Product Description Document

Experimental Ceiling, Visibility, and Low Level Wind Shear Grids in the NDFD

May 2022

Part I – Mission Connection

a. Product/Service Description – National Weather Service (NWS) Weather Forecast Offices (WFOs) provide local digital aviation forecasts that are experimentally available on the National Digital Forecast Database (NDFD) over the continental United States (CONUS), and Puerto Rico. These experimental datasets support production of Terminal Aerodrome Forecasts (TAFs) and provide graphical safety and flight planning information within each WFO geographic service area.

The five digital aviation weather elements are:

1. Ceiling Height
2. Visibility
3. Low Level Wind Shear (LLWS) Height
4. LLWS Direction
5. LLWS Speed

b. Purpose/Intended Use – These gridded datasets support consistent weather information for internal NWS and external users. The information also supplements regulatory aviation weather information required by the Federal Aviation Administration for planning and execution of flight operations. The experimental ceiling, visibility, and LLWS grids available through the NDFD, when used in combination with other NDFD elements, allow the aviation community to use a central repository to obtain graphical weather information that contributes to safety of flight decision making and situational awareness. These grids, available for all CONUS and Puerto Rico grid points, provide information consistent with the Terminal Aerodrome Forecast (TAF).

c. Audience – The audience for ceiling, visibility, and LLWS gridded information includes NWS meteorologists and aviation interests, both public and private.

d. Presentation Format – The experimental grids for CONUS will be available for download at hourly resolution out to 30 hours in GRIB2 format via both https: and ftp: from the NWS Telecommunications Gateway FTP (TGFTP) server at:

For CONUS:
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.conus/VP.001-003/ds.cig.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.conus/VP.001-003/ds.vis.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.conus/VP.001-003/ds.llwshgt.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.conus/VP.001-003/ds.llwsdir.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.conus/VP.001-003/ds.llwsspd.bin

For Puerto Rico:
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.cig.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.vis.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.llwshgt.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.llwsdir.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.llwsspd.bin

In addition, the following 10 grids for Puerto Rico will now be experimentally available at hourly resolution out to 36 hours.

tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.apt.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.td.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.rhm.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.sky.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.temp.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.waveh.bi
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.wx.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.wdir.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.wgust.bin
tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndfd/AR.puertori/VP.001-003/ds.wspd.bin

Visualization of these data will be available on an experimental NDFD map viewer at https://digital.mdl.nws.noaa.gov

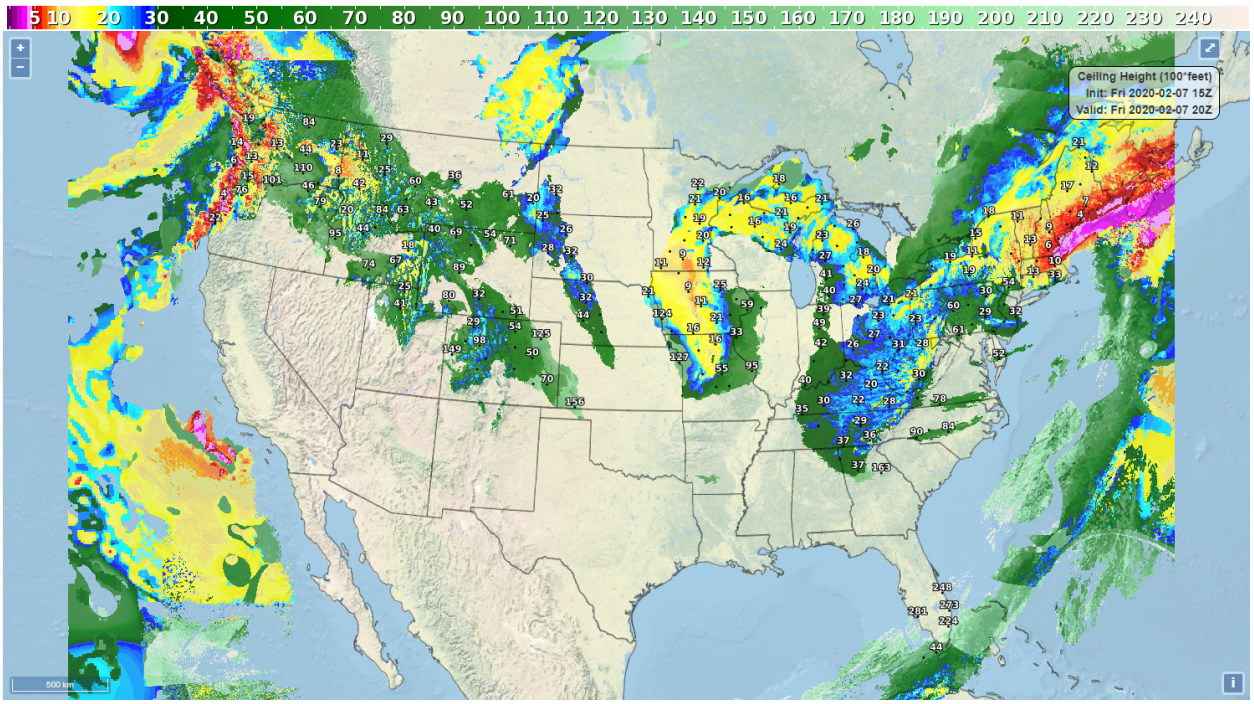

Figure 1. Example of visualization for ceiling information.

