EHICs (European Health Insurance Cards) are still valid if issued before January 1.

If they are entering as a tourist, they can stay for **90 days** – and they can do that twice a year. But if they are entering for business purposes, they might need a visa.

All of this is on the UK Gov website if you want to take a look.

The Question of Covid

Not being part of the EU anymore means that flights from the UK to the EU will **no longer have the same Covid entry restrictions applied**. "Luckily" no-one was really letting UK flights in anyway, what with their virus mutation running rampant, so right now, any change for flights originating in the UK (and passengers for that matter) is not really relevant. The entry rules for UK nationals in the rest of Europe are changing fast, and every country is different but in most cases **it will be harder for UK travellers to avoid Covid related rules for non-essential travel**. Don't know where to start? We don't blame you. The best place is the UK FCO website which has the most up to date entry requirements for UK nationals for every country around the world.

CO2 much?

One extra little snippet of info to know about Brexit is that the amount of emissions small, non-commercial operators can produce as "improved". If you already have an EU-ETS (emissions trading scheme) exemption then your allowance has now been doubled.

Instead of 1,000t CO2, you can now produce 2,000t CO2 - half in the EU and half in the UK.

Don't think you can get away with puffing about and no-one watching though. The UK are setting up their own scheme, and France will be monitoring the EU bit of it (apparently they won the task because UK operators tend to spend more time there than anywhere else in Europe).

If you are trying to work out what 1,000t of CO2 coming out your aircraft looks like, then there is a handy calculator you can use (but its roughly 103,400 gallons or 391,500 litres of JET A1 burned).

The news for N-reg'ers

Well, to be honest, not a lot at this point. The main thing to know is that the UK no longer falls under EU (EASA) rules and law, so if you have any problems **you'll now be dealing direct with the UK CAA**... but currently their laws aren't actually any different to what they were at the end of December.

If you are carrying passengers from Europe to the UK (or vice versa) then there will be **different passport and entry procedures** for them now.

That's about it.

So, the really important bit... can you bring food?

Always one of the big questions for crew who want to stock up on all things delicious. Basically, no meat, milk, or dairy stuff into the EU from the UK. The UK is a bit more chilled, but you do need to declare things, and a suitcase filled with Camembert and wine probably won't go down very well.

Of course, the real good news is all those juicy **duty free goods** which travellers between the UK and EU will now be able to buy!

A is for Airplane: The OPSGROUP 2020 Wallchart

David Mumford 20 January, 2021



2020 was a long, sometimes challenging, sometimes exciting, sometimes sad... and always very Covid filled year!

We wanted to take a quick look back at some of the things which really stood out to us over the past twelve months.

So we wrote a list...

The list became a **little poem...**

And then, as a logical next step, the poem turned into an ABC wall chart!

Here it is in all its glory!



Click to download PDF

You can download a nice hi-res version by clicking on it. Print it out, stick it on your wall, send it to a friend – whatever you like.

The OPSGROUP 2020 Wallchart was designed by our wonderfully talented artist friend, Cecilia La Rosa, and you can see more of her amazing work here.



A is for Airplane, flying high as a bird

As always, airplanes were on our mind. The safety of them, the places they are going, and the people flying in them.



B is for Bureaucracy and unreadable words

Messy Notams, changes to charts, new regulations, old documents – we tried to keep you updated you on changes you needed to know about, mainly by writing things in an easier-to-read way.



C is for Covid not going away

No 2020 wall chart would be complete without a mention of Covid. Traffic across the world fell by almost two thirds. Then it started to improve, then it got a bit worse again, and then the vaccine came out – unfortunately, shortly followed by a new strain of the virus... Here's hoping 2021 sees the end of it.



D is for Datalink on the NAT HLA

The Great North Atlantic Datalink Mandate. It went into the final phase on 30 Jan 2020, and if you want to fly between FL290-FL410 you must be equipped with CPDLC and ADS-C... But then due to Covid this got delayed a number of times, with Shanwick saying it will remain suspended until 25 Feb 2021.



E is for Errors of the Gross Nav variety

The FAA changed their definition of Gross Navigation Errors to mean anything more than 10nm. You used to have 25nm before you got into trouble (except for on the NAT HLA which was always 10nm).



F is for OpsFox, a secret society

Business at the Lucky Star Chicken restaurant was up in 2020. Goat Curry (number 64 on the menu) proved to be a popular favourite. Join the secret society and submit your reports.



G is for Guy Gribble, gone too soon

Our friend and colleague Guy Gribble passed away on 26th October 2020.

Guy joined OPSGROUP on Day 1 (some four and a half years ago), and was an ever-present contributor, collaborator, mentor and friend to us. If you've ever sent us an email with a difficult question and received a good answer, the chances are that Guy Gribble was the man behind the scenes who helped us figure it out for you. We lost count of the number of times Guy would post replies on Slack giving people advice and guidance.

The NBAA will have an award named after Guy for "Outstanding Contribution" – which tells you all you need to know about the impact he had on the industry.

Thank you Guy and Rest in Peace - your legacy continues.



Our mission is to make aviation human-friendly for us all.



I is for Israel overflight clearance

Big news from the end of 2020 as Israel rebuilt relationships with the UAE, and for the first time in decades we saw a flight between the two nations. Israel then opened their airspace for overflights, and Jordan allowed Israeli bound flights to pass through their airspace as well. The overflights mean shorter, more efficient routings, and it's a highlight of the year that friendships are being rebuilt between Israel and neighbouring regions.



J is for Jamming and GPS interference

GPS Jamming remained an issue, particular across Eastern Mediterranean, Middle East and Caucasus, with thousands of reports of jams through the year. The story is bigger than just the equipment issue though, it is a political and conflict related one too. We wrote this article on it to help give a bit more info on the issue.



K is for Kiwis showing us what to do

New Zealand led the way on how to deal with the Covid situation, managing to go nearly a month with no cases. They slowly started to reopen a travel corridor with Australia, but remain strict on their entry requirements.



L is for Lockdown, no kiwi for you

Lockdown was (and still is) a big part of 2020. For some it was a difficult time away from family, but for others it allowed time for new skills to be learned, hobbies to be enjoyed, and a fair few Zoom quizzes to take place. We will keep reporting on the big Covid changes but are definitely looking forward to a day when no Covid alerts are required anymore.



M is for Members, colleagues and friends

We're grateful to everyone in the group for showing up, trading stories, experiences, and information, having regular chats, and in turn keeping us all safe and up to date.



N is the Notam problem again

The Notam problem hasn't gone away, but we are getting there...



O is for OPSGROUP, share what you know

OPSGROUP is more than just the team working here – it's all the members and the knowledge and information you all share.



P is for Pilots flying us home

2020 was a tough year on pilots, and we think they deserve a big Thank You for continuing to fly our families and cargo safely around... but we also thank the cabin crew who looked after us onboard, the ATC controllers who kept the skies safe, the engineers who fixed the airplanes, the dispatchers and planners, handlers and airport workers, and everyone else affected by Covid and who kept working hard. So P is really for People.



Q is for Quarantine in a government compound

Quarantine can be tough. Trying to work out a country's Covid-related entry rules is one thing, but where you get locked up and how long for is quite another. So Q is for quarantine questions, queuries about Covid-cancelled flights, and all the queues of people who want to go flying again. Let's hope 2021 is far Quieter on all things Covid.



R is for Relief Air Wing, eyes on the ground

When a hurricane hits, the world responds. But before anyone can fly in to help, they need to know what things look like on the ground. After Hurricane Dorian devastated the Bahamas in September 2019, no information was available for several days. Relief aircraft were waiting, but critical information was missing. What airports are open? Is there fuel available? Is there ATC? Where is help best directed? Learning from the lessons of Hurricane Dorian, the mission of Relief Air Wing is to get that critical information, provide it to the first responders, and help to coordinate the aviation relief effort.



S is for SafeAirspace, where not to fly

On 9th January 2020, we saw the tragic shoot-down of Ukraine Int Airlines flight 752 over Tehran by Iranian Armed Forces, having mistaken the aircraft radar return for an inbound missile. And just a month later, a passenger plane almost got shot down over Syria, after coming under fire from Syrian air defences.

Throughout the year we've seen new conflict zones emerge, posing risks to overflying aircraft – from Saudi Arabia and Yemen, to Armenia and Azerbaijan, to Ethiopia and Eritrea.

Our sense of mission with Safeairspace.net is stronger than ever – to provide a single, independent, and eternally free resource for all airspace risk warnings, so that airlines and aircraft operators can easily see the current risk picture for unfamiliar airspace.



T is for Towers, controlling the skies

Towers (and the ATC folk in them) controlled the skies splendidly this year. We also looked into what happens during "ATC Zero" events, particularly over the NAT HLA after we saw Gander East close briefly in December.



U is for Unreliable speeds on aircraft stored too long

Unreliable airspeed incidents increased after bugs and beetles made nests in airplane probes – an unexpected consequence from Covid. And unreliable airspeed was not the only thing to look out for with long term storage.



V is for going Viral when you do something wrong

From men on jet packs, to pilots drawing pictures in the sky, we laughed at some of the stories we saw this year. And not all were bad – the Don't Rush challenge went viral as aviation communities from all over created their own Don't Rush movies.



W is for Winter Ops, cold weather tips

Winter is here – at least in the Northern Hemisphere. Here are 5 golden rules that could help you stay out of trouble during these colder months. Here's a quick lowdown on freezing fuel problems as well.



X is for Space X, launching their ships

We reported on a fair few temporary danger airspace areas through 2020, many of which were down to Space X and other rocket launches. The operational impact for earth flights kept us reporting, but we're also a little excited at the developments in space flight. OPSGROUP GALACTIC might be a new idea for 2021...



Y is for a big Yes to 2021

2020 has been tough – but we have faith that 2021 will be better. We hope borders open, vaccines roll out, Notams improve, airplanes get better, airspace gets safer, and aviation becomes more human!



Z is for Zoom calls - sometimes they're fun!

Our OpsChats were a big part of our year and we loved our 2-timezones-in-1-day Zoom call.

We look forward to seeing you all again in 2021!

ALL WE HEAR IS: RADIO BA DA, RADIO BODØ, RADIO BA DA

OPSGROUP Team 20 January, 2021



Wave at the ATC tower, and you might find there is no-one in to wave back. But that does not mean air traffic controllers are not watching us anymore, they just might be doing it from somewhere a little more remote.

The rise of the remote controller

In 2021, LEMH/Menorca airport will no longer have air traffic controllers in their tower. Instead, they will

have a network of 360 degree panoramic and pan-tilt zoom cameras which will feed high resolution images to a single, mighty control tower in Bodø, Norway.

Kongsberg (possibly a reference to King Kong who liked climbing up towers, but more likely just named after the town in Norway where it was founded), is working with various airports on a program called Ninox. The plan is to eventually have advanced Remote Tower Systems across 15 different airports.

The plan is to eventually have advanced Remote Tower Systems across 15 different airports. Two systems are already fully operational, and the overall result of the project will be an ATC service that brings "new capabilities to air traffic operations, enabling safe operation at reduced costs."

They had me at "new capabilities".

The world's first air traffic control tower – a wooden hut built in south London 100 years ago.

Is there anybody up there?

Rather than having controllers at the airport, able to look out the window, this system feeds images to a remote control tower. The cameras are incredibly high resolution and can zoom in on the smallest details, detecting movements from birds and drones. They also can have infra-red settings making it possible to see in the dark.

The tools provide greater contingency as well as vision enhancement, and there are options for automated object detection, virtual safety nets, and augmented reality features to be installed.

The real big advantage is that multiple towers can be managed with one all powerful air traffic controller so even the smallest airports providing only AFIS will potentially be able to sign up and have a "controller" over-seeing their traffic – increasing their services without a mega increase in costs.

What if the big 'what if' happens

A big "what if?" for this system is "what if the feed fails?"

This isn't a problem though – each tower is connected to the Remote Towers Centre via networks with huge amounts of redundancy. If one network fails, another can be used to connect again. It also means if one controller gets stuck in traffic, another controller can control from a different spot on the network.

Rapunzel, Rapunzel, let down your air... craft

So far only Norwegian airports have been set up on the Bodø master network. Røst airport has been operating under remote tower conditions since October 2019, with 3 more coming online through October and November of this year.

But actually...

The concept is already used across Europe, and there are multiple projects around the world.

EDDR/Saarbrücken Airport in Germany has had a remote tower since 2018. With 15,000 flight movements a year it is one of the largest airports to have its operations controlled remotely.

They have projects worldwide including Brazil and New Zealand, and both civilian and military. EGJJ/Jersey Airport in the UK has implemented a contingency system, Iceland is testing the technology for severe weather conditions and LOWW/Vienna is already using their vision enhancement system.

EHAM/Amsterdam Schiphol Airport has also been involved in trials, in conjunction with the Single European Sky ATM Research (SESAR) project and Air Traffic Control the Netherlands (LVNL). The trials tested how controllers would use the cameras, as well as the screens for radar, weather and flight planing which were integrated into their stations, and the results were pretty good.



Grey and cloudy London City Airport looks better from a tower

And then there is AIMEE

AIMEE is an AI developed by the company Searidge, and NATS and NAV Canada are pretty excited about it.

It receives inputs from different sensors, sources and scenarios, and uses an algorithm that learns patterns and so can predict problems, and offer solutions quicker than a human brain can.

AIMEE is being trialled at EGLL/London Heathrow to see if it can improve capacity by as much as 20%. The system will use ground level cameras to monitor aircraft positions in rubbish weather, and will be able to see when aircraft have exited runways much quicker than people eyeballs through fog can.

AIMEE is also being installed at airports like KORD/Chicago O'Hare and CYYC/Calgary where its AI eyeballs will monitor de-icing bays and provide a spacial marshalling system. In KFLL/Fort Lauderdale the system is used on gates for remote apron management.

So the future is remote

People-less control towers are not a thing of the future, they are happening now. Anytime you fly across London, you are probably being controlled by controllers in Swanwick.

For pilots, there is no change in procedures – they will still talk to personnel on the radio, but the actual people looking after you are squirrelled away in their remote tower in Norway.



Bodø Tower – What ATC see

Are we going to have a Matrix type AI computers taking over situation?

No, don't worry, it won't.

