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AVIATION WEEK
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Ending NOTAM Nonsense

When will international aviation **elevate these critical notices** to the digital age?

BY **DAVID ESLER** david.esler@comcast.net

Normally overcast on a Bay Area summer night, the weather was unusually clear at San Francisco International Airport (KSFO) on July 7, 2017, when Air Canada Flight 759, an Airbus A320 inbound from Toronto and on a visual approach to Runway 28R, was cleared to land. It was 23:46 local time.

Waiting for takeoff on Taxiway C, parallel to Runway 28R and nearly 500 ft. to the north, were two United Airlines Boeing 787s, a Philippine Airlines Airbus A340 and a United Boeing 737. Runway 28L had been closed earlier in the evening for maintenance and was unlighted except for a flashing “X” at its threshold. The combined passenger and crew load of the five airplanes exceeded 1,000 people.

Confusing Runway 28R for the closed 28L and thinking Taxiway C was the active, the Airbus crew lined up on it for approach and landing. As the descending aircraft came within a half mile of the end of Taxiway C, the apprehensive Philippine crew turned on their A340’s landing lights and the captain of the lead United 787 radioed the tower, “Where is this guy going? He’s on the taxiway.”

Still descending, the A320 overflew those first two airliners, clearing the A340’s vertical tail by just 14 ft. and coming within 81 ft. of the ground before the crew, realizing their error, advanced the aircraft’s thrust levers, just as the sole controller in the SFO tower ordered the flight to abort the landing and go around. In the seconds it took for the A320’s turbofans to spool up, the aircraft continued to descend to an altitude of 59 ft.

It is generally assumed that, had

not fate, bright landing lights and an alarmed pilot’s radio transmission intervened, the SFO incident could have resulted in one of the worst aviation accidents in history. The ensuing NTSB investigation determined that the probable cause of the incident was the Air Canada crew’s mistaking Taxiway C for the active runway, as they had missed the Notice to Airmen (NOTAM) on the Runway 28L closure, a fact buried in their briefing package of dozens of NOTAMs. Contributing factors included the crew not backing up the visual approach with the ILS for Runway 28R, which had not been tuned as part of their pre-landing preparations. In addition, there was the matter of crew fatigue since the captain of the late-night transcontinental flight had had no significant rest for the previous 19 hr., nor the first officer for a dozen hours (legal under Canadian rules at the time but not under FARs; the Transport Canada duty time regs were subsequently tightened).

“Although the Notice to Airmen about the Runway 28L closure appeared in the flight release and the aircraft communication addressing and reporting system message that were provided to the flight crew,” NTSB Finding Number Nine of the subsequent investigation stated, “the presentation of the information did not effectively convey the importance of the runway closure information and promote flight crew review and retention.”

The NOTAM finding is emblematic of the increasing shortcomings of the system, developed in the 1930s and changed very little in most parts of the world since then, to convey critical information to pilots. In addition to



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archaic formatting issues, complicating interpretation and consuming time to translate, read and absorb, the system is overwhelmed with a proliferation of NOTAMs, which have increased from 500,000 in 2007 to 2 million and counting this year, worldwide.

Buried in the 'Stuff'

The latter was addressed by NTSB Chairman Robert Sumwalt in an interview with BCA concerning the Air Canada 759 incident at SFO.

"We did find that Air Canada's ineffective NOTAM presentation was a contributing factor in that near-accident," he said. "The crew missed the NOTAM that the runway was closed. Today, they are reading [their briefing packages] on iPads, and the SFO runway closure was on page 8 of 27 iPad pages, and of the 27 pages, 10 of them were NOTAMs. And we all know that these were 10 pages of 'stuff' written in a computer-like code where the user has to decipher abbreviations, convert times to be useful to the given flight, and everything you need to know is buried down in there. In the Air Canada incident, there was something that was critical for them to know about — and it was buried down in the 'stuff.'"

Concern among NTSB members about the limitations and propensity for misuse of the outdated NOTAM system has been so rife over recent decades and the SFO debacle so significant that, for the first time in its history, the Safety Board conducted a full-up accident-level investigation of an incident. "If that had been an accident," one member pronounced, "it would have been worse than Tenerife," the 1977 runway collision of two Boeing 747s in the Canary Islands that killed 583 people.

