The Finish Line: NOTAM SPRINT 2023

OPSGROUP Team
1 May, 2023

From **May 8-12**, the NOTAM Alliance will host a **NOTAM SPRINT**: a workshop to create a framework for a vastly improved NOTAM Briefing for pilots and dispatchers. The NOTAM Alliance is a user-led group of airlines and aircraft operators focused on radically changing how NOTAMs are provided to flight crews, and includes major airlines like Austrian, Lufthansa, Aer Lingus and United Airlines.

The background to the NOTAM Sprint is a year of tremendous gains in NOTAM improvement. 2023 started with an FAA system failure, which in turn brought global attention to the NOTAM issues that pilots face every day – oversized 50-page+ briefing packages that are impossible for crews to parse. This creates a huge safety risk: critical updates affecting their airports and route of flight are regularly missed.

After decades of attempts to solve the NOTAM problem, the advances in Artificial Intelligence and a fresh approach to the core issues in 2023 led to a two-month review of the content of NOTAM messages. During February and March, a working group of 50 pilots, dispatchers and NOTAM experts created a "Top 50" list of tags that can be applied to any NOTAM, across 9 categories: Airport, Approach, Runway, Taxiway, ATC, Navigation, Airspace, Hazards, and Library. A Large Language Model (LLM) can then used to apply the appropriate tag to any NOTAM, which allows them to be sorted and filtered.

The result is a shortened "**SuperNOTAM**" Briefing harnessing the "**Dark Cockpit Philosophy**" – presenting first only critical NOTAMs to flight crew, with the more routine operational NOTAMs in a Supplement for reference. Irrelevant NOTAMs are filtered out. Each airline can set their own preferences as to which NOTAM types are deemed most critical (eg. Runway closures, Fuel warnings, Rescue/Fire cover), and which are routine/operational (eg. Parking stand changes, frequency outages, taxiway changes). The most persistent "junk" NOTAMs – Birds, Grass Cutting, and Obstacle Light outages – can be consigned to the scrap heap if desired.

The NOTAM SPRINT aims to create a working prototype of the model, turning the theory into reality, and reducing the NOTAM content at least tenfold. Over five days, airlines, operators, pilots and dispatchers will work on the key areas of the model.

All users are welcome to particpiate in the event, which will have daily Zoom group chats, a Slack working group, and an evening *Notam Newsletter* to summarise the day's progress. At the end of the five days, the goal is to have an open-source blueprint for a NOTAM model that all aircraft operators will be able to employ, and ultimately, bring long-awaited and much needed relief to flight crews and dispatchers worldwide.

To read more about the event, visit the event page NOTAM SPRINT 2023, and to **register**, use this link.

NOTAM SPRINT 2023 – links

- NOTAM SPRINT 2023: About this event

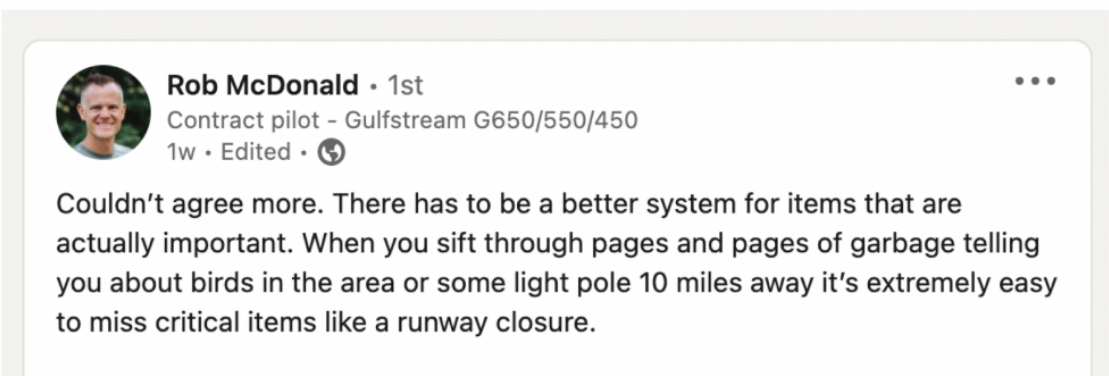
- Register for NOTAM SPRINT 2023
- NOTAM SPRINT Poster (PNG)
- The NOTAM Tags concept
- Fixing Notams – a guide
- The NOTAM Alliance – home

Taking the Trash Out: Let’s fix NOTAMs

Mark Zee
1 May, 2023

After a hiatus of a year or so, we’re back working on NOTAMs. In 2021 we ran a campaign with ICAO (and IFALPA, and IFAIMA) to improve NOTAMs. We focused on “Old” NOTAMs, ones that sit in the system for no good reason, sometimes for as long as 20 years. They are mostly gone – including the Albanian NOTAM about the Y2K problem.

That’s good, but the NOTAM problem isn’t fixed. Rob, below, summed it up nice and simply last week.

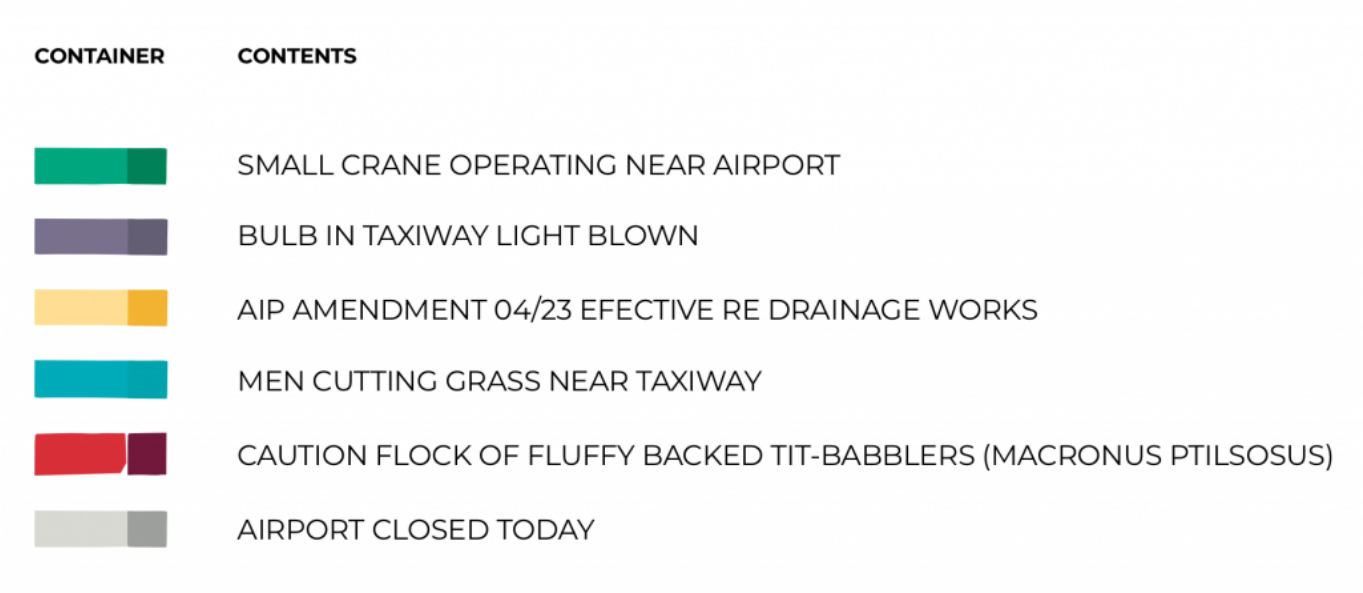


So, let’s continue the work. Why do we have a system that makes it **extremely easy to miss critical items**? And how do we fix it? Let’s visualize the problem.

NOTAMs are like containers on a ship

Imagine you’re the pilot of a Boeing 787 about to sit down at a briefing table to review NOTAMs for your flight from Copenhagen to Bangkok today. You will get a folder containing a printout of NOTAMs for your route. Here they come.

Each container is a NOTAM. Unlike actual containers on actual ships, there is no manifest. **We don’t know what’s in the container until we open it and take a look**. That means that we can’t automatically sort them out beforehand, and we can’t put them in any order of importance. Therefore, the pilot gets a random list of NOTAMs, and it’s up to them to make sense of it.



If you only had six NOTAMs to take a look at, no big deal. You'll spot that the airport is closed today. But we usually have somewhere between 100 and 1,000. The result? **A system that makes it extremely easy to miss critical information**.

Finding the simple fix

This is a simplified version of the problem, but not by much.

Question, then: **How do we improve the NOTAM system so we can sort and filter them?**

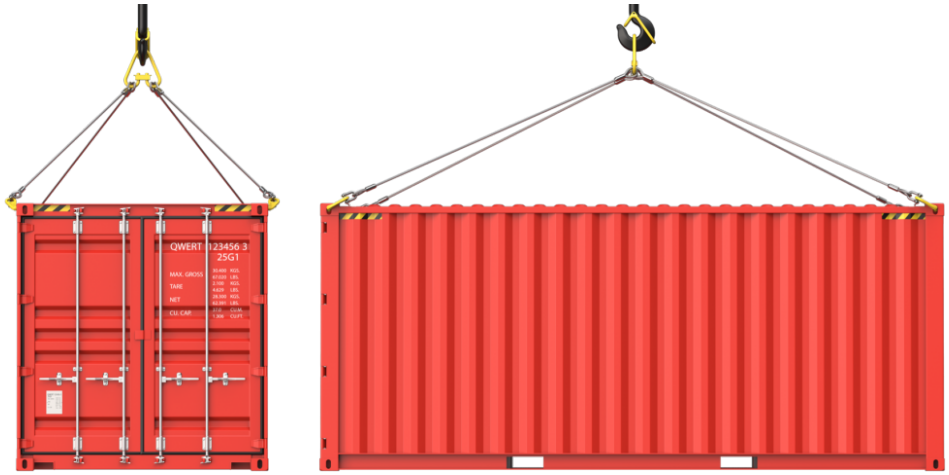
Let's get a technical for a moment, since we're going to need some smart people that understand the system architecture. Here are some basics that are important.

