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MANAIR

Manual of Standards and Procedures for Aviation Forecasts

Eighth Edition, Amendment 4

July 11th, 2024

This edition supersedes, on July 11th 2024, all previous versions of MANAIR.

Canada

Cat. No.: En56-238/4-1-2024E-PDF
ISBN: 978-0-660-72683-0
EC22036

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Foreword

The *Manual of Standards and Procedures for Aviation Weather Forecasts* (MANAIR) specifies procedures, practices and formats to be used in the preparation of aviation weather forecasts. It serves as a precise standard for the operational meteorologist who produces Canadian aviation weather forecasts. It also provides necessary information for those who deliver aviation weather services.

This manual is used within Environment and Climate Change Canada (ECCC) as a standard for operational meteorologists producing aviation weather forecasts, and for informational purposes for users who deliver Canadian aviation weather services. Revisions and amendments will be issued when warranted. All holders of the manual are responsible for keeping their copies current. When revisions and amendments have been entered, they are recorded on the page headed Record of Amendments.

Inquiries on the content of this manual should be directed to the Meteorological Service of Canada through appropriate channels.

Record of Amendments

Number	Effective date	Entered by	Date of entry
1	July 2022	Gilles Ratté	July 2022
2	November 2023	Claudine Larocque	September 2023
3	March 2024	Claudine Larocque	March 2024
4	July 2024	Claudine Larocque	July 2024

Record of revisions

Significant and substantial revisions to MANAIR Eight edition are listed below with a description of the changes. The Record of revisions is updated whenever amendments are issued.

Section	Description of revisions	Effective date
Record of revisions	Addition of the page «Record of revisions»	July 2022
2.6.11.1 section 4)	Removal of ice pellet showers (SHPL) as a weather phenomenon for compliancy with WMO No. 306 Manual on Codes.	November 2023
2.6.11.2.1, 2.9.5.2	Weather element GS referred as snow pellets and/or small hail in all instances	November 2023
Appendix A	Limits for CYYQ and CYQI	March 2024
2.6.11 and 2.6.11.2.2	SA only allowed with BL or DR	July 2024
4.9.1.2.3	Corrected typo LYRS should be LYR	July 2024
4.9.1.3.1	Added definition for intermittent	July 2024
Appendix A	Limits for CYGQ, CYYY and CYVV, notes updated	July 2024

Table of Contents

Chapter 1 Introduction

1.1 Purpose of manual

This manual is incorporated as a regulatory standard by reference from *Canadian Aviation Regulations* (CAR) 804.01(1)(b). It specifies procedures, practices and formats to be used in the preparation of aviation weather forecasts in Canada. It expands upon the International Standards and Recommended Practices as stated in the International Civil Aviation Organization (ICAO) Annex 3 to the *Convention on International Civil Aviation - Meteorological Service to International Air Navigation* as referenced by CAR 804.01(1)(a). The standards in Annex 3 are superseded, domestically, by State differences filed by Canada against the Annex in accordance with CAR 800.01(2). The standards in this manual have equal weight with the standards in Annex 3 or those formed by Canadian State differences to the Annex but they take precedence over recommended procedures established in Annex 3.

1.2 Word meaning

The bolded word "**shall**" is used in this manual to indicate that instructions are mandatory, or must be followed. The word "should" is used to denote a recommended practice, or a good way to do something.

1.3 Applicability

This manual has been produced in conjunction with Transport Canada (TC), NAV CANADA, and the Department of National Defence (DND) and **shall** be used by people involved in the production and delivery of aviation weather forecasts serving all categories of aviation: civil or military, domestic, trans-border (Canada-United States) or international.

1.4 Responsibility for the aviation weather program

The Minister of Transport is responsible for the development and regulation of civil aeronautics and the supervision of all matters connected with civil aeronautics. The responsibility for the provision of civil aviation weather services in Canadian airspace and any other airspace in respect of which Canada has the responsibility for the provision of air traffic control services, has been designated to NAV CANADA. NAV CANADA also specifies the location and frequency of aviation weather observations and forecasts, and is responsible for the dissemination of this information for aviation purposes.

Note: In special circumstances, the Minister of Transport may authorize a private company to issue aviation weather forecasts for specific aerodromes.

The Minister of National Defence is responsible for the development and regulation of military aeronautics and the supervision of all matters connected with military aeronautics. The responsibility for the provision of military aviation weather services in Canada rests with the Director, Meteorology and Oceanography (DMetOc).

Note: Specific exemptions may be authorized by DMetOc in special circumstances when it is essential to conform to the standards or procedures of DND or an allied command (e.g North American Aerospace Defense Command (NORAD) or North Atlantic Treaty Organization (NATO)).

The International Civil Aviation Organization (ICAO) has designed the World Area Forecast System (WAFS) to provide forecasts of enroute meteorological conditions of the greatest possible accuracy and in a standardized form for international civil flight operations.

In accordance with the standards set by the World Meteorological Organization (WMO) and ICAO, aviation weather forecasts provided by the Meteorological Service of Canada (MSC) are prepared by certified aeronautical meteorological forecasters (AMF) as defined in 1.6.

1.5 Aviation weather forecast production

Aviation weather forecasts are produced by:
Environment and Climate Change Canada (ECCC):

- Environment and Climate Change Canada, MSC has been contracted, by NAV CANADA, the responsibility for the production of civil aviation weather forecasts.
- ECCC/MSC, under the provisions of a Memorandum of Understanding with DND, provides similar services.

Private meteorological suppliers:

- Any private company authorized by TC or DND to issue aviation forecast for specific aerodromes.

1.6 Aeronautical Meteorological Forecaster (AMF)

An Aeronautical Meteorological Forecaster (AMF) is a meteorologist who meets, at a minimum, the definition and top-level competency standards as defined in the *Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology, Volume I, Meteorology* (WMO-No. 1083), as they pertain to aeronautical meteorology, and who is continuously and actively responsible for the content of any aviation weather forecast service. Additional AMF competencies may be required by the service provider, which are in keeping with Canadian regulations.

1.7 Form of forecasts

Forecasts are issued in one of two forms designed to satisfy internationally agreed upon requirements. The designated formats are identified below.

1.7.1 Chart / graphical

Forecasts in chart or graphical form depict forecast conditions over large areas with greater clarity than forecasts in alphanumerical form. Specifications of this form are given in chapters 4 and 7.

1.7.2 Alphanumeric code

Forecasts in alphanumeric code are used when required by international standards (e.g. aerodrome forecasts (TAFs) in code) or when chart forms are unsuitable.

1.8 Components and types of routine aviation forecasts

Because of differing requirements for detail and accuracy, aviation forecasts are separated into forecasts of aerodrome conditions and forecasts of enroute conditions. Each of these forecasts may be issued in one or more of the forms detailed in 1.7.

1.8.1 Aerodrome forecasts

These are normally issued for periods of 12, 24 or 30 hours at regular intervals (normally every six hours). These forecasts are issued for specified aerodromes in alphanumeric code (TAF).

1.8.2 Forecasts of enroute weather

Forecasts of enroute weather **shall** be issued, as described:

- **Graphic Area Forecasts (GFA)**: For aircraft operating over short or medium ranges (less than 1,000 nautical miles) and at altitudes below 24,000 feet, area forecasts are issued at regular intervals (normally every six hours). Detailed specifications of GFA are given in Chapter 4.
- **Significant weather forecasts**: For planning operations of aircraft over longer ranges and at altitudes between 700 hPa and 400 hPa (10,000 feet to 24,000 feet), routine forecasts of weather of significance to such operations are produced in chart form as described in Chapter 7.
- **SIGMET**: Information message to advise pilots of the occurrence or expected occurrence of specified weather phenomena, which may affect the safety of aircraft operations, and the development of those phenomena in time and space. Details of specifications of SIGMET are given in Chapter 5.
- **AIRMET**: Information message to advise pilots of the occurrence or expected occurrence of specified weather phenomena which may affect the safety of aircraft operations, which were not already included in the GFA, and the development of those phenomena in time and space. Details of specifications of AIRMET are given in Chapter 6.
- **Upper Winds and Temperatures (FB)**: Forecast of winds and temperatures aloft produced at six-hour intervals in numerical form for defined levels below 24,000 feet. Details of FB specifications are provided in Chapter 3.

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Chapter 2 Aerodrome forecast (TAF)

2.1 Definition

The aerodrome forecast (TAF) is the forecaster's best judgment of the most probable weather conditions expected to occur at an aerodrome together with their most probable time of occurrence. It is designed to meet the preflight and in-flight requirements of flight operations. Aerodrome forecasts are intended to relate to weather conditions for flight operations within six statute miles (roughly five nautical miles) of the centre of the runway complex depending on local terrain. Certain specified weather phenomena, when expected within the vicinity of the aerodrome, are also included in a TAF.

2.2 Aeronautical Meteorological Forecaster (AMF) responsibility

An AMF responsible for the production of TAFs for Canada **shall** produce those forecasts using the standards and recommended practices concerning weather forecasts and observations identified in the Canadian Aviation Regulations (CAR).

2.3 Observational requirements

Aerodrome forecasts are issued for aerodromes for which regular hourly and special weather reports meeting standards for observations, as stated in the *Manual of Surface Weather Observation Standards* (MANOBS), are available. Aerodrome forecasts based on automated observations **shall** be issued only for acceptable Automated Weather Observation System (AWOS) sites. They are recognizable by the label "AUTO" in the corresponding METAR or SPECI report.

2.3.1 Parameters required to establish a TAF service

The meteorological parameters required to establish a TAF service are the following:

- sky condition
- visibility
- present weather and obstructions to vision
- air temperature
- dew point temperature
- wind speed, direction and character
- mean sea level (MSL) pressure

Regular hourly and special weather observations are only one of the data sources available to forecasters. Therefore, when it comes to maintaining an already established aerodrome forecast, no single element is necessarily critical.

After analyzing available data from other sources (e.g. satellite imagery, radar pictures, webcam data), if, in the forecaster's judgment, one missing observation or a missing element will have no impact on the quality of the aerodrome forecast, the forecast can be maintained.

2.4 Time references

All time references **shall** be stated in Coordinated Universal Time (UTC).

2.4.1 Issue time

The issue time of an aerodrome forecast is the time that it is released to the telecommunication system. To facilitate flight planning, aerodrome forecasts **shall** be transmitted on the telecommunication system as close as possible to, but not later than 20 minutes prior to the beginning of their period of validity.

For those aerodromes which do not have a 24-hour observing program, two consecutive hourly observations immediately prior to the issue time of the forecast are required before issuing a forecast. Depending on the valid period of the forecast, the above situation can be accomplished in one of two ways:

1) After receiving the second hourly observation, the TAF is issued as soon as possible, for example, 15 minutes after the second observation is received. The period of validity of such a TAF is backdated to begin on the whole hour prior to the issue time of the forecast. The forecast, however, is valid from the time that it is received. For example, after receiving the 13Z and 14Z observations for Fort Good Hope, the TAF is issued as: TAF CYGH 201410Z 2014/2101 …
2) After receiving the second hourly observation, the TAF is issued approximately 40 minutes after the hour of the observation. In this case, the period of validity of such a TAF is postdated to begin on the whole hour following the issue time of the forecast. For example, after receiving the 10Z and 11Z observation for Muskoka, a TAF is issued as: TAF CYQA 201140Z 2012/2100 …

If two consecutive hourly observations are not available immediately prior to the issue time of a TAF, a nil TAF **shall** be issued, e.g. TAF CYTS 051640Z NIL followed by NO OBS included in the remarks section. Alternatively, if only one observation is available, the nil TAF would read TAF CYTS 051640Z NIL followed by INSUFFICIENT OBS included in the remarks section.

In exceptional circumstances (e.g. where there is a nearby weather station providing routine hourly and special weather reports) forecasts may be issued after receipt of the first hourly report.

TAFs are normally scheduled to be updated six hours after the previous issue time. Under no circumstance **shall** a TAF be scheduled more than seven hours after the previous issue time.

2.4.2 Time of validity

An aerodrome forecast **shall** be valid from the moment it is issued (e.g. a TAF with an indicated period of validity from 11Z to 23Z issued at 1040Z is considered to be valid from 1040Z) until it is amended, or until the next scheduled TAF for the same aerodrome is issued, or until the valid period is ended with no new TAFs issued, whichever comes first.

Note: When a new TAF is issued, it automatically cancels the previous one.

2.5 Format of the Canadian Aerodrome Forecast (TAF)

The information included in a Canadian aerodrome forecast (TAF) is presented in a fixed order as described in 2.5.1 and 2.5.2. For a description of the WMO international TAF code, refer to the *Manual on Codes, Volume I.1 - Part A – Alphanumeric Codes* (WMO-No. 306).

2.5.1 Telecommunication header

TAF bulletins begin with a WMO abbreviated telecommunication header (as required by the *Manual on Global Telecommunication System* [WMO-No. 386]). The normal source input header for a TAF bulletin is of the following form "FTCNii CWAO ddhh00 (BBB)" where:

- ii is the bulletin number, as listed in Appendix A for each TAF;
- CWAO refers to the Canadian Centre for Meteorological and Environmental Prediction/Network Operations (CCMEP/NETOPS) as the centre compiling the bulletins;
- ddhh00 is the date and time, in whole hours UTC, that precedes the time of entry to the collection circuit of a regular forecast issue, as required by the Global Telecommunication System (GTS) of the WMO (e.g. FTCN32 CWAO 101800); and
- BBB is an indicator used for amendments, corrections, or delayed bulletins and will be added automatically by the national bulletin preparation software to all TAFs scheduled for transmission to the GTS. The inclusion of this term is required by international protocol, as outlined in the *Manual on the Global Telecommunication System, Volume I, Attachment II-12 – Instructions for the Use of the Indicator BBB* (WMO-No. 386), BBB will take the form AA(x) for amendments (including corrections) and RR(x) for delayed bulletins. The letter (x) will take the value of "A" for the first amendment or delayed bulletin, the value "B" for the second and so on (e.g. FTCN32 CWAO 201800 AAA, FTCN33 CWAO 182100 RRA, etc.) up to and including "X". If more than 24 BBB indicators have to be used for the sequences, then x = X should continue to be used. x = Y should be used when a system failure causes loss of the record of the sequence of character values. x = Z should be used when bulletins are prepared or compiled more than 24 hours after the time of observation.

Delayed bulletins are used to transmit TAFs normally contained in a regularly scheduled bulletin after that initial bulletin has been transmitted or for a subsequent or additional issuance of a bulletin whose "FTCNii CWAO ddhh00" would not be unique without a BBB field and AA(x) does not apply.

Regularly scheduled bulletins, as well as delayed and amendment bulletins, can contain one or more TAFs. In most instances however, a regularly scheduled bulletin will typically contain multiple TAFs whereas amendment bulletins will typically contain just one.

Note: The time that appears in the telecommunication header **shall** always be in whole hours Universal Coordinated Time (UTC) preceding the transmission time. This rule is outlined in the *Manual on the Global Telecommunication System, Volume I – Global Aspects, Part II,* p. 2.3.2.2 (WMO-No. 386). In Canada, the transmission time is interpreted to be the time at

which the regular issue of a forecast is published. Delayed and updated bulletins are also considered regular forecast issue as opposed to amendments and cancellations, which modify the content of a previously published bulletin with an already established transmission time.

2.5.2 Symbolic form

The symbolic form of a Canadian aerodrome forecast in TAF code is:

TAF bbb CCCC YYGGggZ {NIL *or* $Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$ {CNL *or* dddffGf_mf_mKT
WS$h_xh_xh_x$/ddffKT VVVV {w'w' *or* NSW} {$N_SN_SN_Sh_Sh_Sh_S$ *or* VV$h_Sh_Sh_S$ *or* SKC}
PROBC_2C_2 $Y_bY_bG_bG_b/Y_eY_eG_eG_e$
TEMPO $Y_bY_bG_bG_b/Y_eY_eG_eG_e$
{BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$} *or* {FMYYGGgg}}}
RMK

Note (1): Groups included in braces { } and separated by the word "or" represent mutually exclusive options.

Note (2): Each individual time period beginning with FMYYGGgg **shall** start a new line and indented four spaces, while continuation lines **shall** be indented five spaces.

Note (3): The length of a line **shall not** exceed 69 characters. A period is not required at the end of every TAF. An equal "=" sign, indicates the end of the message to comply with the GTS rules.

2.5.2.1 Partial program format

For an aerodrome operating a partial observing program (e.g. no nighttime observations), an appropriate remark **shall** be included in the last regular issue of the TAF as follows:

- NXT FCST WILL BE ISSUED AT YYGGggZ (e.g. NXT FCST WILL BE ISSUED AT 181000Z)
- NO FCST ISSUED UFN

Where:

- YY is the date in which the next TAF will be issued; and
- GGgg is the time (UTC, hour and minutes) at which the next TAF will be issued.

Note: If, for unexpected reasons, the observing program should end earlier or start later than expected, a cancelled or nil TAF **shall** be issued as described in 2.10.1.

2.5.3 Definition of symbols

Only a broad overview of the description of the terms is provided in this section. More details regarding the preparation and the coding of aerodrome forecast are provided in 2.6.