"We acknowledge that NOTAM modernization has to happen, a better way to present the material, and that the current system is archaic — 'just a bunch of garbage,' as I was quoted in the media," Sumwalt, a former airline captain, continued. "I believe that having timely information is critical to safety of flight. But when it is buried down in a lot of code — stuff — and people can't find the important items, the critical information essentially becomes useless — which is why I said 'garbage.' I do want to emphasize that the idea of NOTAMs is not garbage, but it is the amount of material that is irrelevant that obscures safety of flight."

The inadequacy of the worldwide NOTAM establishment can best be

About Europe's NOTAMs

Eduard “Eddie” Porosnicu, a senior aeronautical information management expert at Eurocontrol, is that organization’s lead researcher on NOTAM renovation. Here’s a Q&A *BCA* conducted with him on the digital NOTAM project his organization is prosecuting for the European Aviation Safety Agency’s Single European Sky-ATM Research (SESAR) ATC modernization program.

BCA: What is the state of NOTAM modernization and why, six years after we talked about this for our 2013 article, are flight crews still having to look through dozens of paper notices as part of their preflight?

Porosnicu: A radical improvement in the pilot preflight information bulletins (PIBs) requires a radical change in the NOTAM concept. The research done within the SESAR “Digitally Enhanced Briefing” (ePIB) project has confirmed that we can significantly improve preflight briefing, on condition that the NOTAM information was provided according to a digital data model. A prerequisite is that all other aeronautical data, such as airport layouts, airspace structure, procedures, etc., is also available according to the same digital aeronautical data model.

Unfortunately, progress toward digital NOTAMs was slower than expected. In the U.S., the FAA has already deployed a digital NOTAM production system at more than 350 airports (see <https://notams.aim.faa.gov/#news>). However, the FAA digital NOTAM data does not seem to be used yet on a large scale for improving the preflight information bulletins. A reason could be that the potential developers of applications and the potential users are waiting for a critical mass of Digital NOTAMs to exist. Other regions of the world need to provide Digital NOTAMs before users are willing to make the investment that would allow benefiting from the FAA Digital NOTAMs. In Europe, Digital NOTAM capabilities will be provided by the new European AIS Database (EAD) system, which is planned for the coming years.

The main difficulty, in my opinion, is that we are in a vicious circle: Data providers hesitate to make the investment because there is no immediate use, and data users wait for sufficient digital data to be available in order to start their developments and begin using it.

BCA: Is your research at Eurocontrol being done on behalf of EASA and ICAO?

Porosnicu: At the global level, ICAO is now making the necessary steps to break the vicious circle that I mentioned. Since November 2018, ICAO Annex 15 has introduced recommendations for states to provide digital data sets, which will progressively replace the paper Aeronautical Information Publications (AIPs). Digital NOTAM is mentioned in the Annex 15 recommendations. The ICAO Information Management Panel (IMP) has a dedicated working group for aeronautical information, which has the task to develop a new NOTAM system concept, based on digital data services.

BCA: Is there coordination with the U.S. FAA?

Porosnicu: Yes, the Digital NOTAM specification is developed in close cooperation with the FAA and other international partners. (See https://ext.eurocontrol.int/aixm_confluence/display/DNOTAM/overview)

BCA: When we visited Eurocontrol this year, you showed some examples of a digital NOTAM format. Is this a prototype for what could be a universal format?

Porosnicu: Yes, the objective is to develop a specification that is applicable globally. The U.S. FAA Digital NOTAM system applies the same concept format, based on the Aeronautical Information Exchange Model (AIXM).

BCA: Pilots want a NOTAM system that can operate through a search engine with filtering so they can retrieve only those NOTAMs that are specific to their operations. When will this be available?

Porosnicu: In Europe, this is expected to come with the enhanced EAD project, which is, for the moment, in the planning phase. In the U.S., based on the existing FAA Digital NOTAMs, such applications could probably be made available already, at least for the airports covered by the FAA Digital NOTAM system. **BCA**

appreciated when one considers that the information delivery system was conceived nearly a century ago and based on telegraphy, which was the fastest method for conveying textual information at the time. This determined the “archaic” format of capitalization, code and abbreviations, the last two to reduce the cost of telegraphing the messages, which at the time was expensive. Some of this technology dates from 1909 (“Q-codes” for categorization) and 1924 (the ITA-2 International Telegraph Alphabet character set). Plain text has had to wait for digitization and the internet — and most of the aviation world is still waiting.