1. **There isn't really an international "NOTAM system"**. Each country issues NOTAMs for their airspace, and keeps a local list of them for pilots in that country. Other countries can query that list (done via the AFTN, with an RQL message), and get a copy of new NOTAMs (by sending an RQN message). Not every country does this, but if they do, they'll then have a **limited database of NOTAMs** from selected other countries. A tiny handful of countries, regions, and organizations do this for every country, which makes for a fairly reliable **international database of NOTAMs**. Examples of this are the FAA (NOTAM Search), US DoD (DINS), and Europe (EAD). These databases form the source data used by pilots and operators, often via service providers like Jeppesen, LIDO, Foreflight etc. who may apply some final processing to attempt to sort and filter them for their customers.
2. Since there isn't an international NOTAM system, then logically, **nobody is in charge of it**. **ICAO** sets the standards for when a country should issue a NOTAM (Annex 15), how they are formatted (Doc 10066), and what codes to use (Doc 8400). **Eurocontrol** publishes a guidance manual (called OPADD). That's about it. Nobody has the job of monitoring all international NOTAMs for quality or quantity.
3. **The NOTAM structure is very limited**. It uses a limited character set called ITA2, which pre-dates ASCII. This limits messages to UPPER CASE. The format is set in Doc 10066, giving a NOTAM 7 sub-parts from A to G, preceded by a Qualifier called the "**Q-code**". In theory, the Q-code tells the reader what the NOTAM is about (magically solving the container problem

above), but in practice, it doesn't work. Why? There are too many choices, and therefore they are often applied incorrectly, or not at all. The Q-code categories were dreamed up in 1950, and there are **13,783 possible Q-codes.** 20% of NOTAMS don't have a Q-code at all (The NOTAM office often enters XX or XXXX, meaning "not sure").

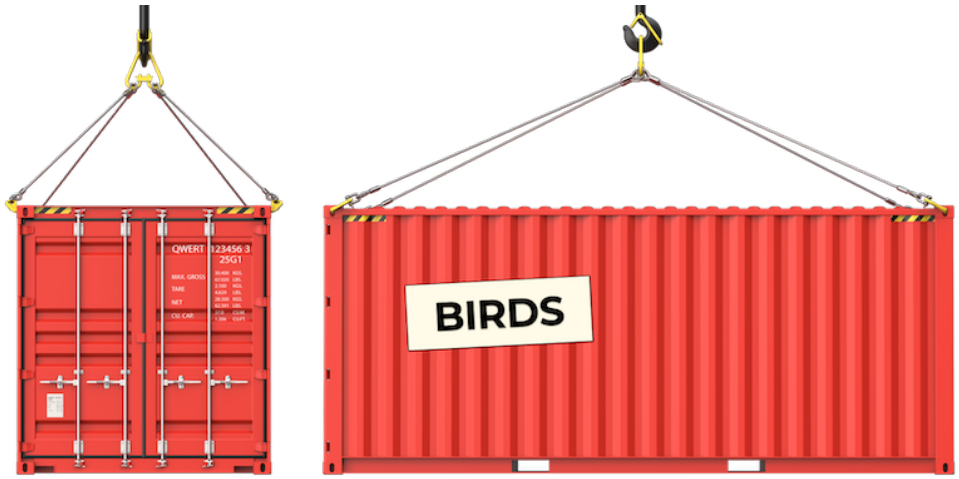
What's in the NOTAM container?

Let's get back to the yard, and lower down one NOTAM container and take a look.



We know it came in on the NOTAM ship so it relates in some way to our route today, but **we don't know what's in it**. Therefore, we can't sort it or filter it out. It just joins all the other NOTAMs that we load up into the pilot's briefing, and leave it to them to make sense of.

But if the shipper (the originating NOTAM Office) puts a label on it saying "**BIRDS**", then we immediately know what to do with it.



Pretty quickly we can start organizing the containers. Each operator can figure out the order they want to put them in, and which ones to leave at the back of the yard.

By knowing what the NOTAM is about, in advance, we can set up some basic processing rules. Each aircraft operator is different: Airlines don't care about broken obstacle lights 5 miles from the airport, but a Police helicopter does. Perhaps someone cares about birds, most pilots don't. It doesn't matter; **let the operator decide for themselves how important each label is**, and what order to put them in (or discard).

Sounds easy, but is it?

In a huge list of NOTAMs, the ability to **sort** and **filter** them is the key to making them manageable. If they are sorted and filtered, then it's unlikely a pilot will miss the big ones. Back to ***what Rob said*** (⬆) **–** the problem is that it's **extremely easy to miss critical items**, and that's what we want to change.

We have some limitations:

1. **It must be a simple change**. There are 193 countries that are ICAO members, each one ultimately resistant to a system-wide change that will cost money and require infrastructure investment. It would be lovely to start from scratch with a new system, but it's not feasible. We need a simple change to the format with big impact. Conversely, if you think even that is impossible, just remember that Snowtams changed format in 2021.
2. **We can't use *Item E***. To be able to sort and filter, a computer has to be able to know what the NOTAM is about, without having to read the content text. It can't make sense of the text in *Item E* (the text of the NOTAM) – we tried this some years ago with machine learning, and after 2 millions passes, AI wasn't able to formulate an algorithim that worked. There are just too many countries with different ways of writing NOTAMs to use *Item E*. So we must have a label of some kind.
3. **We must change the back end**, not the front end. This must be a change available to everyone. Sure, Foreflight does good stuff, especially with US domestic NOTAMs. There's a bunch of software and apps that can help to make NOTAMs more digestible. Some can be displayed graphically, but not many. Big airlines have back-office staff to organize and even

rewrite some NOTAMs. But they all do it differently, and not many of them solve much of the big problem. We're still getting dozens, even hundreds, of pages of NOTAMs to read.

That's where the work begins. We don't have all the answers, and we need some smart NOTAM-folk to help. It's not the intention here to present a vague solution and say "This is it" – this article is intended to generate some critical thought and discussion on what the "Big Fix" looks like. Labelling them in some way seems the way to go, but we're not sure.

Remember this …

There's nothing like saying "*NOTAMs, what do you think?*" to generate a slew of pilot complaints, jokes (some great memes after the January outage!), and things that need to be fixed. We've been working on this here for a couple of years, but efforts to fix the b*rds date back **almost 60 years**. With that in mind, addressing the most common talking points may help.

1. **NOTAMs suck**. We know. We're just a bunch of pilots and dispatchers that really don't like them, and we're doing our best to make change happen. But if we want to solve them, we have to find **the one thing that fixes most of the big problem in one hit**. UPPER CASE is tough to read, but that's not the big problem. Abbreviations are annoying, but that's still not the big problem. **The Big Problem is that we can't see the critical stuff** because we have to read hundreds of them before flight in no particular order. If we can sort and filter them, that means we'll see the important stuff first, and don't have to read such a long list.
2. General ranting at the FAA, ICAO, IATA, or even the government doesn't help. Instead, help us to help find a sensible solution, draw it out, think it out, test it, and we can then present it to those that can help implement it.
3. **Digital Notams**. Sometimes this comes up as a solution that's on the horizon, and will fix everything. That conversation has been happening for at least 20 years, and while a lot of good people are working on this, it doesn't fix the problem we have right now. In a perfect world, SWIM and Digital Notams will come online in 2028 (five years from now), and start to solve some of the issues. Problem is, we live in an imperfect world, and the chances that this will solve our woes as they exist today are slim.
4. **Hey, I made a thing that solves NOTAMs**. Like we said above, yes, there are some really great apps, graphical tools, and software that help make some sense of NOTAMs. Foreflight is a favourite amongst us pilots. But despite some of the advances, the originating NOTAM is still a brutalist remnant of the early 20th century, and the vast majority of pilots still get giant chunks of NOTAM text to plod through. **We want to fix the problem at source**. At the same time, it's likely that the smart people that made these things can also be the smart people to solve the source problem!

So, what now?

We want to hear from you! Write to us at team@fixingnotams.org. We can only solve this as a community group, and we're working on a few events to get people together for some discussion. We'll set up a few group chats on Zoom to get the discussion started and some ideas flowing.

Ultimately, the plan is to start funnelling some ideas along the pipeline until we reach one that really

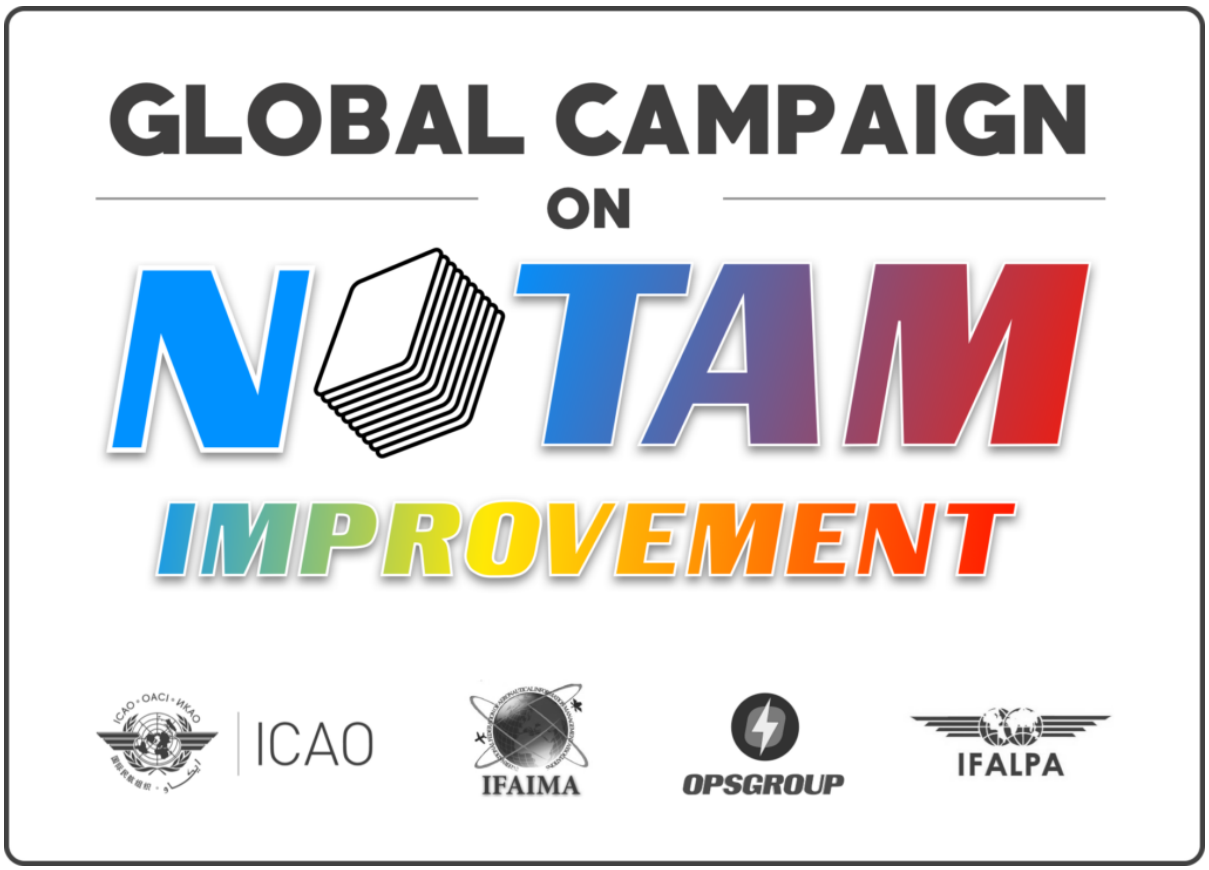
seems to work, and take that to the organizations that can implement it. So, it's up to you. **Want to get involved? You're awesome! Please reach out to us.**

