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Change is in the Air:

NOTAM Modernization Moves Ahead

A technician works on an ILS Localizer antenna system. When this type of work shuts down an ILS, the FAA issues a NOTAM to give pilots a heads-up.

For many pilots, the mere mention of Notices to Airmen—better known as NOTAMs—prompts a range of reactions. None are complimentary. Almost universal is a sense of head-scratching bewilderment (what *is* all that gibberish?!) and head-banging frustration (why does it have to be so *hard* now that there are apps for everything?!). Also, the avalanche of arcane abbreviations can easily obscure information truly relevant and important to your flight.

I can relate. Before the January 2008 reform that folded the former L (local) NOTAM into a new super D (distant) NOTAM format (see "Know Your NOTAMS" in the Jan./Feb. 2008 issue of *FAA Aviation News*), I remember preparing for a flight to Sun 'n Fun. The D NOTAMs in my official weather briefing included prominent references to volcanic activity in Montserrat. But, since the now deservedly

defunct L NOTAMs were not distributed beyond the defined local area, there was nothing at all about the temporary control tower at KVDF, the normally non-towered destination airport.

While GA pilots are grateful for the informational improvements engendered by the new super D NOTAM format, the enduring—and larger—headache comes from FDC (Flight Data Center) NOTAMS. The first task is to sift through the many pages (or screens) in search of those NOTAMs relevant to your flight. Next is to parse puzzling phraseology that only a machine can truly appreciate. For instance:

1/7959 ZOB PART 2 OF 5 FLIGHT RESTRICTIONS CLEVELAND, OHIO, NOT INCLUDING 18000 FT MSL EFFECTIVE 1102221530

UTC (1030 LOCAL 02/22/11) UNTIL 1102222045 UTC (1545 LOCAL 02/22/11). WITHIN A 12 NMR OF 412659N/0814445W OR THE DJB079019.6 UP TO BUT NOT INCLUDING 18000 FT MSL EFFECTIVE 1102221530 UTC (1030 LOCAL 02/22/11) UNTIL 1102222045 UTC (1545 LOCAL 02/22/11). EXCEPT AS SPECIFIED BELOW EXCLUDING CANADIAN AIRSPACE AND/OR UNLESS AUTHORIZED BY ATC IN CONSULTATION WITH THE AIR TRAFFIC SECURITY COORDINATOR VIA THE DOMESTIC EVENTS NETWORK (DEN)....

The FAA has made that task much easier with the introduction of plain English NOTAMs with graphics, available online at http://tfr.faa.gov/tfr2/list.html. Still, why are FDC NOTAMs so inscrutable and what is the FAA doing to fix them?

AIM-ing for Improvement

The short answer: A lot. "We know it's a huge issue for pilots, and we really are making progress toward a modernized NOTAM system," says the FAA's Barry Davis. As manager of the Aeronautical Information Management (AIM) group (*see sidebar*), Davis and his team aim to provide the right data at the right time in the right place. The AIM group was at the forefront of the "L over D" effort in 2008. Along with an array of alphabet government and industry organizations in the United States and abroad, the team has been working concurrently on the much greater challenge of reforming the entire Federal NOTAMs System (FNS), which includes the much-maligned FDC NOTAMs.

Davis well understands pilots' frustration with a product-oriented system rooted in telegraph times. "What pilots, dispatchers, and controllers need," he acknowledges, "is a system that will allow them to sort, filter, alert, transpose, and fuse this information." Davis defines these functions as follows:

- *Sort*—the system provides all data relevant to the route, including departure and destination airports.
- *Filter*—using a tool, such as the 12 keywords in the super D NOTAM, the system organizes the data into meaningful categories (e.g., RWY, COM, OBST).
- *Alert*—the system flags areas of special note or concern, e.g., closed runway or temporary control tower.
- *Transpose*—the system automatically converts raw data into a graphical presentation that would be displayed on a cockpit moving map display.
- *Fuse*—the system is capable of correlating its data with data from other sources, such as weather, to offer the pilot a more complete decision-making tool.

The key to creating this capability is to transition from the traditional product-based system to a data-based approach. And, as Davis describes it, "database" is actually a very good word for the changes now underway. "With the product-oriented system we have now, our automation can't do much more than sort in a fairly general way," he notes.

The 2008 introduction of keywords in the super D NOTAM has given the automation—and thus the NOTAM product's human end-users—some ability to filter. To get to the next

> **Pilots, dispatchers, and controllers need a NOTAM system that will allow them to sort, filter, alert, transpose, and fuse important information.**

levels, though, the system has to be a fully digitized database. "Think about how a database works," says Davis. "Once a database is populated with discrete structured facts, end-users can choose from any number of views to display the specific information they need."