In addition to the awkward and hard-to-read formatting is the ever-increasing number of NOTAMs, bloating briefing packages with up to 100 pages of them, depending on the length of the trip and whether it’s domestic or international (the average is 50). This is what confronted the crew of Air Canada 759, and every professional flight crew understands the problem.

As Mark Zee, founder of the Ops Group flight information service, wrote in an article critical of the current NOTAM system posted on the Medium website and also carried in the Ops Group weekly briefing in July, “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.”

In an interview with *BCA*, Zee summarized the NOTAM problem, breaking it down into constituent parts:

► The huge number of NOTAMs in the briefing package, “making it way too difficult to find the critical element that could lead to disaster.”

► The telegraphic format issue, specifically, “everything is printed in caps and hard to read.”

► “Coding and abbreviations, and most pilots don’t know them all. You can take any message and make it unclear with those two things, caps and coding.”

► Lots of rubbish: grass cutting, birds, fireworks, foxes on the airport — all useless information to the pilot. There are a lot of animals in the NOTAMs and nothing you can do about it in your airplane.”

► The count, 2 million total this year worldwide. “It shouldn’t matter to the pilot how many there are worldwide, but

each airport contributes to that number, so no matter where you fly, there will be more of them. We are drowning in the data and missing the message.”

The Legal Argument

The data proliferation issue that is overwhelming flight crews was addressed by the NTSB in its Air Canada 759 findings: “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!”

So, what is the most efficient and effective way to communicate critical information? “Why not start with the idea that the pilot has to have the critical information for a safe flight to an airport?” asked Zee. However, the current system “is inherently flawed from the 1930s and [so] you have to start from scratch.” The objective, he maintains, is to communicate clearly to pilots what is happening on the intended route of flight, at the destination airport and the alternate.

If all this seems familiar, it is. In fact, *BCA* focused at length on the same subject and its flaws in “NOTAMs in Transition,” which we published in our January 2013 issue (page 24). In it we described the same NOTAM shortcomings and the need for a transition to a digitized system with information presented in plain text and accessible via search engines equipped with filtering so users could bring up only the most critical information for a given flight. The consensus of the sources we interviewed back then in government and air traffic management was that NOTAM modernization was just around the corner. Six years later, while some progress has been made by the FAA with a beta version of a digitized system (more on that later), most of the world is still reading NOTAMs written in code and flight crews are snowed in avalanches of them. And occasionally they can miss a critical one about a runway closure.

NBAA and NOTAM Modernization

The National Business Aviation Association has been part of an industry taskforce to provide input to the FAA on NOTAM reform and other information management issues.

According to Heidi Williams, director, AT Services and Infrastructure at NBAA, “Industry came together in early 2017 and formed the Aeronautical Information Services (AIS) Reform Coalition composed of airlines, general aviation, NBAA, AOPA, IATA, and others.” The coalition then met with Teri Bristol, COO of the FAA Air Traffic Organization, “and talked to her about what we saw as challenges, NOTAMs being a big part of that.”

This included not only the volumes of NOTAMs flooding the system but lack of digitization, change from domestic to ICAO format, inconsistencies in aeronautical data, and a common point of interface at FAA, since these issues have characteristically been handled by a multitude of divisions with little coordination. “This is a big challenge when you’re trying to work the issues,” Williams said. “[Bristol] understood and embraced the challenge and had her team do an assessment of the challenges we laid out. She appointed Abigail Smith as her liaison with industry to work the challenges.” Williams is the industry lead for the coalition.

“Abby has wrangled all the FAA, and we are making excellent progress,” Williams told *BCA*. “The lack of digitization is a key focus – this will entail going from [the present NOTAM format and distribution system] to the FNS, or Future NOTAM System.” Transition to the FNS and an ICAO format was predicted for “later this year.”