Global Campaign on NOTAM Improvement

Mark Zee
1 May, 2023

Update: The NOTAM campaign was launched with 1,500 attendees on April 8th – and yes, it was the largest virtual event in ICAO history! The first update webinar on progress being made is on **June 16th at 1200Z** – register with this link, and join the call.

The **Global Campaign on NOTAM Improvement** is being launched on April 8th, 2021. Spearheaded by **ICAO**, and supported by **OPSGROUP**, **IFAIMA**, and **IFALPA**, the campaign will focus on making significant improvements to the NOTAM system to **enhance its effectiveness, usefulness, and reliability** as a mechanism for pilots to receive critical flight information.



Kick-Off Webinar, April 8th 2021

At 1200Z on April 8th, 2021, we will launch the campaign with a worldwide webinar. So far, we have 600 registered participants. We are on track to make this **the biggest virtual event in the history of ICAO**. If you think about it, that's pretty amazing for a meeting about NOTAM's!

This webinar is open to everyone, and we would be delighted to have you join it – to show your support for the Notam Improvement campaign, to learn more about what the plans are, get the latest update, and see how you can get involved: this is a collaborative, shared mission that needs your help, whether you are a pilot, dispatcher, AIS officer, software developer, Flight Planning provider, ANSP, CAA, or are in any other way a user or provider of some aspect of the Notam system.

So, **please join us** – it's open to all:
Register for the Worldwide Webinar on Thursday, April 8th, 2021 – 1200 UTC

1200 UTC = **7am** Lima, **8am** New York, **1pm** London, **2pm** Berlin, **4pm** Dubai, **7pm** Bangkok, **10pm** Sydney, **12am** Auckland.

Why should I join the Webinar?

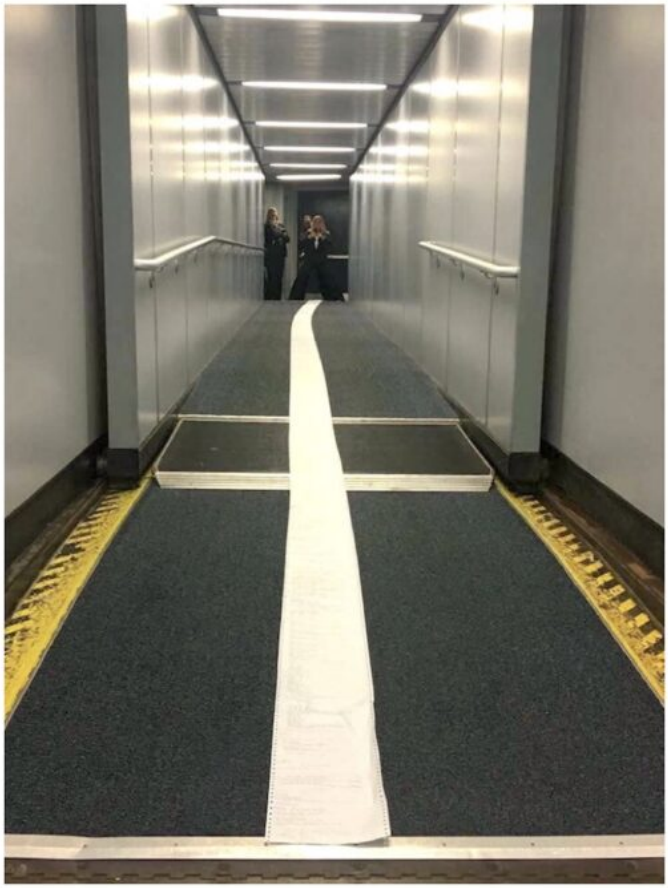
Over the last few years, as many as 10,000 pilots and dispatchers have supported a move to fix Notams – through petitions, surveys, comments, emails, and joining the OPSGROUP Notam Team to help fix the problem. Your voice has been heard: this work is the result. Now, we need your support for this campaign – to reinforce the message that as an industry, **we really care about this**. Your presence will encourage those working on solving the Notam Problem, and you will get the full picture of where we stand in the progress to fix things.

We will speak about the mission, demonstrate the problem with some real world examples of pre-flight briefings, showing how these impact the daily lives of pilots and dispatchers, clarify the definition of “Old NOTAM’s”, and show how AIS staff can use the existing regulatory framework in Annex 15 and Doc 8126 to become a gatekeeper for NOTAM quality, demonstrate the Notameter, address regional challenges, and have a Q&A session.

Our presenters and speakers will include **Stephen Creamer** (Director of the Air Navigation Bureau at ICAO), **Alex Pufahl** (ICAO Technical Officer), **Mark Zee** from OPSGROUP, **Capt. Lauri Soini** from IFALPA, **Fernando Lopes** and **Antonio Locandro** from IFAIMA, **Marco Merens** from ICAO, and ICAO Regional Officers.

What is the Notam Campaign all about?

First, the problem: Pre-Flight NOTAM Briefing packages are often far too big to be fully read and understood by pilots before a flight. The result: **critical information is missed**. Finding safe ways to decrease that volume is the key focus of this campaign.



In the **Global Campaign on Notam Improvement**, our aim is to solve the Notam Problem in manageable chunks, gathering energy as we solve them and make progress. Rather than re-invent the wheel, we will fix the system from within, starting with the easier aspects and progressing from there. **The first phase** of this campaign focuses on Old Notams. At any one time, there are about 35,000 active Notams globally, and 20% of these – one in five – are old; in other words, not respecting the existing rules of Notams being issued in principle once only for a maximum of three months (everything else should go into the AIP, an AIC, or some other publication).

We are drawing on the collective cooperation of the AIS community – the Notam Officers – to uphold the rules and get rid of Notams that don’t follow them. The result will be a potential decrease of 7,000 Notams

per month, and a 20% reduction in the size of the average briefing packet. For more on the Notam Problem itself, have a look at “Why pilots are reading a Reel of Telegrams in the Cockpit“.

Who is behind it?

The Global Campaign is a meeting of minds, agreeing on one thing: **Notams need fixing**.

ICAO is spearheading the campaign, in the recognition that the Notam Problem is a worldwide issue that affects flight operations in every country.

Providing support, energy, and huge enthusiasm to help solve things are **IFAIMA**, representing the Aeronautical Information community, **IFALPA**, voicing the concern of Airline Pilots, and **OPSGROUP**, whose pilot, dispatcher, and flight operations members have been tirelessly involved in the mission to fix Notams since 2017.

What can you do to help?

Thank you for asking! If you are in the **AIS community** – perhaps as a Notam Officer, AIS Officer, Publisher, or Promulgator – please tell your colleagues, join the webinar, and get involved in this Campaign. If you are a **Pilot or Dispatcher**, join the webinar, share the news of this campaign (#NOTAM2021), voice your support, and monitor progress – we’ll want your help down the track as well. If you are a **Flight Planning Provider or Software Developer** – again, join the webinar, and when the time comes, get involved in the collaboration around technical improvements. If you work for an **ANSP or Civil Aviation Authority** – join the webinar, encourage your colleagues to join too, and help support the Campaign. If you work for an **Organziation**, tell your members, and share news of this campaign (#NOTAM2021). Oh, and join the webinar!

How we got here …

This is a Global Campaign for a very good reason. We only solve this problem when we solve it for all countries – so we take the lessons learned domestically from those countries that have seen NOTAM wins, and amplify that across the rest of the globe.

In terms of change so far, most notable is the work done by the AIS Reform Coalition in the United States, chaired by Heidi Williams from the NBAA. This group of people from NATCA, ALPA, AOPA, IATA, A4A, ACI, the NBAA and others have been working feverishly in partnership with the FAA to drive change and improvement. And it has had remarkable results – the US has radically improved NOTAMs in the last 2 years: NTAP gone, a big reduction in PERM Notams, a single office for AIS, a transition to the FNS, and NOTAM Search replacing Pilot Web. Canada has transitioned to ICAO format for Notams, and provided a new delivery mechanism through CFPS.

We must also recognise huge efforts from the members of OPSGROUP, who as pilots, dispatchers, and other flight operations specialists have made their voice heard, sharing support, input, ideas, and enthusiasm for change; the efforts of IFALPA to bring attention to the issue, and IFAIMA who have given full support to solving things on the AIS side.

An important distinction to make here is that this work is on “**NOTAMs, Now**“. There is separate, ongoing work in the field of the “Future of NOTAMs”. You may have seen acronyms like SWIM and AIXM, and terms like Digital Notams or Graphical Notams. The FAA, ICAO, Eurocontrol, and other agencies are building a

model for the future, when NOTAM's will change from the current AFTN format and transmission into an internet, IP based, transmission and follow a service-oriented approach. This work is valuable, but with a target implementation date of 2028, has a different focus. Even if it goes smoothly, it would not instigate change until 2028. Needless to say, if we don't fix the underlying issues now, it may not even solve them then, either.