All this technology is there to supplement real people brains because it can process stuff faster. But it is unable to make the decisions human ATC currently make, so we are more likely to get pilot-less airplanes before we see entirely people-less control towers.

US pilots and air traffic controllers can now take the Pfizer vaccine

David Mumford 20 January, 2021



US pilots and air traffic controllers are now **allowed to take the new Pfizer Covid vaccine**. On Dec 12, the US FAA issued a statement authorizing this, which means aviation professionals can take the vaccine **without risking losing their medical certificates**. You can read the FAA's official statement here.

The FAA has reviewed the @pfizer COVID-19 vaccine for use by FAA-certificated pilots and air traffic controllers, with a required 48-hour waiting period after vaccination. Read more at https://t.co/iIQAKB3id6. pic.twitter.com/tFC29Qkkex

- The FAA → (@FAANews) December 12, 2020

The vaccine needs two doses, three weeks apart. The FAA say you will need to **wait 48 hours after each dose before you can operate.**

All future vaccines will need a **separate approval** – the Pfizer one is the only one you can take at this stage.

Now that the Pfizer vaccine has been approved by the FDA, a huge supply chain effort is underway to get the vaccine ready for use as soon as possible. With crew likely to be carrying shipments of the vaccine, the FAA has issued a new safety alert for the **carriage of dry ice**. In big quantities this can be hazardous to crew and cause carbon dioxide poisoning if things aren't handled properly. It is also important to be aware of manufacturer limits on how much you can carry. The new SAFO provides guidance on the risks, and how operators can better protect themselves.

TCAS Trouble: Why We're Getting It Wrong

Chris Shieff 20 January, 2021



Earlier this year Eurocontrol published a report on TCAS Resolution Advisories, and the results weren't pretty...

Over a 12-month period, over the heart of Europe, only 38% of RAs were flown correctly and **34% of** aircraft even manoeuvred in the wrong direction.

In other words, **nearly half of crew for one reason or another didn't follow the RA** – a last-resort safety net proven to save lives. So concerned are Eurocontrol, they rank the issue as its **second highest air traffic threat** – it's a big deal.

Here's the issue in a nutshell

ICAO say that no matter what, unless the safety of your aircraft is compromised by something more dangerous (think terrain or stall etc.) if you get an RA, **you have to follow it**.

TCAS, ACAS or whatever you want to call it has been around for a long time. Development started back in the 50s, and it has been mandated in the US for larger aircraft since the 80s. It has become incredibly reliable.

So, if it's that black and white, the question remains, why does this keep on happening? Turns out

there are a bunch of reasons, and so it is worth taking a look at exactly what is going wrong up there.

The Elephant in the Room

We may as well address it first – when crew choose to second guess an RA. The good news is that this isn't happening very often. Most of the time there are other factors at play. But while we're here, a little note on TAs and RAs.

Traffic Advisories (TA) **prevent**. You haven't lost separation yet, but you might. They're a warning for us to go heads up and do something about it – make visual contact, talk to ATC, level off, you name it. This is the time for us to go to work and make decisions.

Resolution Advisories (RA) **mitigate**. There is no more time to prevent – **that ship has sailed.** RA's typically trigger when you are within 25 seconds of a collision threat with the other aircraft. But here's the kicker – you are expected to respond to it within 5 seconds. In other words, there is not much time for us to make effective decisions. Safest course of action? You guessed it – **follow the RA**.



RAs - not much time to react.

So, what else is going on then?

Numero Uno – The number 1 biggest reason why RAs aren't followed? Because we think **we can see the threat out the window.** Unfortunately, you can't assume that the aircraft you can see is the one who triggered the RA. We're also not very good at assessing threats visually, especially at altitude and it does not give us any info about what the other aircraft is intending to do.



Is this aircraft above, below or at our level? And what is it planning to do next? RAs do a lot better job of assessing a threat than our eyes can.

Startle Factor – Put us in a stressful situation and we react in different ways. RA's are a rare event, and they're **not always preceded with a TA.** In other words, without warning they can emerge with significant 'pucker factor'. A large number of mis-flown RAs in the EUROCONTOL report lasted for less than 8 seconds. Beware of the **'knee jerk' reaction** – our instinct is to act but surprise can get in the way of procedure.

Beware of Contradictions – It's not ATC's fault, but it's important to understand. They don't know what your TCAS is telling you to do and they will be working hard to help. The issue is when **ATC instructions contradict your RA**. In 2002, a Tupolev passenger jet collided with a 757 over Germany – one crew followed the RA and the other ATC. The industry learnt an important lesson: **always follow the RA**. Use the phrase "TCAS RA" on the radio and ATC will understand you are following one.



When a TCAS RA and ATC conflict, the TCAS takes precedent.

Performance – RA's are often not followed as the crew are **worried about performance.** This usually happens when they're heavy and high or near their service ceiling and get a climbing RA. So, what should you actually do? The official word is this: **do your best to follow it**, even if your response is weak. Even if it means maintaining your level. In most cases an RA will only result in a level change of less than 500 feet. The biggest threat by far is opposing the RA, which will put your aircraft in far more danger.



Performance limited? A weak reaction is safer than an opposite one.

Training - That old chestnut. But the reality is it is really important to practice these things in the sim.

Weird ones. Unexpected ones. Ugly ones. Ones with multiple threats. Because this is usually what we're up against in **the real world.** Also keep your finger on the pulse for changes. Some modern aircraft can now fly RA's automatically, but the sims you train in may not have had the same update.



Practice all the nasty ones - reversal RAs, multiple aircraft, low and slow, high and heavy - you name it.

Older Versions – watch out for them. The latest one (7.1) has a number of major safety updates including clearer instructions and 'reversals' – a fancy term for knowing when the other aircraft isn't doing what it is supposed to do. Older versions of TCAS are more likely to be misunderstood by crew. One phrase in particular is especially bad – "Adjust Vertical Speed, Adjust." In many cases crew have increased their vertical speed rather than reduce it. If you're using older versions it is important to be aware of its limitations.



TCAS is an awesome piece of kit that has made huge advances in preventing completely avoidable accidents. But it is only as reliable as the humans who respond to it. That's why it is so important we learn about what we we're getting wrong so it can do its job – keeping us safe up there.

Other Useful Things

- Eurocontrol's recent report on RA non-compliance
- The FAA's Guide to TCAS 7.1 (the latest version)

Fuel Facts: Let's get to the (freezing) point

OPSGROUP Team 20 January, 2021



Fuel is to airplanes what coffee is to pilots – something you just cannot fly without. But just as there are different types of coffee, you're going to come across different types of fuel as well...

Did you ever hear about cat poo coffee?

Yep, there is a coffee made from beans pooped out by weird jungle cats. Had it, doesn't taste great.

There are also a range of fuel varieties that can be used for turbine aircraft. It isn't just your standard Jet A1 that you might find on offer, and not all are going to be suitable for your aircraft or operation.

Fuels are generally categorised not by what they're made of (a bunch of different hydrocarbons), but on the performance specifications they have.

Only ever feed your airplane the fuel types that are approved in your flight manual, but here's a little recap in case you do not recognise the items on the menu.

The Menu

Jet-A1 – The most traditional drink, it is straw coloured with a flash point of 38°C (100°F), and a freezing point of -47°C.

Jet A – Another tasty kerosine grade fuel which will work just fine. The flash point is the same but this turns into an icy slushie at only -40°C.

Jet B – A delicacy from the Northern Regions. This is a cocktail of kerosine and naphtha – the stuff dragons produce out their nostrils (ok, that is not true, but it might as well be because this stuff is hard to handle with its higher flammability). Wide cut, and only really used in colder climates, with its freezing point of -50°C.

TS-1 – A Russian cocktail, more flashy than most at 28°C, but with a freezing point of -50 °C. It is also sometimes called RT (which looks like PT when it is written in Russian). RT is a superior grade TS-1, but not widely available.

RP – Brewed in China, the RPs come in a variety of styles. RP-1 has a freezing point of -60°C, RP-2 -50°C, but it is RP-3 we really recommend because it is basically Western Jet-A1 produced at export grade.

Chip fat oil – Not literally, but if you fly into a remote airport in some regions you might find fuel is not of the standard required. Look out for anything that isn't straw coloured, doesn't smell right, or has things floating in it.



specifications are generally not as good.

If you are going to use it, there are likely going to be some pretty specific operational procedures involved because these fuels are much more volatile. Things like over-wing fuelling is generally a no-no, and the filtration system is going to appreciate a slow flow so it can keep up.

All those numbers

Fuel doesn't freeze like water. It is not liquid one minute and ice the next. Instead it turns into a strange, slushy porridge consistency.

What's more, if you have a mixture of freezing points, the freezing point won't be a nice in the middle -44.5°C so the only reliable way to work this out when you've mixed a load together is to take a

measurement - assuming you're carrying your own Fuel Freezing Point Measuring Gadget...

If not, the next best method to use is this -

- 90% or more of your fuel is one type? Use that freezing point.
- 89% or less of your fuel is one type? Use the highest (worst case) freezing point.
- You have 900 gallons of Jet A1 freezing at -47°C and 100 gallons of Jet A freezing at -40°C? Then call it -47°C and be off on your merry way.
- You have 899 gallons of Jet A1, and 101 gallons of Jet A? Then take the highest freezing point which in this case would be Jet A at -40°C

Do we really care about freezing points of fuel?

Yes, very much so, especially if you are flying some long haul treks over the North Pole at high altitude in the winter.

With outside air temperatures lower than -60 degrees, freezing fuel can get you into some very hot water, (or cold fuel to be more accurate.)

In Jan 2008, British Airways Flight 38 crashed just short of the runway at EGLL/Heathrow after flying from Beijing, China. They had been cruising between FL350 and FL400, with OATs reported to be between -65 to -74°C. While the fuel itself never froze, it did become cold enough for ice crystals to form in the fuel system.

These pesky little ice particles blocked stuff up and reduced the fuel flow, starving the engines, and causing a big loss in thrust right when the pilots needed it.
TUDNU	PARAS	ROVON	PAREX
N3753.0	N3731.6	N3716.0	N3605.5
E04444.8	E04541.6	E04553.4	E04651.9
410 262/087 -60	410 266/095 -61	450 265/076 -61	450 270/088 -64
390 259/104 -59	390 261/113 -59	410 266/098 -61	410 267/113 -61
370 259/106 -57	370 261/114 -57	390 262/115 -59	390 263/121 -59
KEBEP	NOTSA	RADID	IMGOD
N3504.9	N3317.8	N3024.7	N3014.3
E04740.2	E04903.3	E05126.2	E05130.8
450 272/100 -65	450 275/121 -67	450 281/131 -68	450 281/130 -68
410 268/124 -62	410 271/139 -63	410 279/139 -63	410 280/138 -63
390 266/120 -60	390 271/128 -58	390 280/134 -57	390 280/132 -57
DASDO	LAGSA	LAM	T_O_D
N2854.0	N2833.1	N2722.4	N2702.1
E05205.9	E05220.9	E05311.0	E05317.3
450 282/123 -69	450 283/121 -69	450 287/116 -70	NO WX DATA
410 282/127 -62	410 282/124 -62	410 285/116 -63	NO WX DATA
390 282/122 -56	390 282/119 -56	390 284/110 -56	NO WX DATA
DESCENT 390 288/092 -56 350 285/085 -47 310 286/082 -37			

200 307/058 -13 100 327/027 P08

The temperature gets darn cold at altitude!

What can we do about it?

Ultimately, you need to **turn up the temperature!** There are only a few ways to heat your fuel up if it starts getting too chilly:

Stir it Up – Unlike Bond who preferred his drinks shaken and not stirred, mixing cold fuel with warmer fuel makes it better. Some larger aircraft with complex fuel systems do this automatically, but if you are able to do so manually there will probably be a checklist and following it to avoid turning off the wrong pumps might be wise.

Speed it Up – Flying faster means more drag which means more energy converted into hotness. Not much though... an increase in Mach 0.01 will increase the TAT by around 0.7°C, and increasing your speed also increases your fuel burn.

Bring it Down – Warmer air will help, and by descending 7000' you can increase the TAT by around 7°C. In seriously cold air masses, descent to at least FL250 might be required, but this all means a much higher fuel burn.

Tanker? No thank ya...

Tankering fuel if you are operating into somewhere chilly might cause you some problems. The fuel is likely to get cold in flight, and up the likelihood of some frosty wings on the ground. So check the de-icing situation at your destination if you are tankering and it's cold out.

Some other useful info

- 1 imperial gallon = 1.2 US gallons.
- You can monitor the price of jet fuel here.

The November Mega OpsChat - All the Links...

OPSGROUP Team 20 January, 2021



The November 24th "East/West-One-Day-Two-Calls" **OpsChat Bonanza** was great! Thank you to all who joined us, and those who shared some useful intel with the group.

Boy, did we cover a lot! The good news is if you missed the show, you can **re-watch the recording here:**

During the chat, we provided a **bunch of links** for each topic covered. If you weren't quick enough to catch them at the time (we don't blame you), here's a little summary....

November Updates...

Greenland

What? Baffling Notam issued declaring Greenland's airports were closed.

What else? Panic not, a better one was then reissued, saying that you could still use Greenland's airports

for ETOPS and diversion alternates. We called them and they said that tech-stops and ferry flights are also allowed (although not listed in the Notam). They've basically just banned passenger flights, and don't want people staying overnight.

More Info:

- Greenland Closes Its Airports To (Nearly) All Passenger Flights Opsgroup Blog Post
- Official Word from The Danish Civil Aviation

Israel

What? You can now overfly Israel (as well as Jordan, Saudi Arabia and Bahrain).

What else? You need a local sponsor, should depart from an approved airport (but they do make exceptions) and need a permit.

More Info:

- Israel overflights now allowed - Opsgroup Blog Post

Hong Kong

What? Strange ILS behaviour, especially on Runway 07R/25L. Pretty much down to antennas, terrain and Boeing AFDS...

What else? They have also updated their Covid entry restrictions for crew – it's now slightly harder to get in.

More info:

- The Thing About the ILS
- Hong Kong Entry Rules for Flight Crew OpsGroup Blog Post

- The Official Word

CENEMAR (Central America)

What? There are some new flight planning requirements you need to know about.

What else? You can flight plan direct above FL200, and must include the new AFTN address MHFPZYZX when filing your flight plan.