The coming months will see the introduction of an ICAO flight plan, as well. “This will allow greater global harmonization of data sharing and will allow us to get to a digital format to reduce the volume and have the ability to filter and parse NOTAMs and aeronautical data,” Williams claimed. “We are excited that this has Teri’s attention and FAA executive level support to get us there.” **BCA**

So Why?

Why does a system critical to high-density jet travel yet rooted in the teletype age continue to be employed? The answer is a combination of bureaucratic machinations and an entrenched status quo, combined with the difficulty of achieving technological compatibility and gaining international agreement.

Listen to Saulo Da Silva, chief, global interoperable systems, at the International Civil Aviation Organization (ICAO) in Montreal: “Aviation is a safety-oriented business by default, so you can’t necessarily change something overnight. We’re aware of the need for a NOTAM evolution. As of today, in and of itself, the NOTAM does not provide a safety risk. What we have is a need for the evolution of the NOTAM system to improve the efficiency of exchange of critical information . . . that affects the operation of an aircraft. This

task not only impacts safety but the efficiency of flight operations. Because this evolution needs time and a discussion between many stakeholders, ICAO has convened an Information Management Panel [IMP], drawing on about 25 members from among our 193 signatory states and seven international organizations, covering all seven ICAO regions, including a team of advisors, to evolve the NOTAM system into a web-based information service.”

That effort has been under way for five years, and counting.

What appears to be slowing implementation of an international NOTAM solution is the goal of making digitized notices part of an overall electronic information management system. Accordingly, NOTAMs must become part of universal System Wide Information Management (SWIM) and nothing meaningful is going to be achieved until that occurs.

“So the NOTAM service would be a SWIM service,” Da Silva confirmed. “But it has taken a lot of time because it is not simply [an effort] to convert from a system developed in the 1930s to the present level of technology.”

According to Da Silva, among the concerns that must be addressed are information confidentiality, integrity and availability. “When you transition to a modern IT basis, that is, plan to use the internet structure as its foundation, you have to understand that there are security parameters that must be considered so the information can’t be tampered with. So, we need a system that is robust enough to prevent hacking. There is no silver bullet that will solve this; it takes a lot of work and discussion.”

And Alexander Pufahl, ICAO technical officer, notes that SWIM is intended to be the management platform for all information related to civil aviation including NOTAMs. “However they will look in the future, NOTAMs will be distributed as an information service over SWIM, an IP-based, ground-to-ground and ground-to-air network,” he explained. “Today we still have the Aeronautical Fixed Telecommunications Network [AFTN], over which, for more than half a century, NOTAMs have been distributed. So, this will be replaced with an IP-based network.”

Currently, NOTAMs, flight plans

and other documents are distributed as messages over the AFTN. It is envisaged in ICAO document 9854, the global air traffic management operational concept, that “in the future” they will be disseminated over an IP-based SWIM infrastructure in digital format. The working group is assessing a host of concerns, including information security and need-to-know versus nice-to-know value, in making recommendations. So, from the global information management perspective, NOTAMs are “one small aspect” of the information that will be distributed by SWIM. “And,” he said, “that explains part of the delay.”

The integrity of the information on the SWIM network has to be guaranteed, which also contributes to the delay. “We are not only changing the NOTAM format but have to guarantee, among other aspects, the integrity of the information,” Pufahl said. “Whatever system is used to exchange information currently being processed via NOTAM, it has to be robust enough so we will not be trapped in the future with something worse like a denial-of-service attack or another type of cyberattack that may corrupt the information. SWIM is not an isolated project; we have other projects to guarantee the cybersafety and resilience of the system. It has to be a trusted network as part of a global trust framework.”

Target Date

So, when will a new system be in place? “The most important thing is to establish NOTAMs as an information service,” Pufahl said. “And our goal is to do this before 2030.” He says implementation will be up to the individual states but the system will be interoperable and “technologically agnostic.”

“I know there are problems with the current NOTAM paradigm,” he continued. “I’m a pilot, too, and we all feel the pain.” And have waited long years for an anesthetic.

Eduard “Eddie” Porosnicu, senior aeronautical information management expert at Eurocontrol, offered his perspective on the current NOTAM conundrum during a *BCA* visit to Eurocontrol’s Brussels headquarters in June. NOTAMs “are still dominated by paper,” he observed. “It may be a PDF document, but it’s still a very long one, usually printed out and very difficult to read.”

