National Weather Service

Volume 5, Issue 1 April 6, 2015

ZSE Weather Watch

A newsletter from the Seattle ARTCC Center Weather Service Unit

New Collaborative Aviation Weather Statement (CAWS) *by Alex Dodd*

IN THIS ISSUE

Up until this spring, the CDM Convective Forecast Planning Guidance (CCFP) has been the primary product by which national traffic management decision-makers, among other stakeholders in the National Airspace System (NAS), are notified of impactful convective weather (i.e. thunderstorms).

Implemented in March 2015, the new Collaborative Aviation Weather Statement (CAWS) will be event-driven (non-scheduled) with as much lead time as possible. CAWS will be initiated when a convective event is expected to significantly impact air traffic, especially when that impact extends to the NAS. Collaboration will be ongoing 24 hours a day, 7 days a week, as opposed to previous CCFP collaboration and issuance, which was on a set schedule every 2 hours. This provides flexibility in the ability to update these important forecasts as soon as necessary, and make adjustments as the convective event evolves.

CAWS was derived from the need to improve collaboration on events that impact the NAS, take advantage of new, high-resolution computer model guidance, and issue weather updates at more optimal times (as opposed to regular, routine, but non-optimal times for the customers).

The main purpose of the CAWS is to allow decision-makers to more effectively manage air traffic, and enable more efficient use of available airspace, by providing more timely delivery of high-confidence, high-relevance, and aviation weather constraint-specific forecasts of convection.

The CAWS collaboration process is more efficient and responsive to its users, as it allows any participant in the online discussion forum (NWSChat) the ability to initiate a CAWS discussion, at any time. These participants include Aviation Weather Center, Center Weather Service Unit meteorologists, National Aviation Meteorologists (NAMs) at the FAA Air Traffic Control System Command Center (ATCSCC), and other aviation industry meteorologists and partners. Aviation Weather Center Meteorologists will be responsible for issuing the preliminary CAWS (open to a 5-minute double-check) and final CAWS product. CAWS will be available at http://www.avationweather.gov/caws , and will also be disseminated via an advisory from the FAA Command Center.

The CCFP remains and will be relatively unchanged, except in how it is derived. Now driven by a blend of state of the art high-resolution computer model guidance, it will be refined over time as these models improve, and while verification and user feedback are factored in. The "new" CCFP can be found at http://www.aviationweather.gov/ccfp and will be available year-round, 24-7.

During the height of thunderstorm season this spring and summer, there will be an evaluation of the usability, effectiveness, and areas of potential improvement to the collaborative process and CAWS. There is also a customer survey on the CAWS website at AWC, which will be used to gather valuable feedback for improvements to the CAWS process and product.

CAWS Standard Format:

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Valid: hhmm-hhmm  UTC
ARTCCs affected:   ABC
Terminals affected:  XYZ
SUMMARY
A short 1-3 line high level text explaining why the CAWS has been issued
DISCUSSION
Detailed aviation weather information specifically related to air traffic
constraints.  This section should answer the “who, what, where, when, and why?”
questions.
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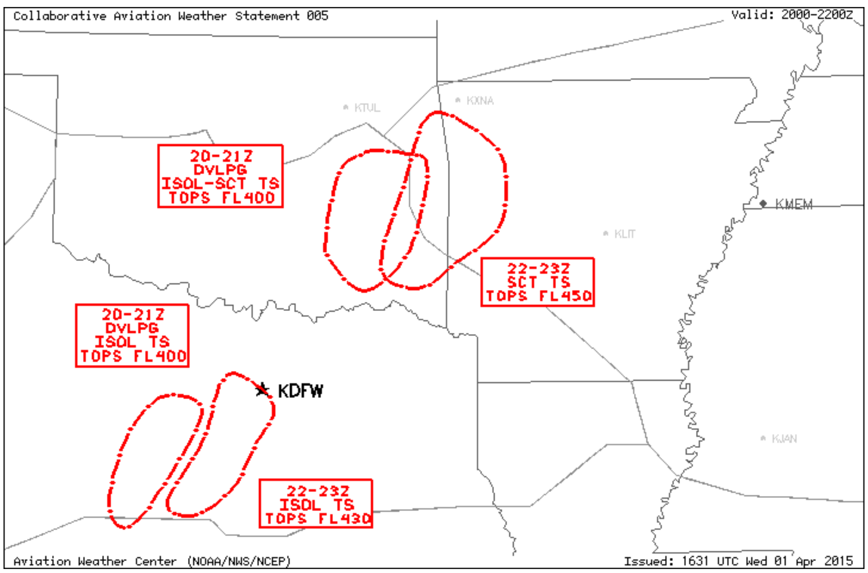