More info:

- CENEMAR: New Flight Planning Requirements - Opsgroup Blog Post

Other big updates from 2020...

November 5th ICAO changes

When? Er... November 5th!

What? We are talking changes to wake turbulence categories, NAT Contingency Procedrues, SLOP and Gross Navigation Errors.

- The 511 on Nov 5th Changes Opsgroup Blog Post
- Hopefully a Link to the New 4444



Wake Turbulence Categories

Other overflights that are now ok

What? FAA SFAR updates - where US operators can't go!

Where?

- Ukraine: UKFV/Simferopol FIR is ok, UKDV/Dnipro FIR is not ok.
- Iran: Not ok, but the Gulf of Oman and Persian Gulf are Emirates, Kuwait, Bahrain and Muscat FIRs.

- Safeairspace
- Overflying Crimea Opsgroup Blog Post



Ukraine Airspace and a link to Safeairspace

Russian Me-trics

What? Russia are moving to feet (referenced to QNH) below transition through their airspace, starting with major airports.

When? From December 3rd.

More info:

- Russia are still playing me-trics on us Opsgroup Blog Post
- The Russian AIP (don't worry, it is in english too)

ADS-B

What? When will you get in trouble for not having it.

Where?

- Europe: ADS-B is required from June 2023, but have your retrofit plan in by December 7 (unless your AoC is before 1995).

- US: ADS-B is required anywhere Mode C, or in the picture below.
- Rest of World: Above FL290, pretty much.

- European ADS-B Mandate Opsgroup Blog Post
- The FAA FAQs on ADS-B



Where you need ADS-B in the US

North Atlantic Datalink Mandate

What? The North Atlantic Datalink Mandate (NAT DLM) is the thing that came into effect in Jan 2020, which meant that CPDLC was then required between FL290-FL410 throughout the entire NAT region. Simply put, you must be equipped with CPDLC and ADS-C if you want to fly between these flight levels.

And then what happened? Then Covid happened. Because of the resulting reduction in traffic they suspended this mandate, and it looks set to stay this way until the end of Feb 2021. Bottom line, aircraft which do not have CPDLC and ADS-C can continue to operate across the North Atlantic between FL290-410 until then.

More info:

- North Atlantic Datalink Mandate - Opsgroup Blog Post

SafeAirspace Update...

Ethiopia

What? Escalating conflict - Danger to overflying aircraft - beware of open airways!!

Where? Ethiopia - the Tigray region bordering Eritrea

- Safeairspace Ethiopia
- Airspace Risk Warning: Eritrea and Ethiopia Opsgroup Blog Post



Ethiopia Tigray region and a link to our post

Saudi Arabia

What? Drone and ballistic missile strikes continue from Yemen, no end in sight.

Where? Southern Saudi Arabia particularly, but Jeddah and Riyadh have also been attacked.

More info:

- Safeairspace

Armenia/Azerbaijan

What? The conflict is 'officially' over, but the airspace remains dangerous!

Where? The airspace between Azerbaijan's UBBA/Baku FIR and Armenia's UDDD/Yerevan FIR.

More info:

- Safeairspace

Western Sahara

What? An emerging conflict zone, with the threat of anti-aircraft weaponry. Little info or warnings, that may well affect aircraft operating into the Canarias.

Where? Northwestern Africa – a area region between Morocco and the Polisario.

More info:

- Safeairspace

Hong Kong revised entry rules for flight crew

David Mumford 20 January, 2021



Hong Kong has published **extensive guidance on its entry rules** via its dedicated Covid website, but in a bizarre twist, it's actually the Notams which make it clearer to quickly work out exactly what's allowed here:

A1199/20 – IN VIEW OF THE LATEST SITUATION OF COVID-19, THE HONG KONG SPECIAL ADMINISTRATIVE REGION GOVERNMENT IS IMPLEMENTING THE FOLLOWING MEASURES:

1. ALL NON-HONG KONG RESIDENTS COMING FROM OVERSEAS COUNTRIES AND REGIONS BY PLANE WILL BE DENIED ENTRY TO HONG KONG.

2. NON-HONG KONG RESIDENTS COMING FROM THE MAINLAND, MACAO AND TAIWAN WILL BE DENIED ENTRY TO HONG KONG IF THEY HAVE BEEN TO ANY OVERSEAS COUNTRIES AND REGIONS IN THE PAST 14 DAYS.

3. ALL TRAVELLERS COMING FROM MACAO AND TAIWAN, INCLUDING HONG KONG AND NON-HONG KONG RESIDENTS, WILL BE SUBJECT TO A 14-DAY COMPULSORY QUARANTINE, WHICH IS THE SAME AS THE ARRANGEMENTS FOR PEOPLE ENTERING HONG KONG FROM THE MAINLAND.

4. HONG KONG RESIDENTS ARRIVING IN HONG KONG WHO HAVE BEEN TO ANY OVERSEAS COUNTRIES AND REGIONS IN THE PAST 14 DAYS WILL BE SUBJECT TO A 14-DAY COMPULSORY QUARANTINE.

5. AIR CREWS ARE EXEMPTED SUBJECT TO CONDITIONS. DETAILS CAN BE FOUND IN

HTTPS://WWW.CORONAVIRUS.GOV.HK/ENG/INBOUND-TRAVEL.HTML

29 SEP 07:39 2020 UNTIL 29 DEC 15:59 2020 ESTIMATED. CREATED: 29 SEP 07:39 2020

Ok, still not actually that clear. Big block of text, all upper case, an assault on the eyes...

So, to make that even clearer, between now and Dec 29:

- Non-residents may only enter if coming from China, Macao or Taiwan, but not if they have travelled to any other country within the past 14 days.
- All inbound pax, including Hong Kong residents, are subject to a 14-day quarantine.
- There are special rules for flight crew...

Rules for Flight Crew

On Nov 24, Health authorities in Hong Kong published a document with the revised entry rules for flight crew. There are basically slightly different rules depending on whether crew have been in "very high risk places" in the past 14 days. Either way, all crew should have a negative PCR Covid test taken within 48 hours of operating, along with a letter from their airline/company that certifies an accredited laboratory was used. On arrival, all crew get tested again and must isolate until departure.

	HONG KONG				
香港商用	航空中心有限公司				
Dear Duty O	fficer,				
RE: Latest te	RE: Latest testing and self-isolation arrangement for crew (updated 24Nov2020)				
In regard of shown in the to strictly fol	the latest testing and self-isolation arrangem table below, we would like to draw your im low the conditions of self-isolation specified	ent for all air crew members, as mediate attention to remind all crew by the Department of Health.			
Local based Non-local ba remain insid stay from an permitted to	crew must self-isolate for 24 hours ("test an used crew are mandated by respective comp e their respective assigned hotel guest room vial through departure. In-room dining is ge leave their guest room and use public areas	i go") any policy and local ordinance to for self-isolation throughout their nerally available as crew are not / restaurants.			
Please be aw specified in t observe self- responsible	vare that under local law it is an offense to fa the Notification of Medical Surveillance, whi isolation. The hotel is required to report suc government department.	il to observe any of the conditions th includes the requirement to h violations to the airline and the			
Thank you for Tightened Ter With effect f categories, th set out below	rr your kind attention. sting and Quarantine Requirement for All Inbou rom 22 November 2020, in accordance with e HKSAR Government will tighten the testing and :	nd Crew Members the risk level of respective exemption quarantine arrangement for air crew as			
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Click to download the rules!

Rules for Positioning Crew

You have to go through all the same health checks, but there's a way to get around the 14-day quarantine on arrival. You need to prepare a letter in advance (see below). As positioning crew, you're required to self-isolate at a hotel for medical surveillance whilst you're waiting for your outbound flight. You'll have to wear a mask and get your temperature checked daily for reporting to the authorities. If you have a residence in HK, you should be allowed to go there instead.

To apply for the **exemption from the 14-day quarantine for positioning crew**, you have to send a letter to HKBAC, who will charge you HKD500 (around \$65 USD). Here's how it works, and the info you need to include:

- 1. Flight Operator issues the letter with company letter head describing travel purpose and duty of the concerned crew
- 2. The Operator sends email to HKBAC to get verification endorsement on the letter. After verification, a scanned copy of the letter would be sent to the Operator by email.
- 3. The Operator provides that letter with verification by HKBAC to its concerned crew.
- 4. The concerned crew brings along the letter when travelling as passengers on commercial flight
- 5. Upon landing in Hong Kong, the crew approaches Crew Channel to obtain exemption from the Duty Immigration Officer before going through Immigration as passenger

Remarks:

- 1. *HKBAC's checking is only for the identity verification based on the information provided by the Operator. HKBAC does not hold any liability on the exemption approval process.*
- 2. Administration fee at HKD500 per endorsement would be applied and will be charged to the Operator which requests for the crew exemption letter.
- 3. Validity of the letter for crew exemption will be 7 days from the commercial flight date.
- 4. Although air crew can be exempted from the compulsory quarantine, the Department of Health (DH) will arrange Medical Surveillance for persons under the exempted categories of persons during their stay in Hong Kong. Exempted persons are subject to the temperature check and health declaration procedures carried out by DH.
- 5. In order to avoid your crew members being denied check in or boarding the commercial flights, please contact the commercial airlines that the crew would be travelling in in advance to ensure they are aware of the exemption.
- 6. Please be advised there is no guarantee that HK Health accepts the air crew letter for inbound positioning crew.

Hong Kong has always been a tricky place to fly to, unless you're an airline with landing rights secured for the next two decades. As the world's third busiest airport, with only two runways, it goes without saying that **congestion is a big issue here!**

Things have gotten slightly easier this year due to the **downturn in traffic** caused by the Covid

pandemic, with airport authorities now allowing airlines to keep their slots even if they don't use them. So, good news for them, but also good news for GA/BA operators, as the overall reduction in traffic means that **a lot more slots are available right now - daytime ones too!** So if need to go to Hong Kong and can navigate the entry rules, slots and parking should not be a problem.

Have you flown to Hong Kong recently? How did it go? Send us an email and let us know, or even better – file a report on **Airport Spy** and it will automatically go out to everyone in the group!

November Ops Chat

OPSGROUP Team 20 January, 2021



EAST CHAT: 10 AM LONDON



The changes you missed in 2020 November ops alerts Airspace risk review + Surprise ATC guests!

Also: Russia changes to feet / Israel overflights / Covid fog / Flight planning engines / and: whatever you want to talk about ... lots of Q&A's.

WEST CHAT: 10 AM NEW YORK



TUESDAY NOVEMBER 24 2 Calls, 1 Day

The changes you missed in 2020 November ops alerts Airspace risk review + Surprise ATC guests!

Also: Russia changes to feet / Israel overflights / Covid fog / Flight planning engines / and: whatever you want to talk about ... lots of Q&A's.

WEST CHAT: 10 AM NEW YORK

We have decided to run not one, but two Ops Chats on Tuesday November 24th!

Why two calls?

The calls have been getting bigger and bigger. So, we're runing two so there's more time to talk, answer questions, and make sure that if you want to get a chance to take part, you can. And also, so that you don't have to stay up until midnight (or worse) if you're not in the United States.

Who can join?

This is an **open call**. If you work in international flight ops, you're welcome to join us.

So, when should I set my alarm for?

The date is Tuesday, November 24th.

Chat 1, the **EAST-CHAT** is **at 10am London time.** (10am London, 11am Berlin, 2pm Dubai, 6pm Singapore, or **1000Z**) Register and save your spot at ops.group/eastchat

We will have some lunch.

Chat 2, the **WEST-CHAT** is at **10am New York time** (9 am Paris (Texas), 7 am Forks of Salmon (California, or **1500Z**). Register at ops.group/westchat

So, pick the time that suits you best and join us for a chat. Or, join us for both chats. Your choice!

What are we chatting about?

• We are getting to the end of this year, and the plan is to **get out from the Covid fog** and take a look at **what else has been going on in 2020.**

- There have been some **big changes**, and in case you have missed them, we will give you **brief rundown** of what they are.
- We will look over the "highlights" of November's ops alerts.
- There will be a **2020 Airspace risk review** looking at Conflict Zones and changes this year.

Get your questions ready

You can be nice and **send these through early** (email us) so we can look clever answering them, or you can put us on the spot. But we love questions so prepare some for us.

Airspace Risk Warning - Ethiopia and Eritrea





There is a new Conflict Zone in the east of Africa, which carries elevated risk to flight operations that may not be obvious from NOTAMs or other risk warning sources.

Some airways have been closed by the Ethiopian and Sudanese CAAs. Other airways that are still open are very close to the Conflict Zone. These are frequently used by international operators on the Europe- East Africa route. In particular: UN321, UG300 and UL432. **We are concerned that operators may be using these routes without being aware of the risk**.

OPSGROUP has today issued an Airspace Risk Warning to its members.



Download OPSGROUP Airspace Risk Warning - Ethiopia/Eritrea (PDF)



Download Hi-Res version of this Conflict Zone map

Situation

The region being disputed is called Tigray. It's in the north of Ethiopia. Government forces are fighting a regional force that wants independence, called the TPLF. In the past week, there has been heavy fighting, multiple airstrikes, missiles launched, and a growing refugee crisis. A domestic conflict has become a cross-border war.

Our Concerns

There are many warning flags that point to previous shootdown incidents – not least MH17 and PS752. These are the reasons we are particularly concerned about the risk to civil aviation in this region:

Local NOTAMs are misleading

The NOTAMs issued by the Ethiopian CAA to close airways in the conflict zone (UM308, UT124) do not say why they are closed. NOTAMs issued to reroute traffic to adjacent routes (UN321, UL432) do not say why they are rerouted. The same applies to NOTAMs issued by the Sudan CAA to close airways and reroute traffic. Flight crews and aircraft operators are therefore not alerted to any conflict in the area by NOTAM.

Arbitrary Reroutes

Traffic is being rerouted to other airways by ATC, but it's not clear, or likely, that there has been any risk assessment. European flights are now using UN321/UG300, and UL432 – all of which come exceptionally close to the conflict zone. As we've learned from MH17 and PS752, just because airspace is open and available, does not mean it is safe.

Previous shootdowns

The Ethiopian Army shot down an Embraer 120 in May 2020, in Somalia. The Ethiopian Air Force shot down a US Learjet in August 1999 in the Eritrean border region. Both were misidentified.