As an example, he cited a flight from Paris to Singapore whose attendant NOTAM list totaled 80 pages. And this — called a “narrow route bulletin” — was for a swath 40 nm left and right of course and 25 nm around the planned airports. “We want to change this to a map and a list of events termed a Digitally Enhanced Briefing or Enhanced Preflight Information Bulletin (ePIB),”

REGION	2000	2006	2007	2008	2009	2010	2011	2012	2013
Europe (L+E+B)	117,560	200,384	232,105	255,959	284,972	305,851	298,312	286,987	298,367
Pacific (A+N+Y)	16,919	27,642	31,462	38,897	39,405	42,058	45,462	41,129	42,310
Asia (R+V+W+Z)	30,452	47,624	51,104	56,565	64,937	69,344	70,530	73,274	81,974
Russia + Central Asia (U)	3,817	10,220	10,675	11,838	11,949	15,534	22,109	28,054	28,429
Africa (D+F+G+H)	12,242	17,981	19,949	21,868	21,905	23,290	22,668	26,087	25,702
Mid Asia (O)	5,571	12,998	12,973	13,353	14,376	13,800	14,598	13,140	13,404
North America (C+K+P)	78,897	120,441	135,587	221,497	255,040	306,744	338,131	360,358	445,075
South + Central America (M+S+T)	25,614	41,518	44,003	45,226	45,940	47,862	52,416	50,872	57,244
TOTAL	291,072	478,808	537,858	665,203	738,524	824,483	864,226	879,901	992,505

Attention: International NOTAM only!
MIL and National Series not included.

he said. This would include a list of relevant NOTAMs for the airport, in which items can be clicked on, and the location subsequently seen on the map. Digital NOTAMs would also be written in normal text, rather than all upper-case letters and in code as in the traditional model. "Pilots have recommended that the list be prioritized by the pilot," Porosnicu said, "with the most important items at the top."

Sounds good, so far, but then this: "The prerequisite for all of this is the digital aeronautical data set," he continued, "and we are progressing slowly." Oh.

"The U.S. already has the data set and digital NOTAMs for more than 300 airports as a SWIM service, but most pilots are not qualified to use it, and a developer will have to provide a device that connects to the service and translates the data," Porosnicu explained. "In Europe, we have the baseline data but not the digital NOTAMs. Estonia has a project to have digital NOTAMs for airspace restrictions this year." In Europe, Eurocontrol provides the European AIS Database (EAD); planned is an upgrade that will include digital NOTAMs and graphical

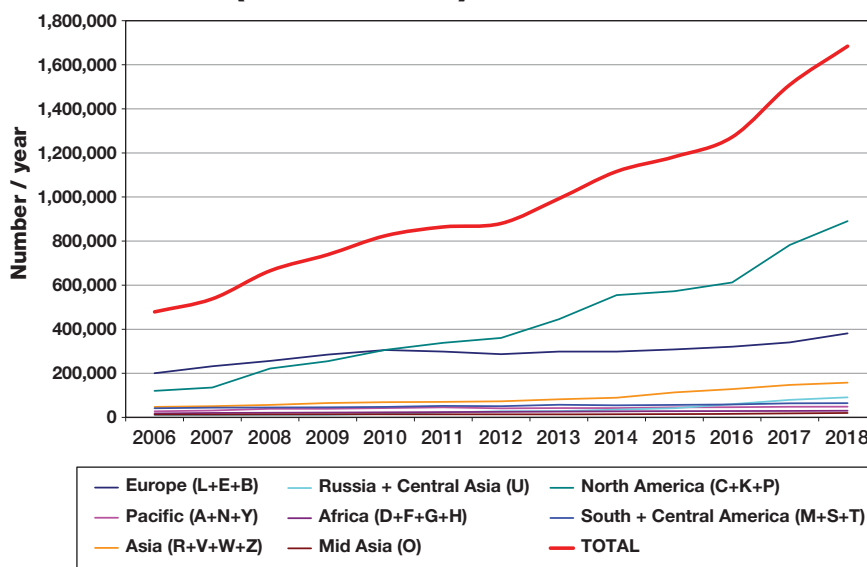
preflight information bulletins.