Table 1: Definition of symbols

Symbol	Description
TAF	Bulletin identifier (refer to 2.6.1).
Bbb	Amendment or correction indicator (refer to 2.6.2).
CCCC	International aerodrome identifier (refer to 2.6.3).
YYGGggZ	Date/time (UTC) of origin of the TAF (refer to 2.6.4).
NIL	Missing forecast identifier (refer to 2.6.5)
$Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$	Date and period of validity of the forecast (refer to 2.6.6).
CNL	Cancelled forecast identifier (refer to 2.6.7)
$dddffGf_mf_mKT$	Surface wind speed and direction with gusts (refer to 2.6.8)
$WSh_Xh_Xh_X/dddffKT$	Low level wind shear group (refer to 2.6.9)
VVVV	Horizontal prevailing visibility at the surface (refer to 2.6.10)
w'w'	Significant forecast weather (refer to 2.6.11)
NSW	Abbreviation for no significant weather (refer to 2.6.12)
$N_SN_SN_Sh_Sh_Sh_S$	Cloud group (refer to 2.6.13.1&2)
$VVh_Sh_Sh_S$	Vertical visibility (refer to 2.6.13.3)
SKC	Abbreviation for sky clear (refer to 2.6.13.4)
$PROBC_2C_2\ Y_bY_bG_bG_b/Y_eY_eG_eG_e$	Probability group (refer to 2.6.14)
$TEMPO\ Y_bY_bG_bG_b/Y_eY_eG_eG_e$	Temporary change group indicator (refer to 2.6.15)
FMYYGGgg	Rapid and permanent change group indicator (refer to 2.6.16.1)
$BECMG\ Y_bY_bG_bG_{b/}Y_eY_eG_eG_e$	Gradual but permanent change group indicator (refer to 2.6.16.2)
RMK	Remarks (refer to 2.6.17)

2.6 TAF Forecast preparation and coding

The description of forecast conditions **shall** always contain, as a minimum, information about the following elements:

- wind
- visibility
- weather
- cloud

2.6.1 Aerodrome forecast message identifier (TAF)

The code name "TAF" (Aerodrome Forecast) **shall** be included at the beginning of each TAF (e.g. TAF CYUL 191635Z 1917/2017…).

2.6.2 Amendment/Correction indicator (bbb)

The indicator "bbb" takes the form of "AMD" and is used for both amendments and corrections and is placed after the term TAF followed by one space (e.g. TAF AMD CYUL…).

2.6.3 Location identifier group (CCCC)

The group "CCCC" is the international four-letter aerodrome identifier (for a full list of international identifiers, see ICAO Document 7910: *ICAO Location Indicators* (DOCS 7910). For Canadian aerodromes the first letter of this group is always a "C" (e.g. TAF CYUL…).

2.6.4 Date/Time group (YYGGggZ)

The day/time group "YYGGggZ" is the date and time of issue of the forecast in UTC (e.g. TAF CYUL 191640Z …). This term will be inserted automatically by the national bulletin preparation software once the forecaster sends the forecast.

2.6.5 Missing forecast indicator (NIL)

A nil TAF shall include the term "NIL" following the day and time of issue of the forecast. All subsequent TAF groups, except for remarks, shall be omitted.

2.6.6 Date and period of validity group ($Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$)

The group "$Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$" represents the period of validity of the forecast, where:

- $Y_1Y_1G_1G_1$ is the date and hour (UTC) of the beginning of the period of validity; and
- $Y_2Y_2G_2G_2$ is the date and hour (UTC) of the end of the period of validity (e.g. TAF CYUL 191740Z 1918/2018).

This group will be inserted for all TAF bulletins except for nil TAFs. For most TAFs, the period of validity will begin at the current or upcoming hour. For cancelled TAFs, the beginning of the

period of validity will correspond to the beginning of the period of validity of the last issued valid TAF, which means that the valid period may start prior to the current hour.

2.6.7 Cancelled forecast indicator (CNL)

A cancelled TAF shall include the term “CNL” following the date and period of validity group of the forecast that is being cancelled. All subsequent TAF groups, except for remarks, shall be omitted.

2.6.8 Wind group (dddffG$f_m f_m$KT)

The mean direction and speed of the forecast wind **shall** be indicated by “dddff” where ddd is the wind direction given to the nearest 10 degrees true, and ff is the wind speed given in knots. Except as stated below, the group dddff is immediately followed, without a space, by the letter code indicator KT to indicate the wind speed unit (knots).

When it is forecast that the maximum wind speed (gust, symbol G) will exceed the mean speed by 10 KT or more, the maximum wind speed **shall** be indicated by adding G$f_m f_m$ between dddff and KT. There is no space either before or after G$f_m f_m$ (e.g. 32020G30KT).

The code “ddd” should normally be encoded as variable (VRB) only when the mean wind speed is three knots or less (e.g. VRB03KT). A variable wind at higher speeds may also be indicated during strong convective activity (e.g. when a thunderstorm passes over an aerodrome).

A north wind of 20 KT **shall** be indicated as 36020KT, while a calm wind **shall** be indicated as 00000KT.

For wind speeds (mean and/or maximum gust) of 100 KT or greater, the exact value of the speed **shall** be given using three digits instead of two digits (e.g. 320105G130KT).

2.6.9 Low level wind shear group (WS$h_x h_x h_x$/dddffKT)

While the main effect of turbulence is related to erratic changes in altitude and/or behavior of the aircraft, the main effect of wind shear is the rapid gain or, more critical, loss of air speed. Therefore, for forecasting purposes, any cases of non-convective low level wind shear within 1,500 feet AGL will be labeled as WS. This group is not part of the international code but it is used in North American TAFs (this difference has been filed with the ICAO by Canada).

The low level wind shear group **shall** be included in a TAF whenever the forecaster has strong evidence to expect significant, non-convective wind shear which could adversely affect aircraft operation within 1,500 feet AGL.

To a large extent, wind shear is an element which, for the time being, cannot be satisfactorily observed from the ground. As a result, aircraft observations and radiosonde reports represent the only available evidence. However, the following guidelines could be used at the forecaster's discretion to establish whether significant non-convective wind shear hazardous to aircraft exists:

1) Vector magnitude exceeding 25 KT within 500 feet AGL
2) Vector magnitude exceeding 40 KT within 1,000 feet AGL
3) Vector magnitude exceeding 50 KT within 1,500 feet AGL
4) A pilot report of loss or gain of indicated air speed of 20 KT or more within 1,500 feet AGL

The low level wind shear group, when included, **shall** be encoded as WS$h_Xh_Xh_X$/dddffKT where:

- WS means low level wind shear;
- $h_Xh_Xh_X$ represents the height (above ground) of the layer in which the low level wind shear is expected (e.g. 015 means 1500 feet above ground);
- ddd is the wind direction at level $h_Xh_Xh_X$ (e.g. 240 means 240 degrees); and
- ffKT is the wind speed, in knots (KT), at level $h_Xh_Xh_X$ (e.g. 45KT).

Note: When the wind speeds at $h_Xh_Xh_X$ is expected to be 100 KT or higher, a three-digit figure **shall** be used (e.g. 120KT). Wind gusts **shall not** appear in this group.

2.6.10 Visibility group (VVVV)

The horizontal prevailing visibility group "VVVV" **shall** always be indicated in statute miles and fractions up to three miles, then in whole miles up to six miles (e.g. 2 1/2SM SHSN, meaning visibility two and a half statute miles in light snow shower). The letters SM (statute miles) **shall** be added without a space to each forecast visibility to identify the unit.

Visibility values allowed are the following:

1) 0 to 3/4SM (in increments of one eighth [1/8] statute mile)
2) 3/4SM to 2 1/2SM (in increments of one quarter [1/4] statute mile)
3) 3SM to 6SM (in increments of one [1] statute mile)
4) P6SM (for visibility greater than six [6] statute miles)

When whole miles and fractions of a mile are used in combination, a space **shall** be placed between the whole mile and the fraction (e.g. 1 1/2SM; 2 1/2SM).

2.6.11 Significant weather group (w'w')

The significant weather group "w'w' " is comprised of weather phenomena which may contain one or more forms of precipitation, obscuration or other (refer to Table 2, columns 3 to 5). Weather phenomena are preceded by one or more qualifiers, one of which describes the intensity or the proximity to the station of the phenomena. The other qualifier is a descriptor and describes the weather phenomena (refer to Table 2, columns 1 to 2).

Table 2: Significant present and forecast weather

Qualifier Intensity or proximity Column 1	Qualifier Descriptor Column 2	Weather phenomena Precipitation Column 3	Weather phenomena Obscuration Column 4	Weather phenomena Other Column 5
- Light	**MI** Shallow	**DZ** Drizzle	**BR** Mist (Vis ≥ ⅝ SM)	**PO** Dust/Sand Whirls (dust devils)
Moderate (no qualifier)	**BC** Patches	**RA** Rain	**FG** Fog (Vis < ⅝ SM)	**SQ** Squalls
+ Heavy	**PR** Partial (covering part of the aerodrome)	**SN** Snow	**FU** Smoke (Vis ≤ 6 SM)	**+FC** Tornado or waterspout
VC In the Vicinity	**DR** Low Drifting	**SG** Snow Grains	**DU** Dust (Vis ≤ 6 SM)	**FC** Funnel Cloud(s)
	BL Blowing	**IC** Ice Crystals (Vis ≤ 6 SM)	**SA** Sand (Vis ≤ 6 SM shall be used with BL)	**SS** Sandstorm (Vis ½ SM and ⅜ SM)
	SH Shower(s)	**PL** Ice Pellets	**HZ** Haze (Vis ≤ 6 SM)	**+SS** Sandstorm (Vis ¼ SM or less)
	TS Thunderstorm	**GR** Hail	**VA** Volcanic Ash (with any visibility)	**DS** Dust storm (Vis ½ SM and ⅜ SM)
	FZ Freezing (supercooled)	**GS** Small hail and/or snow pellets		**+DS** Dust storm (Vis ¼ SM or less)

Note: Precipitation intensity refers to all forms combined.

Note: The forecast w'w' group(s) **shall** be indicated by considering columns 1 to 5 in the previous table in sequence, that is, intensity followed by weather phenomena (e.g. +SHRA for heavy shower of rain).

A w'w' group **shall** be indicated by selecting appropriate items from column 1 to 5 of Table 2 (in sequence) which describe the forecast weather. The w'w' group **shall** be ordered as follows:

1) first, if appropriate, the qualifier for intensity or proximity; followed without a space by, if appropriate,
2) the abbreviation for the descriptor; followed without a space by
3) the abbreviation for the forecast weather phenomenon or combination thereof.

The w'w' group **shall** be omitted if no significant weather is expected. The w'w' group **shall** also be omitted after a change group of the form TEMPO/BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ when it is not expected to differ from the preceding value. For example …3SM BR SKC BECMG 0815/0816 BKN020 … This implies that the visibility/weather group 3SM BR remains unchanged after the BECMG.

When two or three weather elements are indicated, the combined weather group will be considered as one entity. When one element is expected to change, the entire group **shall** be repeated. For example: …4SM BR … TEMPO 4SM -RA BR… The BR is repeated because another element, namely -RA, is introduced. In addition, the visibility is also repeated because it is considered to be an integral part of the weather group.

In case of a "significant change" in visibility, the entire weather group **shall** also be repeated. A significant change (visibility, weather, cloud amounts, etc.) is a change for which, under normal circumstances, an amendment would be required.

In this example …3SM -RA BR TEMPO 2108/2112 1SM -RA BR… -RA and BR are indicated before and after the change group TEMPO, because a significant change in visibility is forecast.

Similarly, in the case of …5SM -RA BR TEMPO 2108/2112 4SM -SN BR…, the BR is repeated because a significant change in precipitation is forecast.

2.6.11.1 Qualifiers and descriptors

1) The “intensity qualifier” (Table 2 column 1) refers to the total precipitation of the weather group and is coded as plus “+” or minus “-”, meaning heavy or light as described in MANOBS. When the intensity of the phenomena is expected to be moderate, no indicator sign **shall** be indicated in the group.

2) In “precipitation types**”** where the intensity is not applicable such as ice crystals (IC), no intensity **shall** be included in the TAF. The intensity qualifier **shall** be indicated only with the following:
   - precipitation
   - dust storm or sandstorm (DS/SS)

Note: When associated with the proximity (VC) indicator or with the qualifiers BL and DR, the intensity of precipitation **shall not** be specified.

3) The “proximity (VC) qualifier**”** (Table 2, column 1) is used only when the following phenomena are expected to occur at a distance greater than 6 statute miles up to 10 statute miles from the centre of the runway complex (within roughly 5 to 11 nautical miles) except in the case of hub airports mentioned below,:
   - dust storm (DS)
   - sandstorm (SS)
   - fog (FG)
   - funnel cloud(s), tornado(es) or waterspout(s) (FC)
   - thunderstorm (TS)
   - shower (SH)
   - dust/sand whirls (PO)
   - blowing dust/sand/snow (BLDU/BLSA/BLSN)
   - volcanic ash (VA)

   VCTS can be used in TAFs to describe air mass thunderstorm situations where there is high regional confidence of occurrence, but a corresponding low probability at the aerodrome. In situations where the terminal area covers a large region, as it is the case for the four Canadian hubs (CYYZ, CYVR, CYUL and CYYC), VC can be used with TS to describe organized thunderstorms occurring and/or expected to affect areas of importance (e.g. approaches, departures, terminal area entry fixes, etc.) within the terminal area (±45SM /±40NM radius) but not the aerodrome itself.

4) "Descriptors" (Table 2, column 2): Not more than one descriptor **shall** be included in any w'w' group (e.g. -FZDZ). When more than one group is indicated, only one descriptor per group may be used (e.g. -FZDZ, SHSNRA, etc.).

- The descriptors shallow (MI), patches (BC) and partial (PR) **shall** be used only to forecast fog (FG). For example:
  - the term MIFG is used when the visibility within the fog layer between the ground and two metres above the ground level is expected to be less than 5/8 SM while the visibility above that layer is greater than 5/8 SM;
  - the term BCFG is used to forecast fog patches covering only part of the aerodrome and the visibility in the fog patch is expected to be less than 5/8 SM with the fog layer extending at least to two meters above ground level; and
  - the term PRFG (fog bank) **shall** be used to forecast fog covering a substantial part of the aerodrome while the remainder of the aerodrome is expected to be free of fog.
  - MIFG, BCFG and PRFG are to be used in association with visibility of P6SM only.
- The descriptors low drifting (DR) **shall** be used only in combination with dust (DU), sand (SA) or snow (SN) when these are raised by the wind to less than two meters above the ground.
- The descriptor BL (blowing) **shall** be used only in combination with DU, SA or SN to forecast dust, sand or snow raised by the wind to a height of two meters or more above the ground.

Note: When SN and BLSN are expected together, they **shall** be indicated in separate w'w' groups (e.g. 5SM -SN BLSN).

- Shower (SH) **shall** be used only in combination with VC or one or more of the precipitation types, rain (RA), snow (SN), , snow pellets (GS), and/or hail (GR).
- Thunderstorm (TS) must either be stated alone or in combination with one or more of the precipitation types RA, SN, GS, and GR.
- Super-cooled, freezing (FZ) is used in combination with the weather types FG (e.g. FZFG when the visibility is expected to be less than 5/8 of a mile and the temperature is expected to be below freezing, except when the fog is composed entirely of ice crystals), drizzle (DZ), and RA (e.g. -FZRA).

Note: For a more detailed description of the above terms refer to the *Manual of Surface Weather Observation Standards* (MANOBS).

The various TAF constructs for thunderstorms and their implied meanings are outlined in the following table.

Table 3: Thunderstorm probability definitions

Descriptor	Probability of Occurrence at the Airport	Notes
MAIN TSRA	60 - 100%	High confidence, positive forecast of persistent CBs at the airport.
TEMPO TSRA	40 - 60%	High confidence, positive forecast of temporary CBs at the airport.
PROB40 TSRA	40%	Moderate to high probability forecast of CB at the airport.
PROB30 TSRA	30%	Moderate probability forecast of CB at the airport.
TEMPO VCTS	Approximately 20%	High confidence, positive forecast of disorganized air mass CBs in the region. Low probability of CB directly impacting airport.

2.6.11.2 Weather phenomena (Table 2, columns 3 to 5)

2.6.11.2.1 Precipitation

Types of “Precipitation” (Table 2, column 3) which are allowed in the TAF are the following:

- drizzle (DZ)
- rain (RA)
- snow (SN)
- snow grains (SG)
- ice crystals or diamond dust (IC) when the visibility is expected to be 6 SM or less
- ice pellets (PL)
- hail (GR)
- snow pellets and/or small hail (GS)

When more than one type of precipitation (Table 2, column 3) is forecast, the appropriate abbreviations **shall** be combined in a single group, according to regulations stated in this section, with the predominant type of precipitation being stated first. Not all precipitation types can be combined. Only RA, SN, SG, PL, GR, and GS (e.g. SGPL, SNRA, PLSN, etc.) can be combined, while DZ and IC cannot (e.g. RADZ, SNIC, etc. are not allowed). In such a single group, the intensity **shall** refer to the total precipitation (-SHSNRA) where SN is the predominant type of precipitation.

When more than one significant weather phenomenon other than a precipitation combination mentioned above is forecast, separate w’w’ groups, but not more than three, **shall** be included in the forecast in accordance with Table 2 (e.g. -FZDZ -SGSN BR, etc.).

2.6.11.2.2 Obscuration

Obscuring phenomena (Table 2, column 4) are forecast whenever the prevailing visibility is expected to be six statute miles or less. The only exception is volcanic ash (VA) which, when expected, **shall** always be indicated regardless of visibility.

The obscuration SA (sand) **shall** only be used in combination with BL or DR.

2.6.11.2.3 Other

Other weather phenomena (Table 2, column 5) are classified as:

- dust/sand whirls (PO)
- squalls (SQ)
- funnel clouds(s) (FC)
- tornadoes or waterspouts (+FC)
- sandstorm (SS)
- dust storm (DS)

2.6.12 Alternative term NSW

The abbreviation "NSW" (no significant weather) is an alternate term for w'w'. It is used to replace the w'w' group after a change group of the form TEMPO/BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ to indicate the end of significant weather phenomena indicated in the w'w' group prior to the change. The term NSW **shall not** be used in the initial forecast period.

2.6.13 Cloud and obscuration groups ($N_SN_SN_Sh_Sh_Sh_S$ and $VVh_Sh_Sh_S$)

The cloud or obscuration group "$N_SN_SN_Sh_Sh_Sh_S$" or "$VVh_Sh_Sh_S$" **shall** be used in the initial time period and in any subsequent FM group(s) to indicate cumulative cloud amounts $N_SN_SN_S$ and the height above ground $h_Sh_Sh_S$ of the base of cloud layers in units of 100 feet. When the sky is totally obscured, the cloud group is replaced with the vertical visibility group $VVh_Sh_Sh_S$. In the absence of clouds, the term SKC (sky clear) **shall** be used.