No guidance to operators

No aviation authorities or official sources have issued any guidance or warnings to date via normal channels.

Rapid Escalation of Conflict

The situation has intensified rapidly, and is extremely unpredictable and unstable. The impact on aviation has not been widely reported.

Guidance

Enroute - Overflight:

If you're transiting any airspace near or over Ethiopia, Eritrea, or Sudan, take a close look at the map and cross check the airways you are operating on. Several open airways are exceptionally close to the Conflict Zone. Just because they are open does not mean they are safe.

Landing - Airports:

Airports in the north of Ethiopia, including the Tigray and Amhara regions, are unsafe at present. Many are closed. There have been missile attacks on HABD/Bahir Dar, and HAGN/Gondar. HHAS/Asmara in Eritrea should be avoided – missile attack on Nov 14, 2020.

Information Sources

The Conflict Zone & Risk Database at SafeAirspace.net contains all current published warnings and alerts for Ethiopia and Eritrea.

SAFEAIRSPACE **Conflict Zone & Risk Database** Ethiopia CRISK RADAR Risk Level: Two - Danger exists Ethiopia: What are other operators doing? Nov 2020: Major escalation of the conflict in the Tigray region, along the Ethiopia/Eritrea border. Some airways have been closed by the Ethiopian and Sudanese CAAs. Other airways that are still open are very close to the Conflict Zone. 🐓 0 % with Avoid or Do Not Land policy These are frequently used by international operators on the Europe- East Africa route. In particular: UN321, UG300 Avoid 0% and UL432. Multiple airports have been targeted by rockets. Missiles were fired across the border into Eritrea, targeting HHAS/Asmara. Within Ethiopia, HABD/Bahir Dar and HAGN/Gondar were also targeted. Specific routes only 0% Sep 2018: Risk due to hidden ATC strike. Ethiopian ATC controllers went on strike, and the ECAA and Ethiopian Airlines recruited both retired and foreign controllers to pick up the slack. Ethiopia denied several times that there was in fact a Case by case 0% Unrestricted strike happening at all. The strike ended September 7th. Many were not qualified to operate in Ethiopian airspace, due No policy 100%



The countries that issue the most relevant updates for unsafe airspace are:

- US (FAA) through Notams and SFARs
- UK (DFT) by Notam and then AIP
- Germany (BMVI) by Notam
- France (DGAC) by AIC

Note: Operators should not rely on EASA Conflict Zone Information Bulletins (CZIB)'s as a primary source of information. These serve only as pointers to the above sources, and often are not issued until several months after updates, if at all. Note that the Civil Aviation Authorities of the countries whose airspace is determined to be unsafe are unlikely to issue reliable guidance.

Group effort

This information is compiled from OPSGROUP member input, information, intelligence and analysis. If you have additional information to share, please send it to report@safeairspace.net.

Members: More information



OPSGROUP Members: More information in the discussion in the Forum about Ethiopia/Eritrea: Forum > International Ops > New Conflict Zone Ethiopia/Eritrea

All links to further resources are there.

Greenland closes its airports to (nearly) all passenger flights

OPSGROUP Team 20 January, 2021



Greenland have closed (nearly) ALL their airports to international passenger flights.

Well, apart from ones that come from Denmark. But don't go thinking you can make a quick stop off there first, they've even specified those are not allowed.

There is a provision for you to get special permission if you are transporting someone particularly important to the Greenland economy, but beyond that, no pax.

Here is the NOTAM:

BGGL SONDRESTROM FIR/FIC

A0621/20 – COVID-19: FLIGHT RESTRICTIONS. ALL CIVIL FLIGHTS FROM OUTSIDE BGGL FIR, ARE BANNED FROM LANDING AT AERODROMES WITHIN BGGL FIR. FOLLOWING EXEMPTIONS APPLY:

1. FLIGHTS FROM AERODROMES IN DENMARK

1A. FLIGHTS ORIGINATING IN OTHER COUNTRIES THAN DENMARK, WITH INTERMEDIATE STOP IN DENMARK BEFORE CONTINUING TO GREENLAND, ARE NOT EXEMPTED FROM THE BAN.

2. FLIGHTS TO BGTL. SPECIAL PERMISSION MAY BE OBTAINED FROM THE DANISH TRANSPORT-, HOUSING-AND CONSTRUCTION AUTHORITY FOR THE PURPOSE OF TRANSPORT OF PERSONS WITH PARTICULAR IMPORTANCE TO THE ECONOMY OF SOCIETY. FURTHER INFORMATION ABOUT RESTRICTIONS AND PROCEDURE FOR THE APPLICATION FOR SPECIAL PERMISSION CAN BE OBTAINED VIA THE FOLLOWING LINK: HTTPS://TBST.DK/EN/CIVIL-AVIATION. THE FLIGHT RESTRICTIONS DO NOT IMPACT THE USE OF AERODROMES AS ETOPS ALTERNATE OR FOR EMERGENCIES.

Still confused? Fear not, the government have now published a full clarification of the rules here – in **plain language** (which we like very much).

Can I do a tech stop?

Yes! Ferry flights and tech stops (gas and go) can continue - but you'll need to remain onboard.

Overnight tech stops are not allowed without special permission.

Can I pick up passengers in Greenland?

Yes! You are allowed to ferry an empty aircraft to collect passengers. You just can't bring them in.

What about ETOPS? Polar Alternates?

Yes! These are still permitted at BGBW/Narsarsuaq and BGSF/Kangerlussuaq. But watch out for extra charges if filing one of these airports on your flight plan as an alternate.

BGTL/Thule is only open to emergency diverts – not as a planning alternate because it's a military airfield which has no passenger facilities.

Who is this going to impact?

Mainly anyone who wants to bring in passengers for entry to Greenland. If you want to do it, you will need to apply for a special exemption at least 48 hours in advance. And you'll need a really good excuse.

Greenland serves as an important spot for ETOPS aircraft, and for an en-route alternate for polar operations – to repeat, you can still use BGBW and BGSF as ETOPS alternates.



So far they think the rule will remain in place until the end of January next year. Given the current mutated mink situation Denmark have found themselves in, we don't expect it to reopen sooner.

Has Russia stopped playing me-trics on us?

OPSGROUP Team 20 January, 2021



Russia have never been in much of a rush to join (most) of the rest of the world in how they measure stuff, but they are slowly getting there...

No longer playing me-trics on us?

Way back in 2011, they decided they would start using Feet instead of Meters above the transition level. So traffic cruising on through did not have to worry about sudden changes to metric levels, but any descending down into Russian airports still needed to whip out the old conversion tables once they went below transition.

Then in 2017, they started a trial at ULLI/St Petersburg to see if the whole Foot thing might work for them.

It turns out it went ok, because as of 3rd December 2020 they will be **implementing this across Russian airspace** – check out AIC 08/19 for the official announcement.

It's not all smooth sailing yet though...

The AIC seems to suggest that changes will occur in <u>all</u> airspace from Dec 3, but this requires lots of chart updates – in reality it's more likely that the big international airports will get updated first, and then the rest will follow.

At the end of November, European Regulators issued a **caution to operators** because some of the chart and database folk are struggling to update everything in time. We are talking en-route charts, SID and STAR charts, updates to prohibited and danger areas, updates to sector boundaries...

In their Safety Information Bulletin, EASA say if you are heading to Russia, check your charts to ensure they are in date, and keep an eye out to see what the changes are and if they have been implemented where you are heading.

What has changed?

- En-route stays the same: Flight Levels in feet, and metres if you are in a Russian aircraft.
- Below transition you will now also receive clearances in Feet (QNH).
- Pressure will be reported in hPa, unless you are a Russian aircraft then you can request in mmHg.

Last time we checked **188 out of 193 ICAO member states are using feet and QNH**, instead of meters and QFE. The only countries still working in Meters are China, Mongolia, North Korea, and Russia and Tajikistan (in lower airspace).

Here is a picture of UUWW airport showing the change:



The bit to look out for

Transition Levels

Initially, we had information that the transition altitude was going to be fixed at 10,000 feet across Russian airspace. **Not so, it turns out**. Each airport will have their own transition altitude and associated transition levels, **so be sure to check the approach plates**.

It looks as if Moscow is standardising it across their airspace with a transition altitude of 10,000['], and transition levels based on the pressure

- FL110 when QNH is 1012hPa or above
- FL120 when QNH is 977hPa or above
- FL130 when the QNH is less than 977hPA

And there is more

- All ATS routes have changed to RNAV5.
- A lot of TMA structures, and airspace areas around airports have changed which means a lot of arrivals and departures for airfields in the Moscow TMA airfields will also have changed.
- UUDD/Moscow Domodedovo and UUEE/Moscow Sheremetyevo airports now have independent simultaneous arrivals on their parallel runways.

IMPLEMENTATION OF THE NEW AIRSPACE STRUCTURE IN THE FOLLOWING FIR: MOSCOW, ARKHANGELSK, VOLOGDA, YEKATERINBURG, KOTLAS, ROSTOV-NA-DONU, SAMARA, SANKT-PETERBURG, SYKTYVKAR, TYUMEN.

The purpose of this Aeronautical Information Circular is to notify users of the airspace about the significant changes in the structure of the airspace of the Russian Federation.

Implementation of the new airspace structure pursues the following objectives:

- to enhance flight safety;
- to ensure capacity growth and efficient use of the airspace;
- to reduce operational expenses of the airlines.

The new airspace structure will be implemented on AIRAC effective date 03-Dec-20 in the FIR listed below:

- Moscow FIR;
- Arkhangelsk FIR;
- Vologda FIR;
- Yekaterinburg FIR;
- Kotlas FIR;
- Rostov-na-Donu FIR;
- Samara FIR;
- Sankt-Peterburg FIR;
- Syktyvkar FIR;
- Tyumen FIR.

Due to implementation of the new structure, the following airspace components are subject to changes:

- ATS route network;
- ACC sectors boundaries;
- prohibited, danger and restricted areas;
- CTR;
- SID, STAR, APPROACH procedures (taking into account change to QNH, indicating altitude in feet).

Users of the airspace will be informed of all changes in the airspace structure in advance.

Click to download PDF

References:

- You can access the Russian AIP here
- You can read up on Metric Altitude Reference info here
- Read our article from 2017 when ULLI/St Petersburg made the switch to feet and QNH

Thanks to Igor Nikolin, Deputy Head of the Air Navigation Support Service UTair Airlines for assistance with this post.

GPS Jamming: All the Wrong Signals

Chris Shieff 20 January, 2021



We live in a GPS world. This fantastic technology has **revolutionised aviation** since the first basic unit was approved for IFR use back in 1994. It has become engrained in day to day operations. We use it for a bunch of really important stuff – navigation, communication, surveillance, ADS-B and even TAWS. It is a technology that we rely on to stay safe.

And herein lies the problem. It relies on radio signals from satellites to work, and they can be **intentionally interfered with**. If you operate between Europe and Asia then the chances are this is not new. What is concerning is that it is happening more and more. In the last five years EUROCONTROL report that cases of GPS outages have risen dramatically. The number one suspect? **Deliberate interference.**

The Hot Spots

Almost always, widespread GPS outages occur in areas of political tension. It's no surprise then that the **Eastern Mediterranean, Middle East and Caucasus** are consistently the most affected regions – last year alone there were 3,500 reports of outages there. **About 10 a day**. And that's just from the people who spoke up. The **LCCC/Nicosia FIR over Cyprus** extending through to **LLBG/Tel Aviv** is particularly bad, with reports as far north as Italy, as well as **Turkey and Egypt.**

It is a part of the world **alive with tension** – spill over from the Syrian War, ongoing conflict in Libya and the current Azerbaijani conflict. Unfortunately it is also a **major air corridor** for flights between **Europe** and the **Middle East and Asia**. It is almost unavoidable.

But it's not just there – There are reports of GPS sabotage throughout the world – rings of interference (also known as 'crop circles') have been traced to **China, North Korea** and even **the US**.

So why tamper with GPS?

Unfortunately **electromagnetic warfare** is real. The goal for military interests is to make things as difficult as possible for the other side including disrupting communications and navigation. GPS jamming is also used as a defence against drones – the explosive ones which we see in the headlines, and the ones that are spying. In other cases, jamming is used to protect people's **privacy**, and sometimes as a source of **criminal mischief.** Unfortunately for us, whether we like it or not, civil aviation is along for the ride...



Portable GPS Jamming Device

Jamming or Spoofing?

GPS signals are low power, which means that a **weak interference** source can cause a receiver to fail, or more concerningly **produce false information**. A basic way to achieve this is with jammers – devices that mask the signal with noise. Although they are illegal in the US, they're not in other countries. And they're readily available.



Readily available: jammers for your car.

A more sophisticated approach used by the military is 'spoofing' where a ground station transmits a fake GPS signal that overrides the legitimate one.

In simpler terms - jamming causes the receiver to die, spoofing causes it to lie.

In powerful military applications, the effect of a single device has been known to affect a **300nm radius**, and it is almost impossible to locate them. They can be installed at bases, mounted in vehicles or put onboard ships.



Jammer mounted in an SUV

So why is this a problem for aviation?

The issue is getting worse, and outages are sporadic and unpredictable. Three quarters of GPS loss worldwide is occurring in the cruise, and in ten percent of these cases it lasts for **more than half an hour.** There have also been reports where GPS receivers never regained a signal. According to ICAO's rules, frequent outages must be Notamed but the reality is, **few states are actually doing it.** To make matters worse, with so few aircraft flying during the pandemic it is unclear just how bad it is getting.

For crew, a loss of GPS forces an aircraft to rely on other means to navigate in airspace that **relies on accurate navigation** to separate you from other traffic. It can also lead to other issues including false alerts and even GPWS warnings. Requiring pilots to ignore them is a concerning precedent.

The plot thickens, enter 5G.

We've all heard about it - the revolutionary technology that will let you download your favourite episode of 'The Bachelor' in record time. Worrying news in the US has emerged that the federal government has allowed a new network provider to access a slice of the radio spectrum **usually reserved for GPS signals** to power a huge 5G network across the country. The frequencies are powerful, and there is **no guarantee** that they won't won't interfere with GPS signals.



The mighty 5G antenna

So what can we do it about?