The forgoing aside, since anyone can find almost anything on line with Google, a search engine in wide use for 20 years, why is it taking so long to build a comparable system for NOTAM retrieval? "It is not rocket science," Porosnicu maintained, "but it is truly complicated because of the global dependencies and the huge legacy embedded in the current NOTAM system. In many places around the world, the current

NOTAM system employs very modern IT systems. Complex algorithms and data input interfaces ensure that the NOTAM messages follow the ICAO standards. NOTAM elements such as geographical coordinates, frequencies, etc., are automatically extracted from quality-assured data sources, the same that are used to create the AIP and the aeronautical charts.

"Ironically," he continued, "the output of these very modern IT systems

(International) NOTAM Trends



Source: Eurocontrol via Frequentis

Below: EAD NOTAM statistics per region. The table is courtesy of the Eurocontrol AIS Database (EAD) Services.

2014	2015	2016	2017	2018	Increase 2000 - 2018
298,876	308,226	320,976	340,514	381,270	324%
42,200	45,367	46,297	48,323	48,717	288%
89,133	113,364	128,595	147,062	157,723	518%
35,397	41,587	60,282	79,563	90,995	2384%
26,612	29,342	29,913	29,107	30,293	247%
14,008	15,520	15,392	18,077	20,074	360%
554,668	572,196	611,984	782,702	890,566	1129%
54,976	56,896	58,378	64,089	64,578	252%
1,115,870	1,182,498	1,271,817	1,509,437	1,684,216	579%

Source: Eurocontrol

remains a text message with telegram-style aspects such as full upper case, abbreviations, contractions and codes, which make it very difficult to read and use . . . because that is the global standard! The standard needs to change in order to make progress. The good news is that ICAO is finally getting there with the IMP working group. If there is progress on a new ICAO NOTAM concept, we can expect that around 2025 many pilots around the world will see a radical improvement in the preflight information bulletins brought by digital NOTAM."

At 700 Independence Avenue

Meanwhile, as noted and largely undercover, the FAA has been engaged in its own NOTAM modernization program in response to the 2012 FAA Reauthorization Act and the Pilot's Bill of Rights. "We are working to modernize the system," Abigail Smith, director, air

traffic organization's technical training at FAA headquarters, explained. "Work spooled up in 2012 after the reauthorization, and I became the executive champion in March 2019 for this and it has gained more energy in the reauthorization of 2018."

The result is NOTAM Search, a fully digitized NOTAM retrieval system offering plain-text messaging and filtered searching and sorting.

"Go to the FAA web page," Smith instructed, "log on, and you have the choice of reviewing NOTAMs in plain language or the old format. Additionally, you can search on key words like 'airport,' 'chart,' 'communications,' 'GPS,' 'international,' 'air traffic,' 'military,' 'navaid,' 'obstruction,' 'route,' 'procedures,' 'security' and 'services.' You can sort by location number, class, UTC and condition. If you are flying, you can state a route, it will save it, and it will filter appropriate NOTAMs to you as you ask it."

And all of this is available right now and has been since January 2013, a fact unknown to many. Perhaps more pilots

will become aware when the old Pilot Web service is shuttered on Jan. 24, 2020, and users will be referred to NOTAM Search. "The word hasn't gotten out," Smith admitted. "Turning off Pilot Web will be an improvement."

Yet to be done for NOTAM Search will be loading Geographic Information System software (GIS) — the data that supports graphics — into the system for airport information. "There are many providers of aviation graphics," Smith said, "and some are innovative in terms of display, so we want to get the data set right so pilots can get the information in the most valuable way for them. This is ongoing. We add airports to NOTAM Search every week — new ones come on — in partnership with other government agencies to get that data in a more rapid manner."

Of the 300 most NOTAM-producing airports in the country, 289 of them are originating digital NOTAMS — i.e., they have the data sets — and the FAA is working to get the rest of them. Another product of the FAA modernization project is NOTAM Manager,

an app for generating NOTAMs. "We are getting the word out that [airports] can generate NOTAMS using NOTAM Manager," Smith said. "They have control of their own data."

