

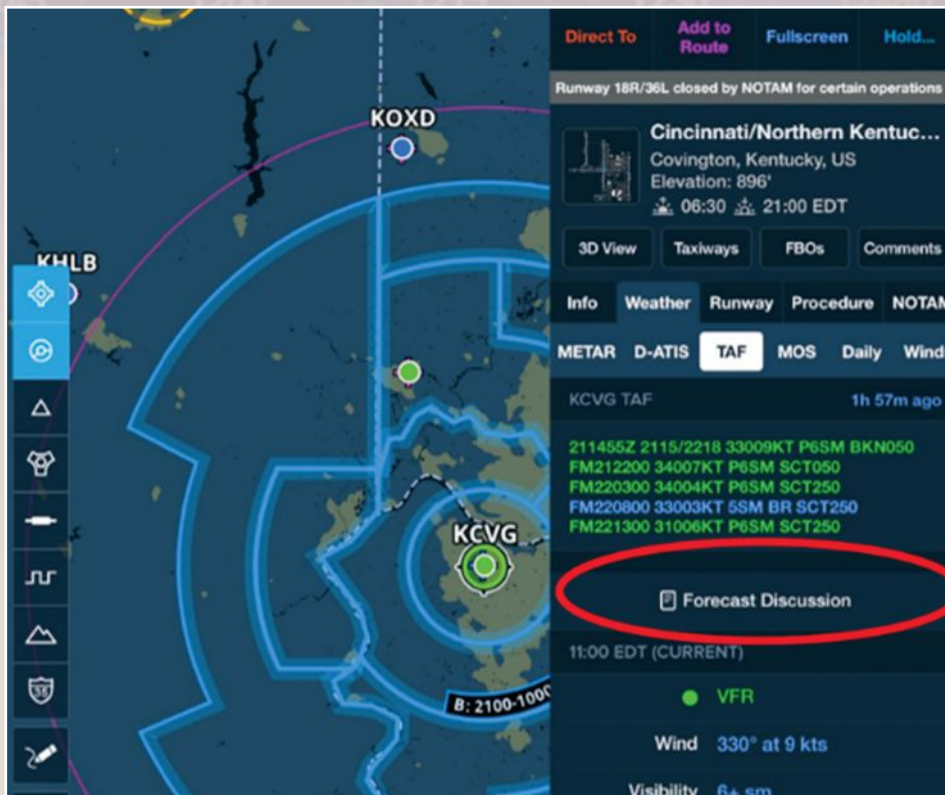
# FAA

# WEATHER!

## Better Forecasts Are Hiding in Plain Sight

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*Next-level weather tools are available to make every shift go smoothly for airborne public safety units.*



Imagine a sweltering summer day with the temperature hovering in the mid-90s. The humidity is paralyzing. A cursory review of the Terminal Aerodrome Forecast (TAF) for the nearby Class B airport indicates that it should be a nice day weather-wise for all your anticipated patrol flights.

Just a few hours into your shift, you hear what you believe to be a crack of thunder. You run outside your hangar only to visually verify what your ears told you: a pop-up thunderstorm has occupied the airspace just over your facility. You scurry to push your pre-flighted aircraft back into the hangar to avoid damage you don't want to explain to the brass. You mumble a few choice words under your breath about another blown forecast by the local Weather Forecast Office (WFO) that issued the TAF for that nearby Class B airport.

But could you as a public safety aviator have done anything differently to make sure the false start never happened?

### Memory Lane

Many aviators forget the intricacies of TAFs. To help you review, several sources





define TAFs, the best of which is published in the latest *FAA Aviation Weather Handbook*, published in December 2022. The handbook describes the TAF as “a concise statement of the expected meteorological conditions significant to aviation for a specified time period within 5 statute miles of the center of the airport’s runway complex (terminal).” The handbook reminds us that “the TAFs use the same weather codes found in METARs.”

One hundred twenty-three different National Weather Service (NWS) WFOs prepare TAFs for more than 700 airports. The forecasts are valid for 24 or 30 hours and amended as required. They provide forecast details like wind direction and speed, prevailing visibility, cloud coverage, ceiling height and precipitation type. They are essential, as they have many implications from a regulatory point of view, such as fuel loading and alternate airport requirements for instrument flight rules operations.