Unfortunately, like Covid, **the problem isn't going away anytime soon.** While manufacturers work on new ways to protect your aircraft, there are a few things you can do.

The most important thing is contingency – **have a plan.** Be aware of the threat of jamming if flying in affected areas of the world, and the issues it may create for you in the flight deck. If you lose GPS signal, **report it to ATC.** The more reports they get, the better. They will work to increase your separation and coordinate with other units.

When you're flying a GPS-based approach, know what you'll do if the **screen goes blank**. Be prepared for the unexpected because as recent events have shown, that super reliable technology can fail.

And **stay informed**, here are some useful resources:

- EUROCONTROL check out the latest stats on GPS outages here, and report loss of signal here.
- FAA GPS Anomaly Reporting Form. For all US based GPS issues.

Third Country Operators (TCO) Authorisation - How to get one (it's free!)

OPSGROUP Team 20 January, 2021



In Short: You need a TCO if you want to operate commercially in the EU. It's **free** and **pretty easy** to get one if you meet ICAO regulations (it just takes a little time to get everything ready to send).

What is it and who needs one?

"Third Country Operator" (or TCO) refers to non-European aircraft operators conducting **commercial** air transport flights **into the EU**. This includes business aviation flights that intend to operate commercial charter flights into the EU.

Private flights are naturally not commercial and are **exempt**. There are also provisions to allow for 'oneoff' or short-notice non-scheduled flights by commercial air transport operators that do not hold a TCO authorisation.

The TCO regulation requires TCOs to hold an authorisation issued by the European Aviation Safety Agency (EASA). The purpose of the authorisation is to confirm that the operator meets international operational and safety standards.

You can see a list of operators who already have TCOs here.

What is it measuring?

In one sentence: you are being asked to **demonstrate compliance** with international standards as stipulated in Annexes to the Convention on International Civil Aviation.

In particular Annexes 1 (Personnel licensing), 2 (Rules of the Air), 6 (Operation of Aircraft, Part I (International Commercial Air Transport – Aeroplanes) or Part III (International Operations-Helicopters), as applicable, 8 (Airworthiness of Aircraft), 18 (Dangerous Goods), and 19 (Safety Management).

Some common gotchas:

- Do you have a Safety Management System (SMS)? Even if SMS is not required by your local regulator, EASA expects these applicable international standards to be complied with when, operating to the EU.
- You need a Flight Data Analysis Program (FDAP) if your planes maximum take-off weight is greater than 27,000kgs (59,500lbs).
- Do you comply with the reinforced Cockpit Door Regulations?
- Are you compliant with Mode S Elementary, ADS-B Out and Mode S Enhanced Surveillance? Or do you have a plan in place to retrofit?

If you operate in a regulated environment (i.e. most Western countries) – you won't find too many quirks with ICAO regulations if you are a Part 121 operator. If you are Part 135, you might need to work on a few things.

How closely does EASA look at your compliance?

According to EASA, the deep dive of your compliance follows "a risk-based approach that takes into account the safety performance of the operator involved, the safety information available for the State of Operator and the State of Registry, and the level of exposure to European citizens."

Good news – if you are from Australia for example, you've never had an incident and are flying new planes, you are probably going to be scrutinized far less than say an operator from Syria.

A small note here from my experience. Some will have you believe that IS-BAO certification is required to demonstrate compliance for SMS and other items. **This is not true. You do not need IS-BAO certification.** If you have it, great, but EASA will assess your application on a case-by-case basis and ask for extra information if they need it.

How to get a TCO approval?

So, let's start off with the good news. It's **free** to apply and get authorised.

It's actually pretty simple to apply:

- 1. Download and Complete the Application Form here. You will need to provide some basic information along with the form and then email it in.
- 2. You will get setup with a login to the TCO Portal as the Master User. (Pro Tip, setup a second person with access in case you forget your login). Note: The portal is a little prehistoric and cumbersome to use, so hit the "save" button often!
- 3. You will then need to insert a whole bunch of technical information about your operation and fleet into the Basic Operator Data. This will take several hours and have you searching for AOC's, COA's, Insurance papers etc, but you should have most of it. You can save time by assigning certain sections to others in your company. If you get stuck there is some help available within the portal itself and I have found all my interactions with EASA staff during multiple TCO applications to be really friendly. They seem to respond quickly and are happy to help out if you get stuck or confused.

📾 Dashboard 🌍 TCO File 🔄 Basic operator data 🧟 Users 🛛 🤱 My details 🔢 Master User Guide 🕕 Terms of Use 🔞 Help 🖺 Logout					
BOD					
I. General operator information II. Organisation III. Accident history IV. Operator's Statement V. Aeroplanes					
E Save Submit & Assign sections					
I.1 Operator's data					

- 4. When you submit, they will take up to 30 days to complete the technical evaluation. They actually prompt you if you haven't submitted after a period of time. Naturally they will normally ask some extra technical questions to demonstrate compliance. As you don't send them your operations manuals you normally will need to find the reference to your procedures and send it back to them via the portal.
- 5. After the back-and-forward and requests for extra information, if they are happy with your submission they will issue your TCO approval! Yay, you did it!

What next?

Well – EASA monitors compliance via ramp checks, amongst other ways – but we already gave you the low down on how to prepare for that a few months back.

Did we miss something? Drop a comment below.

Extra Reading:

- EASA TCO Website
- EASA TCO FAQ
- FAA Circular on TCO
- Pakistan International Airlines recently lost their TCO approval due to what we will call "crew qualification irregularities"!

Space Weather: Here Comes Hubble...

Chris Shieff 20 January, 2021



History has shown that every ten years or so, earth comes under attack from high amounts of **space weather**- and we're about to embark on the next cycle.

Wait, there's weather in space?

Yep, but not in the conventional sense. That big ball of burning energy we call the Sun does more than provide us with the light and warmth we all seek on vacation.

It also constantly spews gas and particles into space, in what is known as the **solar wind**. These particles are charged with electricity, and are flung towards earth at up to a million miles an hour.

Luckily for us, our atmosphere and the earth's magnetic field acts like a shield. But sometimes these determined particles **make it through to our atmosphere**. When that happens we are often treated to the spectacular light shows we know as auroras. If you fly at high latitudes at night, chances are you have been lucky enough to see them. Sadly space weather can have more serious consequences for aviation than struggling to capture that illusive insta shot on your trusty iPhone 4.



An Aurora - the only good thing about space weather.

Like the earth weather we're used to, **space weather is changeable -** its severity depends on what is happening on the sun.

Its surface is a busy place – hot gases are constantly on the move as powerful magnetic fields twist and turn. When things get especially rowdy, **a storm occurs** and the solar wind gets stronger. Occasionally these storms produce a **solar flare** – essentially the sun burps, and sends significant amounts of radiation towards earth. This is where the trouble can occur.

What kind of trouble?

Communications. During solar events, **HF and satellite** communications can be disrupted. In severe cases, even disabled. There may be effects on **CPDLC and ADS-C services**. Line of sight VHF is less likely to be impacted, but that does not help much when you're over the middle of the ocean.

Systems. Some of your aircraft's systems are sensitive to radiation storms. Space weather may induce **sudden electrical failures** that can range broadly from insignificant to 'ruin your day.' Systems that rely on **magnetism** can also be affected

Navigation. The sun's particles disrupt the upper layers of the atmosphere, which can interfere with GNSS signals from satellites. You guessed it – the result is **unexpected position errors**. If it gets really bad, the signal may be lost all together. We're using RNAV based approaches more than ever these days, and the likelihood of not having ground based aids as a backup is increasing.

The Body. During these storms, you can be exposed to unusually high levels of **ionising radiation** (the nasty one for humans, think Chernobyl). As a general rule, the higher you fly or the higher the latitude, the more exposed you are. The effects of this on crew is the subject of ongoing studies. But the more you can **avoid higher exposure** levels the better.



The broad effects of a solar flare.

What can we do about it?

Here's the best news: space weather is predictable. And ICAO are onto it.

Solar monitoring has improved significantly in recent years. A number of countries have joined forces to create three agencies responsible for issuing **ICAO Space Weather Advisories (SWX)** around the clock.

Space Weather Advisories have a standardised format, and are **not the same thing as a SIGMET**.

They are only issued whenever space weather conditions get bad – essentially **moderate and severe impacts**, and only when operations **above FL250** are affected. They are activated for comms, GNSS and radiation interference, so seeing an SWX advisory during your pre-flight briefing is a pretty good indicator to **have a closer look**.

FNXX01 KWNP 020100 SWX ADVISORY 20190502/0100z DTG: SWPC SWXC: ADVISORY NR: 2019/59 2019/58 NR RPLC: SWX EFFECT: GNSS MOD OBS SWX: 02/0100Z HNH HSH E18000-W18000 FCST SWX + 6 HR: 02/0700Z HNH HSH E18000-W18000 FCST SWX + 12 HR: 02/1300Z HNH HSH E18000-W18000 FCST SWX + 18 HR: 02/1900Z NO SWX EXP FCST SWX + 24 HR: 03/0100Z NO SWX EXP RMK: IONOSPHERIC STORM CONTINUES TO CAUSE LOSS-OF-LOCK OF GNSS IN AURORA ZONE. THIS ACTIVITY IS EXPECTED TO SUBSIDE IN THE FORECAST PERIOD 20190502/0700Z= NXT ADVISORY:

Example of a SWX Advisory, this time for GNSS outages.

They predict the effect of space weather at six hourly intervals across a twenty four hour period. To define the areas affected, SWX advisories effectively draw a box. They divide the world into six bands of latitude, and tell you how wide the box is with longitude. **Still confused?** A picture always helps...



Beware the square!

For a full briefing, **the FAA** has recently published a helpful information bulletin which explains how Space Weather Advisories work in more detail. And if you're really brave, more info can also be found in ICAO Doc 10100.

Some other useful stuff:

- NASA's frequently asked questions on space weather.
- The Center for Disease Control and Prevention and their work on radiation exposure risk.

CENAMER: New Flight Planning Requirements

David Mumford 20 January, 2021



If you fly through the MHCC/Cenamer FIR above FL200, there's a new requirement coming on Oct 28, 2020 - when filing your flight plan, you must include the AFTN address MHFPZYZX.

This is the address of a **new automated system** they've got, which will **check if you've written your flight plan properly** (i.e. according to ICAO standards). If you have, you'll get an ACKNOWLEDGE (ACK) or ACCEPTANCE message, and the system will then fire it off to all of the individual countries within the MHCC/Cenamer FIR that you'll be overflying / flying to. If you've got it wrong, you'll get a REJECTED (REJ) or ERROR message, with the reason why, and you'll have to file it again.

There's another thing they're rolling out called the **"e-FPL" system**, but don't worry too much about that – it's only to be used for operators departing from a Central American airport who don't have access to their own system to send flight plans.

Lots of countries have published AICs on this, but Belize have been good enough to provide one in English. It covers what to do in detail, including instructions on how to make sure you're writing your flight plans properly! Check it out:



Wait, what and where is CENAMER?

CENAMER is a combination of CENtral AMERican countries that work together as one for ATC Service. The controlling Authority is COCESNA. The actual controllers are in Tegucigalpa, Honduras, but control the airspace of **Belize, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua**.


The fabled "CENAMER Notification"

This is where things start to get a bit tricky. For flights intending to operate within the MHCC/Central American FIR), COCESNA **require notification**. Every FIR worldwide requires the same thing, but because of the grouping of countries, the process is a little different for COCESNA. A preformatted AFTN message must be sent containing the flight details and planned schedule, to both the AIS office, and to the various billing departments.

The latter is most important, because it give them the opportunity to warn in advance if airspace entry will be denied because of **unpaid Navigation Fees**. The CENAMER Notification confirmation is normally in the format MPTOXXXX192330, being the originating AFTN address and a date/time stamp.

Notification Requirements

Notification: All flights entering the MHCC/Central American FIR must send notification 48 hours prior to entry.

Documents Required: None.

Lead Time: Official requirement is 48 hours before flight. Notification can be made up to 1 hour prior to airspace entry, but there is a risk that not all departments will have had time to process the message. Assuming there are no billing issues, denial of entry into the airspace is unlikely.

Validity: Once notification is made, there is no need to revise it for a new schedule. The Notification can be considered valid for 72 hours.

Permit Format: Confirmation is normally in the format MPTOXXXX192330, being the originating AFTN address and a datetime stamp. FPL Field 18 entry is not mandatory, but you can include it as PERMIT/CENAMER NOTIFICATION MPTOXXXX192330.

Do I need AFTN access to make this happen?

Yes. Well, probably...

We've had reports that COCESNA have now started handling this whole process by **email**, but if they don't reply for whatever reason, you'll need AFTN to file the Notification and to follow-up with any countries which reply to say you owe them nav fees.

You can start off by sending COCESNA an email at facturacionycobros@cocesna.org in good time prior to the flight, requesting details of any outstanding navigation charges and a copy of the invoice. Sometimes they reply, sometimes they don't. If you receive the invoice, you pay up, and your flight is good to go.

However, if you **don't** receive a reply and there **are** outstanding charges, you'll only know about it when you come to file your flight plan, at which point you'll receive a reply on AFTN from the specific country (or countries!) you owe money to. At this point, you're at their mercy as to whether they accept or reject your flight plan – and you may not have time to pay for any outstanding charges. These individual countries won't email you, they'll send you a message via AFTN (to the same address you use to file the Notification).

Bottom line, whoever files your Notification (and then, later, your actual flight plan) **will need access to the AFTN system** so that they are able to reply to these messages as they come through – and to check to make sure that your flight plan is accepted! This is where using a third party agent for overflights in this region can come in handy, as they should manage this whole process for you and communicate with all the relevant countries via AFTN.

Which AFTN addresses do I send messages to, and what should I say?