The AIS Community, Pilots, and Dispatchers, working together

Here's the really exciting part of this Campaign: for the first time we are seeing pilots, dispatchers, and AIS staff working together on solving the issue. This is a core tenet of the campaign: only when you have all parties involved, do you have a shot at success.

The AIS Community is invaluable in solving the problem, but they need our help. First, they need to know exactly the impact of the Notam Problems we describe – this drives their will to make change and improvement. Second, they need the support – which this Campaign will provide – to stand as gatekeepers for Notams. They themselves are often under pressure to publish Notams that they know don't align with the rules, but have no alternative.

Phase One

So, once the Campaign is launched, what does the roadmap look like? Logically enough, we start with Phase One. A simple, bite-size chunk of the problem – **Old NOTAM's**. In volume terms, it's a lot more than bite-size – it's actually 20% of the problem. The key is that it's easy to understand, and therefore easy to work on. We don't need to make any structural changes, or change how the system functions. This is simply about focusing on a known issue – that 7,000 of the 35,000 active Notams that should not be there.

Even more importantly, the focus is also on the **energy, enthusiasm, and goodwill** to make the changes necessary. As we gain momentum, we get encouragement from each and every Old NOTAM that is removed forever. We see that through collaboration, community, and support for each other, we can make change happen.

Remembering that this is a decades old problem that has been on the agenda since 1964, and that there are 193 countries on this journey, progress may feel slow at first. But we're going to learn from each other, and go as fast as feels right. We'll be celebrating the small wins!

Phase Two

The next phase will look at **technical improvements**. In other words, what structural and systemic changes can we make to NOTAM's to leverage quick improvement.

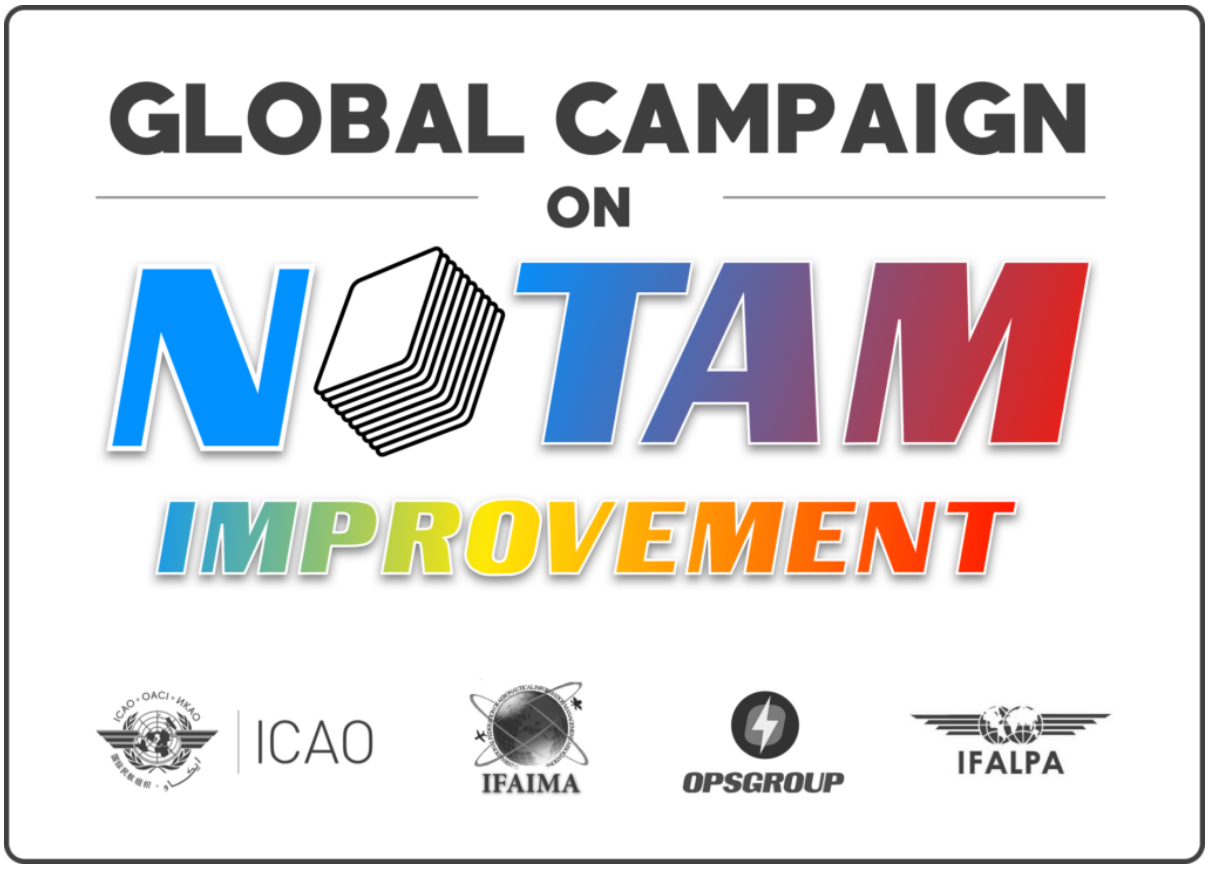
We envision that this stage will be best served by a great deal of **collaboration and discussion**. One of the key groups here will be Flight Planning software providers. The vast majority of NOTAM briefings today are provided by these companies. As things stand, each one has a different, in-house method of

processing the Notam flow – usually with algorithms, keyword searches, date/time validity ordering, and some Q-code assessment. So we might ask, how can we best structure the Notam data to provide a robust, reliable format with metadata that allows sorting and filtering – the two big asks from the pilot community. In other words, **show me the critical stuff first**, and skip the fluff.

We also, again, need full collaboration with AIS to see what the impact of those technical improvements will be, and whether they support them. Adding pilots and dispatchers into the mix will allow us to verify that the changes being discussed will actually have an impact by the time they reach the cockpit. If they don't, then we're not doing it right.

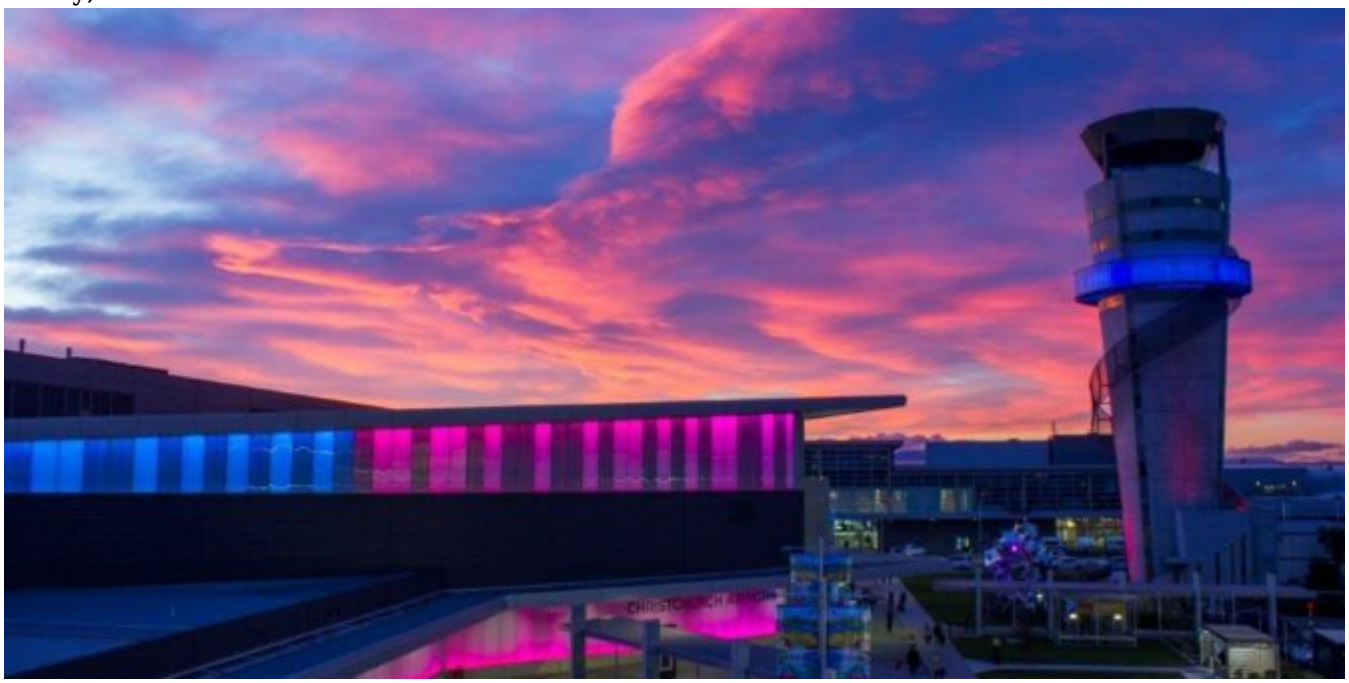
More about #NOTAM2021

- **Kick-Off Webinar**: Register for the event on April 8th, 2021 at 1200 UTC
- Progress Webinars start on June 16th, 2021.
- ICAO information page on the Global Campaign.
- OPSGROUP
- IFAIMA
- IFALPA
- FixingNotams.org – the journey so far



NOTAM 2021 update: progress, at last

Mark Zee
1 May, 2023



Here's something you might not have been expecting: at long last, **true progress on fixing NOTAMs**.

If you've been following the story over the last few years, you'll know that there has been an ever brightening spotlight on the problem. Here at OPSGROUP, we've certainly been vocal about the issue. The response to our first blog post back in 2017 was huge, and so we made it our mission: **Let's Fix NOTAMs**.

We started out with a campaign to bring attention to the problem: We wrote the Field Guide to Notams, ran a Worst NOTAM competition at EBACE, held a Notam Summit in New York, conducted a pilot and dispatcher survey with 2100 responses, asked OPSGROUP members for support and input, ran a design contest, and through all of this gathered ideas on how to fix things. That led to an updated article in 2019 titled "Why Pilots are reading a Reel of Telegrams in the Cockpit" – which gathered more energy and interest around the problem. We then formed a Notam Team, started the "Fixing Notams" website, worked with other industry groups looking at the issue like the AIS Reform Coalition, and saw the FAA host the first industry gathering on NOTAMs in November 2019. We started a petition to keep momentum going, with 8800 people signing our plea to fix Notams.

