

Product Description Document

Traffic Flow Management (TFM) Convective Forecast (TCF)

Part 1 – Mission Connection

1. Product Description:

The Traffic Flow Management (TFM) Convective Forecast (TCF) is a high confidence graphical representation of forecasted convection meeting specific criteria of coverage, intensity, and echo top height. The TCF graphics are produced every 2 hours and valid at 4-, 6-, and 8-hours after issuance time.

Areas of convection in the TCF include any area of convective cells containing (at a minimum):

- a. Composite radar reflectivity of at least 40 dBZ;
- b. Echo tops at or above FL250;
- c. Coverage (a & b) of at least 25% of the polygon area;
- d. Forecaster confidence of at least 50% (High) that criteria (a, b, & c) will be met.

Lines of convection in the TCF include any lines of convective cells:

- a. Composite radar reflectivity of at least 40 dBZ having a length of at least 100 nautical miles (NM); and
- b. Having a linear coverage of 40% or greater; and
- c. Having echo tops at or above FL250.
- d. Forecaster confidence of at least 50% (High) that criteria (a, b, & c) will be met.

All four of the threshold criteria listed above for both areas and lines of convection are required for inclusion in the TCF. This is defined as the minimum TCF criteria.

The TCF domain is the Flight Information Regions (FIR) covering the 48 contiguous states and adjacent coastal waters. It also includes the Canadian airspace south of a line from Thunder Bay, Ontario to Quebec City, Quebec.

2. Purpose/Intended Use:

Government and airline industry Air Traffic Management (ATM) decision makers need timely delivery of high-confidence, high-relevance forecasts of convection across the Continental United States and adjacent coastal waters. These forecasts will allow ATM decision makers to proactively and collaboratively initiate, amend, or terminate planned or active TFM initiatives, resulting in safe and efficient use of the National Airspace System (NAS).

Specifically, the TCF requirements are designed to address three major purposes:

1. To provide an accurate representation of the convection of most significance for strategic decisions of air traffic flow management;

2. To provide a common forecast baseline, as consistent as possible, shared and collaborated among all meteorological organizations responsible for providing forecasts of convection to ATM within the Federal Aviation Administration (FAA)/Industry Collaborative Decision Making (CDM) processes and/or within commercial aviation organizations; and
3. To use as the authoritative source of convective weather forecast information for TFM strategic planning and decisions which are collaborated between the government and industry.

3. Audience/Users:

The TCF is used by ATM decision-makers in support of convective weather mitigation strategies within the NAS. It is designed to meet the needs of TFM decision makers at the FAA Air Traffic Control System Command Center (ATCSCC), FAA Air Route Traffic Control Center (ARTCC) Traffic Management Units (TMU), and airline and corporate Flight Operations Centers (FOC).

4. Presentation Format:

The TCF is available in graphical format <http://www.aviationweather.gov/tcf> and via ASCII coded text via NOAAPort. The ASCII files are issued under the following World Meteorological Organization (WMO) Headers:

FAUS28 KKCI – 4 Hour Forecast

FAUS29 KKCI – 6 Hour Forecast

FAUS30 KKCI – 8 Hour Forecast

5. Feedback Method:

The National Weather Service (NWS) is accepting comments through October 31, 2017, via the online survey below:

www.nws.noaa.gov/survey/nws-survey.php?code=TFMTCF

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

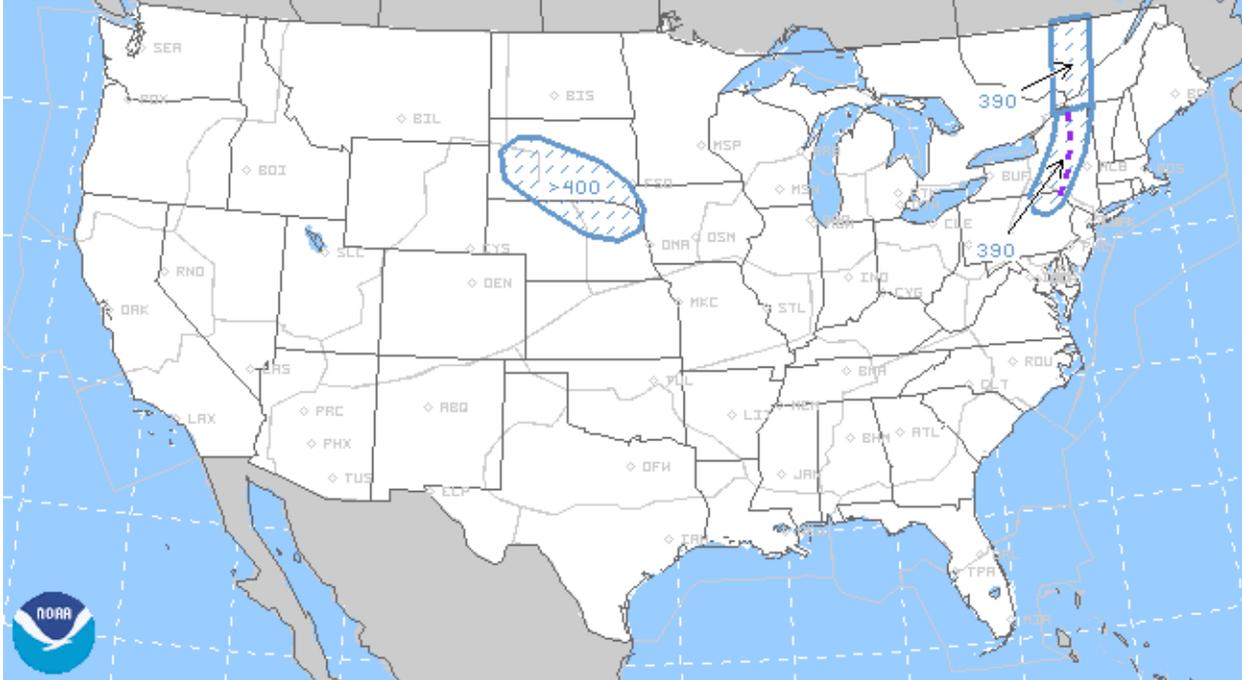
1. Format and Science Basis:

The TCF is a high-confidence forecast of convection produced through a collaborative forecast process that leverages NWS forecasters' judgement.

The graphics available at <http://www.aviationweather.gov/tcf> have the following format.

TFM CONVECTIVE FORECAST

VALID: 1900 UTC TUE 3 JUN 2014



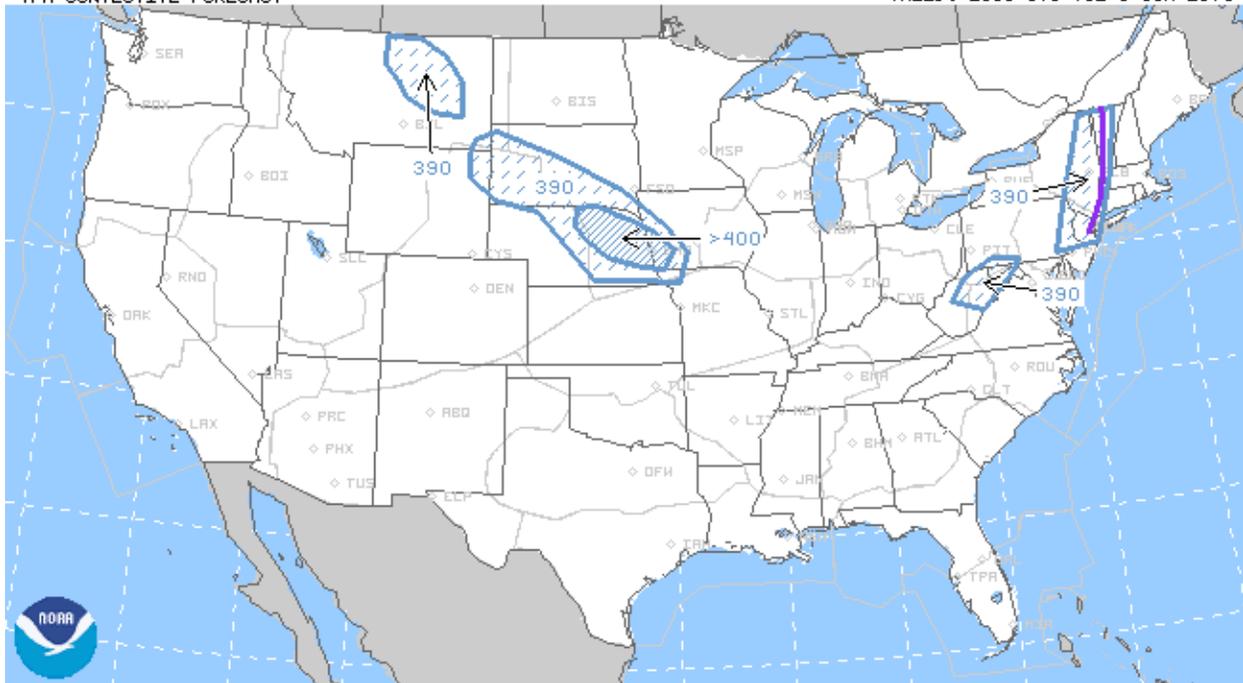
AVIATION WEATHER CENTER (NOAA/NWS/NCEP)
TFM CONVECTIVE FORECAST

ISSUED: 1500 UTC TUE 3 JUN 2014
VALID: 2100 UTC TUE 3 JUN 2014



AVIATION WEATHER CENTER (NOAA/NWS/NCEP)