Your message should read something like this:

CENAMER NOTIFICATION OF FLIGHT REF XXXX PLEASE ADVISE IF ANY OBJECTION TO OPERATE

AIRCRAFT: XXXXX CALLSIGN: XXXXX TYPE: XXXXX OPERATOR NAME: XXXXX DATE OF FLIGHT: 20DEC2020

PLEASE CONFIRM RECEIPT OF THIS NOTIFICATION PLEASE CONFIRM OK TO OPERATE BY AFTN TO (INSERT YOUR AFTN HERE)

SCHEDULE: 20DEC ETD KDEN1300 ETA SBGR2230

NAVIGATION FEES SETTLED BY: XXXXX OPERATOR: XXXXX EMAIL: XXXXX

COPY TO ALL CONCERNED:

MHCCYSYX/CENAMER CONTROL MHCCZQZX/CENAMER CONTROL FPL MHTGYAYX/HONDURAS CAA MHTGYOYX/HONDURAS AIS MHLMYGYX/HONURAS RCO MROCYAYX/COSTA RICA CAA MROCYOYX/COSTA RICA AIS MROCYGYX/COSTA RICA RCO MNMGYAYX/NICARAGUA CAA MNMGYOYX/NICARAGUA AIS MNMGYGYX/NICARAGUA RCO MSLPYGYX/EL SALVADOR RCO MSSSYAYX/EL SALVADOR CAA MSSSYOYX/EL SALVADOR AIS MGGTYAYX/GUATEMALA CAA MGGTYOYX/GUATEMALA AIS MGGTYGYX/GUATEMALA RCO MZBZYAYX/BELIZE CAA MZBZYGYX/BELIZE RCO

And here's the list of AFTN addresses to send it to:

ICAO: MHCCYSYX ICAO: MHCCZOZX **ICAO: MHTGYAYX** ICAO: MHTGYOYX ICAO: MHLMYGYX ICAO: MROCYAYX ICAO: MROCYOYX ICAO: MROCYGYX ICAO: MNMGYAYX ICAO: MNMGYOYX ICAO: MNMGYGYX ICAO: MSLPYGYX ICAO: MSSSYAYX ICAO: MSSSYOYX ICAO: MGGTYAYX ICAO: MGGTYOYX ICAO: MGGTYGYX ICAO: MZBZYAYX ICAO: MZBZYGYX

Is the CENAMER Notification the same as an Overflight Permit?

No. It's important to note that this is **not a permit**, this is just to ensure the CENAMER countries receive notification of your planned flight, and can check for any unpaid Navigation Fees. Each individual country in this region requires an **overflight permit** as well (except for El Salvador and Costa Rica, if you're operating a private flight).

For more information on permit requirements, OPSGROUP members can use the dedicated Permits App in your Dashboard. If you're not a member, you can get a copy of the same information in our Permit Book, or alternatively, join OPSGROUP here!

2020: A Record Breaking Hurricane Season



It has been a record breaking season for the Hurricanes. We are not talking the Carolina based NHL team. We are talking actual hurricanes.

2020 has now tied with 2005 as the most active hurricane season in history. No surprise there given what's gone on in 2020 so far.

Hurricane Zeta became the 11th hurricane of the year. It is also the earliest in a season that 27 storms have needed naming (2005's Zeta only formed at the end of November).

2005 is still (thankfully) beating 2020 in terms of major hurricanes.

What is the difference?

'Hurricane' comes from an old world which means 'god of the storm'. 'Typhoon' comes from the beast Typhon – a Greek monster who fathered the sphinx, Cerberus and the super lion Nemean that Hercules had to kill. The etymology of the world 'Cyclone' is less terrifying, but they all boil down to the same thing –

They are fancy terms for great, big, mess-making, flash-booming, horror storms. Whether it is a Hurricane, a Cyclone, or a Typhoon just comes down to where in the world it is wreaking havoc.

Hurricanes, Cyclones, Typhoons also get individual names if they get big enough. Some of these names get retired if they cause too much damage and destruction – like Katrina in 2005.

A full list of Hurricane names can be found here.

So, what are they?

They are "large-scale, atmospheric wind-and-pressure systems characterised by a low pressure at the centre, and by a circulating wind motion". They spin counterclockwise in the Northern Hemisphere, and clockwise in the Southern Hemisphere.

Buys-Ballot famously stated if you stand with your back to the wind in the Northern Hemisphere then the low pressure will be to your left. I wouldn't recommend standing with your back to a Hurricane though.

These storms only get classified as a Storm if the tropical depression they form from gets mean enough – basically, winds exceeding 39 mph. If the storm's winds exceed 74 mph it gets reclassified as a Hurricane.

Hurricane's also get classified from 1-5 based on their capacity for damaging things.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds				
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.				
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.				
3 (major)	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.				
4 (major)	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.				
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.				

Why does aviation hate them?

Well, mainly because of the weather they bring. The crazy winds, serious rainfall and flooding, and power outages they cause.

How can we avoid them?

Meteorology departments track storms and try to forecast their movement. Some of the movement is based on air currents and sea currents (because hot water feeds them) amongst other things. From this they can create what are called Spaghetti models which help forecast where the storm will travel.

Agencies such as NOAA also (on purpose) fly airplanes into them. These Lockheed WP-3D Orion aircraft have 4 turboprops and are pimped out with probes for measuring every wind and pressure change to help scientists see what is going on inside.

Little salute to the pilots who do those flights!

These aircraft measure everything! They have radars which can scan the storm vertically and horizontally, and can even drop probes to test the water temperature.



Satellites monitor storms as well, but mainly just send down horrifying photos of how massive they are.

All this information gets fed to sites, some of which we monitor...

What do we tell you?

We check a site called Cyclocane which tells us about active tropical storms, and their forecast paths. We try to give an alert about severe weather forecasts, and alerts on airports that are cancelling operations due to weather.

We also check other weather forecast sites, and NOAA for warnings on serious weather which might affect operations.

Zeta...

Zeta is a serious storm. Still currently over the water, it is strengthening and is expected to bring storm surges and extreme winds of over 100 mph

There are storm surge, tidal and hurricane warnings in place for Florida and Louisiana.

It is expected to turn North on October 28 or 29, and is expected to make land fall close to New Orleans late in the evening of October 28



ZETA Land Hazards

NWS Local Hurricane Statements

New Orleans LA AL282020 **ZETA EXPECTED TO BRING HURRICANE CONDITIONS AND STORM SURGE TO A PORTION OF THE NORTHERN GULF COAST TODAY** Birmingham AL AL282020 **Tropical Storm Watch Expanded Across Southeast Central Alabama** Tallahassee FL AL282020 **AIR FORCE HURRICANE HUNTER AIRCRAFT REPORTS THAT ZETA IS STRENGTHENING** Lake Charles LA AL282020 **AIR FORCE HURRICANE HUNTER AIRCRAFT REPORTS THAT ZETA IS STRENGTHENING** Jackson MS AL282020 **URRICANE ZETA CONTINUES NORTHWARD, FORECAST TO MAKE LANDFALL LATER TODAY** Mobile AL AL282020 **ZETA EXPECTED TO BRING TROPICAL STORM CONDITIONS AND STORM SURGE TO THE AREA LATE THIS AFTERNOON AND OVERNIGHT** Peachtree City GA AL282020 **Remnants of Hurricane Zeta is expected to impact portions of north and west Georgia late today into Thursday**

Volcanoes - No lavaing matter

OPSGROUP Team 20 January, 2021



One of the rowdy Icelandic volcanoes is at it again. Earlier this month, the Icelandic Met Office changed the aptly named Grímsvötn to a 'Code Yellow' after it started showing high levels of activity.. There has also been a fair amount of action in the Pacific Rim, and even Mount Etna has been rumbling...

Why is volcanic ash so dangerous?

For starters, it is not the same thing as smoke.

Volcanoes are on the ground, airplanes are in the air, but unfortunately volcanoes spit out loads of hot, nasty stuff and they tend to spit it rather high. That hot, nasty stuff is a mixture of glass, rock and mineral particles, and it is really fine – the diameter of a particle measuring less than 2mm. It is also very porous meaning it weighs next to nothing and is easily carried along on the wind.

Once the ash cloud starts to spread it, it can be very hard to spot – **even a fairly dense ash cloud is unlikely to show up on your weather radar because the particles are just too small.**

If it is ingested into a jet engine, it will erode the compressor blades before forming a substance similar to molten glass inside the combustion chamber, and this then re-solidifies on the turbine blades. The end result can be stalling and engine failure – and you might not be able to get them going again. And if that wasn't enough, it can also damage the flight deck windows, block pitot static systems, and get into the cabin air and damage ventilation and pressurisation systems.

So volcanic ash is to airplanes, like sand is to picnic on a beach – it gets everywhere, and pretty much ruins it.

Take British Airways Flight 9 for example...

In 1982 a British Airways 747 was en-route from London Heathrow to Auckland (with a few stops along the way). While overflying Indonesia, late into the night, their windshield began to glow an eerie shade of blue. They had unwittingly entered an ash cloud from the recently erupted Mount Galunggung. Within three minutes, all four engines had stopped. They descended over 25,000' and were making some pretty close-up eye contact with fish before they finally managed to get the engines running again.

In December 1989, a KLM 747 had a similar incident when en-route from Amsterdam to Tokyo, Narita. This time it was an ash cloud from the Redoubt Volcano that caused all four engines to fail. They also eventually managed to re-start and landed safely into Anchorage with no injuries, but with around 80

million dollars worth of damage to the airplane...

Okay, so what can we do about it?

For starters, understand the alerts you see in your pre-flight briefings.

To help operators plan against potential ash encounters, ICAO have helped develop a universal alerting system for aviation that uses a simple but informative colour coding to give a heads up of the activity level of volcanoes.

ICAO COLOUR CODE	STATUS OF ACTIVITY OF VOLCANO		
GREEN	Volcano is in normal, non-eruptive state. or, after a change from a higher level: Volcanic activity considered to have ceased, and volcano reverted to its normal, non-eruptive state.		
YELLOW	Volcano is experiencing signs of elevated unrest above known background levels. or, after a change from higher alert level : Volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.		
ORANGE	Volcano is exhibiting heightened unrest with increased likelihood of eruption. or, Volcanic eruption is underway with no or minor ash emission. [specify ash-plume height if possible].		
RED	Eruption is forecasted to be imminent with significant emission of ash into the atmosphere likely. or, Eruption is underway with significant emission of ash into the atmosphere. [specify ash-plume height if possible].		

ICAO also coordinate several Volcanic Ash Advisor Centers (VAACs) around the world that operate under the International Airways Volcano Watch. They use a network of met stations, satellites and even reports from pilots to provide forecasts, SIGMETS and advisories to the aviation community regarding ash clouds and eruptions. In other words, they try to tell you where it is, how bad it is and if it will get worse.

So, you can plan your flights to avoid affected areas both laterally and vertically.

Know the signs...



Click to download.

We have made you a handy infographic explaining what happens, and what you should do about it, but the general gist is:

Watch out for the signs that you might be entering an ash cloud – a strange colored cloud (in the vicinity of a known volcano), sulphuric or acrid smells in the cabin that can't be blamed on the co-pilot, increased static charge around the flightdeck windows, garbled radio, or a picture of it on your sigmet chart (that you missed in the pre-flight briefing) are usually a good giveaway;

If you think you've flown into ash, get out fast. A 180 degree turn is usually best. Follow the actions or volcanic ash checklist for your aircraft type, and consider getting yourself on oxygen;

Look after your engines. Monitor your engine closely – you might see surging, stalling or high EGTs. If they are, reduce power and turn the auto throttle off. **Do not try** to climb out of it;

Watch your speed. If you're getting erroneous speed indications, go back to basics using pitch and power until you can confirm your speed is safe;

Report it – Chances are if you've flown into it, so will another aircraft behind you, so make sure you put a radio call out to warn them, and to let ATC know why you just did a massive wheelie in the sky.

The Bigger Issue for Aviation

In 2010 the unpronouncable Eyjafjallajökull erupted and caused enormous disruption to air travel across Europe. The disruption lasted for over a week, and that was just one volcano!

A previously published report established that over one hundred airports in twenty-six different countries were affected by the eruptions of just forty-six volcanoes within a three period. Unfortunately for aviation, there are about 1500 active volcanoes in the world (not counting the ones that line the ocean floor.) 75% of these fire breathing mountains live in the Ring of Fire, in the Pacific, but there are some seriously cranky calderas on all continents bar Australia.

Which ones should we keep an eye on?

Volcano-watching organizations and aviation authorities have established a ranking system for volcanoes using an overall threat score, and a threat to aviation score which take into account 24 factors.

In the US, Kīlauea in Hawaii ranks numero uno worst with an overall threat score of 263, and an aviation threat score of 48. Mount St. Helens, Washington poses the greatest threat to aviation with a score of 59.

So what other resources are there to help avoid serious aviation disruptions from eruptions? Unfortunately, volcanic eruptions can be a little hard to forecast, but generally how much they are rumbling, GPS data that monitors seismic activity, and historic eruption data are used to predict if and when they might pop.

Ash clouds are relatively hard to track as well – normally data is plugged into ash cloud modeling programs that consider the density and plume size, and the wind conditions for the day to model how it might disperse. Satellite sensing to detect radiation absorption levels, and thermal infrared wavelength levels also help, but there is no one sensor for observing everything.

Aviation authorities determine ash zones based on the concentration of ash. These are either a No Fly Zone, or an Enhanced Procedure Zone, and are based off tolerance levels agreed with aircraft and engine manufacturers. Generally enhanced procedures require training for the pilots (on identifying effects) and additional maintenance checks for the engines and aircraft.

Too Long; Didn't Read

- 1. **Keep an eye on our alerts.** Opsgroup will send out alerts on any volcanic eruptions that look like they will significantly impact flight operations;
- 2. **Familiarise yourself** with the signs of ash clouds, and the actions to take in case you ever do end up in one.

Other resources

- http://www.bom.gov.au/aviation/warnings/volcanic-ash/ shows the Volcanic Ash SIGMETs received in the last 24 hours for all regions around the world.
- https://www.ssd.noaa.gov/VAAC/vaac.html links to the individual websites of all the different Volcanic Ash Advisory Centers.
- http://icelandicvolcanos.is shows a nice clear map of the volcanoes in Iceland, color-coded to show varying levels of activity.
- How to make your own volcano at home!

The 511 on the Nov 5th ICAO changes

Chris Shieff 20 January, 2021



A whole bunch of procedural stuff will be changing from 5 Nov 2020, with the release of a new amendment to ICAO's Procedures for Air Navigation Services document. There will be changes to **Oceanic Contingency and Weather Deviation Procedures, Wake Turbulence Separation, SLOP Procedures,** and how the **FAA defines Gross Navigation Errors.**

What is the PANS-ATM (ICAO Doc 4444)?