In terms of specific solutions, we tried a bunch of things. We built an AI bot with ICAO, called NORM – to see if we could use machine learning to sort out the mess. In the Notam Team, we looked at the problem from the ground up, and looked at building an entirely new system, called N2. We also collaborated further with ICAO to build the Notameter, a tool to analyse the quality of existing Notams. Internally at OPSGROUP, our small team spent many hours researching, pondering, idea generating and data analysing.

The result? Much learning, much discussion, much collaboration – but no concrete results or fixes. This the way of things. NOTAMs are harder than they look. The AI was not able to make sense of Notams in the way we'd hoped, the initial Notameter was interesting but wasn't changing anything. A brand new system wasn't going to work: despite the failings, the existing system has buy-in and trust, and attempting to circumvent that with an entirely new mechanism sounds inspiring, but isn't practical.

But progress doesn't always come along the path that you expect. And in the quiet, dark days of a Covid-dominated December, a small group of die-hard Notam Fixers formed to continue the battle. Taking all the learnings of the Notam journey over the last few years, we sat down together once a fortnight over the last few months, and forged a new path. Each of us represented our own group of allies in the mission: ICAO, IFAIMA, IFALPA, and OPSGROUP. This togetherness created a renewed energy to solve the problem.

And now, we have traction.

Next month, ICAO will spearhead the launch of a **Global Campaign on NOTAM Improvement**. Our aim is to solve the Notam Problem in manageable chunks, gathering energy as we solve them and make progress. Rather than re-invent the wheel, we will fix the system from within, starting with the easier aspects and progressing from there. The first phase of this campaign focuses on **Old Notams**. At any one time, there are about 35,000 active Notams globally, and 20% of these – one in five – are old; in other words, not respecting the existing rules of Notams being issued in principle once only for a maximum of three months (everything else should go into the AIP, an AIC, or some other publication). We are drawing on the collective cooperation of the AIS community – the Notam Officers – to uphold the rules and get rid of Notams that don't follow them. The result will be a potential decrease of 7,000 Notams per month, and a 20% reduction in the size of the average briefing packet.

The ICAO Global Campaign on Notam Improvement will kick off with a worldwide webinar on April 8th, for which ICAO has issued an invitation to member states by State Letter. After this, a series of bi-monthly progress webinars will start on June 16th.

The backing of ICAO means we are now tackling the Notam Problem head on, with the fullest force.

The focus on "Old Notams" is just the first phase of this campaign. As well as tackling this particular aspect of the Notam Problem, we will be creating awareness of the wider issue, especially in the AIS community, and forming support mechanisms for AIS offices around the world to deal with not just Old Notams, but also further improvements down the track. In **Phase Two**, we plan to look more closely at how we can improve the mechanics of the system itself.

NOW, versus Later

An important distinction to make here is that this work is on "**NOTAMs, Now**". There is separate, ongoing work in the field of the "Future of NOTAMs". You may have seen acronyms like SWIM and AIXM, and terms like Digital Notams or Graphical Notams. The FAA, ICAO, Eurocontrol, and other agencies are building a model for the future, when NOTAM's will change from the current AFTN format and transmission into an internet, or IP based, transmission and following a service-oriented approach. This work is valuable, but with a target implementation date of 2028, has a different focus. Even if it goes smoothly, it would not instigate change until 2028. Needless to say, if we don't fix the underlying issues now, it may not even solve them then, either.

Thing-Labelling

For the enthusiasts, I'll delve some more into the Notam Problem, what we've learned, and what the next phase of fixing might look like.

In **Phase One**, the brief is simple and clear: remove Old Notams, and reduce the count. That count – or total volume of Notams – reached about 1.9 million in 2020. Reducing that count by 20% means a reduction in the volume of Notams that pilots are presented with pre-flight. It's a simple, quick win.

In **Phase Two**, we will be able to look at the first systemic change – not just reducing the count as in phase one, but finding ways to improve the quality and usability of the system as a whole.

One potential option is how we can label Notams. You might recall we built an Artificial Intelligence bot with ICAO, called NORM. The terms Artificial Intelligence (AI) and Machine Learning are in essence still interchangeable, and the latter makes things easier for most of us to comprehend. Machine learning is really just "Thing Labelling" (see this article from Cassie at Google). Very simply: tell me what this thing is about, and I can do something with it. NORM wasn't able to "thing label" quite as well as we'd hoped, but the concept remains valid for Notams – if you can tell me what this Notam is about, I can do things with it.

We have a manual thing-labeller for NOTAMs built in: the Q-code. This five letter code, like **QFAHX**, which means "This NOTAM is about **Birds**". The trouble is, that there are far too many choices. There are 179 Subjects (60 AGA, 47 ATM, 40 CNS, 27 Nav Warnings, 5 Other) and 77 Conditions (16 Availability, 16 Changes, 26 Hazards, 19 Limitations). The number of permutations, or possible 5 letter Q-codes, is therefore 13,783.

The result? As you might imagine, the person putting a NOTAM into the system has to choose a Q-code, and with that many choices, the same subject can have a host of different Q-codes. In a review of all Notams issued in 2020, we found 1,063 different Q-codes in common use. In addition, we found that 47% of Aerodrome Notams, and 25% of FIR Notams, used the Q-code "XX" or "XXXX", which translates as "I don't quite know which one to use".

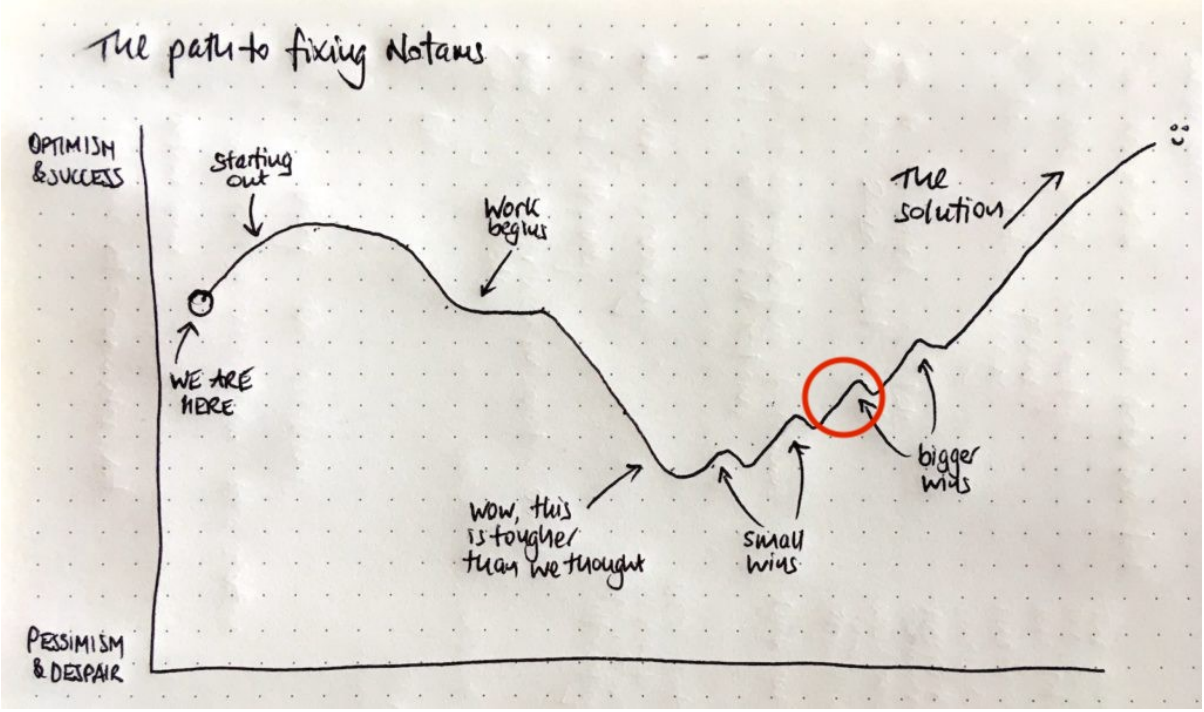
Net result: The Q-code isn't a reliable thing-labeller as it stands. However, if we refine the number of available Q-codes to a set amount, like 50, or 100, we then have a robust and reliable way of labelling the Notam. And if we have a reliable label, then we can do two magical things: SORT and FILTER them. Sorting means that we can present critical items first (like a runway closure), and Filtering means we can exclude things we don't care about (Birds, perhaps).

A key item on the Pilot wishlist is "**Show me the critical stuff first**". If the NOTAM can be labelled to show "What is this NOTAM about", it would allow end users (directly, or through the NOTAM distributors like Lido, Jeppesen, ARINC, etc.) to reliably filter and sort them. In other words, Closed Runways appear first and Birds and Grass Cutting appear last, if at all. The magic of refining the Q-code field to achieve this is that we don't need to build anything new, make any structural changes to a Notam message (exceptionally challenging), nor create a burden on states to invest in new technology. It's a simple, very effective, tweak.

There are other recognised issues: for example, the Upper Case format, Plain English vs Abbreviations, and in time, I believe we can solve those too.

Getting closer to the solution

For those of you that have been with us for a longer period, you might remember the little chart I drew a year or two back. Fixing Notams was never going to be easy.



I think we're somewhere around the red circle area. We have done so much, and we now have global attention, a harmonious, energised group of organizations working on the problem, and as of April 2021, the backing and full force of ICAO in this Global Campaign for Notam Improvement.