ISSUED: 1500 UTC TUE 3 JUN 2014

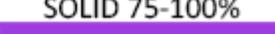
**COVERAGE****HEIGHT**

SPARSE	
25-39%	
MEDIUM	
40-74%	

TOPS: 100's OF FEET MSL

25000 - 29000	290
30000 - 34000	340
35000 - 39000	390
40000+	>400

LINES

	
BROKEN 40-74%	SOLID 75-100%

Areas of convection are identified by blue polygons in the TCF 4-, 6-, and 8-hour forecasts; or purple (either solid or dashed) lines in the TCF 4-, 6- and 8-hour forecasts. Coverage is indicated by broken hatching (25-39%) and striped hatching (40-74%). Within each TCF polygon, maximum echo tops encompassing coverage greater than 25% are identified in one of four classes:

1. 25,000 - 29,000 feet MSL are identified as 290
2. 30,000 - 34,000 feet MSL are identified as 340
3. 35,000 - 39,000 feet MSL are identified as 390
4. 40,000 feet MSL and above are identified as >400

The echo tops classification is incorporated inside the polygon. If the shape or size of the polygon does not allow for inclusion of this data inside the polygon, a line will be drawn in a convenient location extending from the interior of the polygon to the label.

A line of convection containing medium coverage (40-74%) is displayed as a dashed purple line, meaning a broken line of forecast convection, alone or within an area of coverage. A line of convection containing high coverage (75-100%) is displayed as a solid purple line, meaning a solid line of forecast convection alone, or within an area (polygon) of coverage.

The TCF ASCII formatted data fields are described below:

General Format

CCFP ISSUED VALID
 AREA COVERAGE CONFIDENCE GROWTH TOPS SPEED DIRECTION VERT# LAT[1]
 LON[1] ... LAT[VERT#] LON[VERT#] LATT LONT
 LINE COVERAGE VERT# LAT[1] LON[1] ... LAT[VERT#] LON[VERT#]
 CANADA_FLAG {ON/OFF}

Forecast Header Format

CCFP	TCF Header	4 Characters
ISSUED	Forecast Issuance Time (UTC)	
CCYYMMDD_hhmm		
VALID	Forecast Valid Time (UTC)	
CCYYMMDD_hhmm		

Forecast Area Format

AREA	Convective Area	4 Characters
AREAL COVERAGE	Convective Coverage	1 Digit Integer Code
Medium	= 2 40-74%	
Sparse	= 3 25-39%	
CONFIDENCE	Confidence	1 Digit Integer Code
High	= 1 50-100%	
GROWTH	Not Used in TCF	1 Digit Integer Code
	= 3 (Convective Growth Code is not used)	
TOPS	Storm Height	1 Digit Integer Code
FL400	= 1	
FL350-FL390	= 2	
FL300-FL340	= 3	
FL250-FL290	= 4	
SPEED	Not Used in TCF	Integer

Speed	= 0	
DIRECTION	Not Used in TCF	Integer
Direction	= 0	
VERT#	Number of LAT/LON Pairs	Integer
LAT[x]LON[x]	Vertex Latitude and Longitude	Integer Pair
Latitude	= LAT * 10.0 degrees	
Longitude	= LON * -1 * 10.0 degrees	
LATT LONT	Longitude and Latitude of Left Center of Box	
Latitude	= LATT * 10.0 degrees	
Longitude	= LONT * -1 * 10.0 degrees	

Forecast Line Format

LINE	Convective Line	4 Characters
LINE COVERAGE	Convective Coverage	1 Digit Integer Code
Solid	= 1 75-100%	
Broken	= 2 40-74%	
VERT#	Number of LAT/LON Pairs	Integer
LAT[x] LON[x]	Vertex Latitude and Longitude	Integer Pair
Latitude	= LAT * 10.0 degrees	
Longitude	= LON * -1 * 10.0 degrees	

Canadian Participation Format

CANADA_FLAG
CANADA OFF
CANADA ON

2. Training:

FAA conducts training with industry. This training package may be found at <http://tfmlearning.fly.faa.gov/>. NWS conducts training with the Center Weather Service Units and Aviation Weather Center.

3. Availability:

From March 1 through October 31 the TCF is collaboratively produced by meteorologists at the Aviation Weather Center (AWC) in Kansas City, Missouri and embedded at the FAA ATCSCC in Warrenton, Virginia, at the Center Weather Service Units (CWSU) embedded at the FAA's ARTCC, at various airlines, and by other authorized participants. Automated routines will continue to make the TCF available from November through February.

The TCF is issued 24 hours a day seven days a week at 30 minutes prior to the indicated issuance time. The issuance time supports the FAA's Strategic Planning (SP) Webinar which occur 15 minutes following odd hours Eastern Time. The Canadian portion of the forecast is available

from April 1st through September 30th. However, Nav Canada may request the issuance of each forecast as early as March 1st and as late as October 31th. All available Canadian forecasts are incorporated into the TCF. During times the forecasts are not available for Canadian airspace, the TCF graphics will be annotated with “No Canadian TCF.”