2.6.13.1 Cloud amount ($N_SN_SN_S$)

The cloud amount "$N_SN_SN_S$" **shall** be given as SKC, FEW, SCT, BKN, and OVC as indicated in Table 4.

The code "$N_SN_SN_S$"represents the total (cumulative) amount of cloud that the forecaster expects to occur at the level up to and including $h_Sh_Sh_S$.

The group "$N_SN_SN_Sh_Sh_Sh_S$" is limited to a maximum of three significant layers of cloud. The only exception is for cumulonimbus clouds (CB), which **shall** always be indicated when expected.

In case of a significant change in a cloud layer, the entire cloud group, including those cloud layers not expected to change, **shall** be repeated. A significant change in the clouds is intended to mean a change for which an amendment would be required.

Table 4: Sky cover terms

Abbreviation	Cloud amount in oktas
SKC	No cloud
FEW	Trace to 2 inclusive
SCT	3 to 4 inclusive
BKN	5 to 7 inclusive
OVC	8

Towering cumulus (TCU) and altocumulus castellanus (ACC) **shall** not be forecast. Only CBs **shall** be forecast. When expected, a CB cloud **shall** be indicated by adding the letter abbreviation "CB" to the cloud group without a space (e.g. ...BKN020CB...).

2.6.13.2 Cloud height ($h_Sh_Sh_S$)

The code "$h_Sh_Sh_S$" represents the height of the base of the cloud layers, or the vertical visibility in a surface based layer in hundreds of feet above the ground. Cloud height ($h_Sh_Sh_S$) **shall** be forecast according to the following intervals:

1) 100-foot increments from the surface to 1,500 feet
2) 500-foot increments from 1,500 feet to 3,000 feet
3) 1,000-foot increments above 3,000 feet

2.6.13.3 Vertical visibility group ($VVh_Sh_Sh_S$)

When the sky is expected to be obscured, the group "$VVh_sh_sh_s$" **shall** be used in lieu of $N_SN_SN_Sh_Sh_Sh_S$. In this case, VV is the indicator for vertical visibility and $h_sh_sh_s$ is the value of the vertical visibility in units of 100 feet, e.g. VV005, meaning vertical visibility is five hundred feet or obscured ceiling at five hundred feet above ground level (AGL).

2.6.13.4 Alternative term SKC

The term sky clear "SKC" **shall** be used in Canada to forecast the absence of cloud or obscuration at the beginning of any self-contained part period. The reason for this practice is to avoid giving the impression that the group was inadvertently left out. In addition, the term SKC **shall** be used to replace the cloud or vertical visibility group after a change of the form TEMPO/BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ to indicate that the cloud or the obscuration is no longer expected.

2.6.14 Probability group (PROBC_2C_2 $Y_bY_bG_bG_b/Y_eY_eG_eG_e$)

In order to indicate the probability of occurrence of an alternative value(s) of a forecast condition, the group PROBC_2C_2 $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ will be stated immediately before the alternative value(s).

The code "C_2C_2" represents the numerical probability, in percent, of the alternative value of the weather condition. There is no space between PROB and C_2C_2. Only the values 30 and 40 **shall** be allowed to indicate the probability 30% and 40% respectively.

A probability of less than 30% of actual values deviating from those forecast is not considered to justify the use of the group PROBC_2C_2. When the probability of an alternative value is 50% or more, this **shall** be indicated by the use of BECMG, TEMPO, or FM as appropriate.

The probability group **shall** be used to forecast weather phenomena that may adversely affect aircraft operations. These include the following:

- thunderstorms and associated phenomena
- freezing precipitation, ice pellets, and snow grains
- low level wind shear (within 1500 feet AGL)
- ceiling and visibility values important to aircraft operations (e.g. thresholds such as alternate and lowest approach limits)

Only one PROBC_2C_2 group is allowed per self-contained part period. The probability group PROBC_2C_2 **shall not** be used as a direct modifier of BECMG or TEMPO $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ (e.g. …PROB40 TEMPO 0915/0918 … or …PROB30 BECMG 0915/0916 …is not allowed).

The combination FM (condition A) PROB (condition B) BECMG (condition C) is allowed, provided that the time period of the PROB group ends on or before the time the BECMG group begins, e.g. (condition A) PROB40 0918/0922 (condition B) BECMG 0922/0923 (condition C). The combination FM (condition A) PROB (condition B) TEMPO (condition C) is not allowed.

The time period of the PROB group cannot cross two self-contained part periods, i.e., the combination … FM271900 (condition A) PROB 2719/2723 (condition B) FM272200Z (condition C)… is not allowed.

An exception to this rule, however, is allowed when hours and fraction of one-hour are used in the FM group. For example, the combination ….(condition A) PROB 2718/2720 (condition B) FM271930 (condition C) … is allowed to indicate that the fluctuation in the weather condition stated in the PROB group will last until the beginning of the next self-contained part period, in this case, 271930Z.

Similarly, the combination … FM271930 (condition A) PROB 2719/2723 (condition B) … is allowed to indicate that the fluctuation in the weather condition stated in the PROB group is expected to start at the beginning of the self-contained part period, in this case, 271930Z.

Note: The reason for the above exceptions is that in a PROB group only whole hours are allowed to identify the period during which the possibility of some weather event may occur. In both the above cases, the overlap **shall** be less than one hour. This practice will give forecasters greater flexibility in the use of PROB in conjunction with an FM group not starting on a whole hour.

In any of the above and following examples, the ending of a group is to be understood as one minute prior to the time stated. For example, (condition A) PROB30 2718/2721 (condition B) BECMG 2723/2724 (condition C) is to be understood as a 30% probability of condition B existing from 271800Z to 272059Z and a permanent change from condition A to condition C between 272300Z and 272359Z.

2.6.15 Transitory change group TEMPO $Y_bY_bG_bG_b/Y_eY_eG_eG_e$

The transitory change group "TEMPO $Y_bY_bG_bG_b/Y_eY_eG_eG_e$" **shall** be used when a temporary fluctuation in some or all of the elements forecast is expected to occur during the period $Y_bY_bG_bG_b$ to $Y_eY_eG_eG_e$. This group **shall** be used only when the modified forecast condition is expected, in each instance, to last less than one hour and, if expected to recur, will not cover more than half of the forecast period during which the modified condition is expected to occur, i.e. the period indicated by $Y_bY_bG_bG_b/Y_eY_eG_eG_e$. When the modified forecast condition is expected to last more than one hour, a new change group of the form FM or BECMG **shall** be used. This transitory group **shall** be followed by a description of only those elements for which a change is forecast to occur. In other words, when an element is not indicated after TEMPO $Y_bY_bG_bG_b/Y_eY_eG_eG_e$, it **shall** be considered to be the same as it was prior to $Y_bY_bG_bG_b$.

Example: ...FM271100 VRB03KT 3SM -RA BR OVC020 TEMPO 2712/2715 1SM -RA BR FM271500

In the above example, the cloud group OVC020 is not repeated after TEMPO because it is forecast to remain unchanged. On the other hand, the weather group -RA BR is repeated after TEMPO because a significant change in the visibility is forecast.

The time period "$Y_bY_bG_bG_b/Y_eY_eG_eG_e$" **shall** always be stated following TEMPO, even in those cases where it spans the same time period as the self-contained part period (e.g. …FM271500 (condition A) TEMPO 2715/2720 (condition B) FM272000 …)

The time period of the TEMPO group cannot cross two self-contained part periods, e.g., the combination … FM271900 (condition A) TEMPO 2721/2801 (condition B) FM272300 (condition C)… is not allowed.

An exception to this rule, however, is allowed when hours and fraction of one-hour are used in the FM group. For example, the combination … (condition A) TEMPO 2718/2720 (condition B) FM271930 (condition C) … is allowed to indicate that the fluctuation in the weather condition stated in the TEMPO group will last until the beginning of the next self-contained part period, in this case, 271930Z.

Similarly, the combination … FM271930 (condition A) TEMPO 2719/2723 (condition B) … is allowed to indicate that the fluctuation in the weather condition stated in the TEMPO group is expected to start at the beginning of the self-contained part period, in this case, 271930Z.

Note: The reason for the above exceptions is that in a TEMPO group only whole hours are allowed to identify the period during which some weather fluctuations are expected. In both the above cases, the overlap **shall** be less than one hour. This practice will give forecasters greater flexibility in the use of TEMPO in conjunction with a FM group not starting on a whole hour.

The combination FM (condition A) TEMPO (condition B) PROB (condition C) is allowed, provided that the time period specified in the PROB group is the same as or a subset of the time period specified in the TEMPO group. For example: FM (condition A) TEMPO 2719/2723 (condition B) PROB30 2720/2723 (condition C)…, or the PROB group begins at the same time or after the TEMPO group ends. For example: FM (condition A) TEMPO 2715/2720 (condition B) PROB30 2720/2723 (condition C). Only one such combination per self-contained part period is allowed.

The combination FM (condition A) TEMPO (condition B) BECMG (condition C) is allowed, provided that the weather condition specified in the BECMG group is forecast to occur after the time period specified in the TEMPO group (e.g. [condition A] TEMPO 2718/2722 [condition B] BECMG 2723/2801 [condition C]).

An exception to the above rule is allowed when a change in wind speed and/or direction is the only change expected in the BECMG. In such cases, a BECMG group embedded in a larger TEMPO group can be used. For example, the combination: FM (condition A) TEMPO 2714/2721 (condition B) BECMG 2719/2720 30015KT …is allowed. Only one combination of TEMPO and BECMG is allowed per self-contained part period. In the TEMPO/BECMG combination the TEMPO group **shall** come first. In other words, the combination … (condition B) BECMG (condition C) TEMPO (condition D) is not allowed.

Normally, only one TEMPO group should be used per self-contained part period. A maximum of two TEMPO groups may be used when the following conditions are met: neither of them are used in combination with a BECMG or PROB group, only one weather element is changing in each TEMPO and that their timings do not overlap. For example: FM271000 (condition A) TEMPO 2714/2717 OVC010 TEMPO 2717/2720 4SM -SHSN. In this case the visibility and the weather are considered only one element, because when the visibility changes, the weather responsible for the change **shall** also be stated even if it remained the same.

The triple combination of the groups TEMPO … PROB … BECMG is not allowed. For example, FM (condition A) TEMPO 2715/2720 (condition B) PROB30 2717/2720 (condition C) BECMG 2721/2722 (condition C) is not allowed.

2.6.16 Change groups FMYYGGgg and BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$

These groups **shall** be used when, during the entire period of the forecast ($Y_1Y_1G_1G_1$ to $Y_2Y_2G_2G_2$), a permanent change in some or all of the elements forecast is expected to occur at an intermediate time YYGGgg or during the period $Y_bY_bG_bG_b$ to $Y_eY_eG_eG_e$.

2.6.16.1 FMYYGGgg

The period of validity of a TAF may be divided into two or more self-contained part periods. Such divisions, when required, **shall** be done with the use of the group "FMYYGGgg" where:

- FM is the abbreviation for "from"; and
- YYGGgg is the date, hour and minutes in UTC at which the permanent change is expected.

The group FMYYGGgg is used to indicate a permanent change (typically over a period of one hour or less) of meteorological conditions expected to occur at time GGggZ on day YY.

Most often, the "gg" will take the form "00", indicating a whole hour. However, the timing of changes should be as detailed as the supporting data and forecaster knowledge will allow. If a forecaster can determine a change and/or events to a finer resolution, particularly in the early hours of the forecast period, then the use of the "gg" to indicate timing to some fraction of an hour is encouraged (e.g. FM271830, FM081215).

When the group FMYYGGgg is used, all forecast conditions given before this group are superseded by the conditions indicated after the group. In other words, a complete forecast will follow and all weather elements **shall** be indicated.

When hours and minutes are used to begin a new self-contained part period (e.g. FM261930), any group of the form PROB/TEMPO used after the FM group and intended to start at the same time as the FM group, **shall** be indicated as starting on the whole hour before the fraction of the hour stated in the FM group. For example, FM081230 (condition A) TEMPO 0812/0816 (condition B)…meaning that the group TEMPO starts at 1230Z rather than at 1200Z. Similarly, a group of the form PROB/TEMPO used before such a FM group and intended to end with the beginning of the new FM group **shall** be indicated as ending on the whole hour after the fraction of the hour stated in the new FM group. For example: ... (condition A) TEMPO 0818/0820 (condition B) FM081930 (condition C) … meaning that the group TEMPO ends at 1930Z rather than 2000Z. The same reasoning applies to the PROB group.

For the sake of clarity, each FM group will start a new forecast line with the proper indentation. This is done automatically by the national bulletin preparation software.

Note: Forecasters are encouraged to subdivide the valid period of the TAF using FMYYGGgg as often as possible rather than using the forecast change indicator BECMG. The rationale behind this is that a FMYYGGgg group is a more complete group, therefore more effective and useful to users.

2.6.16.2 BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$

The change group "BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$" **shall** indicate a gradual evolution of meteorological conditions between time $Y_bY_bG_bG_b$ and time $Y_eY_eG_eG_e$. The duration of the period from $Y_bY_bG_bG_b$ to $Y_eY_eG_eG_e$ should normally not exceed two hours and **shall** never exceed four (e.g. …BECMG 1721/1722 … or … BECMG 1722/1800…)

This permanent change group **shall** be followed by a description of only those weather elements for which a change is forecast to occur. In other words, if a weather element is not indicated after BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$, it **shall** be considered to be the same as it was prior to $Y_bY_bG_bG_b$.

Note: The forecaster **shall** exercise judgment when deciding to use the change group FMYYGGgg or BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$. As a rule, to keep the forecast clear and unambiguous, using the change group BECMG $Y_bY_bG_bG_b/Y_eY_eG_eG_e$ should be kept at a minimum and confined to those cases where only one or at most two weather elements are expected to change. In those cases where more than two weather elements are expected to change, the permanent change group FMYYGGgg should be used to start a new self-contained part period.

Normally, only one BECMG group should be used in the same self-contained part period. A maximum of two BECMG groups are allowed in a self-contained part period when only one weather element at a time is changing.

Example: ...(condition A) BECMG 1713/1715 1SM BR BECMG 1715/1717 4SM BR … or (condition A) BECMG 1714/1715 34015KT BECMG 1717/1718 4SM -SHSN ...

In this case, the visibility and the weather are considered only one element; when the visibility changes, the weather responsible for the change **shall** always be stated even if it remained the same.

The combinations of BECMG/PROB and BECMG/TEMPO are not allowed. For example, FM (condition A) BECMG (condition (B) PROB/TEMPO (condition C) are not allowed. Refer to 2.6.12 and 2.6.13 for the use of BECMG when it follows a PROB or TEMPO group respectively.

2.6.17 Remarks (RMK)

Remarks should be included at the end of a TAF preceded by the designator "RMK".

2.6.17.1 Valid TAF remarks

The following remarks are authorized when a regularly scheduled TAF is issued or when amending an existing TAF as appropriate:

1) FCST BASED ON AUTO OBS
2) When one or more sensors are non-representative of the current weather but there are other means of obtaining the pertinent information:
   - AUTO OBS REP NON-REPRESENTATIVE WIND
   - AUTO OBS REP NON-REPRESENTATIVE VIS
   - AUTO OBS REP NON-REPRESENTATIVE CLD
   - AUTO OBS REP NON-REPRESENTATIVE T
   - AUTO OBS REP NON-REPRESENTATIVE DP
   - AUTO OBS REP NON-REPRESENTATIVE PCPN
   - AUTO OBS NON-REPRESENTATIVE OF CRNT WX
3) When one or more sensors are inoperative but there are other means of obtaining the pertinent weather information, the forecaster can maintain the TAF in effect by adding the proper remark:
   - WIND SENSOR INOP
   - VIS SENSOR INOP
   - CLD SENSOR INOP
   - PCPN SENSOR INOP
   - T SENSOR INOP
   - DP SENSOR INOP
   - FCST BASED ON OBS BY OTHER SRCS
4) Remark stating the next scheduled issue of a TAF
   - NXT FCST BY YYGGggZ, where YY is the date, GG is the UTC hour and gg is '00' minutes.

Note: Remarks listed in 2) and 3) above should be included when forecasters are confident of the weather condition at the aerodrome and that it is safe not to cancel the TAF. The last remark from list 3) can be used when two or more sensors are not reporting or reporting non-representative observations. When two or more TAF elements are not being reported or reported with non-representative data, the forecaster should err on the side of caution and cancel the TAF.

If, for any reasons, forecasters are not confident of the actual weather condition at the aerodrome and/or consider that the one missing/non-representative element is critical to issuing the TAF, they should cancel it using the remarks stated in 2.6.17.2 section 2) and 3).

2.6.17.2 Cancelled or nil TAF remarks

The following remarks are authorized as appropriate when a cancelled or a nil TAF is issued:

1) Remarks stating lack of observations:
   - NO OBS
   - INSUFFICIENT OBS (for nil TAFs only)
2) Remarks stating that the observations reported cannot be used to issue a valid TAF:
   - WIND SENSOR MALFUNCTION
   - VIS SENSOR MALFUNCTION
   - CLD SENSOR MALFUNCTION
   - T SENSOR MALFUNCTION
   - PCPN SENSOR MALFUNCTION
   - SENSORS MALFUNCTION
3) Remarks stating which missing observation element is required to issue a valid TAF:
   - WIND SENSOR INOP
   - VIS SENSOR INOP
   - CLD SENSOR INOP
   - PCPN SENSOR INOP
   - T SENSOR INOP
   - SENSORS INOP
4) Remarks stating other reasons for the lack of TAF:
   - WX CNTR CONTINGENCY
   - END OF FLY PROGRAM

2.6.17.3 Aerodrome advisory remarks

The following remarks are authorized as appropriate when an aerodrome advisory is issued:

- ADVISORY OFFSITE
- ADVISORY OBS INCOMPLETE
- ADVISORY NO SPECI

2.7 Aerodrome advisories

Aerodrome advisories may be issued in place of aerodrome forecasts, for the reasons outlined in the following sections. Their advisory status will be indicated with a remark in the remark section.