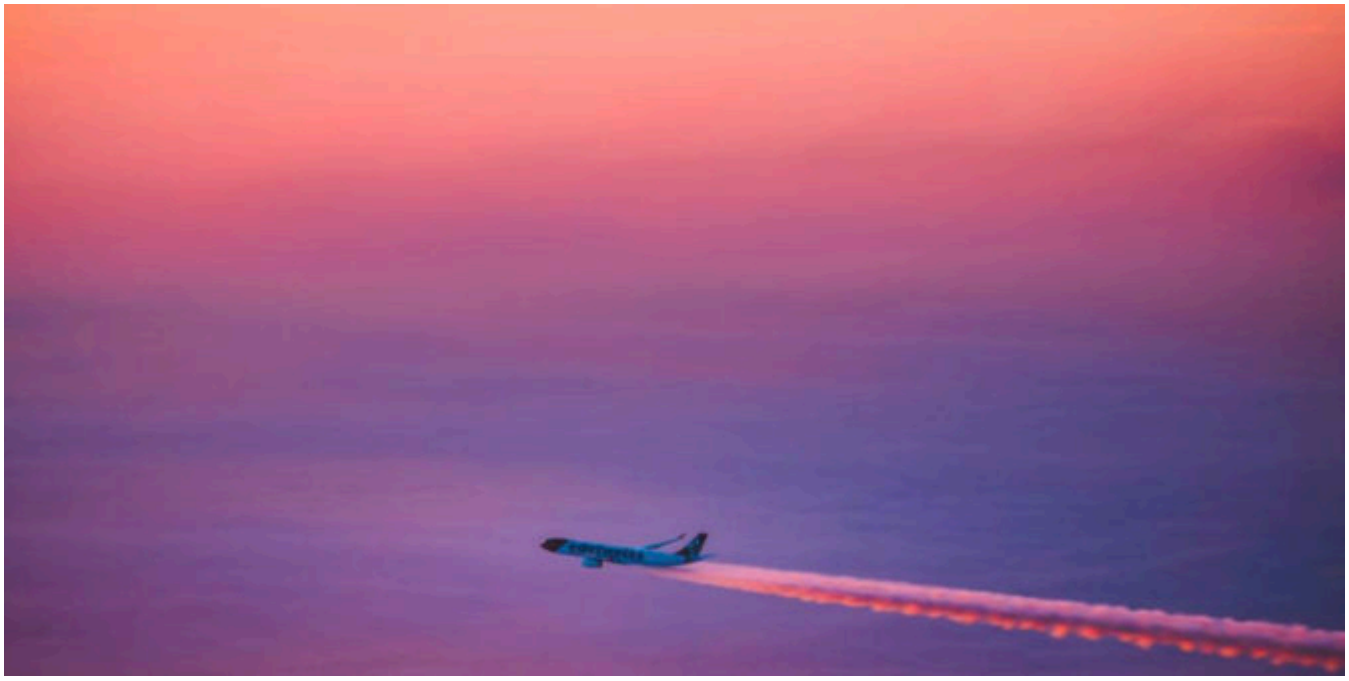
I'm excited to see what we can achieve from here.

Further reading and links

- The ICAO Global Campaign on NOTAM improvement
- Register for the kick-off worldwide Webinar – April 8th, 1200Z
- Review the Notameter: measuring progress on Old Notam
- The journey so far: FixingNotams.org

NOTAMs: Creating the solution through community collaboration

Mark Zee
1 May, 2023



Update: *November 1st, 2019*: **The Notam Team is up and running** – we're fixing Notams. Follow our progress at fixingnotams.org.

There cannot be a more agreed upon problem in aviation. **Every single airline, every single flight: the most critical information about that flight is passed to the pilots in the style of a Telegram from the early 1900's**. Coded, abbreviated, often undecipherable, upper case chunks of text: the least human-friendly format imaginable.

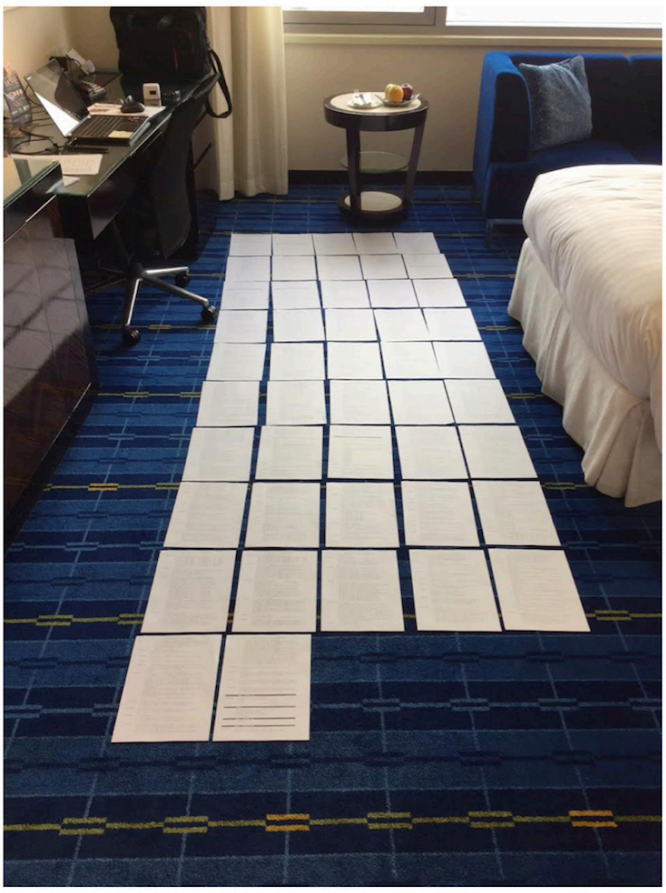
A news story in 2013 declared "**Plug pulled on the world's last commercial electric telegraph system**".

Shhh. Don't tell them. Not true. Our NOTAM system is still proudly flying the flag. We use the ITA-2 International Telegraph Alphabet character set from 1924, instead of ASCII, which the rest of the world switched to in 1963. Ever wonder why Notams are all upper case? That's why. We use Q-codes (from 1909) to categorize the message. We use abbreviations heavily, because it costs more money to send messages in plain text format. Wait, scratch that – that logic ended in the 90's because, well, the internet.

And so, while the passenger is choosing emojis for their last What'sApp message before the aircraft doors close, in the cockpit the pilot is deciphering what the impact of this Telegram might be □♀:

```
A4732/19 NOTAMN Q) LIMM/QOBCE/IV/M/A/000/999/4526N00916E005 A) LIML B)
1907040000 C) 1907172359 E) REF AIP AD 2 LIML 3-3 NEW OBST ERECTED TWO
CRANE RWY35 PSN 5943.8M AFTER THR35 AND 172.1M RIGHT RCL ON TAKE OFF
DIRECTION COORD (WGS-84): 453022.0N 0091555.0E MAX ELEV AGL 69.2M/227.0FT
MAX ELEV AMSL 185.7M/609.3FT ROTATING JIB 77M ICAO SIGNAL UNPROVIDED.
```

. If that seems tough to get through, now consider what 50 pages of it looks like:



That is the average size of the Notam Briefing package that each crew is given. And so, your job as a pilot at briefing time, is to **find the one Notam that will end your career or endanger the aircraft**, in a package the same size as a short novel. Buried deep in Birds of Bangkok, War and Peace by Greece and Turkey, Unlighted Tiny Obstacles, Goat grazing times, Grass cutting timetables – is a runway closed, a diversion airport unavailable, a decision height changed. And you'll miss it.

Air Canada 759 missed the one telling them that 28R was closed in San Fransisco, so they tried to land on the taxiway. Only an alert United crew prevented the worst crash in American history, and then only by 14 feet, or 1 second. That led to the NTSB to declare "*Notams are Garbage*".

From the Final NTSB Report: *"Concerns about legal liability rather than operational necessity, drive the current system to list every possible Notice to Airmen (Notam) that could, even under the most unlikely circumstance, affect a flight. The current system prioritizes protecting the regulatory authorities and airports.* ***It lays an impossibly heavy burden on individual pilots, crews and dispatchers*** *to sort through literally dozens of irrelevant items to find the critical or merely important ones. When one is invariably missed, and a violation or incident occurs, the pilot is blamed for not finding the needle in the haystack!"*

Thank you, Robert Sumwalt, for calling the problem out.

It’s not just the volume, or readability – it’s the **Mensa-level problem solving skills** required to parse the contents. Answer this question: If you’re on Parking Stand 505 Right, can someone else use Stand 503 Left?

```
ZLXY/XIANYANG L0090/17 WHEN STAND NR.501 BE USED, STAND NR.502, 503,
503L, 503R CAN NOT BE USED SIMULTANEOUSLY. WHEN STAND NR.503L OR NR.503R
BE USED, STAND NR.501, 503 CAN NOT BE USED SIMULTANEOUSLY. WHEN STAND
NR.503 BE USED, STAND NR.501, 503L, 503R CAN NOT BE USED SIMULTANEOUSLY.
WHEN STAND NR.505R BE USED, STAND NR.505 CAN NOT BE USED SIMULTANEOUSLY.
WHEN STAND NR.505 BE USED, STAND NR.505L, 505R CAN NOT BE USED
SIMULTANEOUSLY. WHEN STAND NR.505L BE USED, STAND NR.505, 506, 508 CAN
NOT BE USED SIMULTANEOUSLY.
```

If you did figure it out, how long did it take? Now multiply that time by 250, a straw-poll average number of Notams in a briefing. Think this is manageable in the 20 minutes the crew have to brief the flight?

In 2007, the annual count of Notams reached 500,000. This year, 2019, we are on track for 2 million Notams. The problem is intensifying, and rapidly. **We are drowning in the data, but missing the message**. Every change imaginable is stuffed into the system:

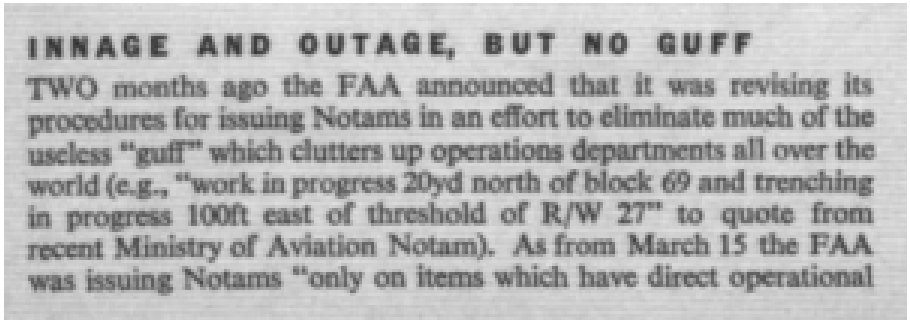
```
FTTA A1219/16 PASSENGER FACILITIES READ 2 HOTELS AND 4 INNS IN THE CITY
INSTEAD OF 1 HOTEL AND 4 INNS IN THE CITY ASECNA AIP MODIFY AIP 14AD2.3-
02. 13 JUN 10:05 2016 UNTIL PERM.
```

And this Chinese entry is the best one of 2019 so far …

```
F2298/19 NOTAMN Q) ZSHA/QXXXX/IV/NBO/A/000/999/3014N12026E005 A) ZSHC B)
1905050852 C) PERM E) REF AIP CHINA SUP15/18(2018-5-15)ZSHC AD2.24 -20G,
MORSE CODE OF IXX CHANGE FM 'DOT,DOT','DASH,DOT,DOT, DASH', 'DOT,DOT,DOT'
TO 'DOT,DOT', 'DASH,DOT,DOT, DASH', 'DASH,DOT,DOT, DASH', OTHERS REMAIN.
```

Say it out loud.