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Collaborative Aviation Weather Statement 005
NWS Aviation Weather Center Kansas City MO
1631 UTC Wed 01 Apr 2015

Weather: Thunderstorms
Valid: 2000-2200Z

ARTCCs affected: ZFW, ZME
Terminals affected: KDFW

SUMMARY: TS Impacts Expected AR NCNTRL TX 20-22Z

DISCUSSION: Expect two areas of thunderstorms to redevelop as early morning thunderstorms move
northeastward into western AR. Also Expect thunderstorms to redevelop over southeastern OK and
areas northeast and southwest of DFW. Expect thunderstorms north and east of DFW thru southern
MO to become scattered with tops FL410-450. Areas south and west of DFW probable isolated TS
with tops to FL430. Probable TS impacts at DFW around 22-23Z.

BOUNDING BOX: 30.91,-98.90 31.07,-90.17 37.12,-90.59 37.05,-98.86 30.91,-98.90
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***Figure 1** –CAWS Example*

Limitations of NEXRAD Available on WARP *by Jim Vasilj*

NEXRAD is a ground-based high resolution Doppler weather radar system operated by the National Weather Service, Department of Defense, and Federal Aviation Administration. It can operate in different modes depending on the weather situation, rotates 360°, and scans at angles generally between 0.5° and 19.5° above the horizon. A full volume scan is completed in 4.1 to 10 minutes. There are NEXRAD sites across the United States, Puerto Rico, Guam, and other locations (Figures 2 and 3). Meteorologists can use data from multiple locations, scan elevations, and parameters (e.g., reflectivity and velocity), to analyze precipitation.

WARP uses NEXRAD to create mosaic depictions that are used on controllers' radar screens. The display is based on a composite reflectivity, which is the maximum reflectivity above a location from the various scan angles and sites available. This data is put through a quality control check to remove false echoes. Products available are for composite reflectivity 0 to 60,000ft; 0 to 24,000ft; 24,000 to 60,000ft; and 33,000 to 60,000ft.

Although three-dimensional data is available, there are limitations of NEXRAD radar. One major factor is terrain, which is an issue across much of the western states. Depending on the elevation of the radar and surrounding terrain, large areas at lower elevation scan angles may be blocked by hills or mountains near the radar (Figure 3). Note that significant portions of Oregon have no available radar coverage below 10,000 feet. There also are fewer radar sites in the west with less overlap, which can limit quality control. And composite images are made from the most recent data from multiple sites and multiple scan levels, so the data used to create the images are not from exactly the same time or elevation.

Quality control is not able to fully remove false echoes, so there may be times when a controller indicates that there is precip in an area where actually there is none. And because the controller is looking at composite imagery from a vertical column, the indicated precipitation could be well below the flight level of the pilot (e.g., the pilot is flying at 30,000ft and the controller is looking at the 0 to 60,000ft product, calling out precipitation that is actually below 20,000ft).

In the cockpit, pilots can adjust the radar to a desired elevation angle and get instantaneous output, whereas WARP images are compiled every five minutes based on the most recent data available with no adjustment to the individual NEXRAD site settings available to the controller. However, NEXRAD systems can better detect ice crystals, hail, and snow which are in thunderstorm tops. And when there is an area of strong reflectivity, there is a better chance that the WARP NEXRAD composite image will resolve the shape and extent of the precipitation, whereas the onboard radar beam may not get past the strong edge of the precipitation closest to the plane. When possible, it is best to use information from *both* NEXRAD and cockpit weather displays, and not to assume that the pilot can see everything that the controller is seeing. Both cockpit weather displays and NEXRAD mosaics on WARP have their benefits; neither is inherently better, they are just different.

For more information on the limitations of airborne weather radar, please refer to the previous ZSE Weather Watch newsletter (Volume 4, Issue 4) at http://www.wrh.noaa.gov/zse/newsletters/WeatherWatchNov2014.pdf .