2.7.1 Offsite (OFFSITE)

To be used when the forecast is based on observations that are not always considered to be representative of the actual weather conditions at the airport. In normal situations, an observation **shall** be considered representative of the weather conditions at the aerodrome if it is taken within 1.6 NM (3 km) of the geometric centre of the runway complex.

In cases where the 1.6 NM (3 km) criteria does not apply because of local characteristics, the representativeness of an observation **shall** be determined and approved by Transport Canada for civilian aerodromes, or by the Director of Meteorology and Oceanography for military aerodromes.

The words "ADVISORY OFFSITE" **shall** appear in the remark section after the abbreviation "RMK" (e.g. TAF … RMK ADVISORY OFFSITE. NXT FCST BY 221800Z=).

2.7.2 Observation incomplete (OBS INCOMPLETE)

The term "OBS INCOMPLETE" is to be used when the forecast is based on observations with missing or incomplete data on a regular basis (e.g. MSL pressure not reported).

The words "ADVISORY OBS INCOMPLETE" **shall** appear in the remark section after the abbreviation "RMK" (e.g. TAF … RMK ADVISORY OBS INCOMPLETE. NXT FCST BY 221800Z=).

2.7.3 No specials (NO SPECI)

The term "NO SPECI" is to be used when the forecast is based on observations from a station with a limited observing program that does not issue special weather observations.

The words "ADVISORY NO SPECI" **shall** appear in the remark section after the abbreviation "RMK" (e.g. TAF … RMK ADVISORY NO SPECI. T SENSOR INOP. NXT FCST BY 221800Z=).

2.8 Updated forecasts

An updated forecast is a forecast issued on a scheduled basis which replaces the previous TAF without extending its period of validity. Updated forecasts are issued at the request of NAV CANADA usually for major, high traffic aerodromes. Normally, updated TAFs are issued for aerodromes whose regular TAFs have a period of validity of 24 or 30 hours; however, this is not a necessary condition. Updated TAFs, since they are more recent forecasts, are intended to provide more accurate information than their predecessors, especially in the short range, and will normally be scheduled for issuance three hours following each regular TAF issue. In some cases NAV CANADA may decide that at certain times of the day, due to low traffic volume, the issuance of updated TAFs is not required (e.g. overnight).

An updated TAF does not extend the period of validity of the TAF that it supersedes. For example, if a 24 hour TAF covering a period from 041200Z to 051200Z is updated at 041440Z, the updated TAF **shall** indicate a period of validity as 0415/0512 (i.e. 041500-051200Z). As with other TAFs, an updated TAF is valid from the time it is issued until it is amended or until it is superseded by the next issue of the regular TAF for the same aerodrome.

In preparing both regular and updated TAFs, forecasters should attempt to provide as much precision as supporting data will allow to the first six hours of its period of validity. In particular, forecasters are encouraged to time the start of new part-periods as precisely as possible (i.e. using hours and minutes as described in 2.6.16.1).

2.9 TAF amendments

A TAF **shall** be amended when the forecast conditions are no longer representative of the actual or expected conditions according to criteria listed in 2.9.5.

TAF amendment response time and performance thresholds **shall** be agreed upon between the meteorological service provider and its client. The meteorological service provider **shall** demonstrate performance against the established thresholds. TAF performance relative to these targets is to be reviewed, deviations investigated and continuous improvement implemented.

The time in the telecommunication header of an amended TAF **shall** indicate the whole hour (UTC) that precedes the time of entry to the collection circuit of the last regularly scheduled bulletin containing that TAF (refer to 2.5.1).

The date/time group YYGGggZ in the bulletin, however, **shall** indicate the date and time of origin of the amended TAF. For example, a first amendment of a regular TAF for CYYZ issued at 1845Z on the 21st day of the month **shall** be issued as:

TAF AMD CYYZ 211845Z 2118/2300...

An amended forecast covers the remaining period of the original forecast and is identified by AA(X) in the telecommunication header (refer to 2.5.1) and by the prefix TAF AMD in place of TAF on the following line.

2.9.1 Responsibility for issuing amended TAFs

A forecaster must use initiative, discretion, and good judgment in determining when amendments should be issued. It must be emphasized that both the responsibility and the authority for issuing amendments rest with the forecaster and the supervising meteorologist.

TAFs should be amended whenever they become, in the forecaster's judgment, unrepresentative of existing or expected weather conditions. Furthermore, forecasters should strive to issue amended TAFs proactively rather than reactively.

2.9.2 Amendments based on PROB C_2C_2 $Y_bY_bG_bG_b/Y_eY_eG_eG_e$

The group "PROBC_2C_2 $Y_bY_bG_bG_b/Y_eY_eG_eG_e$" may be used to state the probability of occurrence of a weather phenomenon significant to aviation. If low ceilings and/or visibility conditions introduced by this probability group are observed and are considered to be a short lived phenomenon that will last for less than one-half hour and not expected to recur, it is not necessary to amend the TAF. In other cases (i.e. TS, GR, FC, +FC, FZRA, FZDZ, PL, SG and L LVL WS) or when the phenomenon is expected to last for a longer period or to recur, an amendment is always required regardless of their duration.

2.9.3 Amendments based on human/machine mix

There is no requirement to amend or update a TAF solely due to a change in the type of observations.

2.9.4 Amendments to aerodrome advisories

Aerodrome advisories are to be amended according to the amendment criteria set out in 2.9.5.

2.9.5 Amendment criteria

An amendment **shall** be issued when the actual or expected weather condition is in a different category than the forecast condition.

A weather category is defined by the lower of either the ceiling or the visibility.

2.9.5.1 Cloud and visibility

The principal weather categories are delineated by the following thresholds:

1) Ceiling 2,500 feet and visibility six miles (generally representative of non-alternate IFR threshold)
2) Ceiling 1,000 feet and visibility three miles (threshold between VFR and IFR)
3) Alternate limits for the aerodrome
4) IFR approach limits for the aerodrome
5) Additional limits as determined by other responsible parties

Limits for categories three, four and five are provided by NAV CANADA, DND or other responsible parties in line with TC regulation. These limits are published in Appendix A of this manual which gets updated in MANAIR Circulars several times a year between MANAIR publications.

For amendment purposes, each of the above thresholds are part of and included in the category immediately above the threshold. This means that for deteriorating conditions, a change in category occurs when either the ceiling or the visibility crosses the threshold value leading to the next lower category. On the other hand, for improving conditions, both ceiling and visibility must cross the threshold values leading to the next higher category.

Note: A TAF does not need to be amended for changes in ceiling or visibility when both the forecast and observed values are less than the lowest published landing minima for the aerodrome. This rule is valid provided that the lowest approach limits for the aerodrome are not higher than the IFR threshold (1000 feet/3 statute miles). In such cases, an amendment is required when the weather condition crosses the IFR threshold. For example, if the lowest approach limit of an aerodrome is 1500/4 and the TAF calls for 1200/3, an amendment is needed if the weather condition lowers to below 1000/3.

2.9.5.2 Weather and visibility

1) Thunderstorms, hail, tornado, funnel clouds, and waterspouts: An amendment **shall** be issued when thunderstorms, hail, tornado, funnel clouds or waterspouts are observed or expected to occur and were not forecast or when they were forecast and subsequently no longer expected to occur. These rules apply with no exception, regardless of the value of the visibility and the duration of the phenomenon.

2) Freezing precipitation, freezing fog, ice pellets, and snow grains: An amendment **shall** be issued when freezing precipitation, freezing fog, ice pellets, or snow grains at the surface are observed or expected to occur and are not forecast or when they are forecast and subsequently no longer expected to occur. These rules apply with no exception, regardless of the value of the visibility and the duration of the phenomenon.

3) Rain, snow, snow pellets (or small hail), ice crystals and drizzle: An amendment **shall** be issued when rain, snow, snow pellets, ice crystals or drizzle, lowering visibility to less than six statute miles, is observed or is expected to occur and is not forecast. Similarly, an amendment **shall** also be issued when the same type of precipitation, lowering visibility to less than six statute miles, is forecast and subsequently is no longer expected to occur. When the visibility remains six statute miles or greater before and after the onset of precipitation, there is no need to amend a TAF for the onset or cessation of rain, snow, snow pellets, ice crystals or drizzle.

4) Precipitation state change: When precipitation, listed in 3 above, is observed and the state of the precipitation (liquid or solid) is not the same as forecast, then an amended forecast is required, provided that the visibility due to precipitation is reduced to less than six statute miles. Similarly, when precipitation of the forecast state is not occurring and is no longer expected to occur, then an amended forecast is required provided that the visibility was originally forecast to be less than six statute miles.

5) Obscurations and blowing snow: When a change in visibility due to an obscuring phenomenon or blowing snow is observed or is expected to occur and is not forecast, a TAF amendment is required only if the visibility lowers to less than six statute miles. Similarly, when such a change is forecast and subsequently is no longer expected to occur, an amended TAF is required provided that the visibility was originally forecast to be less than six statute miles. The only exception is volcanic ash which requires an amendment, when not forecast, regardless of the value of the visibility. All other obscuring phenomenon (BR, FG, FU, DU, BLDU, SA, BLSA, HZ) as well as BLSN are considered equivalent given the same visibility.

6) Sand storms, dust storms and squalls: An amendment **shall** be issued when these weather phenomena are observed or expected to occur and were not forecast or when they were forecast and subsequently no longer expected to occur. These rules apply with no exception, regardless of the value of the visibility and the duration of the phenomenon.

2.9.5.3 Winds

An amendment **shall** be issued when:

1) Speed
   - the observed speed is double or more, or half or less of the forecast value and either the observed or forecast value is greater than 15 KT; or
   - the difference between the observed and forecast speed is 20 KT or more.
2) Direction
   - the observed direction differs by at least 45 degrees from the forecast value for all observed speeds greater than 15 KT.

2.9.5.4 Low level wind shear

An amendment **shall** be issued when a strong wind shear (as defined in 2.6.7) was not forecast but subsequently occurs or is expected to occur or when it was forecast but subsequently is no longer expected to occur. In addition, if the forecast wind speed, direction, or height of the wind shear layer is not representative of the actual condition, the forecaster can amend the TAF at their discretion.

2.10 Cancellation of TAFs

When a TAF must be cancelled, it **shall** be done by the issuance of an amended TAF. The format and reasons for cancelling TAFs are stated in 2.10.1 and 2.10.2. The reason for the cancellation **shall** be included in the remark section of the TAF. The list of allowable remarks is stated in 2.6.17.

Once a TAF for an aerodrome has been cancelled due to missing/insufficient observations or missing/incorrect elements, the TAF service **shall** not be reinstated until one hourly observation is received in VFR conditions or two consecutive hourly observations are received in below VFR conditions. In both cases, the forecast **shall** be issued within 20 minutes after the appropriate observation is received.

However, until the conditions previously stated have been met and problems with the missing/insufficient observations have been resolved, any following regular scheduled issue of that TAF **shall** be issued as a nil TAF.

2.10.1 Cancellation for missing observations

In the event that scheduled hourly observations are not received, the forecaster **shall** determine the reason for the missing observations.

If the observations were not received because of a telecommunication problem, the forecaster **shall** make every reasonable effort to obtain them, whenever possible, by alternative means. If two consecutive hourly observations from an aerodrome cannot be obtained, the TAF for that aerodrome **shall** be cancelled.

1) For an existing TAF:
   When an existing TAF must be cancelled because of a lack of weather observations, an amended TAF to cancel the existing one **shall** be issued. As opposed to the format of a regular amendment, the validity period of a cancelled TAF covers the same period as the last issued TAF for that aerodrome. This indicates that the previously issued TAF is no longer valid. For example:
   TAF AMD CYQG 052035Z 0518/0618 CNL
   RMK NO OBS. NXT FCST BY 060000Z=

2) For the first TAF of the day at an aerodrome with a partial program:
   When weather observations are not available or are insufficient for issuing the first TAF of the day at an aerodrome operating under a partial program (less than 24 hours per day), the first regular TAF of the day **shall** be issued as a nil TAF according to the two following formats as appropriate:
   TAF CYPQ 101140Z NIL
   RMK NO OBS. NXT FCST BY 101800Z=
   or
   TAF CYPQ 101140Z NIL
   RMK INSUFFICIENT OBS. NXT FCST BY 101800Z=

2.10.2 Cancellation due to unreliable or missing AWOS observation element(s)

A forecaster may cancel a TAF for an aerodrome equipped with a stand-alone AWOS site when:

1) The observation of any critical element is missing or believed to be incorrect or affected by a mechanical malfunction for two hours; and
2) All attempts have failed to determine a reasonable inferred value(s) based on sound meteorological knowledge and techniques.

As stated in 2.3.1, no single element is necessarily critical. After analyzing available data from other sources (e.g. satellite imagery, radar pictures), if, in the forecaster's judgment, missing one element (other than dew point temperature and MSL pressure) will have a negative impact on the quality of the aerodrome forecast, the forecast should not be maintained. In the above circumstances, the TAF **shall** contain a brief explanation for its cancellation in the remark section according to the following:

a) In the event the forecast is cancelled due to missing element(s) and forecaster's inability to infer a reasonable value, the TAF **shall** include one of the following statements:

- CLD SENSOR INOP
- VIS SENSOR INOP
- PCPN SENSOR INOP
- T SENSOR INOP
- WIND SENSOR INOP
- SENSORS INOP

Example:

TAF AMD CYTL 201910Z 2018/2102 CNL
RMK CLD SENSOR INOP. NXT FCST BY 202000Z=

Note: The last statement in the previous list **shall** be used when more than one of the sensors is inoperative.

b) In the event the forecast is cancelled due to sensor malfunction or incorrect observation element(s) and forecaster inability to infer a reasonable value, the TAF **shall** include one of the following statements:

- CLD SENSOR MALFUNCTION
- VIS SENSOR MALFUNCTION
- PCPN SENSOR MALFUNCTION
- T SENSOR MALFUNCTION
- WIND SENSOR MALFUNCTION
- SENSORS MALFUNCTION

Example:

TAF AMD CYTL 281615Z 2814/2902 CNL
RMK VIS SENSOR MALFUNCTION. NXT FCST BY 282000Z=

Note: The last phrase in the previous list **shall** be used when more than one of the sensors are malfunctioning or more than one of the elements are deemed to be incorrect.

If a forecaster is capable of inferring a reasonable value for the current weather, and this is in agreement with the current TAF but differs from the AWOS observation, the forecaster does not have to cancel the TAF. In such a situation, the forecaster **shall** amend the TAF to include an explanatory note in the remark section justifying the difference between the AWOS observation and the TAF as indicated in 2.6.17.1.

2.11 Corrections

When typographical errors and/or forecast text omissions are made in the original TAF and are such that the information content of the TAF is unclear or subject to misinterpretation, the TAF **shall** be corrected by sending an amendment. Corrections to Canadian TAFs are handled as regular amendments.

As such, the rules pertaining to amendments outlined in 2.9 and to the telecommunication header for amendments outlined in 2.5.1 apply.

2.12 Examples of TAFS

Example (1):

FTCN24 CWAO 101300
TAF CYTL 101340Z 1014/1102 24010KT P6SM BKN030 TEMPO 1018/1020
5SM -SHRA BR
FM102000 24005KT P6SM SKC
RMK FCST BASED ON AUTO OBS. NXT FCST BY 102000Z=

Example (2):

FTCN24 CWAO 101300 AAA
TAF AMD CYTL 101530Z 1014/1102 CNL
RMK VIS SENSOR MALFUNCTION. NXT FCST BY 102000Z=

Example (3):

FTCN34 CWAO 011700
TAF CYWG 011740Z 0118/0218 28015KT P6SM -SNRA SCT015 OVC040 TEMPO
0118/0124 2SM -SNRA BR OVC015
FM020000 28015KT P6SM BKN030 BKN250 TEMPO 0200/0203 P6SM -SHRA
FM021000 30015KT P6SM SKC
RMK NXT FCST BY 020000Z=

Note: If an updated TAF were scheduled for CYWG, then the remark in the above example would say: NXT FCST BY 012100Z.

Example (4):

FTCN35 CWAO 021700
TAF CYYZ 021740Z 0218/0324 30015G25KT P6SM SCT015 OVC025 PROB30
0218/0223 3SM TSRA BKN015CB
FM022300 30010G20KT P6SM SKC
FM031000 VRB03KT 4SM BR SKC TEMPO 0310/0313 3/4SM BR
BECMG 0314/0316 P6SM NSW
RMK NXT FCST BY 022100Z=

Example (5):

FTCN39 CWAO 021100
TAF CYYR 021140Z 0212/0312 VRB03KT 2SM BR BKN025
FM021230 27015KT P6SM SKC
RMK NXT FCST BY 021800Z=

Example (6):

FTCN38 CWAO 020500
TAF CYQX 020540Z 0206/0306 13005KT 1SM -DZ BR OVC005 TEMPO 0206/0210
1/4SM DZ FG VV002
FM021300 31005KT 4SM BR SKC TEMPO 0302/0306 3/4SM BR SCT005
RMK NXT FCST BY 021200Z=

Example (7):

FTCN32 CWAO 151700 AAC
TAF AMD CYEG 151912Z 1519/1618 27015G35KT 3SM -TSRA SCT008 OVC015CB
TEMPO 1520/1523 VRB25G45KT 1SM TSRAGS OVC008CB PROB30
1520/1523 1/2SM +TSRAGR
FM160000 33015G25KT P6SM SKC
BECMG 1609/1610 33005KT
RMK NXT FCST BY 152100Z=

Example (8):

FTCN36 CWAO 231400 AAA
TAF AMD CYUL 231515Z 2315/2412 30015KT 2SM -SHSN OVC010
FM231615 27015KT P6SM BKN030 OVC060 TEMPO 2321/2405 4SM -SHSN
FM240500 27015KT P6SM SKC
BECMG 2409/2411 00000KT
RMK NXT FCST BY 231800Z=

Note: Example (8) represents the first amendment since the last regular forecast update.