The FAA claims that since NOTAM Search went on line, it has identified 400 NOTAMs in its portfolio that had become stagnant. Half of those were canceled, and the agency claims it is in the process of clearing out the other half. It is also conducting outreach to airport managements to purge their stale NOTAMs from the system, as well, since the FAA cannot cancel NOTAMs issued by outside agencies. Furthermore, it is considering "rearranging" Flight Information Regions to reduce the overall number of NOTAMs in the system. Both of these moves could go a long way toward reducing the proliferation of NOTAMs swamping flight crews in their pre-flight preparation.

One of the next steps in the development of NOTAM Search will be to make the system archival, too. Then, in June 2020, all other feeds will be

Team Effort

For Mark Zee, founder of the Ops Group flight information service, it's time for the NOTAM user community to take matters into its own hands. "For 55 years we've been asking, 'Why doesn't somebody fix this?'" he asked.

Now, after a call to action in an article he posted on the Medium website, readers and Ops Group members are crowd-sourcing solutions to fix the NOTAM deficiencies. Within a month of the article's appearance, some 200 people, predominantly airline and business aviation pilots and flight dispatchers, formed the "NOTAM Team" to take responsibility from the users' perspective in fixing the system. "We've started with Slack, a collaboration software app, that allows us to come together and work," Zee explained.

"The key to why this is different and will work is that it is not the normal way we've tried to solve it for 55 years," Zee continued. "Now we are harnessing that energy to solve it by virtue of the fact that we are not part of a subcommittee — no rules to follow, just crowd-sourcing."

The idea behind the NOTAM Team is to help the aviation authorities in solving the problem, Zee insists. "We are not trying to circumvent the authorities. But does it have to go through them? And the answer is, I don't know. It may be the solution doesn't require five years of committees and approval processes, if it's good enough."

The group has set a lifespan for itself of nine months.

According to Zee, "We are starting to figure it out. We are

asking, what is the way in which to solve it; who's involved; what expertise outside of aviation can we enlist, like designers, info-graphics people, those from other industries who have solved similar problems — for example, the nuclear industry? The answer may not come from aviation but outside. NOTAMs are not an aviation problem, they're an information problem. We are broadening the diversity of the team. Send me an email if you want to participate, or read the article on Medium [www.medium.com] or Ops Group."

But the question follows: Where to take the ideas? Presenting them to the regulatory establishment — ICAO, FAA, et al. — runs the risk they will be sucked into the black hole of bureaucracy and disappear for years, possibly never to reemerge.

Zee admits that, at this early stage of the project, he has no idea what direction the endeavor will take or how to implement the recommendations that result. But he notes, "What we're seeing is a move away from a single government source to independent private-sector flight planning and support services, for example, Jeppesen, with charts and flight planning, and all the other players in the flight planning and trip support business." And that segment of the industry may be accepting of new ideas for presenting and organizing NOTAMs in such a way that the important messages and information aren't buried. In the meantime, as Zee pointed out, "This is pilots solving problems." **BCA**

turned off so NOTAM Manager will be the only way to file and NOTAM Search the only way to retrieve NOTAMs, consolidating all NOTAMs into “a single authoritative source.” In late 2020 or early 2021, the FAA will switch to ICAO standards in terms of how it groups NOTAMs. “We likely will establish between 15 and 20 categories to make it easier for pilots to group and sort NOTAMs,” a spokesman told *BCA*. Categories will include airport surfaces, nav aids, obstructions, etc.

Problem Solved?

So, how well does NOTAM Search work, and does it solve the endemic problems of the traditional system? We queried one business pilot who has used the site and he said it was “definitely easier” to harvest NOTAMs than with the paper system but wondered if it would reduce the overall number of notices confronting crews. On the other hand, he maintained, “it certainly helps, as you are able to order them in a ‘list’ format by subject matter and also apply a filter and sort functions. But it is still up to the crew to go through them and decide on importance. There is no AI [artificial intelligence] function to sort based on impact to operations.”

Once a user is accustomed to it, he said, NOTAM Search is “pretty robust in its graphical and text presentation. The map is very useful for seeing airspace restrictions.” In conclusion, though, he said “the bigger issue is the ‘language’ of NOTAMs. It takes 2 in. of single-spaced type to relay a very simple item. . . . The language needs to be changed from ‘legalese’ to plain English.”