Managing the Many Moving Parts

Though it may sound simple, this transition is something akin to major overhaul on an airplane while it is still flying. "If you look at what we have now and where we need to be, it's easy to conclude that we just can't get there from here," says Davis. A favorite and highly memorable part of his PowerPoint presentation arsenal is a slide known to the AIM team as the "hairball diagram." By showing the dizzying number of NOTAM-generating organizations, the tangle of system entry and data validation points, and the similarly confusing array of output and distribution options, the hairball diagram amply illustrates the challenge confronting any NOTAM modernization effort. It also illustrates several of the core challenges. A new system must be:

- *Globally compatible*—Aviation is inherently global, and the standards established by the International Civil Aviation Organization (ICAO) are essential to safe and efficient worldwide operation. Changes to the U.S. NOTAM system have to be compatible and/or compliant with ICAO standards.

- *Automation-acceptable*—The system, whether product- or data-based, has to work now with existing systems and with future systems.
- *User-friendly*—Though no one would argue that the existing system is friendly to its various end-users, it has the advantage of being the devil we know. As Davis observes, an overnight "here" to "there" shift would be both overwhelming and disruptive.

The AIM group is addressing these challenges one step at a time. The obvious way to ensure global compatibility is to adopt the ICAO NOTAM format, much as we transitioned a few years ago to ICAO standards for defining airspace and reporting weather. If the prospect of learning a new system makes you groan, that is where the AIM group's incremental change strategy for dealing with the automation-acceptable and user-friendly requirements comes in.

First, many of the necessary technical changes to support the digital collection, processing, and dissemination of NOTAM information are occurring in the background. NOTAM-generating entities are already beginning to use the Aeronautical Information Exchange Model coding specification (AIXM) to format basic NOTAM information in accordance with the global ICAO standard. This fiscal year, the FAA's goal is for digital collection, processing, and distribution of 25 percent of all NOTAMs. The goal rises to 60 percent in fiscal 2012. Because the digital formats will allow

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Aeronautical Information Management Group

The FAA's AIM group is the authoritative U.S. government source for collecting, validating, storing, maintaining, and disseminating aeronautical data concerning the United States and its territories to support real-time aviation activities. AIM provides the following services:

- Aeronautical Information Services, consisting of the National Flight Data Center (NFDC) and the Terrain and Obstacle Data Group (TOD)
- Alaska Aviation Camera program
- NOTAM Services Group, supporting NOTAM, CARF, and Military Operations systems
- Traffic Repository
- NAS Data Release Group

Key Programs:

- NOTAM Distribution Program (NDP) facilitates the automation, dissemination, and receipt acknowledgement of NOTAM messages in the Terminal and En Route domains.
- NAIMES provides highly reliable, scalable, and secure aeronautical information data services to users and access to critical data products and services to customers and stakeholders.
- MILOPS utilizes advanced Web-based technology to provide the NAS users and planners with near real-time information as to the Special Use Airspace.

for such things as putting a red X on a moving map navigator's display of a closed runway, they will meet all five of the requirements Davis outlined: sort, filter, alert, transpose, and fuse NOTAM information. The result will be better service to all kinds of end-users.

Second, as noted, the data-based and digitized NOTAM system will allow pilots to choose the product(s), or "views," they want to generate from the overall database of aeronautical information. A pilot who flies internationally can choose to display information in the ICAO NOTAM format. Those of us who fly domestically will not be required to learn the ICAO format, though, because we will have the ability to select another product—for instance, a plain English narrative with *relevant* information (no more volcanoes in Montserrat!) and graphical depictions.

Third, the AIM group is taking an incremental approach to introducing those changes that *will* require pilots to learn and adjust to new formats. The 2008 merger of L and D NOTAMs is one example of this approach. Davis notes that another incremental change is likely to be announced right about the time this issue of *FAA Safety Briefing* is published. As part of the transition to an ICAO-compliant system,

which will ultimately eliminate the distinction between FDC and D NOTAMs, changes will:

- Add keywords to FDC NOTAMs, to include ODP, SID, STAR, CHART, DATA, IAP, VFP, ROUTE, and SPECIAL.
- Eliminate the keyword RAMP, keeping only the APRON keyword.
- Replace obscure terms such as UFN, WIE, WEF, and TIL with the ICAO terms, EST (estimated) and PERM (permanent).

"It's a big river we're trying to cross," says Davis, "but, one bridge at a time, we're getting there."

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For More Information

FAA NOTAM policy page
http://notams.aim.faa.gov

Aeronautical Information Management Group
www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/aeronautical_im/

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Aviation Maintenance Alerts (Advisory Circular 43.16A) provide a communication channel to share information on aviation service experiences. Prepared monthly, they are based on information FAA receives from people who operate and maintain civil aeronautical products.

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