Example (9):

FTCN36 CWAO 051100
TAF CYFB 051140Z 0512/0612 04025G45KT WS015/12060KT P6SM SKC
FM051330 36010G20KT P6SM SCT030 TEMPO 0518/0522 3SM -SHSN BKN030
FM060000 36005KT P6SM SKC
RMK NXT FCST BY 051800Z=

Example (10):

FTCN36 CWAO 090500
TAF CYOW 090540Z 0906/1006 04015KT 1SM -FZRA -SN OVC010
FM090730 27015G25KT P6SM SCT010 OVC025 TEMPO 0913/1005 P6SM -SHRA
RMK NXT FCST BY 090900Z=

Example (11):

FTCN39 CWAO 171100 AAA
TAF AMD CYZX 171152Z 1712/1812 00000KT 1SM BR SKC
FM171315 VRB03KT 3SM BR SKC BECMG 1713/1715 P6SM NSW SCT020
FM180600 VRB03KT 2SM BR SKC TEMPO 1809/1811 1/4SM FG VV001
RMK NXT FCST BY 171800Z=

Note: Example (11) represents the first amendment issued since the last regular issue of the forecast. “AMD” is used in the body of the forecast.

Example (12):

FTCN38 CWAO 151300
TAF CYEU 151340Z 1514/1602 32010KT P6SM SKC
FM151720 32015G25KT P6SM FEW025 TEMPO 1517/1521 BKN025
RMK ADVISORY OFFSITE. NXT FCST BY 152000Z=

Example (13):

FTCN35 CWAO 181700
TAF CYYZ 181740Z 1818/1924 24010KT 6SM HZ BKN250
FM181930 32015G25KT P6SM SKC
BECMG 1822/1823 30005KT BKN025
RMK NXT FCST BY 182100Z=

Example (14):

FTCN35 CWAO 101100 AAB
TAF AMD CYHM 101215Z 1012/1112 20010KT 6SM HZ BKN250
FM101700 22015KT 6SM -SN BKN030 TEMPO 1017/1020 5SM -FZRA -SN
FM102100 23005KT P6SM SKC
RMK NXT FCST BY 101800Z=

Example (15):

FTCN31 CWAO 192000
TAF CYVR 192040Z 1921/2024 26015KT 3SM BR BKN020 TEMPO 1921/1923 1SM -SHRA BR
FM200300 24005KT 3SM BR SCT020
FM200700 VRB03KT 1 1/4SM BR SCT004 TEMPO 2009/2011 1/2SM FG BKN004
BECMG 2013/2015 5SM BR
FM201600 24010KT P6SM SKC
RMK NXT FCST BY 200000Z=

Note: The TAF in example (15) is an updated forecast.

Example (16):

FTCN35 CWAO 151700
TAF CYVV 151740Z 1518/1603 24045G70KT P6SM SQ BKN030
FM151930 32020G40KT P6SM BKN030 TEMPO 1520/1523 P6SM -SHRA
RMK NXT FCST BY 160000Z=

Example (17):

FTCN35 CWAO 171100
TAF CYQG 171140Z 1712/1812 26015KT 6SM -FZRA BR SCT010CB OVC020
TEMPO 1712/1715 4SM TS -FZRA BR
FM171500 34010G20KT P6SM OVC015 TEMPO 1717/1722 4SM -SHSN OVC025
FM172300 34005KT P6SM SKC
RMK NXT FCST BY 171800Z=

Example (18):

FTCN31 CWAO 202300
TAF CYAZ 202340Z 2100/2103 26010KT 5SM HZ FEW030
BECMG 2001/2002 P6SM NSW SKC
RMK NXT FCST WILL BE ISSUED AT 211445Z=

Example (19):

FTCN35 CWAO 201300
TAF CYPQ 201340Z NIL
RMK INSUFFICIENT OBS. NXT FCST BY 202000Z=

Chapter 3 Forecasts in digital form of the wind and temperature aloft

3.1 Purpose

Forecasts in digital form of the winds and the temperatures aloft (FBCN) are prepared to meet aeronautical requirements for flight planning and to complete documentation for flights within Canada and between Canada and the United States, Greenland, Mexico and the Caribbean. The FB wind and temperature forecasts are a replacement of the FD forecasts. However, FD forecasts will remain available for a transitional period. The differences between the FD and FB forecasts include four issues per day instead of two; changes to the period of use and format changes to the headers.

3.2 Content and issuing offices

Objective forecasts of upper wind and temperature are issued by the Canadian Centre for Meteorological and Environmental Prediction (CCMEP) for the locations listed in Appendix B.

The CCMEP issues the FBCN31, FBCN33 and FBCN35 CWAO messages for the 3,000-foot; 6,000-foot; 9,000-foot; 12,000-foot and 18,000-foot levels above sea level (ASL). The 3,000-foot level is omitted when the terrain elevation is greater than 1,500 feet.

Note that the FB forecasts are based on a Numerical Weather Prediction (NWP) model. Because NWP models cannot fully resolve all terrain features, there can be, in areas of highly variable terrain (e.g. mountainous areas) instances of significant difference between actual and model station elevation. There are cases where the actual station elevation lies below 1,500 feet, but the model elevation for that station lies close to or above 3,000 feet. In such cases, the 3,000-foot forecasts are omitted. These cases are clearly noted in Appendix B.

Temperatures are never forecast for the 3,000-foot level.

The U.S. National Weather Service (NWS) issues objective forecasts of upper winds and temperatures for the same locations as the CCMEP, but for the 24,000-foot, 30,000-foot, 34,000-foot, 39,000-foot, 45,000-foot and 53,000-foot levels. These forecasts are transmitted under the headers FBCN31, FBCN33 and FBCN35 KWNO.

3.3 Issue times and periods of use

Wind and temperature forecasts in digital form (FB) are prepared four times daily and are based on 0000 UTC, 0600 UTC, 1200 UTC and 1800 UTC data, respectively. When FB are generated, 6, 12, 18, 24, 30 and 36-hour forecasts are created. The 6-hour, 12-hour and 24-hour forecasts become respectively the FBCN31, FBCN33 and FBCN35 messages, and are transmitted via the ECCC telecommunications network.

The 12-hour, 18-hour and 30-hour forecasts are kept as backups in case of computer problems in the subsequent forecast cycle. The 18-hour, 24-hour and 36-hour forecasts are also kept as back-ups; they are used when computer problems affect two consecutive forecast cycles.

Each of the 6-hour, 12-hour and 24-hour forecasts (or their backups when applicable), though valid for a particular time (denoted as “Valid Time”), applies to a specific period, called “Period of Use.” The following table gives the times of issue, the valid times and the periods of use of each forecast.

Table 5: Issue times and periods of use

Header	Observation time (UTC)	Approximate issue time (UTC)	Valid time (UTC)	Period of use (UTC)
FBCN31 CWAO	0000	0320	0600	0200-0900
FBCN33 CWAO	0000	0330	1200	0900-1800
FBCN35 CWAO	0000	0330	0000	1800-0600
FBCN31 CWAO	0600	0920	1200	0800-1500
FBCN33 CWAO	0600	0930	1800	1500-0000
FBCN35 CWAO	0600	0930	0600	0000-1200
FBCN31 CWAO	1200	1520	1800	1400-2100
FBCN33 CWAO	1200	1530	0000	2100-0600
FBCN35 CWAO	1200	1530	1200	0600-1800
FBCN31 CWAO	1800	2120	0000	2000-0300
FBCN33 CWAO	1800	2130	0600	0300-1200
FBCN35 CWAO	1800	2130	1800	1200-0000

Note (1): Although their headers indicate a later time, the FBCN31, FBCN33 and FBCN35 CWAO forecasts are normally available on ECCC circuits towards 0300 UTC (forecasts based on 0000 UTC data), 0900 UTC (forecasts based on 0600 UTC data), 1500 UTC (forecasts based on 1200 UTC data) and 2100 UTC (forecasts based on 1800 UTC data).

Note (2): The headers in the FBCN31, FBCN33 and FBCN35 KWNO forecast bulletins generally indicate the issue time.

3.4 Format

The symbolic form of the forecast is "ddfftt", where dd is the wind direction in tens of degrees with respect to true north, ff is the wind speed in knots, and tt is the temperature in degrees Celsius.

Wind speeds from 100 KT to199 KT are indicated by subtracting 100 from the speed and adding 50 to the direction (e.g. 240 degrees at 130 KT is coded 7430). Speeds in excess of 199 KT are coded as if they were of 199 KT (e.g. winds from 90 degrees at 210 KT are coded 5999, as would winds of 199 KT). Finally, wind speeds less than five knots are indicated by 9900.

The sign of the temperature is indicated as plus "+" or minus "-", for levels below 24,000 feet. Above 24,000 feet, the sign of the temperature is not indicated.

The CMC issues its regular FBCN bulletins in the following format:

```
FBCN31 CWAO 090320
DATA BASED ON 090000Z
VALID 090600Z FOR USE 0200-0900Z.
      3000  6000      9000      12000   18000
YVR   2118  2322+04   2435+01   2447-08  2456-18
YYF   1818  2125+03   2136+01   2129-07  2134-19
```

The NWS issues its FBCN bulletins in the format of the following example:

FBCN31 KWNO 090158
FD1CN1
DATA BASED ON 090000Z
VALID 090600Z FOR USE 0200-0900Z. TEMPS NEG ABV 24000 FT

	24000	30000	34000	39000	45000	53000
YVR	0815-28	092043	081848	051249	331449	340653
YYF	1315-27	132043	132050	121151	280750	280652

Note: the FBCN KWNO bulletins contain an AWIPS header for internal NWS use on the second line of the forecast bulletin.

When an FB is issued based on a backup forecast (refer to 3.3), the first line of the FB is modified by adding the remark "COMPUTER INOPERATIVE ON DDTTTT DATA", where DDTTTT represents the date and time of the data on which the FBCN31, FBCN33 and FBCN35 bulletins would have been based under normal circumstances (refer to table 5).

Consequently, when a bulletin is based on backup forecasts, the CCMEP indicates the situation as shown in the following example:

FBCN31 CWAO 150320
COMPUTER INOPERATIVE ON 150000Z DATA
DATA BASED ON 141200Z
VALID 150600Z FOR USE 0200-0900Z.

	3000	6000	9000	12000	18000
YVR	0608	0710-05	0419-07	0227-11	3641-18
YYF	0308	0411-07	0316-12	0225-15	0130-21

Chapter 4 Graphic Area Forecast (GFA)

4.1 Definition

A graphic area forecast (GFA) consists of six charts:

- two valid at T_0+0 hr (the beginning of the forecast period);
- two valid at T_0+6 hr (six hours into the forecast period); and
- two valid at T_0+12 hr (the end of the forecast period).

Of the two charts valid at each time, one shows the clouds and weather portion; the other shows the icing, turbulence and freezing level for the same time and area.

In addition, the clouds and weather chart of the last set also contains a worded instrument flight rules (IFR) outlook extending over the subsequent 12-hour period. For a full description of these charts, refer to 4.9 and C.2 of Appendix C.

4.2 Purpose

Ascent and descent planning information for higher performance aircraft is an important but secondary function of the GFA. The GFA is designed primarily to meet general aviation and regional air carrier requirements for pre-flight route planning in Canada. Each panel graphically describes the most probable meteorological conditions expected to occur between the surface and 24,000 feet over a given area at a specified time.

4.3 Issue and valid times

A GFA is issued to reach users approximately half an hour before the beginning of the forecast period (that is, half an hour before T_0).

A GFA is issued at 2330, 0530, 1130 and 1730 UTC, and issues are valid at 0000, 0600, 1200 and 1800 UTC respectively. Each GFA issue includes a 0, 6 and 12 hour forecast as well as an IFR outlook for the subsequent 12 hours.

4.4 Domain

There are seven GFA domains which cover the entire domestic airspace as well as a portion of Gander oceanic airspace for which Canada has the responsibility for the provision of air traffic control services. Refer to C.1 of Appendix C for the map of the seven GFA domains.

4.5 Units

Units to be used in the GFA are the conventional ones used in North America as listed:

- horizontal distance: measured in nautical miles (NM)
- speed: measured in knots (KT)
- atmospheric pressure: measured in hectopascals (hPa)
- wind direction: measured in degrees true
- horizontal visibility: measured in statute miles and fractions of statute miles (SM)
- cloud height: measured in hundreds of feet above sea level (ASL), with the exception of ceilings which are above ground level (AGL)
- base and top of areas of icing and turbulence: measured in hundreds of feet ASL
- freezing level: measured in hundreds of feet ASL
- time: measured in UTC (Z) with midnight indicated by the numerals zero and zero “00”

4.6 Map projection, scale and background

As per the *Technical Regulations*, Volume II, Meteorological Service for International Air Navigation, section [C.3.3] 3.2.2 (WMO-No. 49), the map **shall** use the polar stereographic projection true at 60 degrees latitude north.

For clarity, the map background contains the following features:

- provincial, federal and territorial boundaries
- oceans, coastlines and major lakes
- Canadian airports for which a TAF is issued (indicated as a black circle)

The scale of the map is chosen to allow the map to fit in the appropriate space on the chart. All charts include a scale bar in their corresponding legend box to help users determine approximate distances on the map.

4.7 Characters, abbreviations and symbols

The number and type of characters, abbreviations and symbols allowed in the GFA are limited to those familiar to and fully understood by all users of the product. These are described in the TP 14371, *Transport Canada Aeronautical Information Manual* (TC AIM), and they are already used in other graphical products (such as SIG WX prognoses) currently issued for the aviation industry.

4.7.1 Abbreviations

A GFA is prepared in abbreviated English language using approved MSC abbreviations as published in the *Manual of Word Abbreviations* (MANAB). If an abbreviation is not defined, plain English **shall** be used.

4.7.2 Symbols

The following is the list of symbols allowed in a GFA:

- fronts (cold, warm, stationary, surface and upper)
- trowals
- high and low pressure centres
- frontal waves
- surface and upper troughs
- direction-of-motion arrows
- freezing rain and freezing drizzle
- ice pellets
- wind barbs
- icing (moderate and severe)
- turbulence (moderate and severe)
- thunderstorms
- tropical cyclones (storm and hurricane)
- volcanoes
- radioactive releases

Refer to C.2 of Appendix C for examples of symbols.

4.8 Page layout

The page layout displays the title box, the legend box and the comments box in a column along the right-hand side of the chart. The remainder of the page depicts significant clouds and weather or icing, turbulence and freezing level.

4.8.1 Title box

The title box must include: chart name; four-letter ID of the centre transmitting the charts (CWAO refers to the Canadian Centre for Meteorological and Environmental Prediction/Network Operations (CCMEP/NETOPS)); date and time of issue; the name of the GFA region; chart type; and valid date and time of the chart. This box must be placed in the upper right-hand corner of the chart.

Example of a title box for a clouds and weather chart:

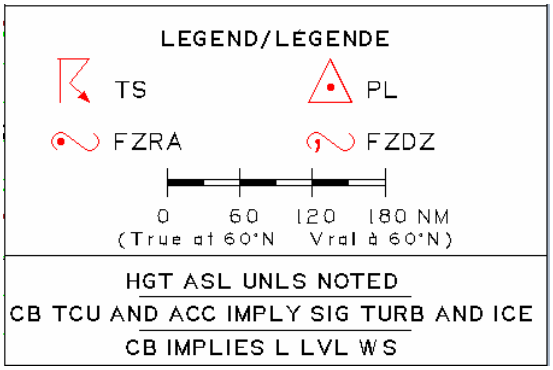
Example of a title box for an icing, turbulence and freezing levels chart:

4.8.2 Legend box

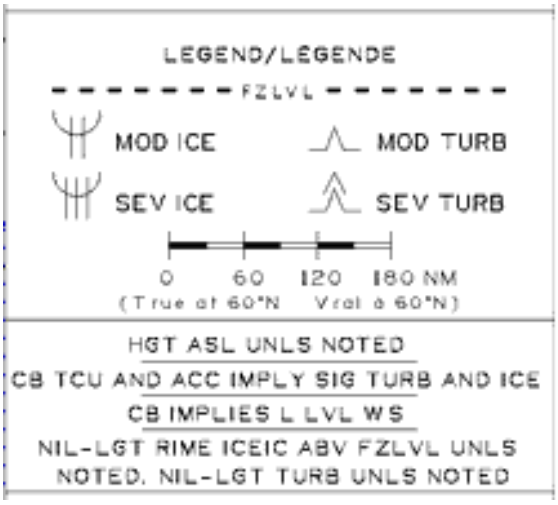
The legend box includes the less common symbols used in the depiction itself. In addition, this box must include a scale bar to help users determine distances on the chart. This box is as wide as the title box and is located immediately below it. Just underneath the legend box are the following three standard phrases:

HGTS ASL UNLS NOTED
CB TCU AND ACC IMPLY SIG TURB AND ICE
CB IMPLIES L LVL WS

Example of a legend box for a clouds and weather chart:



Example of a legend box for an icing, turbulence and freezing levels chart:



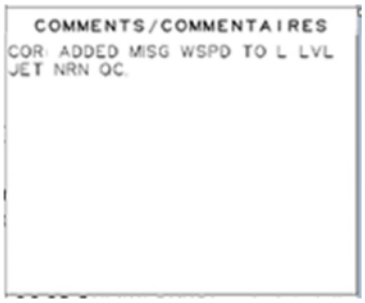
4.8.3 Comments box

The comments box provides any information that forecasters consider important (such as formation or dissipation of fog that decreases or increases the visibility from one category to another).

The box may also be used to describe elements that, if added to the depiction, would clutter the chart. Furthermore, the comments box of the T_0+12 hr clouds and weather chart also includes a 12-hour IFR outlook statement.

Example of a comment box for a clouds and weather chart:

Example of a comment box for an icing, turbulence and freezing levels chart:



4.9 Content of the GFA

A description of the content of the GFA is given in this section. Examples of GFA content are given in C.2 and C.4 of Appendix C.