In 1964, Flight International published a snippet from the FAA, declaring that the Notam system was being revamped, and from March 15th that year only essential, critical Notams would be allowed to remain. **That was 55 years ago**. We’ve tried, and we’ve failed, many, many times, to solve the problem.



INNAGE AND OUTAGE, BUT NO GUFF

TWO months ago the FAA announced that it was revising its procedures for issuing Notams in an effort to eliminate much of the useless "guff" which clutters up operations departments all over the world (e.g., "work in progress 20yd north of block 69 and trenching in progress 100ft east of threshold of R/W 27" to quote from recent Ministry of Aviation Notam). As from March 15 the FAA was issuing Notams "only on items which have direct operational

But – enough about the problem. If you are a pilot, dispatcher, or controller, you know only too well the problem, and its impact.

How about we talk about how we find the solution instead?

Let’s start here.

I’m gathering a team of people that understand the problem from the user perspective. A team of pilots, dispatchers, controllers, and anyone else that wants to help. A team of people that care about solving the problem because of how it affects us every day, and because we know that one day, we’ll be bitten by it. A team motivated by a desire to make this better for our colleagues, and those that will follow us.

We’re not fixing it because we have to, but because we want to.

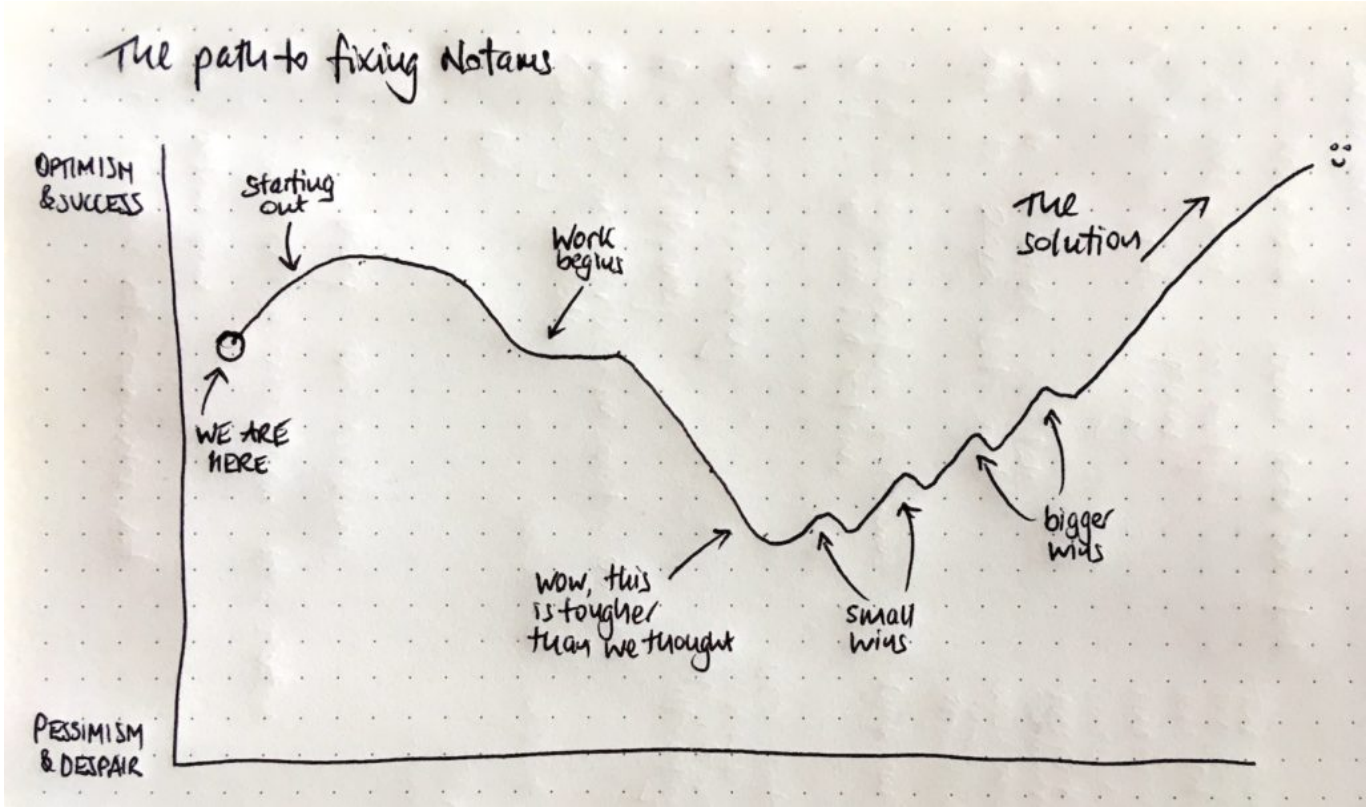
We’re not fixing it to make a profit, or because it enhances the bottom line somewhere. We’re fixing it because we want it to change.

Most importantly, we’re fixing it as a community, collaborating to create the space to allow the solution to come.

Zooming out a little, if we look at this as not an aviation problem, but a communication problem, it becomes less unique, less challenging. Many bigger problems have been solved by looking at them differently.

So we’re going to collaborate with smart thinkers, problem solvers, designers, coders, creatives. We’re going to work together as people, rather than agencies or companies. We’re going to jump into a process that might be messy, challenging, difficult, and will often seem impossible.

As per this handy graph I’ve drawn:



Don’t join us to force change – this is the change. Don’t join us to shout louder – this problem is bigger than any one agency or organization. Don’t join us if you think this is someone else’s problem to fix – **it’s our problem, and we’ll fix it together**.

The first step is creating the space for this magic to happen. Join us if you have no idea how to solve it yet, but you have positive energy to contribute.

The Notam Team needs you! We start July 1st (yep, you’re already late, so jump in). We have set a lifespan of 9 months – do, or die.

The first part of the process is the gathering, the coming together. Once we’ve all said hello and had a look around, we’ll start with the first and most important step – creating that space for the solution. Figuring out how best to collaborate, invite creativity in, think differently. Then, the research – the science, the data, the hard facts. Identify the problem, and the impact. And from there … well, it’s unwritten. Not knowing is part of the approach. Oh, and we’re going to have fun. There’s no creativity without fun.

I believe the problem is eminently solvable, but only as a community. And I hope you’ll join us! If you’re in – just write to me at mark.z@ops.group.

Here’s what pilots and controllers REALLY think about Notams

Mark Zee
1 May, 2023

Update: *November 1st, 2019*: **The Notam Team is up and running** – we're fixing Notams. Follow our progress at fixingnotams.org.

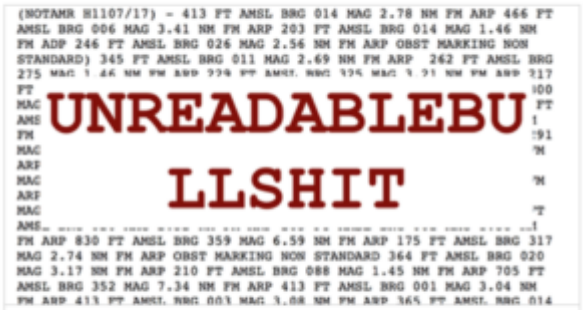
We think Notams suck. No other way to say it. After a few articles we wrote (BS Notams, The Notam Goat Show, and more worryingly, the MH17 Notam problem), we got some feedback in the comments section. And thought we should share, because they really show the problem. So, here they are.

Caution, some strong language!

We're working on a solution, so you can help and add your thoughts **as a comment below**. Also, send us the really bad ones and enter the 2018 Notam Goat Show contest.

Flight Service Bureau

The problem hasn't gone away ...



The problem of Bullshit Notams

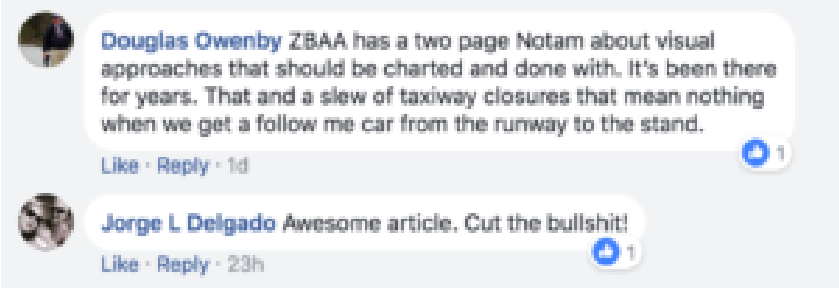
This article created a firestorm of engagement - several hundred emails and 127,000 people that visited the blog. Most of it was overwhelmingly positive. Some of it wasn't. Please read my follow up in response. It's absolutely...

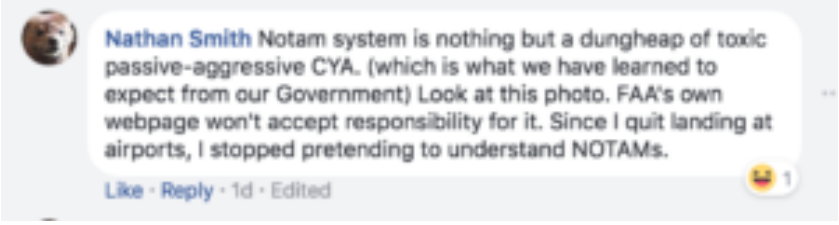
FLIGHTSERVICEBUREAU.ORG

Brooks Yeilding It's currently the biggest threat to aviation safety at all levels. AOPA, NBAA, FAA, ICAO, ALPA, IALPA, etc. are all complicit. It's strictly CYA for everyone except the pilots and it's getting worse every day. I am a senior Captain for a major airline. If I read every word or code on my 70 page flight plan, we would never leave the airport, much less make a push time. However, the blame path from the bent aluminum leads directly to me because it was "right there" in the papers.