Another business aviation pilot was skeptical that NOTAM Search really solves the bigger problems of the NOTAM system, such as the lack of ranking and proliferation. “The order doesn’t make any sense and nothing stands out,” he emailed to *BCA*. He cited a runway closure at JFK International Airport announced for a date in summer 2019 “and while there are hints that Runway 13L/31R will be closed . . . it doesn’t appear explicit until the last page, [with] some 80 or so NOTAMs ahead of it. The only thing they [the FAA] have done is to put a color-coded symbol on the online app. I think the crux of the problem is that the guys who cut the grass and repair the signs get equal billing. They shouldn’t be in the NOTAMs at all.”

Canada Takes Action

Nav Canada has announced that as of Oct. 10 it will transition to an ICAO format and a new website for distributing NOTAMs. The air navigation service provider said one key difference is that notices will be geographically referenced instead of based on NOTAM File identifiers for airports, flight information regions (FIR) and nationwide notices.

Pilots and operators will be able to search for NOTAMs by entering an airport identifier, navaid, FIR or geographic coordinates, with a desired radius around points of interest as an option. They will also be able to enter a flight route and receive all NOTAMs that geographically intersect it, Nav Canada said.

In addition to the new format, notices obtained from the Nav Canada Aviation Weather Web Site will be available using a NOTAM retrieval tool on its Collaborative Flight Planning Services (CFPS) website. Pilots were able to use the CFPS site to access notices beginning in mid-September.

“The adoption of the ICAO NOTAM format — already used by most countries — will ensure compliance with international standards and will eliminate the need for pilots who fly international routes to be familiar with more than one NOTAM format,” Nav Canada said. “It will also pave the way for more advanced filtering functionality, reducing NOTAM clutter by helping pilots access just the NOTAMs pertinent to their flight.” — *Bill Carey*

In that pilot’s opinion, the FAA hasn’t “gotten anywhere close to fixing anything.” For his flight planning, he prefers to use commercially available apps like ForeFlight and NOTAM Decoder, the latter of which arranges NOTAMs for a given airport according to their criticality and codes them red, amber, blue, etc.

Pointing out that NOTAM Search works solely in the U.S. — only one of ICAO’s 193 signatories — Ops Group’s Zee insists that “the problem is not solved. It’s a glimmer of hope, a step in the right direction, but not the solution. The question is what the briefing package looks like, and that’s 100 pages of NOTAMs for an international flight. The FAA system has done a better job of standardizing what NOTAMs say and look like, but it doesn’t solve the larger problem, which is that pilots are not getting the information they need for their flights, and they are missing important things. If you’re flying from New York to Buenos Aires, you’re going to be transiting across multiple countries and so you’re going to get multiple sets of information. NOTAM Search doesn’t change the story from an international standpoint. It is part of what the solution might look like.”

The NTSB has urged the FAA for two decades to rectify the NOTAM issue. It could be that the Air Canada incident at SFO will serve to break the

bureaucratic logjam. The near disaster spurred the Safety Board to speak loudly to the public on the matter, as underscored by Chairman Sumwalt’s pronouncements here and in the Board’s SFO incident findings. It is generally accepted that the FAA (ICAO, too) contributed to the NOTAM problem by years of its inaction. The fact that within the FAA bureaucracy a minimum of five offices have had responsibility for NOTAMs may explain, to some extent, why this has been so. Evidence that the agency means to change its ways is the fact that it recently assigned Smith, a senior agency executive and former air traffic controller, to coordinate the NOTAM modernization initiative.

When the Pilots’ Bill of Rights was accepted by the FAA as part of the 2012 reauthorization, the agency was given one year to fix the NOTAM system. Yet now, seven years later, all the industry has is a beta-level website and a lot of good intentions. As things stand, the agency is prohibited from violating any operator on a NOTAM issue until it gets the system fixed. Nevertheless, even though in its present state it does not solve the NOTAM proliferation problem, NOTAM Search could serve as a foundation for a useful IT-based system. But both users and industry observers believe it needs to go much further. **BCA**