4.9.1 Clouds and weather chart

The clouds and weather chart includes clear and concise information on cloud layers and surface-based phenomena, visibility, weather and obstructions to vision at the valid time of the chart. In addition, this chart includes all relevant synoptic features present and responsible for the weather, indicating their speed and direction of motion at the valid time.

This chart must contain the following:

1) Title box
2) Legend box
3) Comments box, which includes the IFR outlook only on the T_0+12 hr depiction
4) CLDS and WX indicating:
    - synoptic features
    - speed and direction of motion of synoptic features at the valid time
    - organized areas of clouds
    - organized areas of precipitation
    - organized areas of obstruction to vision
    - visibility, weather and obstructions to vision
    - isobars
    - strong surface winds and gusts
    - IFR outlook only on the T_0+12 hr chart

Clouds and weather	Title
	Legend
	Comments

Figure 1: GFA clouds and weather chart

4.9.1.1 Synoptic features

Synoptic features, such as lows, highs, fronts and troughs are indicated with the corresponding symbolic representation used in surface analyses. When the motion of a main synoptic feature is expected to be five knots or more, it is indicated by an arrow for the direction, with the speed in knots enclosed in a box as follows.

Example: Synoptic features

When the motion of a main synoptic feature is expected to be slower than five knots, the term STNR, for stationary, is used.

4.9.1.2 Clouds

4.9.1.2.1 Cloud area and amount

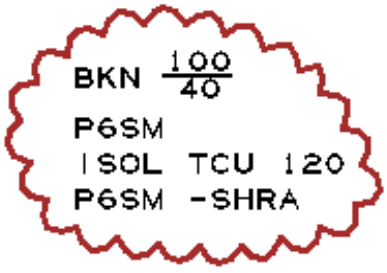
A brown scalloped border encloses organized areas of broken (BKN) or overcast (OVC) cloud between the surface and 24,000 feet. However, when convective clouds are expected (such as TCU, ACC and CB), tops are stated, when known, even if they extend above the 24,000-foot level. Significant cloud layers are based on the amount at each level, not on the summation amount. They are stated using the abbreviations allowed by the *Manual of Word Abbreviations* (MANAB). When the main cloud deck contains more than one significant cloud layer, the cloud amount description depends on the spacing between the layers. When it is less than 2,000 feet, the descriptor represents the summation amount across all the layers, and the term LYR is included immediately after it. When the spacing is 2,000 feet or greater, each layer is stated, with its own descriptor that applies only to that layer. Altitudes of bases and tops of all layers are given, together with the amount. Cirrus clouds are not mentioned in the GFA. Sky conditions are indicated alphanumerically (e.g. SCT).

Table 6: Cloud amount definition

Abbreviation	Definition
SKC	Sky completely free of cloud
FEW	Cumulative coverage is 1-2 oktas inclusive
SCT	Cumulative coverage is 3-4 oktas inclusive
BKN	Cumulative coverage is 5-7 oktas inclusive
OVC	Cumulative coverage is 8 oktas

In areas where there are no organized clouds and the visibility is expected to be greater than six statute miles (P6SM), the terms SKC, FEW or SCT (whichever one is appropriate) are used.

Example of organized broken clouds with embedded convective clouds:



4.9.1.2.2 Cloud type

Cloud type is not indicated with the exception of convective clouds (CU, TCU, ACC and CB) which are always indicated regardless of amount.

4.9.1.2.3 Cloud base and top

The height of both the base and top of clouds are indicated. All heights are stated in hundreds of feet (for example, 2 means 200 feet, 40 means 4000 feet). Unless otherwise specified, all heights in the depiction are the vertical distances above sea level (altitudes). This rule is defined on all graphic charts by including the note HGT ASL UNLESS NOTED at the bottom of the legend box.

When, in a particular case, heights are given with respect to ground level instead of sea level, this situation is clearly stated by using the ceiling designator CIGS with the indicator AGL (above ground level).

Example: LCA CIGS 5 AGL

In mountainous areas, the ceiling designator should be used with caution. Instead, when low layers of cloud are expected to obscure portions of mountainous terrain, statements such as HYR TRRN OBSCD, MT OBSCD ABV 30, MT TOPS OBSCD and ALL PASSES CLSD may be added to emphasize the expected conditions.

Ranges of variability in the altitudes of cloud bases should not be stated when the bases are expected to be 2,500 feet or more above the highest terrain in the area. Bases and tops are stated for all cloud layers, provided there is a minimum spacing of 2,000 feet between cloud layers.

When convective clouds are expected (such as TCU, ACC and CB), tops are stated, even if they extend above the 24,000-foot level. These tops being usually quite variable only the upper limit of the convective clouds is forecast unless different convective cloud types have a different spatial coverage. In addition, only the most likely time for significant development to start is forecast.

By convention, the base and top of clouds are indicated immediately in the form of a fraction whose denominator is the base and the numerator is the top of the cloud, both in hundreds of feet above sea level. When an organized area of clouds exists in layers with little separation, then the term LYR can be used to describe them.

Example of cloud description:

BKN LYR $\frac{160}{80}$

SCT $\frac{60}{30}$

4.9.1.2.4 Convective clouds

As mentioned in 4.9.1.2.3 unlike other types of cloud, convective cloud tops are always explicitly stated, even when they extend above the 24,000-foot level. The type of convective cloud is also stated, regardless of whether or not it is the main cloud or embedded within another cloud deck. As well, if CBs are present with thunderstorms, the appropriate symbol (TS) is added to the area. In dealing with convective clouds and the precipitation associated with them, a qualifier may be used to specify the amount of cloud and another may refer to the visibility associated with the precipitation generated by the convective cloud. However, in most cases, the qualifier will be the same and does not need to be repeated. In the description ISOL TCU 180 2SM -SHSN, the descriptor ISOL is not repeated for the SHSN, it is implied that both the TCUs and the snow showers are isolated. In those cases when ISOL, OCNL or FRQ convective clouds are embedded in a larger area of clouds, the base of the clouds is not stated, only the top. However, if only a convective cloud is present, both the base and the top must be stated, as would be with non-convective cloud.

The following qualifiers regarding convective clouds and associated showers are used in a GFA according to the following spatial coverage definitions when the cloud is in association with another main cloud description.

Table 7: Convective cloud qualifiers description and coverage

Abbreviation	Description	Coverage
ISOL	Isolated	25% or less
OCNL	Occasional	Greater than 25% and up to 50%
FRQ	Frequent	Greater than 50%

Under certain circumstances, a spatial qualifier is used without associating it to an enclosed area. In such a case, a reference is made to the geographical location where the phenomenon is expected to occur

Example: OVR XTRM NRN SECN ISOL TCU 180 P6SM –SHRA

4.9.1.2.5 Surface-based layers

Surface-based layers are described by stating the vertical visibility in hundreds of feet.

Example (1): OVR/VC LKSUPR LCA 1/4SM BLSN CIGS 0 AGL

If the top of the surface-based layer is well defined, then it is stated in a similar fashion.

Example (2): XTNSV 1/4-1SM FG/BR CIGS 0-2 AGL TOP 15

4.9.1.3 Weather, visibility and obstruction to vision

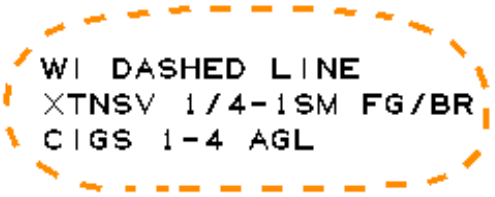
The following qualifiers regarding restriction to visibility, non-convective precipitation and ceilings may be used in a GFA according to the following spatial coverage definitions.

Table 8: Non-convective weather qualifiers description and coverage

Abbreviation	Description	Coverage
LCA	Local	25% or less
PTCHY	Patchy	Greater than 25% and up to 50%
XTNSV	Extensive	Greater than 50%

The percentage of the area coverage specified by a qualifier refers to the area where the actual weather phenomenon is expected to occur. For instance, the following example means that more than 50% of the area enclosed within the dashed orange line is forecast to have a visibility lowered to 1/4-1SM by mist or fog.

Example of lowered cloud and visibility due to mist or fog:



Alternatively, a spatial qualifier may be used without associating it to an enclosed area. In such case, a reference is made to the geographical location (e.g. over SWRN SK) where the phenomenon is expected to occur.

4.9.1.3.1 Precipitation

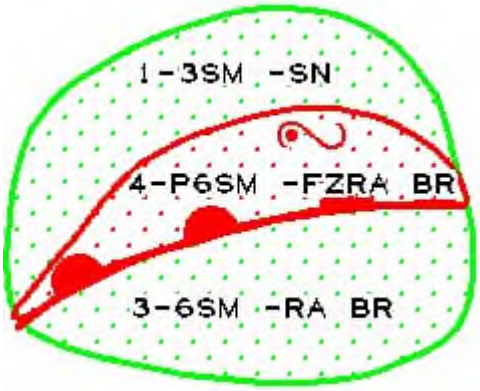
1) **Continuous precipitation**: Areas of continuous precipitation that are XTNSV are enclosed in continuous green lines with the inside area stippled. Red is used instead of green for freezing precipitation. The description of the precipitation and the visibility is stated inside the area.

Example (1): Continuous precipitation

Example (2): Continuous freezing precipitation

2) **Contiguous areas of different types of continuous precipitation**: An area of continuous precipitation containing marked changes in precipitation types is separated by either a solid green or red line depending on the precipitation type change.

Example: Contiguous areas of different types of continuous precipitation



3) **Convective or intermittent precipitation:** Areas of convective or organized but intermittent precipitation are enclosed in a dashed green line with the area hatched. This is used when associated with convective clouds described as FRQ, BKN or OVC which represent a greater than 50% coverage of the area. Similarly for intermittent, it refers to an XTNSV area of stratiform precipitation that is not continuous, also representing a greater than 50% coverage of the area. The description of the precipitation and the visibility is stated inside the area.

Example: Convective or intermittent precipitation

An area of intermittent precipitation containing marked changes in precipitation types is treated in a manner similar to continuous precipitation. The only difference is the use of a dashed line to separate the precipitation types.

4) **Disorganized precipitation**: Disorganized precipitation is indicated alphanumerically without the use of an enclosed area, either at the location of expected occurrence or by specifying the location. For example:
ALG TROF ISOL TCU 150 P6SM -SHRA
ONSHR FLO LKSUPR OCNL TCU 150 1/2-2SM SHSN/-SHSN
IN VLYS LCA 4SM -FZRA BR

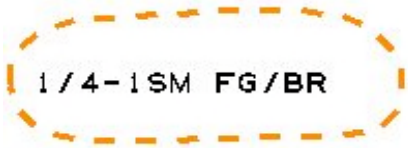
4.9.1.3.2 Visibility

The visibility, in statute miles, is always included. When the visibility is expected to be greater than six miles, it is indicated as P6SM.

4.9.1.3.3 Obstruction to vision

A significant area with visibility restricted to six statute miles or less is depicted by an enclosed dashed orange line with the description stated inside the area or in the comment box. If this area is also affected by precipitation, it is not depicted separately because the obstruction to vision is already included in the precipitation group (e.g. 1/2-2SM -RA FG/BR).

Example: Obstruction to vision depiction



For unorganized obstruction to vision, a description is either put directly on the chart or in the comments box.

Example: ALG CST LWR N SHR QC LCA 3/4SM BR

Smoke from forest fires

The main aviation hazard posed by forest fires is reduced visibility due to smoke. The actual and forecast extent of the area affected by smoke from a forest fire can be difficult to determine. A statement about reduced visibility due to smoke is included in the following comment.

Example: PTCHY 3-5SM FU DNWIND FSTFR E OF PRINCE RUPERT EXC LCA 1/2SM FU VC FSTFR.

The extent of the area affected by reduced visibility due to smoke from a forest fire may also be depicted by an orange dashed line used for obstructions to vision.

4.9.1.4 Isobars

Isobars are included on the clouds and weather chart only. They are depicted as solid black lines with units in hectopascal (hPa), drawn every four hectopascal using 1000 hPa as a reference.

4.9.1.5 Strong surface winds

The direction and speed of strong surface winds are indicated by using wind barbs for wind speed and direction for all areas where winds are expected to have a mean sustained speed of at least 20 KT. Wind gusts are indicated when speeds of at least 10 KT greater than the mean sustained winds are forecast. The gusts are indicated by the letter "G", followed by the gust speed in knots, enclosed in a box, as indicated by the following symbol.

When accompanied by strong gusts, mean sustained winds of less than 20 KT may also be indicated in the GFA, at the forecaster's discretion, if moderate mechanical turbulence is expected to occur as a result of the wind gusts.

4.9.1.6 IFR outlook

The outlook is included in the comments box as part of the T_0+12 hr clouds and weather chart. It should be fairly general and indicate the areas where organized IFR weather is expected within the subsequent 12 hours. In addition, it should state the cause of the IFR weather, along with weather hazards, if any. For example, if IFR ceilings were expected over eastern New Brunswick, the IFR outlook would say CIGS/VIS RA/SN/BLSN/BR ERN NB.

4.9.1.6.1 Tropical cyclones

Tropical cyclones, when expected in a GFA domain, will be described following the guidance of the Canadian Hurricane Centre of the MSC in collaboration with the designated ICAO Tropical Cyclone Advisory Centre. Examples of tropical cyclone depiction are found in C.2 of Appendix C.

4.9.1.6.2 Volcanic ash

Volcanic ash, when expected in a GFA domain, will be described following the guidance of a designated ICAO Volcanic Ash Advisory Centre (VAAC).

Volcanic ash is not depicted in a GFA. When it is expected within a GFA domain, it is mentioned in the comment box of the CLDS & WX CHART in the following format.

VOLCANIC ERUPTION

NAME OF VOLCANO - COUNTRY

LOCATION OF VOLCANO - (LAT/LONG IN DEGREES AND TENTHS OF A DEGREE)

FIRST ERUPTION (xxxxZ day/month/year)

STATUS OF THE ERUPTION (CONTINUING OR ENDED)

CHECK SIGMETS FOR VOLCANIC ASH POSITION

Example: Volcanic ash comment box

VOLCANIC ERUPTION

EYJAFJALLAJOKULL - ICELAND

N6337 W01937

FIRST ERUPTION 1826Z 14/04/2012

CONTINUING

CHECK SIGMETS FOR VOLCANIC ASH POSITION

Additionally, if the volcano at source of the event lies within a GFA domain, a volcanic eruption symbol is placed at the approximate location of the volcano on the chart. An example of the volcanic eruption symbol is found in C.2 of Appendix C.

4.9.1.6.3 Radioactive cloud (release)

Radioactive cloud (release), if expected in a GFA domain, will be described following the guidance of the Canadian Centre for Meteorological and Environmental Prediction of the MSC which is a designated WMO Regional Meteorological Specialized Centre (RMSC).

Radioactive cloud (release) is not depicted in a GFA, but, when expected within a GFA domain, is mentioned in the comment box of the CLDS & WX CHART in the following format:

RADIOACTIVE RELEASE

NAME OF SITE - COUNTRY

LOCATION OF SITE - (LAT/LONG IN DEGREES AND TENTHS OF A DEGREE)

FIRST RELEASE (xxxxZ day/month/year)

STATUS OF RELEASE (CONTINUING OR ENDED)

CHECK SIGMETS FOR RADIOACTIVE CLOUD POSITION

Example: Radioactive cloud release comment box

RADIOACTIVE RELEASE

DARLINGTON, ON. CANADA

N4352 W07843

FIRST RELEASE 1826Z 14/04/2012

ENDED

CHECK SIGMETS FOR RADIOACTIVE CLOUD POSITION

Additionally, if the radioactive release source lies within a GFA domain, a radioactive release symbol is placed at the approximate location of the source on the chart. An example of the radioactive release symbol is found in C.2 of Appendix C.

4.9.2 Icing, turbulence and freezing level chart

The icing, turbulence and freezing level chart is used to depict areas of moderate to severe non-convective icing and non-convective turbulence, along with the type, intensity, and base and top of layers. Otherwise, a general statement about icing and turbulence found in the comments box is applicable.

This chart must contain the following:

1) Title box
2) Legend box
3) Comments box
4) Icing (ICE), turbulence (TURB) and freezing level (FZLVL) indicating:
    - synoptic features described in the clouds and weather chart
    - speed and direction of motion of synoptic features at the valid time
    - areas of icing
    - areas of turbulence and low level wind shear
    - freezing level contours

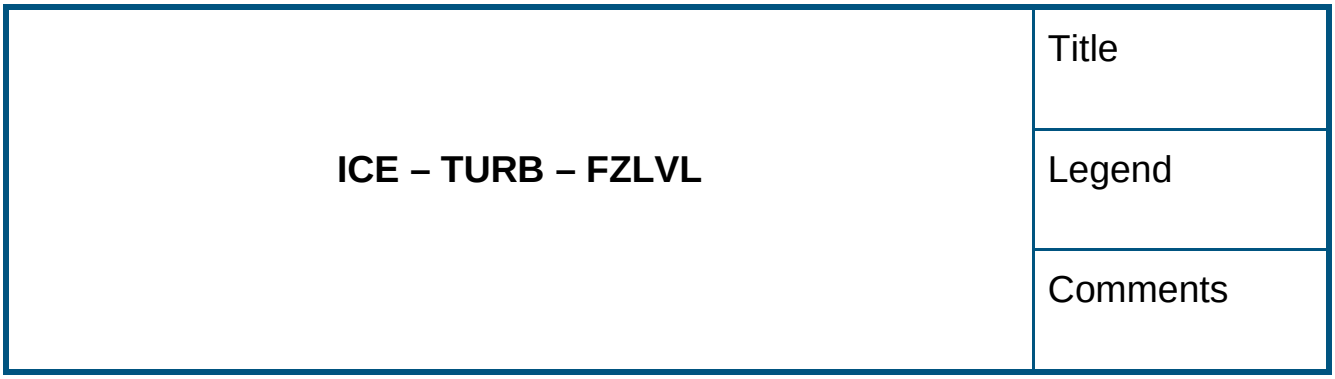


Figure 2: GFA icing, turbulence and freezing level chart

The following qualifiers regarding icing and turbulence may be used in a GFA according to the following special coverage definitions:

Table 9: Icing and turbulence qualifiers description and coverage

Abbreviation	Description	Coverage
LCA	Local	25% or less
PTCHY	Patchy	Greater than 25% and up to 50%
XTNSV	Extensive	Greater than 50%

4.9.2.1 Icing (ICE)

Areas of moderate or severe non-convective icing are depicted by an enclosed continuous blue line with coarse stippling in blue. The intensity and type of icing, as well as the base and top of the icing layer is described in text and by means of their corresponding symbols.