Many pilots don’t recognize the critical caveat above: TAF forecast coverage area is only 5 statute miles. Creating a forecast for such a small area is incredibly difficult for meteorologists at local WFOs. TAFs are often referred to as “point forecasts,” and for good reason; think of a TAF as a fore-

cast that covers an area the size of a college campus.

Remember the storm that popped up and hadn’t been published in the TAF for the “nearby” Class B airport? Just how nearby the airfield is situated is crucial. Even if rain, denoted RA, or thunderstorms, TSRAs, are mentioned in the TAF, the report is concentrated on that single point area. If “vicinity,” abbreviated VC, has been added (e.g. VCTS), the forecaster has predicted the weather event to occur within another 5-statute mile radius around the first area. Now, think of it as a 10-statute mile radius from the center of the airport complex. Anyone that has been in aviation for any appreciable time knows that the difference between an MVFR ceiling—or even a low IFR ceiling—and a clear blue sky can be a matter of 10-15 miles, if not less.

In other words, forecasters aren’t wrong nearly as often as aviators think. Often, the forecast simply doesn’t reach your “nearby” area.

### Mind Reader?

Have you ever asked yourself, “What were they thinking when they put this TAF out?” The good news is that you do have a

way to understand what forecasters are considering when they create TAFs.

The best hidden gem in weather forecast products is the Area Forecast Discussion (AFD). This is not the draconian Area Forecast that retired in 2018 and was replaced by the Graphical Forecast for Aviation. AFD, also at times colloquially known as the Aviation Forecast Discussion, is written in plain English and allows forecasters to tell you how they quantified the certainty or uncertainty around their TAFs.

The AFD’s exact description comes from an NWS Directive (10-503): “The AFD is a semi-technical product primarily used as a means to explain the scientific rationale behind a forecast and to summarize watches, warnings and/or advisories in effect. This highly visible product is used to convey forecast and watch/warning/advisory information primarily to federal agencies, weather sensitive officials and the media.”

All WFOs issue the AFD at least twice daily, and they do not contain product expiration times. AFDs consist of two primary sections: a narrative description of forecast information and reasoning, as well as a summary of public, marine and fire weather outlook/watch/warning/advisory issuances.



Forecast begins with IFR to MVFR visibilities in smoke and haze. Gradual improvement to VFR is possible as winds arrive with cleaner air.

Clusters of showers and thunderstorms make for a complicated forecast. Model guidance being variable, surface obs, satellite and radar can be useful in determining path and location of convection. It appears that the thunderstorm complex to the west may weaken and/or drop southeast this evening as it approaches our TAF sites. Went with VCTS and VCSH while keeping ceilings VFR. Direct impacts to TAF sites including wind gusts and lower ceilings will be contained in amendments as the convection moves closer. More of the same is expected for Friday as additional convection develops in the humid and unstable weather regime.

OUTLOOK...Thunderstorms possible at times Friday night through Monday.

Fig 1

Smoke and haze will continue to reduce visibilities. Will keep 2SM IFR and 3SM MVFR visibilities tonight since these less than ideal conditions may persist longer than had been expected. Models signal improving conditions after 12z as winds increase a bit out of the south but there is low confidence in this scenario due to a lack of model agreement and forecaster skill/experience with such dense and widespread smoke and haze. Otherwise keeping forecast dry for now since showers forming to the west tonight may fall apart Thursday morning as they encounter unfavorable conditions in the lower atmosphere.

OUTLOOK...Thunderstorms possible at times Thursday night through Sunday.

Fig 2

In other words, they contain more than just aviation-related weather concerns. The specific “aviation” section likely gave rise to folks often referring to the product as the Aviation Forecast Discussion.

In their official directive, WFO meteorologists are advised that the discussion should emphasize significant forecast aspects, such as: 1) Identifying the most important hydrometeorological weather affecting the geographical area of responsi-

bility during the seven-day forecast period, 2) identifying the forecast problems-of-the-day and their solutions, 3) indicating forecast team confidence and guidance on weather possibilities not found in other products, 4) providing reasoning behind watch/warning/advisory issuance, 5) highlighting differences in model guidance and an indication of which model appears the most correct and why, 6) providing reasoning for varying significantly from automated model output guidance products, reasons for significant changes from previous forecasts, 8) suggesting expected event timing like precipitation beginning or ending and uncertainty degree, and 9) providing a brief review of the synoptic situation.