Like · Reply · 13h

1





Personally I think taxiway and apron closure NOTAMs are too readable, I think they should be distributed in RADIAL/DME format, or perhaps raw Lat-Lon. Additionally, time should be specified in seconds since the founding of the FAA.

TAXIWAY CLOSED BETWEEN ORL180/08.5DME ORL181/08.6DME ORL181/08.65DME ORL180/08.65DME FROM 1829088020S to 1829190200S

What could be more clear than that?

I wonder if a buried Notam ever did contribute to bent metal, injury, or death? I agree that the volume of nuisance notams is a real task to read through wether it be a long or short turn. However, nothing will be done till there is blood. That’s how the FAA works. Till then, its on us to be like aviation lawyers before every flight regardless of schedule.

Maybe we can get them in binary?

You have to go to binary first, then convert to Morse.

01010100 01000001 01011000 01001001 01010111 01000001 01011001 00100000 01000011 01001100 01001111 01010011 01000101 01000100 00100000 01000010

—– .—- —– .—- —– .—- —– —– —– .—- —– —– —– —– —– .—- —– .—- —– .—- .—- —– —– —– —– .—- —– —– .—- —– —– .—- —– .—- —– .—- .—- .—- ——

For good measure they should be put through an Enigma machine, too. And the output formatted to wingdings

---

Yes. The NOTAM system is fucked. We have Notams about those solar arrays near Vegas in every flight plan. Yes, I see them. I want to know if the damn runway is closed. Why the weird coding? Is it to make pilots feel multi-lingual?

It’s funny, they seem to have every little f*ing detail about towers that are under 400 agl 20 miles either side of my route with one light bulb missing but I can’t get a god damn reliable source for f*ing TFRs. Even the piece of shit FAA website for TFRs is not a “complete and accurate source” but some guy in a FSS station is?????? Such complete and utter bullshit.

The reason nobody reads NOTAMs is because they are mostly garbage.
Why do I care that a crane that is 200 feet AGL ten miles from any airport is unlit? We can’t fly below 500AGL anyway.
Why do I have to decipher code that can easily be written as: From 20170608 1900Z to 20170610 0000Z CYYZ Taxiway L Closed
The system is broken and nobody cares to fix it.

I f*in’ love doing a flight from Newark to DC and getting notams about the North Atlantic Tracks. Motherf***r, if I end up on the tracks during that leg in a 145, the Notams are the least of my damn problems.

The biggest frustration for me is the NOTAMs don’t match reality. KAUS often NOTAMs a runway closed for several hours a couple days each week. Yet we get there and it’s open.
Or an airport will NOTAM an ILS out of service for the day. Show up at the airport and they’re using that ILS.
My home airport is KDAL. One of the PAPIs was out for three days before they NOTAM’d it out of service. Delta landing in front of me asked about it. Tower said they showed it on and asked me. I said, “Uh… It’s been out for several days. I thought y’all knew?”
Finally, my favorite: Surprise runway closures for routine runway inspections. NOTAM? Nah. BTW there’s a 150′ tower 15 miles away with a light out and there’s birds around the airport. Awesome.

I can honestly say that if it isn't a runway closure or terminal closure then I don't really care. The amount of closed taxiways at every airport is absurd. Not to mention many of them are closed year round with no intention of opening them again, just a permanent NOTAM.

Can only agree. It has been raised at the RAPACs, but no progress to date.

If I'm 5nm from the ARP at 150′ AGL, then I have more things to worry about than a crane without a red light…

Ass-covering gone mad. Really… a tree

OBST TREE 58FT AMSL
PSN 386M FM THR RWY 25 AND 183M LEFT OF RWY 25 CL
BRG 047 MAG 0.91NM FM ARP
FROM 01 310536 TO 03 300500 EST

My personal favourite is the "trigger notam" cross-referencing to yet another unfindable / unreadable pile of nonsense.
Just tell us what matters to an "Airman"; today and leave the grand plan, 12 month projection crap out of NOTAMS.

All of this so true, I imagine a world of technology and wonder (ozrunways/avplan/anything but airservices/casa))where we can quickly read a Notam and weather briefing without having to nut it out and do a slow-ass flight plan every time. 2017 and we still cant embrace all the tech.

I totally agree. The last thing any crew is going to be able to do when checking NOTAMs before departure is to magic up a way to access cross-referenced documents in various other publications. Especially when the departure point is not anywhere near base ops, or even any other operations centre.

B.S. NOTAMS….100% concur. Our whole world of aviation is being swamped by similar legal ass-covering paperwork. How can ANY pilot be expected to remember all the additional codicils that do NOTHING to improve safety of flight, but rather give an army of lawyers and providers more chances to fleece an already cash-strapped industry?…..Rant over!

Congratulations, its our industry, the users should be heard.
Start with a blank sheet of paper, what do we want to know in a "NOTAM" and how best to communicate it in a cockpit / in a flight briefing package. If the current format was frozen in 1924, the next system needs

to be good for a couple of years.

This information ceased to be “NOTAMs” long ago. Today they are “NOTOLs”, Notice To Litigants. Thanks for making an effort to change this ancient system.

How many pilots out there actually read ever Head Office Notams or even daily Notams in meticulous detail? Few (if any). You sign on an hour before departure, there is simply not enough time to divulge all the ass covering crap that’s generated daily. Airline companies only want one thing, OTP; how a pilot goes about that they couldn’t care less as long as you don’t break any rules! NOTAMS = “None Other Than Aircraft Missing Slots”

You can bet your life, the one you needed to see at 3 in the morning was the one you missed! Any wonder…

Well said. Have you ever read “MEN AND EQUIPMENT NEAR THE RUNWAY: LANDING WITH CAUTION”? So, If you don’t tell me that, I will land recklessly..

You are a mind reader.
You captured the issue perfectly and the historical context was excellent. While airspace and aircraft have all continued to develop our most basic system of communicating the status of an airport/airspace has not. I could take that further and say communication with ATC is still by AFTN for the most part.So now put yourself in the position of dispatcher/FOO working a series of long haul ETOPS Flight. You might have 20 or more departure /Take off alternate station notams, a whole galaxy of FIR/UIR Notams, not to mention all of the ETOP alternates and if you re-dispatch/re-analysis, you will get to do it inflight once again. Now do that 15-20 times depending on workload. Can you say human data saturation?
This article certainly illustrates the infrastructure issues we face, but it doesn’t come close explaining some of the processes and procedures we have had to put in place to ensure:
1. That we actually get NOTAMS.
2. That we get airport conditions as some countries don’t put them out as Series-S ICAO NOTAM versus Series-A (Yes, theses are the countries that haven’t fully adopted ICAO standards which were adopted in 1944 and ratified in 1947 by the Chicago convention).
Question: What is the current year?

I absolutely agree. My personal bugbear is those lists of co-ordinates …. do they think anyone actually plots them on a map? They might as well not be published at all.

What is clear is the professional approach to the information received: too many inputs, disorderly given, contextually irrelevant, redundant and unusable. A kind of “cry wolf” syndrome, making the pilot complacent about such a bullshit. The very day someone of us is caught in a legal battle for a system-

induced mistake leading to a incident, overlooking the NOTAMs will not appear as an excuse. How to make these information valuable?

Yes… and why oh why are we still using the coded TAF language. We don’t have bandwidth issues anymore. We take plain English, code it, then decode it back to plain English. Surely a TAF written in plain English is not too hard a transition.

We train the pilots of tomorrow, they are inundated with everything the industry throws at them and the unintelligible Nonsense contained in some NOTAMS are just another accident waiting to happen. With all the technology at our disposal today, the filtering systems, electronics messages systems, integration tools and smart people to think about it, there is a solution out there. I suppose we just need to make enough noise in the right places to make a change. Oh well best we get started. hmmm, perhaps a NOTAM about change is needed.

And don’t forget about TFR’s that pop up. The one time I didn’t look at TFRs I got trapped having to divert from Chicago to an outlying airport even though we were part135 and even though we got an IFR clearance and the tower gave us takeoff permission. And center control for an hour just kept passing us on.

How about a change in the format of NOTAMS too, so we don’t have to wade through the whole lot in order to parse the relevant information. NOTAMS are removed when thy are no longer valid, so why cling to chronological order as an indexing system. How about putting them in order of critical relevance: Firstly, changes to airfield opening hours and services (fire, fuel etc). Secondly, changes to runway lengths/closures/etc. Thirdly, changes to approaches available. All the rest can be thrown into the mix at the end of the NOTAM.

Excellent analysis. My personal favorite is the NOTAM sort order which tells me that the REIL lights don’t work, the glideslope is out, the runway markings are non-standard, the localizer is out… ending with: runway closed. Tell me that first, all the other BS becomes irrelevant.

About two days before I saw this post, I’d sent a long email to my company telling them of the NOTAMs we don’t need to see. Then I saw this. Brilliant! I’ve just sent the link to this piece to the company to reinforce that opinion. I’m hoping our briefing pack will be several pages thinner the next time I go to dispatch.

I have come up with a name for this problem: “NOTAM Spam”. It’s a serious one, alright — ASRS Callback #426 brought it up in the context of the US NAS, and I’m sure it’s only worse for international operations. It sounds like ICAO needs to put out a recommendation or SARP about NOTAM spam control…

95% of Notam’s we read are not applicable, or nothing can be done about them. Oh great, I’ll pull out my chart and plot the 25 co-ordinates to see if this airspace will affect my flight -_- that’s one Notam example from plenty of the same type, in the same Notam briefing. Now add the other irrelevant Notam types as mentioned by others in the comments.

Thanks for the article. I shared it with my fellow dispatchers at AAL. We read pages and pages of BS notams on a daily basis and wondered if anyone else had similar feelings about the whole process.

Post your thoughts below!