Procedures for Navigation Services – Air Traffic Management. In other words, the 'go to' manual for aircrews who operate internationally. It explains in detail the standard procedures you can expect to be applied by air traffic services around the world, and what they expect in return.

Here is a summary of the most important changes coming on 5 Nov 2020. Thanks to Guy Gribble at International Flight Resources for this update.

Oceanic Contingency Procedures

Basically, what you should do if you need deviate from your flight path without a clearance. Weather avoidance, turbulence, depressurisation, engine failure – you get the picture. Published procedures are changing: there will be one standard set of Contingency and Weather Deviation Procedures for all oceanic airspace worldwide.

If you've been flying in the North Atlantic Region over the past year and a half, you'll be familiar with how it works – the new procedures were introduced there back in March 2019, and now they're being rolled out everywhere.

The main change here is that Contingency offsets which previously were 15 NM are basically now all 5 NM offsets with a turn of at least 30 degrees (not 45 degrees).

For more on this, check out our article.

Wake Turbulence

Flight Plan Category

There will be a new wake turbulence category for flight plans:

No longer will 'Heavy' rule the skies. 'Super' is about to be added, which will cover the largest aircraft including the A380-800, and Antonov 225. You will even get to say it after your callsign on initial contact with ATC.

ICAO Doc 8643 will shortly include all aircraft which qualify for the category.

You'll need to tell them your category in Flight Plan Item #9 too. For Super, the letter 'J' is what you'll need to include.

Here's the new line up:

J – SUPER (Check Doc 8643 to see if you qualify)

H - HEAVY (Max take-off weight greater than 136,000kg/300,000Lbs)

M – MEDIUM (Max take-off weight greater than 7,000kg/15,500Lbs)

L - LIGHT (Max take-off weight less than or equal to 7,000kg/15,500Lbs)

Wake Turbulence Separation Categories

Countries may choose to use the ICAO wake turbulence codes above to determine how much room to give you from preceding traffic, or they can elect to use a grouping.

Currently, ICAO groupings are based simply on weight and there's only three of them. The problem with that approach is that sometimes the separation provided is excessive which slows down the flow of traffic and creates unnecessary delays.

The US and Europe were on to it when several years ago the FAA and Eurocontrol joined forces to look at the wake characteristics of aircraft in more detail. They came up with a better system – it was a process

known as Aircraft Wake Turbulence Re-Categorization or simply, RECAT.

Turns out that when you take into account factors such as approach speeds, wing characteristics and handling abilities of various aircraft it is possible to safely reduce separation.

As a result, six new categories were created. You can read about those in FAA SAFO #12007 and EU-RECAT 1.5 if you would like to know more.

The point is, ICAO is now adopting those categories.

So why does it matter?

Because the separation applied when following smaller aircraft may be reduced to as low as 2.5nm on approach. Closer than you may be accustomed to.

Out with the old, in with the new. Here's what you can expect to see in November:

Old: HEAVY (H) - aircraft of 136,000kg or more MEDIUM (M) - aircraft less than 136,000kg but more than 7,000kg LIGHT (L) - aircraft of 7,000kg or less New: GROUP A - \geq 136,000kg and a wingspan \leq 80m but >74.68m GROUP B - \geq 136,000kg and a wingspan \leq 74.68m but >53.34m GROUP C - \geq 136,000kg and a wingspan \leq 53.34 m but >38.1m GROUP D - <136,000kg but >18,600kg and a wingspan \leq 32m but >27.43m GROUP F - <136,000kg but >18,600kg and a wingspan \leq 27.43m GROUP G - <18,600 kg or less (no wingspan criterion)

Separation standards will soon be published accordingly.

Strategic Lateral Offset Procedures (SLOP)

Wait, what?

As a result of extremely high levels of accuracy in modern navigation systems, if an error in height occurs there is a much higher chance of collision. It is also greatly increases the chance of an encounter with wake turbulence.

In some airspace, when the lateral separation applied or the distance between adjacent parallel routes is greater than 6nm, aircraft can deviate up to 2nm right of track without a clearance. This is what is known as SLOP.

The way in which it is applied is changing

Where the lateral separation minima or spacing between route centerlines is <u>15NM or more</u>; offsets to the right of the centerline will allowed <u>up to 2nm</u>.

When the lateral separation minima or space between route centrelines is <u>less than 15nm</u> (but more than 6nm), you will be able offset <u>up to 0.5nm</u> right of track.

So, it is important you are familiar with what kind of lateral separation is being applied in the airspace you are operating.

The FAA will change their definition of GNE's

On 5 Nov 2020, the US FAA will change their definition of Gross Navigation Errors to mean anything more

than 10nm (down from 25nm), to align with ICAO's 10nm definition that currently exists on the NAT HLA. So after this date, the FAA will require you report all lateral errors, 10nm or greater worldwide.

More on this from Guy Gribble at International Flight Resources:

"Keep in mind that ATC does not always advise a crew that it files a report; therefore, the FAA inspector will try and contact the crew as soon as possible so the crew will remember details of the event. ATC keeps voice and communications records for between 30-45 days. New York Radio and San Francisco Radio keep voice communications for 30 days. The FAA directs that oceanic error investigations should be complete within 45 days of the incident."

Berlin's long-delayed Brandenburg airport is finally opening

OPSGROUP Team 20 January, 2021



When we say "new" that is a little bit of a lüge – the new EDDB is actually sort of consuming the old EDDB (Schönefeld) into its airport infrastructure, like the creature from The Blob. On October 25, Schönefeld Airport will become "Terminal 5" at Brandenburg Airport; and on November 8, neighboring EDDT/Tegel Airport will close and all traffic will switch to Brandenburg. At this point it will be the third busiest airport in Germany, and the fifteenth busiest in Europe.

The new airport does have some new buildings as well though. Terminal 1 will be the main terminal for the airport, with a train station situated in it for direct connections to the city of Berlin. Eventually a Terminal 2 will also be built.

The airport operator is expecting around 5000 passengers to pass through Terminal 1 on Day 1, and a further 8000 through Terminal 5.

Here's the chart for Schönefeld Airport (i.e. how it looked before):



Click for hi-res PDF

And here's the chart for Brandenburg Airport (i.e. what it looks like now)



Click for hi-res PDF

You can get your hands on the new airport charts via the European AIS Database. It's free to register an account, and lists AIP info (including airport charts) for most countries in Europe (plus Kazakhstan and the Philippines too, for some reason).

So, when?

October 31 will see EasyJet and Lufthansa both racing to be the "first" aircraft to operate into the airport. Rather un-excitingly they will land on the "old" runway though.

November 1 will see the first ever departure from Brandenburg International airport, with the Southerly runway expected to open up to traffic from November 4th.

You might have heard about it earlier...

Work on the airport actually started in 2006, and it was supposed to open in 2011, but nearly a decade later (and close to triple the original budget), it has only just been completed.

The airport suffered a range of construction, corruption and calamity riddled development which resulted in the near decade long delay. Everything from lift sizes to fire suppression systems to approach light power outages occurred.

In 2016 the airport was less than 57% usable...

But jump forward to May 2020 the airport *finally* received its operational licence, and on October 19th it

completed its operational tests. These tests have been running since April (it takes a lot of tests to put a new airport through its paces) and with the rubbish bins made bigger, better signage and more clocks it is now ready to go – for passengers at least.

What about the airplanes?

Well, the important bits for airplanes have actually been up and running for a while now.

The airport will have two parallel runways, spaced 1,900 m (6,200ft) apart allowing for independent flight operations (and high traffic capacity when required).

The old runway, built in the 1960s, has already been renovated – lengthened to a nice 3,600m (12,000ft) and the new runway, commissioned in 2012, is a juicy 4000m (13,000ft).

The airport will be controlled by Deustche Flugsicherung from their impressive 240ft (72m) tower, which has been operational since March 2018.

The general aviation terminal is located to the north of EDDB, and the main FBO for Schönefeld is still there.

What else can we tell you?

- Noise Abatement regulations mean you can probably expect the standard German airport restrictions of no operations between midnight and 05:00LT.
- It has an ATIS on 123.78mHz and a Tower frequency 118.8mHz.
- The elevation is 157ft.
- It's official coordinates are 52'22'00''N 013'30'12''E.
- The airport is named after Willy Brandt, who by all accounts was a total ausgezeichneter herr (awesome dude). He was awarded a Nobel Peace Prize for his work both in Deutschland and across Europe. He is also known for the Brandt report which called for the world to do better in supporting development in 3rd world countries, and he is the guy that flew to Iraq and got Saddam Hussein to free loads of hostages. He then flew back with 174 of them to Frankfurt.



Overrun, Forrest, Overrun!

OPSGROUP Team 20 January, 2021



Earlier this week the Accident and Investigation reports came out about two aircraft overruns, on the same runway, that occurred within two hours of each other.

So what was going on in UEEE/Yakutsk back in 2018?

Or rather, what was going off, and why?

A bunch of factors contributed to this double whammy of airplane excursions. First up, the runway at Yakutsk airport had been shortened for works. It was, in fact, 1,150m shorter – which is quite a significant amount.

There were some Notams published about this, (and pretty decent Notams at that)

A5991/20 said -

DAILY 0000-0800: RWY 23L AVBL FOR LDG ONLY. **LDA 2248M**. TKOF FM RWY 23L CARRIED OUT BY REQ DURING THIS PERIOD. 2. DAILY 0800-2359: RWY 23L AVBL FOR TKOF/LDG. DECLARED DIST: TORA 2248M, TODA 2398M, ASDA 2248M, LDA 2248

And then there was A3621/ 20 which said -

AD TEMPO UNAVAILABLE FOR ACFT OF FLW TYPES: IL-96-300, IL-96-400, IL-86, IL-62, A-310, A-330, TU-154, BOEING777, BOEING747, BOEING-767-400ER, MD-11F AND THEIR MODIFICATIONS.

What about the airplanes, I hear you ask.

Well, the Sukhoi Superjet 100LR is not included on the list of "can't land here" airplanes. However, the Notams should have at least given them pause for thought, especially since both of them had technical issues reducing their deceleration performance.

Number 1 "First to Overrun" was found to have significantly worn out tires (which should have been spotted during a walk around), while Number 2 "Also Skidding Through" had a thrust reverser out of action. No big deal, but factors to be considered in the context of the other conditions of the day.

Talking of those conditions – the ATIS was reporting a tailwind of 6kts which is not outside anyone's limits, and of course 150% of any tailwind is taken into account for landing calculations.

The braking co-efficient, however, was reported as 0.45

Now, ICAO and most national authorities have moved away from reporting measured friction because they decided that, really, it is a pretty useless thing to report. There is not actually any great way to work out how **those** contaminants on **that** day will result in **whatever** friction for **whichever** aircraft – because there is no way to correlate the measurements a ground measuring device can measure in a meaningful way to what an airplane will actually experience. In other words – it has limited practical use in actually characterizing the runway conditions for an aircraft operation.

To further add to its pointlessness, the 0.45 was not even accurate. The real coefficient measured that day was actually less than 0.3.

As slippery as an oiled-up eel

Now, these pilots did do a landing performance calculation using what they thought were accurate figures. Even with their selection of only medium auto brake, and the mandatory 15% safety margin added in during in-flight performance calculations, the results looked ok and so they gave it a go.

However, had they known the coefficient was only 0.3 then they would hopefully have come up with landing results similar to those calculated during the subsequent investigation. These showed that a Superjet needs about 1,598m on a dry runway, 1,838m on a wet runway and a whopping 3,650m if the coefficient of friction is 0.3. Their 15% safety margin could not even cover the extra distance because of

the poor braking action.

So, with one of the reversers out of action, a tailwind, an incorrectly reported friction co-efficient and only 2,248m available for stopping in, **poor old airplane Number 2 never stood a chance of stopping** in the space available.

What can we take away from this?

Runway Excursions are still in the **top 3 most common bad stuff that happens to airplanes**, and considering the vast majority are avoidable with a bit of planning, better procedures or common sense, this is fairly shocking.

So, what can pilots do to prevent overruns?

- 1. Check you performance and check it well.
- 2. If runway contamination is in doubt, if the runway is shorter than usual, if you have technical issues that degrade your landing performance... maybe consider diverting to somewhere with more margin.
- 3. Check your tires (and everything else you're meant to check for that matter).
- 4. Use the best auto brake for the situation.
- 5. In fact, use all the best deceleration "whatevers" you need for the situation.
- 6. If it isn't slowing down like it should be, do those memory items and do them fast.
- 7. Land how the manufacturer recommends (firm and in the right place).
- 8. If it is slippery out, be prepared to use differential braking, or reduce reversers to maintain directional control.
- 9. Keep monitoring the conditions and if something deteriorates recheck your performance.
- 10. Don't trust the braking coefficients given at Yakutsk airport.

Braking, braking, broken...

Sometimes brakes do fail, or systems malfunction, and if that happens being ready with your memory items is the best way to deal with this. They might vary slightly across different types, but the basic actions are probably something along the lines of –

- 1. Yell "AGGHHH! NEGATIVE BRAKES!"
- 2. Brake as hard as you can.
- 3. Select the other braking system.
- 4. Select maximum reverse.
- 5. Keep trying to brake and if it still doesn't work, (and if you have one) select the emergency brake system (usually using the park brake).

What are manufacturers doing to help stop overruns?

A lot of airplanes have some clever devices installed in them nowadays.

Take Airbus for example. They have their ROW/ROP systems. The ROW bit (runway overrun warning) does useful things like monitoring the conditions in real time, and running speedy little calculations based on the known runway length and aircraft weight to make sure the aircraft is still stoppable in the distance available. If it isn't, it will yell at the pilot.

The ROP bit (the protection that kicks in after landing) does something similar, and can automatically apply full whiplash effect with the brakes if it thinks you need it, as well as reminding you to "Set Max Reverse!"

Other aircraft have similar systems with warnings that trigger if an aircraft is too fast, or if the landing flare is too long, or the remaining amount of runway is too short...

What can authorities do to stop excursions?

Ensuring operators train crew and staff properly, and that information is distributed in the industry is important.

Airlines and Operators should have in place technical and practical training for their crew to help them have a better awareness of the risks and factors that lead to overruns. Better monitoring of areas like unstabilised approaches which often precede overrun incidents, and contaminated runway and winter operations awareness, is also necessary.