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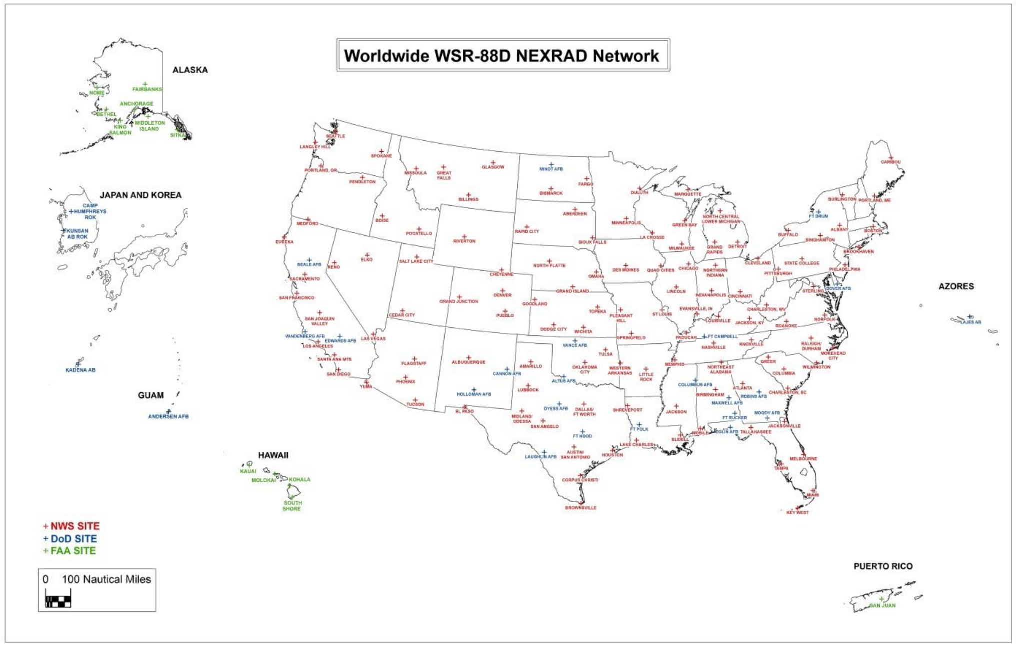

Figure 2 - *http://www.roc.noaa.gov/WSR88D/Images/WSR-88DCONUS-no-coverage.jpg*

NEXRAD Coverage Below 10,000 Feet AGL

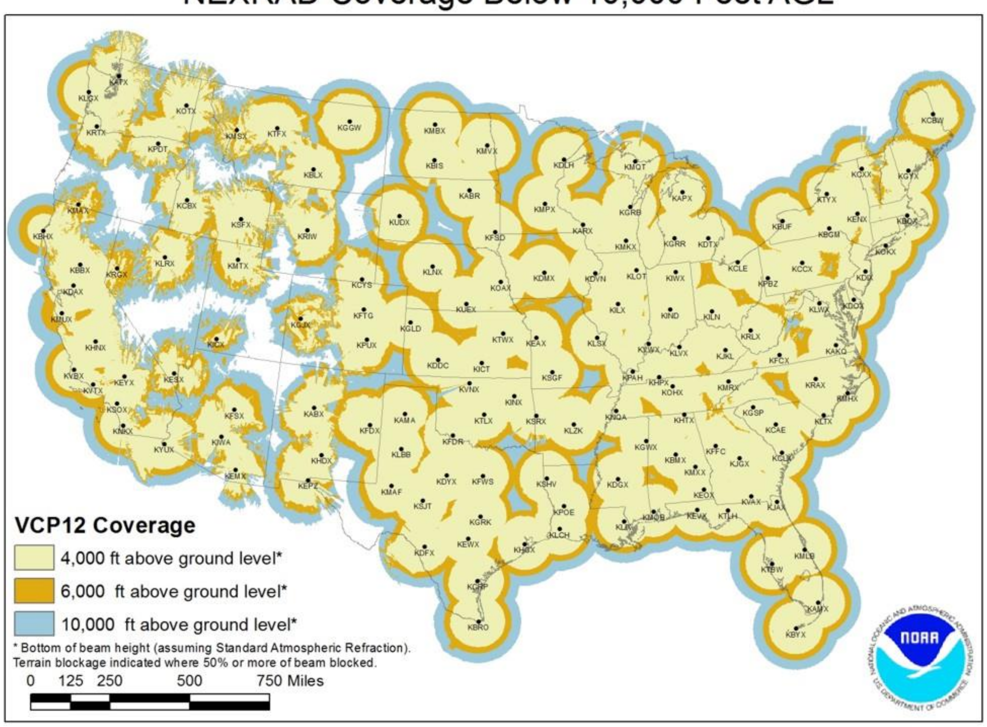

Figure 3 - *http://www.roc.noaa.gov/WSR88D/Images/WSR-88DCONUSCoverage1000.jpg*