Symbol indicating moderate icing:

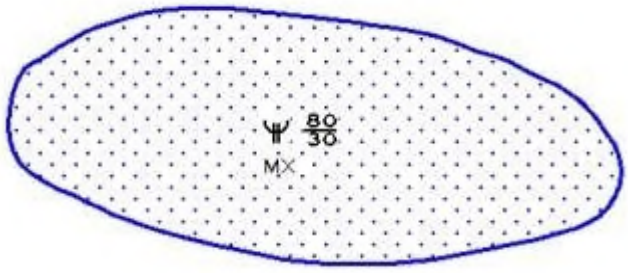
Symbol indicating severe icing:

The base and top of the icing layer are in the form of a fraction, the denominator of which represents the base and the numerator representing the top of the icing layer in hundreds of feet ASL.

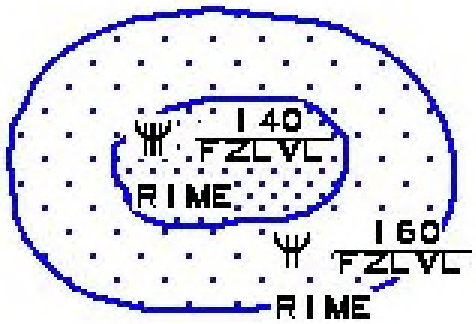
In this example, the base of the icing layer is at the surface while the top is at 2,000 feet above sea level:

The types of icing are: RIME, MX (mixed) or CLR (clear).

Example of a depiction of mixed icing:



Areas of severe icing are indicated with a denser stippling. When an area of severe icing is contained within another area of moderate icing, the area of severe icing will be depicted with a denser stippling as indicated in this example:



Light icing is indicated in the comment box rather than on the chart itself. If icing is forecast to occur during only part of the GFA period, the predicted time of occurrence of the icing is indicated in the comments box of the appropriate chart.

Icing intensity is indicated according to the rate of ice accretion. Since no satisfactory instrument has been installed on commercial aircraft to directly measure the rate of ice accretion on an airframe, the following expressions must be interpreted qualitatively, according to the effect of ice formation on the flying characteristics of the aircraft, as described next.

Light (LGT) icing: The rate of ice accretion is such that flying for prolonged periods (over one hour) without using de-icing equipment may create a problem. Occasional use of de-icing or anti-icing equipment removes or prevents ice accretion. If de-icing or anti-icing equipment is used, no problem occurs.

Moderate (MOD) icing: The rate of ice accretion is such that even short encounters become potentially hazardous. De-icing or anti-icing equipment must be used or a diversion is necessary.

Severe (SEV) icing: The rate of ice accretion is such that de-icing or anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.

4.9.2.2 Turbulence (TURB)

Areas of moderate or severe non-convective turbulence are depicted by an enclosed continuous red line with coarse cross-hatching. The intensity and type of turbulence, as well as the base and top of the turbulence layer is described in text and by means of their corresponding symbols.

Symbol indicating moderate turbulence:

Symbol indicating severe turbulence:

The base and the top of the turbulence layer is in the form of a fraction, the denominator of which represents the base and the numerator representing the top of the turbulence layer in hundreds of feet ASL.

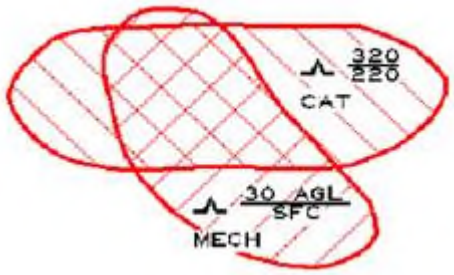
The following example indicates that the base of the turbulence layer is 18 000 feet, while the top is at 26 000 feet, above sea level:

The types of turbulence are:

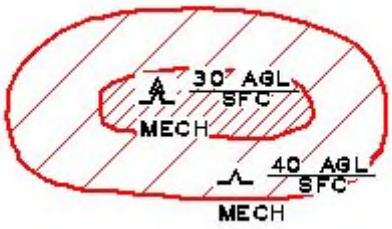
- clear air turbulence (CAT)
- mechanical (MECH)
- lee waves (MTW)
- low level jet (L LVL JET)
- low level wind shear (L LVL WS)

Lower level turbulence is depicted by the use of positive cross-hatching while higher level turbulence, by the use of negative cross-hatching.

Example: High and low level turbulence



Severe turbulence is depicted with dense cross-hatching. The following example shows the severe turbulence surrounded by a larger area of moderate turbulence:



Light turbulence is indicated in the comment box rather than on the chart itself.

The intensity of the turbulence is defined according to its effects on flying, as follows:

Light (LGT) turbulence: Such turbulence momentarily causes slight erratic changes in altitude and/or attitude (pitch, roll, and yaw).

Moderate (MOD) turbulence: Such turbulence is similar to light turbulence but of greater intensity. Changes in altitude and/or attitude occur, but the aircraft remains in positive control at all times. This turbulence usually causes changes in indicated air speed.

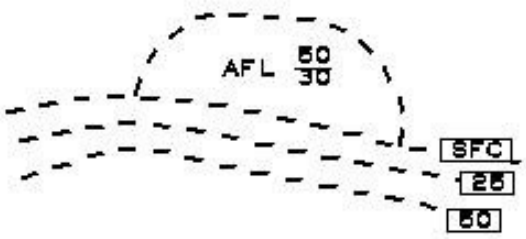
Severe (SEV) turbulence: Such turbulence causes large abrupt changes in altitude and/or attitude. It usually causes large variations in indicated air speed and the aircraft may be momentarily out of control.

A low level jet (L LVL JET), when reaching 50 KT or more is included in the GFA. It may be included at speeds between 35 KT and 45 KT when, upon the forecaster's judgment, significant turbulence or shear is expected. L LVL JET is rounded to the nearest 5 KT and is depicted as follows:

4.9.2.3 Freezing level (FZLVL)

Freezing level contours are indicated on a GFA by dashed lines. The height of the freezing level is indicated using the standard heights in hundreds of feet above sea level (e.g. SFC, 25, 50, 75, 100, etc., meaning, surface, 2,500 feet, 5,000 feet, 7,500 feet, 10,000 feet, etc.).

When more than one freezing level is forecast in the vertical, only the lowest level needs to be indicated, unless meteorological conditions are expected to be relevant to aviation safety (for example: freezing precipitation aloft). An above freezing layer (AFL) is depicted in a defined area as shown:



Temporal changes in the freezing level, when significant, should be indicated in the comment box of the chart: FZLVL 20 LWRG TO SFC AFT 03Z

4.10 Amended GFA

Once issued, a SIGMET or AIRMET message automatically amends the current and relevant GFA. The remark (RMK) found in the National version of those messages indicate the GFA region(s) the SIGMET or AIRMET applies to (refer to 5.8.3.8 and 6.8.3.8).

4.11 Corrected GFA

A correction to a GFA is issued for the following events:

1) Any unforecast weather phenomena not requiring an AIRMET (i.e. below AIRMET criteria threshold) or any other unforecast weather phenomena that, according to the forecaster, should be depicted in the GFA.
2) Forecast weather phenomena (in the GFA) that fails to occur:
    - removal of forecast weather phenomena in the GFA chart that are no longer occurring or no longer expected to occur.
3) A significant error made in a GFA chart:
    - a significant error is one which, if uncorrected, would result in an erroneous interpretation of the GFA and create a potential hazard to aviation.

For detailed guidance on GFA correction, refer to C.3 of Appendix C. Information about the nature of the correction made to the chart is included in the comments box.

Corrections are issued with the term CCX at the end of the first line of the title box, as follows:
GFACN31 CWAO CCX

In the above example, X is a letter that may range from A to Z. The first correction would be “CCA”, the second “CCB”, the third “CCC” and so on.

Chapter 5 SIGMET Information

5.1 Definition

SIGMET: Information message issued by a meteorological watch office (MWO) to advise pilots of the occurrence or expected occurrence of specified weather phenomena, which may affect the safety of aircraft operations, and the development of those phenomena in time and space.

5.2 Domain

The message **shall** describe designated hazardous weather phenomena up to and including 60,000 feet (FL600) for the Canadian Flight Information Regions (FIR) and by international agreement, the Gander Oceanic flight information region. Refer to D.1 of Appendix D for the map of the Canadian SIGMET information domain.

5.3 Projection

As per *Technical Regulations (WMO-No. 49)*, Volume II, Meteorological Service for International Air Navigation, section [C.3.3] 3.2.2, the depiction of the location of the phenomenon **shall** use the polar stereographic projection true at 60 degrees latitude north with lines between coordinate points as orthodromes (great circles).

5.4 Language

SIGMET information is prepared in abbreviated English language using approved MSC abbreviations as published in *Manual of Word Abbreviations* (MANAB). Abbreviations to be used in SIGMET messages are given in D.2 of Appendix D.

5.5 Units

The only units explicitly stated are:

- nautical miles (NM) for a distance associated to the abbreviation WI (within)
- knots (KT) for speed
- Zulu (Z) for time in UTC, with midnight being indicated by the numerals zero and zero "00"
- Heights are stated in flight levels corresponding to hundreds of feet and preceded by the abbreviation FL.

5.6 Types of SIGMET

Although ICAO Annex 3 provides one general SIGMET format, which encompasses all of the specified weather phenomena, it is convenient to distinguish between three types of SIGMET, as follows:

- WS SIGMET for TS, TURB, ICE, MTW, L LVL WS, DS, SS, RDOACT CLD
- WV SIGMET for volcanic ash (VA)
- WC SIGMET for tropical cyclones (TC)

The type of SIGMET can be identified through the data type designator included in the WMO abbreviated heading of the SIGMET message as explained in 5.7.

5.7 Structure of the SIGMET message

A SIGMET message consists of:

- WMO heading - all SIGMET are preceded by an appropriate WMO heading;
- First line - containing location indicators of the relevant ATS unit serving the FIR and MWO, alphanumeric identification and period of validity;
- Meteorological part - containing meteorological information concerning the phenomenon for which the SIGMET is issued; and
- Equal sign "=" - indicates the end of the message.

The first two parts of the SIGMET message are common for all SIGMET types. The content and format of the meteorological part is different depending on the type of SIGMET. Therefore, in the following paragraphs, the meteorological part of the WS, WV and WC types of SIGMET is described separately.

5.8 Format of SIGMET

Note: In the following text, square brackets **[ ]** are used to indicate an optional or conditional element, and angled brackets **< >** are used for symbolic representation of a variable element, which in the real SIGMET accepts concrete alphanumeric values.

5.8.1 WMO header

The *Manual on the Global Telecommunication System (WMO-No. 386)* recommends the use of the following abbreviated headings for bulletins containing meteorological information.

Table 10: Description of symbolic form $T_1T_2A_1A_2$ii CCCC YYGGgg [CCx]

Symbol	Interpretation
T_1	Data type designator (refer to 5.8.1.1)
T_2	Data type designator (refer to 5.8.1.1)
A_1A_2	Geographical designator (where the message applies to, not the issuing country) (refer to 5.8.1.2)
ii	Bulletin number (refer to 5.8.1.3)
CCCC	International four-letter location indicator of the centre originating or compiling the bulletins (refer to 5.8.1.4)
YYGGgg	International date-time group
CCx	Correction identifier (refer to 5.8.1.5)

5.8.1.1 Data type designator

T_1: W for Warnings (WMO-No. 386, table A, A.II 5/2)

T_2: S for SIGMET (WMO-No. 386, table B1, A.II-5/6)

T_2: C for Tropical Cyclone (WC SIGMET)

T_2: V for Volcanic Ash (WV SIGMET)

5.8.1.2 Geographical designator

The geographic designator indicates where the meteorological information applies to, not the issuing country.

A_1A_2: CN for Canada (all FIRs but CZQX Oceanic) (WMO-No. 386, table C1, A.II-5/9)

A_1A_2: NT for North Atlantic area (CZQX Oceanic) (WMO-No. 386, table C1, A.II-5/12)

5.8.1.3 Bulletin number

ii: number with two digits

- 01–19 for global distribution
- 20–39 for inter-regional distribution (as per WMO regions)

5.8.1.4 International four-letter location indicator of the centre originating or compiling the bulletins

CCCC: As standardized practice, all SIGMET messages issued by Canada will be under CWAO which refers to the Canadian Centre for Meteorological and Environmental Prediction /Network Operations (CCMEP/NETOPS) as the centre compiling the bulletins.

5.8.1.5 Correction identifier

CCx: Since there are no provisions in ICAO documentation for correcting a SIGMET, the correction identifier will not be used. Refer to 5.8.6 for details.

5.8.1.6 Bulletin scheme

SIGMET messages will be issued in a set of two bulletins. The first is aimed at international distribution while the second will contain additional information for national purposes. Refer to D.3 of Appendix D for the full bulletin scheme.

Table 11: Example of a bulletin scheme

FIR	FIR name	Type	International (ICAO)	National
CZYZ	TORONTO	SIGMET	WSCN04 CWAO	WSCN24 CWAO
CZYZ	TORONTO	SIGMET (TC)	WCCN04 CWAO	WCCN24 CWAO
CZYZ	TORONTO	SIGMET (VA)	WVCN04 CWAO	WVCN24 CWAO

5.8.2 First line—CCCC SIGMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Table 12: Description of CCCC SIGMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Symbol	Interpretation
CCCC	ICAO location indicator of the ATS unit serving the FIR to which the SIGMET refers
SIGMET	Message identifier
[n]nn	Daily alphanumeric sequence (refer to 5.8.2.1)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of SIGMET given by date/time group of the beginning and date/time group of the end of the period (refer to 5.8.2.2)
CCCC-	ICAO location indicator of the MWO originating the message, and a hyphen "-" (without a space); separating the preamble from text (refer to 5.8.2.3).

5.8.2.1 Daily alphanumeric sequence

- 1) A SIGMET message **shall** be identified by a letter: Letter attribution rules and the lettering scheme are defined in D.4 of Appendix D.

2) A SIGMET message letter **shall** be numerically sequenced:

- numbering of a SIGMET message letter begins at one;
- the number is incremented by one when updating the message, including cancellation;
- the sequence number **shall** correspond with the number of SIGMET messages issued for an event within a FIR since 0000Z on the day concerned; and
- the numbering is thus reset at 0000Z (messages are not updated at 0000Z for the sole purpose of resetting the number).

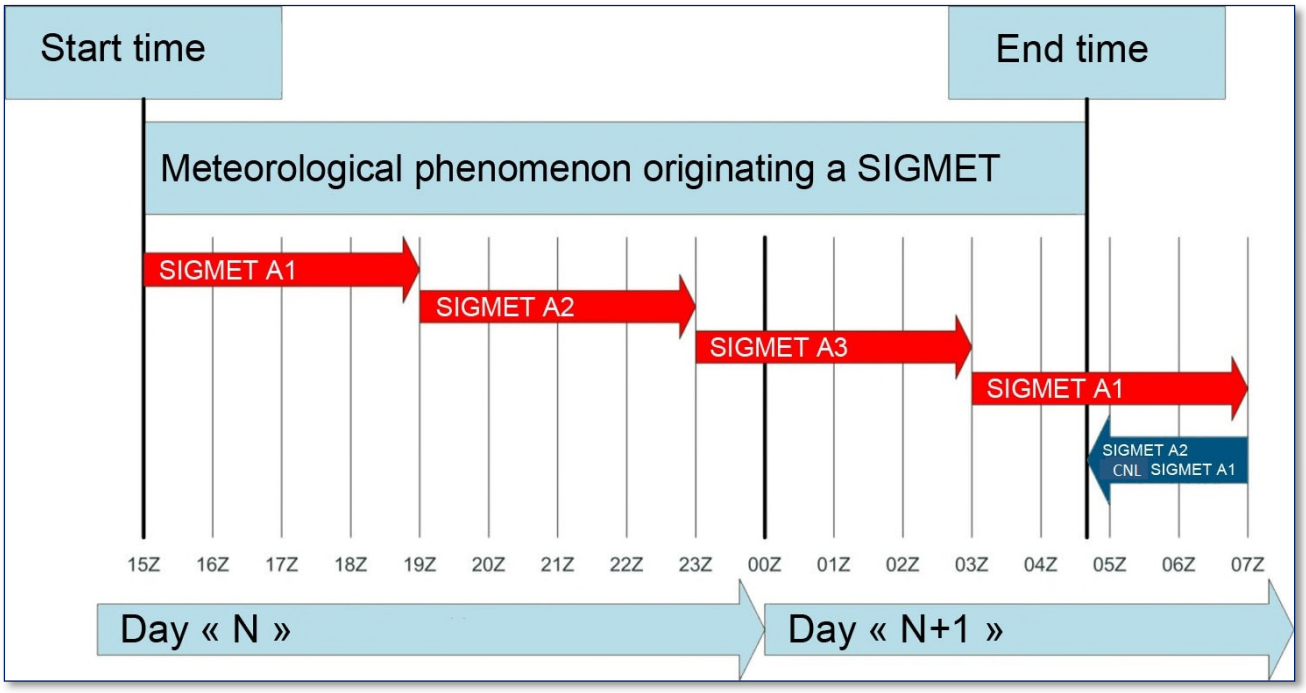


Figure 3: Diagram of numeric sequence of SIGMET messages.