Airports should makes sure Notams about works and changes to runway characteristics are up to date and correct. Giving correct information to pilots about the conditions on the day would also help...

In the US the FAA is advocating the use of EMAS (engineered materials arresting systems) at airports within insufficient runoff space, and this has apparently prevented the severity of 15 aircraft overruns in the years they've been installed.

Further Reading

- Opsgroup article: 5 Tips for Safter Winter Ops
- Airbus "Safety First" magazine: new issues published every 6 months, a wealth of info about all things safety-related.
- Useless fact: If you wanted to ski down a concrete slope using rubber skis, the coefficient of friction for rubber on concrete is 0.9 which means you would need a 42 degree slope to actually get moving.

Ferry Flights in the time of Covid

Chris Shieff 20 January, 2021



Ferry flights are tough to operate even at the best of times. Whether it's getting a new aircraft from the manufacturer to its customer, moving it to or from a repair facility, or just returning it to base, there are a bunch of things to consider beyond the normal planning you would do for a standard private or charter flight: extra permit requirements, insurance issues, equipment compliance, and a close eye on route planning!

Covid restrictions have made all this even more complicated, with many countries completely closing up shop to everything except repatriation and cargo flights at the start of the pandemic, only to reopen months later with complex entry rules and flight restrictions in place.

Here's a summary of the **main considerations when planning ferry flights**, and a **recent example of a trip** we eventually managed to do despite the Covid restrictions of various different countries at the time.

Permit Requirements

One of the most important considerations for ferry flights is whether or not the aircraft will be operating on a standard Certificate of Airworthiness or on some form of a Special Flight Permit. While some countries around the world will allow an aircraft to overfly or land without permission while operating on a standard Certificate of Airworthiness, most countries will not allow an aircraft operating on a Special Flight Permit (or equivalent) to overfly or land without receiving an additional permit.

Permit Lead Time

When obtaining overflight and landing permission for Special Flight Permits, consideration should be given for the lead time. Some countries have different teams looking after these types of permits than the people who issue the permits for "normal" flights. The lead time can vary from 24 hours to five working days, or even longer. Watch out for weekends too! In some countries the working week is not necessarily

Monday-Friday.

Flight support companies and local agents can be invaluable to assist with securing these permissions as they may have local contacts with the civil aviation authorities. These authorities are validating the Special Flight Permit and Operating Limitations, along with the Certificate of Registration and Certificate of Insurance to ensure they meet the requirements for their individual country.

Insurance Requirements

An important consideration when ferrying any aircraft is the Certificate of Insurance. This certificate needs to cover all areas that the aircraft will be operating in, as well as ensuring coverage for any flight crew who may be employed by the aircraft owner. Regions of the world (ex: Europe) may have minimum liability requirements that must be met and clearly stated on the Certificate of Insurance. Even though the certificate states 'worldwide' several countries in Central America will require that the certificate clearly states it includes their country prior to issuing the permission.

Navigation Equipment

Ferry flights are often being conducted to move older aircraft from one place to another with navigation equipment that is either out of date, due to be replaced, or unservicable. It is important to ensure that the navigation equipment and the crew qualifications are up to date and that the flight is being conducted in accordance to the requirements for the countries that the flights are overflying and landing at. A common area that local authorities will look at when conducting ramp checks is what equipment has been installed, certified and is operating.

Covid Complications!

In June 2020 we helped an operator move a Cessna 208 Caravan from the US back to Australia. What complicated this flight was that the operator had already attempted to move this aircraft in March at the beginning of the global pandemic to only end up with the aircraft being grounded for three months in Alaska while we waited for central and southern Asia to open up some of their restrictions.

This aircraft was issued an Australian Special Flight Permit which required permission from every country we were operating into or over, and was equipped with a ferry tank system to give us some additional range in our planning. As the flight was operating through Russia with an overnight stop, the crew were required to obtain Russian transit visas and due to the pandemic testing requirements, the crew were required to be tested prior to departing from the US as well as when en-route in the Philippines.

In the end, we decided on the following routing: PANC/Anchorage – PADK/Adak Island – UHPP/Petropavlosk – RJCC/Sapporo -RJBB/Osaka – ROAH/Okinawa – RPLC/Angeles – WAPP/Ambon – YBRM/Broome



We got special permission for the crew to stay overnight in PADK, UHPP, RJBB, RPLC and WAPP for crew rest.

Even without the additional Covid-related requirements, due to the Special Flight Permit, Japan required additional permissions from various government agencies, including their military. We got a local agent to assist with these arrangements, as well as the special Customs & Immigration arrangements required for the crew to remain overnight in RJBB. They were not authorized to remain overnight under any circumstances in RJCC or ROAH.

While the global pandemic raised a number of additional requirements, we needed to consider several things when determining the ferry flight for this aircraft. The most important consideration was aircraft range. Thanks to the ferry fuel system, we were able to have ample range to fly from Alaska into a customs airport in Russia. While a routing from PANC to UHMA (with or without a stop in PAOM) was considered, it was not possible at the time as UHMA was closed to all international traffic.

The routing through Japan was carefully considered with extensive consultation (and changes) with the Japanese agent. Many local authorities at different airports were back and forth on whether the crew would be allowed to overnight, and it was imperative to find an airport that would allow the crew sufficient rest.

The routing from Japan into the Philippines and through to Indonesia remained a challenge right up to the day of flight. Indonesia reopened their borders to international flights after the crew departed from the US, and required the crew to have a fresh Covid test which was arranged in the Philippines.

More info

Check out our Guide to Getting Unusual Permits. It has the details on 28 countries that have a special process for Ferry Flights and other Special Permits. You'll find Civil Aviation Authority contact details, Agent details (when necessary), and our descriptions of the best practice for each permit.

The Hills Have Ice: Considerations for Himalayan ops

OPSGROUP Team 20 January, 2021



Flying over the Himalayas soon? Read on! From patchy comms to limited alternates to meters that might get your feet in a twist, this briefing will have you covered...

A good place to start might be "Where are the Himalayas?"

The Himalayas border a bunch of countries, but the bits we are generally interested in lie in Pakistan and China – along the primary flight routes between the Middle East and Asia.

Interesting fact – they are the fastest moving mountains in the world, thundering along at a right old pace of 67mm a year (so don't worry, they will still be in pretty much in the same spot when you route over them).

Are they a big deal?

They are the biggest mountains in the world so "big" – yes. "Big deal"? – well, not so much if you are cruising happily at altitude, but if for some reason you suddenly need to descend then they can become a very big deal very quickly.

With 30 peaks higher than 24,000', and stretching over 200 miles, they are a pretty significant obstacle.



There are some good-to-know and some need-to-know points about these parts, so read on...

The Basics

Limited Alternates – Not many people live in the Himalayas, (not counting Yetis), so airports are few and far between, and are often fairly remote.

The Region – Pakistan has ongoing conflicts with India over the Kashmir region. Afghanistan is also unstable so operating near the border is not advised, particularly into OPPS/Peshawar and OPQT/Quetta airports.

Weather conditions – 'Himalaya' translates as 'abode of snow' so that should be something of an indication. The airports are remote and facilities are not always up to standard. Significant mountain waves can be experienced when crossing.

Communications – Big mountains block radio signals and this can be particularly bad around the point where you transfer from Pakistani airspace into Chinese. Which leads us onto the next point...

China – They have their own procedures including different sized airways, different contingency procedures, and of course...

Metres and Feet - China operate in metric. Keep reading for a handy feet to meter conversion table!

Oxygen – Airplanes have oxygen in them, unless they suddenly don't anymore and then you are going to have to find some pretty rapidly. Unfortunately, oxygen is generally at its most plentiful lower down which can be problematic if routing over high terrain...

The Alternates

There are two published crossing points for the Himalayas – **PURPA** on the Pakistan/China border to the north, and **NONIM** on the Nepal/China border to the south. So the alternates you're going to be interested in very much depends on which route you're going to take.



ICAO/ IATA	Airport	Open	RWY (m)	ELEV	PCN
OPIS/ISB	Islamabad	H24	3658	1761	110FCXT
OPPS/PEW	Peshawar	H24	2743	1211	068FCXU
OPLA/LHE	Lahore	H24	3360	712	085RBXU
ZWSH/KHG	Kashi	H24	3200	4528	074RAWT
ZWTN/HTN	Hotan	HS	3200	4672	052RBXT
ZWWW/URC	Urumqi	H24	3600	2126	080FBWT
VNKT/KTM	Kathmandu	0045-1845Z	3050	4390	054FAWT

OPIS/Islamabad, Pakistan – There are two parallel runways with RNP and ILS approaches, including a CAT II on 28L. 10R has an offset final track (VOR approach). This is a destination for some major airlines and so likely has good handling and ground services, an is an RFF Category 10.Where you decide to divert to will depend on what your problem is and whether you can stay up over the mountains. Peshawar, Islamabad and Lahore are each accessible from each other and all lie south of the mountainous zone.

OPPS/Peshewar, Pakistan – This airport is situated near a No Fly Zone and is close to the Afghan border. It has CAT I capability, but report of GS fluctuations are common. Ground handling is available, but engineering and other support is likely to be limited.

OPLA/Lahore, Pakistan – This is another major airport in the area with multiple runways, and Cat IIIb approaches onto 36R. Terrain is relatively low, but the airport lies close to the border with Indian airspace.

ZWSH/Kashi, China – The airport is CAT I. There is serious terrain to the north and west of the airport. Particularly if you are landing onto runway 08, wind off the terrain might be a factor. Runway 08 may require a 180 degree turn at the end with a backtrack due to works. Support here will be fairly limited.

ZWTN/Hotan, China – There is no customs at Hotan so offloading passengers might pose a problem. The closest alternate is not really very close, and the weather here can be a challenge. The MSA is 16,000' and terrain lies predominantly to the south of the airport, but close to the ILS intercept for runway 29. Runway 11 only has a VOR/DME approach. Both runways require a 180 degree turn and backtrack to vacate. Engineering support is available here.

ZWWW/Urumqi, China – Urumqi is a better equipped airport, with CAT I and II approaches available, and likely to have better ground support and engineering services. However, there is significant terrain in the vicinity of the airport, and it's also a long way to have to go in an emergency (around 700nm from Pakistan/China crossing point PURPA).

VNKT/Kathmandu, Nepal – Down south, Kathmandu is really the last decent diversion airport before the endless mountains of the southern Himalayas come into view. If you don't stop here, it's a good 3 hours of flying time before you reach ZUUU/Chengdu on the other side. VNKT is not 24 hours (has quite specific hours), no engineering facilities but fairly good ground support as it is quite a "major" tourism spot so a fair few airlines route in there. Does not have precision approach (only VOR and RNP), and they have a lot of diversions due to weather and higher minimus due no precision approaches. Very difficult approach because you route between mountains into a sort of bowl to land.

Communications

The mountains can cause serious interference with radio comms so keep the following SATCOM codes handy in case you need them:

Urumqi 441208 Lanshou 441205 Kunming 441204 Beijing 441201 Lahore 446302

China

China has some pretty specific procedures and requirements which should probably be looked over before you route this way, but here's a quick summary.

Contingency/ Emergency Procedures if deviation from level required:

- Aircraft must turn RIGHT and track out to 10km/ 5nm from the airway centerline.

- Once parallel with the original route climb or descend as required.
- Switch your lights on, keep talking on 121.5, and keep a good eye out.

Any deviation or reroute requests in China usually needs some serious coordination, and they are strict about any routes that take you off commercial airways or close to military airspace. ATC often send airplanes in random directions, or refuse to clear them to the flight levels they have filed for, without much explanation so be prepared for a lot of extra fuel burn.

Meter to Feet Conversion:

	180-359			000-179		
m	ft	FL	m	ft	FL	
15500	50900	FL509	14900	48900	FL489	
14300	46900	FL469	13700	44900	FL449	
13100	43000	FL430	12500	41100	FL441	
12200	40100	FL401	11900	39100	FL391	
11600	38100	FL381	11300	37100	FL371	
11000	36100	FL361	10700	35100	FL351	
10400	34100	FL341	10100	33100	FL331	
9800	32100	FL321	9500	31100	FL311	
9200	30100	FL301	8900	29100	FL291	
8400	27600	FL276	8100	26600	FL266	
7800	25600	FL256	7500	24600	FL246	
7200	23600	FL236	6900	22600	FL226	
6600	21700	FL217	6300	20700	FL207	
6000	19700	FL197	5700	18700	FL187	
5400	17700	FL177	5100	16700	FL167	
4800	15700	FL157	4500	14800	FL148	
4200	13800	FL138	3900	12800	FL128	
3600	11800	FL118	3300	10800	FL108	
3000	9800	FL98	2700	8900	FL89	
2400	7900	FL79	2100	6900	FL69	
1800	5900	FL59	1500	4900	FL49	
1200	3900	FL39	900	3000	FL30	
600	2000	FL20				

Oxygen

The most critical route is **PS-G325-Purpa-B215** where the MTCA is the highest. Confirming your aircraft is equipped with suitable passenger oxygen systems and awareness of the depressurisation strategies and MSAs for each route is extremely important before operating into this area.

Permits

Pakistan requires overflight and landing permits. These must be requested by an agent. They require one day notice to arrange the permit. Operating into Pakistan airspace required an ADC at least 15 mins prior to entering Pakistan Airspace/ADIZ, and flights operating in need to establish communication at least 15 mins prior to entering.

China also require permits. These can be intimidating. They require use of AFTN/SITA, have specific routing, and are only valid for the exact timing given. Commercial landings require a sponsor later written in Mandarin by the receiving party. We recommend applying direct to a Chinese agent, as the authorities aren't very patient and it can become frustrating at how short they'll be on the phone. If you want to apply direct, you'll send your application through AFTN and SITA, in the specific format required.

China requires aircraft to be ADS-C, CPDLC and SATCOM capable on some of their routes over the

Himalayas, and operators need to verify their equipment with them at least 60 days in advance! So they recommend that only regular scheduled flights apply to use these airways. For more on that, check out our dedicated article here

For some great insights into escape route planning, check out this doc from Flightsafety.org

And finally, don't forget to take your camera because when the air is clear the views can be amazing!

