

# Product Description Document

## Ceiling and Visibility Analysis (CVA)

### Part 1 – Mission Connection

#### 1. Product Description:

Ceiling and Visibility Analysis (CVA) was developed under the Federal Aviation Administration's Aviation Weather Research Program (AWRP). CVA is a real-time approximation of current ceiling and visibility conditions across the continental U.S. based on Meteorological Terminal Aviation Routine Weather Report (METAR) observations. CVA's ceiling and visibility fields are derived through nearest-neighbor interpolation of METAR data. This interpolation process, in effect, "stretches" limited-area METAR observations across the broader domain between stations and accounts for terrain effects on ceiling height. The resulting fields help to visualize the "likely" conditions at range from METARS.

CVA presents simplified area maps of ceiling, visibility and flight category as outlined below: Ceiling estimates are displayed as (i) "Possible Terrain Obscuration" (pale orange) for ceilings less than 200 ft agl, (ii) less than or equal to 1000 ft agl (pale yellow) from 200 to 999 ft, agl, and (iii) 1000 ft agl or greater (pale blue). Visibility estimates are displayed as (i) less than 3 miles (pale yellow), and (ii) 3 miles or greater (pale blue).

IFR and VFR conditions are determined according to the criteria given in the table below.

Flight Category		Formulation		
VFR	Visual Flight Rules	ceiling $\geq$ 1000 ft	and	visibility $\geq$ 3 statute miles (sm)
IFR	Instrument Flight Rules	ceiling $<$ 1000 ft	and/or	visibility $<$ 3 sm

#### 2. Purpose/Intended Use:

The product is intended to accompany other aviation weather products such as METARS, AIRMETS, TAFs and Area Forecasts to help the general aviation pilot (particularly the VFR-only pilot) avoid IFR conditions. To remain current in rapidly changing conditions, CVA is updated using current observations every five minutes. The overview provided by CVA should be followed by further examination of METARS, TAFs, AIRMETS, Area Forecasts and other weather information.

#### 3. Audience/Users:

The product is primarily intended to help the general aviation pilot (particularly the VFR-only pilot) avoid IFR conditions. However, CVA's quick-glance overview of ceiling and visibility conditions can be useful to others involved in flight planning or weather briefing.

#### 4. Presentation Format:

CVA grids are made available by the National Weather Service as GRIB2 (Gridded Binary Data) files for distribution and archive via NOAAPORT (for subscribers) and via FTP from National

Weather Service Telecommunications Gateway (NWSTG). Using the following World Meteorological Organization Headers:

- LIUA00 KKCI - Ceiling
- LVUA98 KKCI - Visibility
- LJUA00 KKCI - Flight Category

Additionally, graphical representations of the CVA data will be in .GIF format on the Aviation Digital Data Service, <http://www.aviationweather.gov/adds/>

### **5. Feedback Method:**

Feedback will typically be collected via comments provided to the [www.aviationweather.gov](http://www.aviationweather.gov) webmaster. Opportunities for face-to-face responses will occasionally occur in the context of media workshops, public outreach events, etc.

For further information please contact:

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## **Part 2 – Technical Description**

**1. Format and Science Basis:** The product makes use of real-time observations to establish ceiling and visibility conditions from approximately 2000 observing points.

Ceiling: At display points between METAR locations (where there are no direct observations), CVA ceiling values are interpolated as follows:

- First, nearest-neighbor interpolation is used to find an initial estimate of ceiling height. This initial estimate is the ceiling height at the nearest METAR location.
- Next, the initial height is corrected for any change in surface elevation between the METAR location and the CVA display point. For example, if terrain at the display point is 200' higher than at the METAR site, the ceiling value (given as feet above ground level) is taken as 200' less than the value at the nearest METAR location. If the resulting ceiling height is negative, a value of zero is substituted.
- Finally, a clear-cloudy test using GOES satellite data is applied. If a conservative interpretation of real-time GOES data indicates that the display point is cloud free, then the ceiling height at that point is reassigned as 'unlimited'.

Visibility: Visibility values at display points are taken as the visibility observed at the nearest METAR site and are displayed as (i) less than 3 miles (pale yellow), and (ii) 3 miles or greater (pale blue).

Flight Category: Flight category values are derived from ceiling and visibility display values according to the official definition, as given in the table below. The reliability of these fields degrades as distance from a METAR site increases. Thus, users should apply cautious practical judgment in considering the representativeness of the product as distance from a METAR site increases.

**2. Training:**

No additional training is required to generate the product.

**3. Availability:**

The Ceiling and Visibility Analysis (CVA) is available 24/7 and updated every 5 minutes.

The Ceiling and Visibility Analysis (CVA) will be available at:

<http://www.aviationweather.gov/adds/cva>

A current example of the Ceiling and Visibility Analysis (CVA) is available at:

<http://weather.aero/tools/weatherproducts/cva>