AFDs contain a lot of information. But the most significant thing they offer is a glimpse into the mind of forecasters and why and how they came up with their TAF.

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## Pot of Gold

AFDs can contain many data points that don't meet the criteria necessary to be published in TAFs. For example, TAFs require a certain degree of probability (PROB30) before issues like thunderstorms can be included. AFDs can therefore forewarn aviators that certain meteorological events come with uncertain probability, both in timing and location.

Fig. 1 shows an example AFD suggesting why a TAF was generated the way it was and explaining a complicated weather picture. In the exam-

ple, the forecaster tells us they went with VCTS and VCSH notations while keeping VFR ceilings. Considering that the thunderstorm complex described in the AFD may “weaken,” the VCTS and VCSH in the TAF may never arrive.

In Fig. 2, the forecaster is brutally honest. Smoke from Canadian wildfires has made the forecast extremely difficult. The forecaster even mentions that confidence is “low” due to a lack of model agreement and “forecaster skill/experience with such dense and widespread smoke and haze.”

## Oh AFD, Where Art Thou?

AFDs are indispensable for any aviator. Public safety crews would benefit from making them a go-to at the beginning of every self-weather brief. But you have to know where to find them to use them.

AFDs are available at [www.aviation-weather.gov](http://www.aviation-weather.gov) under the “Forecasts” tab. In the dropdown menu, simply navigate to “Avn. Forecast Disc.” and click on the link. From the map that appears, click on the WFO issuing TAFs for your region.

Note that the NWS Aviation Weather Center has recently redeveloped its platform, and the new interface went live on Sept. 12. The platform has been in development for some time and is dramatically improved, especially for mobile devices. After Sept. 12, go to the same link, click “Products” and scroll down to “Forecast Discussions” for all AFDs.

Many heavyweight aviation apps, such as ForeFlight, include the Forecast Discussion—you just have to know where to look. In ForeFlight, simply tap on an airport, then weather>TAF, and look for “Forecast Discussion.” The app includes an additional feature in which hazardous weather items like thunderstorms and fog are highlighted in red.

AFDs are an effective tool for the weather decision-making toolbox. And hopefully, they'll help us all give our forecasters the benefit of the doubt. 🏹

KCVG Forecast Discussion

AFD ILN 4h 1m ago

LONG TERM /SATURDAY NIGHT THROUGH THURSDAY/

AVIATION /13Z FRIDAY THROUGH TUESDAY/

MID LEVEL SHORTWAVE OVER THE GREAT LAKES TO SHIFT EAST INTO SOUTHEAST CANADA AND NEW ENGLAND TODAY. THIS WILL PLACE THE OHIO VALLEY IN A NORTHWEST FLOW PATTERN. SURFACE COLD FRONT WILL CONTINUE PUSHING SOUTHEAST OF THE TAF SITES WITH SOME DRIER AIR FILTERING INTO THE REGION.

LOW LEVEL FLOW WHICH STAYED UP AT 5 TO 8 KTS AT MOST LOCATIONS OVERNIGHT AND DRIER AIR HAS LIMITED ANY FOG DEVELOPMENT TO BRIEF MVFR VISIBILITY RESTRICTION AT KLUK VALLEY LOCATION.

EXPECT VFR CUMULUS CLOUDS TO BECOME BROKEN THIS AFTERNOON AND CLEAR OUT AT THE END OF THE DAY.

WITH LIGHT WINDS AND CLEAR SKIES, THE DEVELOPMENT OF FOG WILL BE POSSIBLE TONIGHT. HAVE A MENTION OF MVFR VISIBILITY RESTRICTIONS AT KCVG AND KLUK AND IFR AT KLUK AND KILN.

OUTLOOK... SCATTERED THUNDERSTORMS POSSIBLE SUNDAY.

ILN WATCHES/WARNINGS/ADVISORIES

OH... NONE.  
KY... NONE.  
IN... NONE.