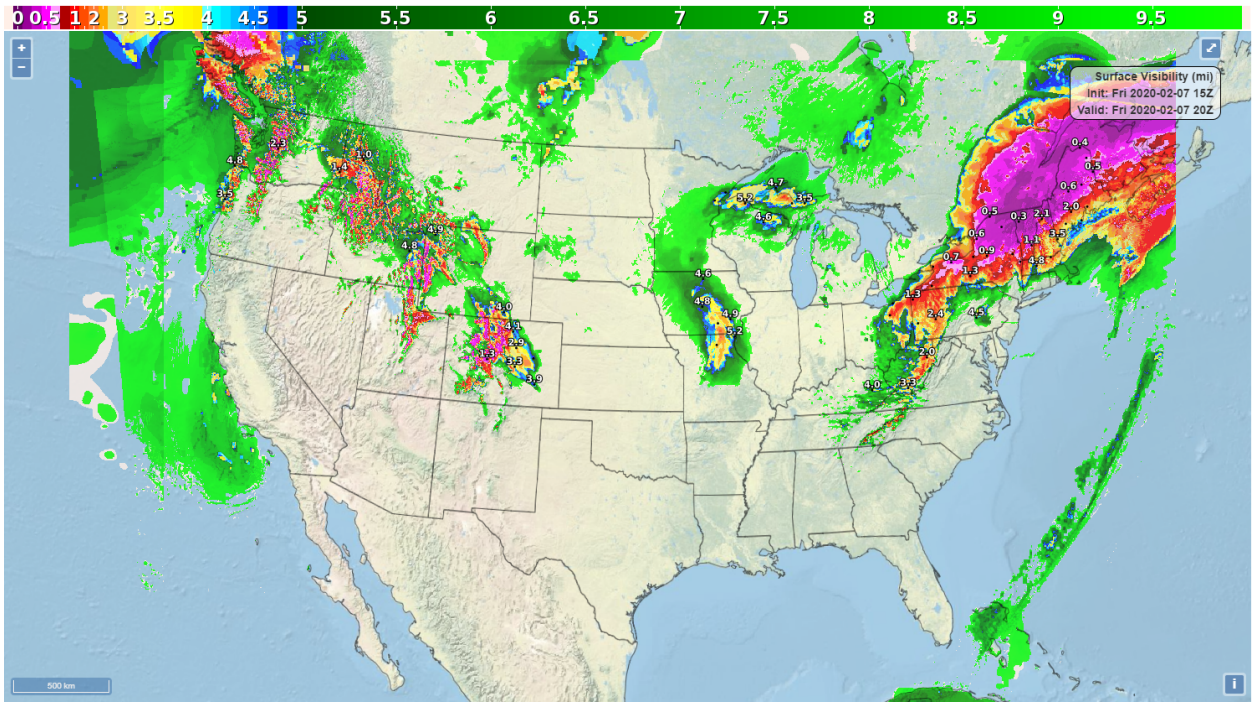

Figure 2. Example of visualization for visibility information.

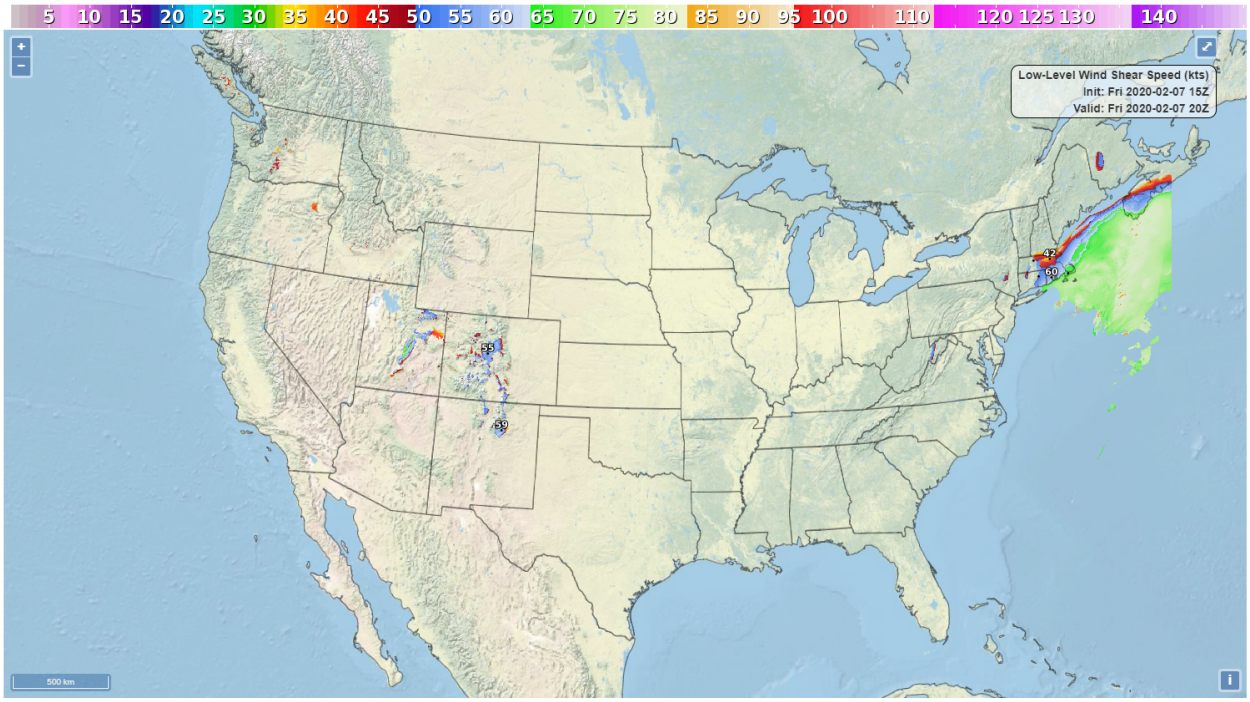

Figure 3. Example of visualization for low level wind shear magnitude.

e. Feedback Method – The National Weather Service (NWS) is accepting comments through May 23, 2023, via the online survey below:

https://www.surveymonkey.com/r/ExpCigVisLLWSGrids

For further information please contact:

Michael L. Graf
Meteorologist/International Liaison
National Weather Service
Email: michael.graf@noaa.gov

Part II – Technical Description

a. Format and Science Basis – Ceiling, visibility, and LLWS grid first guess fields will generally be provided via the NWS numerical weather prediction standardized initialization and configuration tools. WFO meteorologists produce NDFD grids by using the Graphical Forecast Editor (GFE) within the Advanced Weather Information Processing System to modify the grids, correcting for biases, and including local effects not resolved by forecast guidance. These tools also include mechanisms to ensure consistency of ceiling, visibility, and LLWS with other elements in the local digital forecast database.

A ceiling is defined as the lowest cloud base, measured in feet, where the cumulative sky cover is > 50%, and uses the threshold for the qualitative term "broken" or "BKN" with respect to sky cover as determined by the ASOS sky condition algorithm[1]. Lowest cloud base gridded data can have values lower than the ceiling height as the cumulative sky cover may be less than the "broken" sky threshold.

Visibility grid values are consistent with information in the weather and hazard grids. Units are statute miles (SM) with a resolution of 0.25 SM from 0 to 1.50, inclusive, and a resolution of 1 SM from 2 to 10 SM, inclusive. Values > 10 SM are set to 10 SM. Low level wind shear grids depict thin layer shears below 2,000 feet AGL with a magnitude ≥ 30 kts.

1. Low Level Wind Shear Height is in feet above ground level (AGL). This value is the top of the low-level wind shear layer. Values range from 200 to 2,000 feet with a resolution of 100 feet.
2. Low Level Wind Shear Direction is in degrees with respect to true north. Resolution is 10 degrees.
3. Low Level Wind Shear Speed is knots (kts). Resolution is 1 kt.

b. Product Availability – CONUS grids are updated every 30 minutes. Grids for Puerto Rico are updated once per hour. The new experimental grids for digital aviation weather elements are available in one-hour increments, from 1-30 hours.

c. Additional Information – Detailed information about the NDFD is also available online at https://vlab.noaa.gov/web/mdl/ndfd.

[1]Automated Surface Observing System (ASOS) User's Guide (1998), p. 25, Table 3.

Table 3. Cover ASOS Cloud Amount Report —Percent of Sky

ASOS Measured Amount in % of sky cover	Human Equivalent in oktas	ASOS Report
00 to ≤ 05	0	CLR
> 05 to ≤ 25	> 0 to 2/8	FEW
> 25 to ≤ 50	> 2/8 to ≤ 4/8	SCT
> 50 to ≤ 87	> 4/8 to < 8/8	BKN
> 87 to 100	8/8	OVC