Example: CZUL SIGMET M3 VALID 161220/161620 CWUL-

5.8.2.2 Validity period and lead time of SIGMET

Table 13: Validity period and lead time of SIGMET

Symbol	Lead time – up to (hours)	Validity period (hours)
WS	4	4
WV	12	6
WC	12	6

1) The period of validity of a WS SIGMET is four hours.
2) The period of validity of a WV SIGMET and a WC SIGMET is six hours.
3) In the case of a SIGMET for an ongoing phenomenon:
   - the date/time group indicating the start of the SIGMET period will be rounded back to five minutes from the filing time (date/time group in the WMO heading).

4) In the case of a SIGMET for an expected phenomenon (forecast event):

- the beginning of the validity period will be the time of the expected commencement (occurrence) of the phenomenon;
- for a WS SIGMET, the lead time (the time of issuance of the SIGMET) can be up to four hours before the start of the validity period (i.e. expected time of occurrence of the phenomenon);
- for a WV SIGMET and a WC SIGMET, the lead time can be up to 12 hours before the start of the validity period; and
- a SIGMET for an expected phenomenon is issued only for the first appearance of an event in Canadian airspace (i.e. moving in from a foreign airspace or onset inside a Canadian FIR). A phenomenon moving from one Canadian FIR to another is treated as an ongoing phenomenon. No forecast event SIGMET message would be issued for the FIR in which the event is moving.

Example (1): For an ongoing phenomenon:

WSCN05 CWAO 161221
CZUL SIGMET M3 VALID 161220/161620 CWUL-

Example (2): For an expected phenomenon (expected time of occurrence 0315Z):

WSCN01 CWAO 040115
CZVR SIGMET U1 VALID 040315/040715 CWEG-

5.8.2.3 Meteorological Watch Office (MWO)

- CWUL for Canadian Meteorological Aviation Center - East (CMAC-E) in Montréal.
- CWEG for Canadian Meteorological Aviation Center - West (CMAC-W) in Edmonton.

5.8.3 Format of the meteorological part of a WS SIGMET

The meteorological part of a WS SIGMET consists of nine elements (the following table has been divided into two parts due to horizontal space constraints).

Table 14: Meteorological elements of a WS SIGMET

Element 1 Location indicator of the FIR	Element 2 Name of the FIR	Element 3 Description of the phenomenon	Element 4 Observed or forecast	Element 5 Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

Element 6 Level	Element 7 Movement or expected movement	Element 8 Change in intensity	Element 9 Remark
FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	MOV <direction, speed> KT *or* STNR	INTSF *or* WKN *or* NC	RMK

5.8.3.1 Location indicator and name of the FIR (element 1 and 2)

Example (1): CZUL MONTREAL FIR

Example (2): CZVR VANCOUVER FIR

5.8.3.2 Description of the phenomenon (element 3)

The description of the phenomenon consists of a qualifier and a phenomenon abbreviation. SIGMETs are issued for the following phenomena (with only one phenomenon in each SIGMET):

- Thunderstorms (TS) - FRQ or SQL, with POSS hail, tornado/waterspout as necessary
- Turbulence (TURB) - only SEV
- Icing (ICE) - only SEV with or without FZRA
- Mountain waves (MTW) - only SEV
- Low Level wind shear (L LVL WS) – only SEV
- Dust storm (DS) - only HVY
- Sand storm (SS) - only HVY
- Radioactive cloud (RDOACT CLD[1])

Note (1): Different rules apply to RDOACT CLD SIGMET. Refer to 5.8.3.9 for details**.**

The appropriate abbreviations and combinations thereof, and their meaning are given in D.5 of Appendix D.

5.8.3.3 The phenomenon is either observed or forecast (element 4)

OBS [AT <GGggZ>] or FCST

The abbreviation OBS is used when:

- there has been a recent[1] direct observation of the phenomenon (e.g. METAR, PIREP); or
- there has been a recent[1] indirect observation of the phenomena (i.e. remote sensing imagery) or the observation of a meteorological element (e.g. strong wind, freezing precipitation), which leads the forecaster to believe that the phenomenon is occurring.

OBS is optionally followed by the time group in the form of AT <GGggZ>, where GGgg is the time of the observation in hours and minutes UTC. If the exact time of the observation is not known, the time is not included. No additional information will be given, e.g. aircraft type reporting the phenomenon.

Note (1): recent means normally within a two hour period preceding the issuance time of the SIGMET and in no circumstance more than three hours preceding the issuance time of the SIGMET.

The use of FCST occurs if either:

- the phenomenon is not directly or indirectly observed but there is strong meteorological evidence (i.e. numerical guidance) to suggest that the phenomenon is occurring; or
- the phenomenon is expected. In other words, there is meteorological evidence (i.e. numerical guidance) to suggest that the phenomenon will be occurring within the prescribed lead time (refer to 5.8.2.2).

When FCST is used, it is assumed that the time of the occurrence or commencement of the phenomenon coincides with the beginning of the period of validity in the first line of the SIGMET.

Example (1): OBS AT 0140Z

Example (2): FCST

5.8.3.4 Location of the phenomenon (element 5)

The location of the phenomenon is depicted as an area using coordinate points:

- the description always begins with the abbreviation WI (within);
- the area can be described as a circle, a line or a polygon; and
- distances are in nautical miles (NM), direction to one of the eight points of compass (octants[1]).

Note (1): Refer to D.6 of Appendix D for details.

Table 15: Maximum coordinate points by SIGMET shape

Description	Recommended maximum number of coordinate points
Circle[1]	1
Line[2]	4
Polygon[3]	7

Note (1): A radial distance is used to define the size of the circle.
Note (2): The line is defined by the entire width of an area centered on a line between two or more points.
Note (3): Polygons must be closed. The last coordinate point is a repeat of the first one.

Coordinate points:

1) The international (ICAO) SIGMET message describes a coordinate point using a latitude and longitude only (resolution defined in D.6 of Appendix D).
2) The national SIGMET message describes a coordinate point using a latitude and longitude. Additionally, an equivalent description with respect to an aviation reference site[3] is given corresponding to an approximation of the coordinate point in latitude and longitude.

There are two exceptions to this rule:

1) Any coordinate point located within Gander Oceanic FIR will be described in latitude and longitude only. These points will be limited to the resolution as defined in D.6 of Appendix D.
2) Any coordinate point north of N72°00’ will be described with respect to an aviation reference site only if within a 90 nautical mile radius of that site. Otherwise the coordinate point will be represented in latitude and longitude only. This is due to the sparse number of aviation reference sites over northern Canada.

Table 16: Format for coordinate points

National or International	Symbolic form	Examples
International (ICAO)	Nnnnn Wnnnnn	N4502 W07345
National	/Nnnnn Wnnnnn/[Distance[1] Direction[2]] Identifier[3]	/N4502 W07345/25 SW CYUL

Note (1): Distance is in nautical miles (NM) with units not explicitly stated.

Note (2): Direction to the eight point compass (octants). Refer to D.6 of Appendix D for details.

Note (3): Refer to D.7 of Appendix D for the list of available aviation reference sites.

Table 17: Examples of coordinate points

Description	International (ICAO)	National
Circle	WI 45NM OF N4643 W07345	WI 45NM OF /N4643 W07345/75 N CYUL
Line	WI 30NM WID LINE BTN N4459 W07304 - N4855 W07253 - N5256 W06904	WI 30NM WID LINE BTN /N4459 W07304/45 SE CYUL - /N4855 W07253/30 NW CYRJ - /N5256 W06904/75 W CYWK
Polygon	WI N4502 W07345 - N4907 W07331 - N5345 W06943 - N5256 W06758 - N4848 W07149 - N4508 W07206 - N4502 W07345	WI /N4502 W07345/25 SW CYUL - /N4907 W07331/60 SE CYMT - /N5345 W06943/150 E CYAH - /N5256 W06758/45 W CYWK - /N4848 W07149/25 NE CYRJ - /N4508 W07206/25 SW CYSC - /N4502 W07345/25 SW CYUL

5.8.3.5 Flight level and extent (element 6)

FL<nnn/nnn>

SFC/FL<nnn>

TOP FL<nnn>

The location and extent of the phenomenon in the vertical is given by one or more of the above abbreviations, as follows:

- A layer FL<nnn/nnn>, where the lower level is reported first; this is used particularly in reporting turbulence and icing
- A layer with reference to one FL using SFC/FL<nnn>
- The level of the tops of the TS clouds using the abbreviation TOP

Example (1): SEV TURB…FL220/270

Example (2): SEV ICE (FZRA)…SFC/FL030

Example (3): FRQ TS…TOP FL340

5.8.3.6 Movement or expected movement (element 7)

MOV <direction, speed>KT or STNR

Direction of movement is given with reference to one of the sixteen points of compass (radials[1]). Speed is given in knots (KT). The abbreviation STNR is used if no significant movement is expected.

Note (1): Refer to D.6 of Appendix D for details.

Example: MOV SSE 15KT

5.8.3.7 Change in intensity (element 8)

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

- INTSF - intensifying
- WKN - weakening
- NC - no change

5.8.3.8 Remark (element 9)

The remark (RMK) is found only in the National SIGMET message. It begins on a new line. The purpose is to allow additional information of national interest to be conveyed in the SIGMET message. Items listed in the remark line will be separated by a forward slash (/).

- The GFA region(s) the SIGMET message applies to (refer to Figure 4)
- Cross-referencing SIGMET messages when a phenomenon straddles one or several FIR boundaries (refer to Figure 4)
- For a phenomenon that has moved out of an FIR, the cancelled SIGMET message will refer to the continuing SIGMET message in neighbouring FIR(s) within Canada's Area of Responsibility (AOR), (refer to Figure 5)
- Additionally, for a phenomenon that has moved out of an FIR, the continuing SIGMET message in neighbouring FIR(s) within Canada's AOR will refer to the cancellation SIGMET message.

Symbolic form

RMK [GFACN<nn>] / [CCCC <name> FIR SIGMET[n]nn][1]

Note (1): Refer to 5.8.3.1 and 5.8.2.1 for the description.

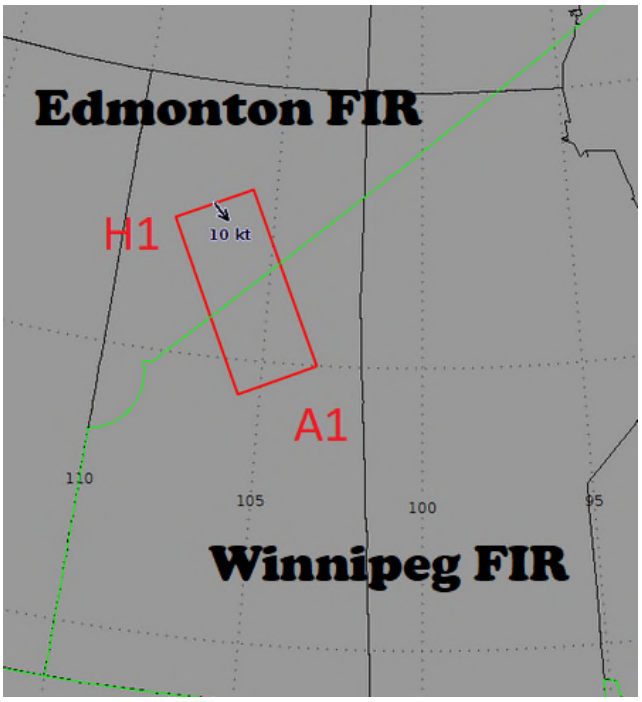


Figure 4: SIGMET phenomenon covering two FIRs

The above phenomenon requires two SIGMET messages, one per FIR. The meteorological part will be identical in both messages (1) and (2) below:

Message (1):
WSCN22 CWAO 161220
CZEG SIGMET H1 VALID 161220/161620 CWEG-
CZEG EDMONTON FIR «meteorological part»
RMK GFACN32/CZWG WINNIPEG FIR SIGMET A1=

Message (2)
WSCN23 CWAO 161220
CZWG SIGMET A1 VALID 161220/161620 CWEG-
CZWG WINNIPEG FIR «meteorological part»
RMK GFACN32/CZEG EDMONTON FIR SIGMET H1=

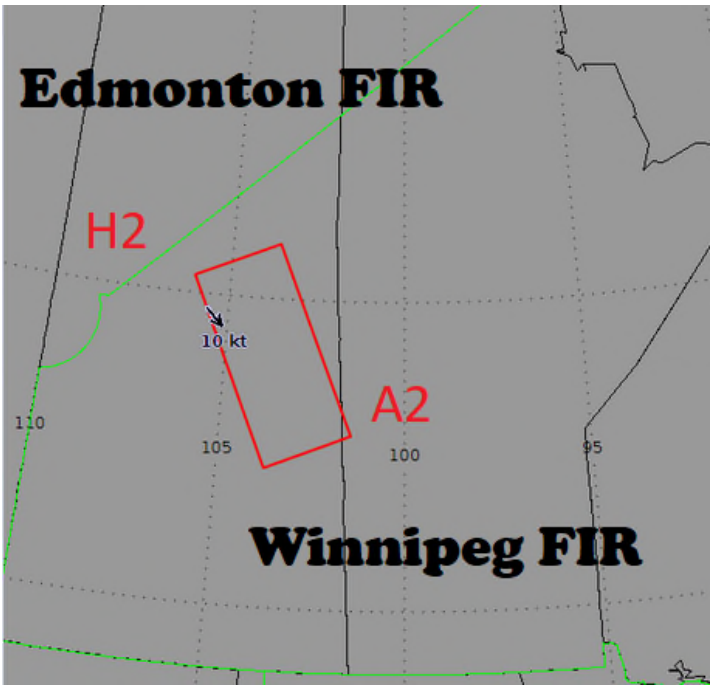


Figure 5: SIGMET phenomenon now within only one FIR

The above phenomenon is a continuation of Figure 4. In other words, the area has moved southeastward with time. The following SIGMET A2 is an update of A1 while SIGMET H2 is a cancellation of H1 since the phenomenon no longer affects the Edmonton FIR.

Message (1):

WSCN22 CWAO 161530
CZEG SIGMET H2 VALID 161530/161620 CWEG-
CZEG EDMONTON FIR CNL SIGMET H1 161220/161620
RMK GFACN32/CZWG WINNIPEG FIR SIGMET A2=

Message (2):

WSCN23 CWAO 161530
CZWG SIGMET A2 VALID 161530/161930 CWEG-
CZWG WINNIPEG FIR «meteorological part»
RMK GFACN32/CZEG EDMONTON FIR SIGMET H2=

5.8.3.9 RDOACT CLD event

For radioactive cloud SIGMET bulletins, only a circle shape is to be used for element 5 “location”. A radius of up to 15 nautical miles from the source may be applied; and a vertical extent from surface “SFC” to the upper limit of the flight information region (FIR) or control area (CTA) is to be applied (i.e. FL600). Only stationary “STNR” is to be used for the element 7 “movement or expected movement”.

For an event where limited information is available to the forecaster (i.e. first issuance of a RDOACT CLD SIGMET), the change in intensity (element 8) may be set as “INTST UNKNOWN”:

Example (1):

WSCN04 CWAO 161220
CZYZ SIGMET R1 VALID 161220/161620 CWUL-
CZYZ TORONTO FIR RDOACT CLD OBS AT 1205Z WI 15NM OF N4350 W07905
SFC/FL600 STNR INTST UNKNOWN=

Example (2):

WSCN24 CWAO 161220
CZYZ SIGMET R1 VALID 161220/161620 CWUL-
CZYZ TORONTO FIR RDOACT CLD OBS AT 1205Z WI 15NM OF /N4350 W07905/25 E CYYZ SFC/FL600 STNR INTST UNKNOWN
RMK GFACN33=

5.8.4 Format of the meteorological part of a WV SIGMET

The meteorological part of a WV SIGMET consists of the following eight elements (this table has been divided into three parts due to horizontal space constraints):

Table 18: Meteorological elements of a WV SIGMET

Element 1 **Location indicator of the FIR**	**Element 2** **Name of the FIR**	**Element 3** **Phenomenon and Volcano Name**		**Element 3** **Volcano Position**
<CCCC>	<name> FIR	VA ERUPTION	[MT <name>]	[PSN <Nnnnn Wnnnnn>]

Element 4 **Volcanic ash cloud**	**Element 5** **Extent of the cloud Vertical**	**Element 5** **Extent of the cloud Horizontal**	**Element 6[1]** **Movement or expected movement**
VA CLD OBS [AT <GGggZ>] VA CLD FCST	FL<nnn/nnn> SFC/FL<nnn> TOP FL<nnn>	Geographical location of the phenomenon	[MOV <direction, speed>KT]

Element 7[1] **Volcanic ash cloud forecast at the end of the period of validity**		**Element 8** **Remark**
[FCST AT <GGggZ>]	[Geographical location of the phenomenon]	RMK

Note (1): Elements 6 and 7 **shall not** be used in conjunction in the same bulletin**.**

5.8.4.1 Location indicator and name of the FIR (element 1 and 2)

Refer to 5.8.3.1.

5.8.4.2 Information on the volcano eruption (element 3)

VA ERUPTION [MT <name>] [PSN <Nnnnn Wnnnnn>]

- The name of the volcano is preceded by the words VA ERUPTION MT.
- The position of the volcano is given by the abbreviation PSN followed by the latitude and longitude in degrees and minutes (Nnnnn Wnnnnn).
- If the FIR is affected by a VA cloud with limited information about the eruption which generated the cloud, then parts of element 3 may be set as “unknown” (refer to 5.8.4.9 for details).

Example: VA ERUPTION MT GARIBALDI PSN N4951 W12300

5.8.4.3 Volcanic ash cloud (element 4)

VA CLD OBS [AT <GGggZ>] or VA CLD FCST

Time of observation of the VA CLD. The time of observation is taken from the source of the observation (satellite image, special air-report, report from ground volcano logical station, etc.). If the VA cloud is not yet observed over the FIR but the volcanic ash advisory received from the responsible VAAC indicates that the cloud will be affecting the FIR after a certain time within the next 12 hours, a SIGMET **shall** be issued, and the abbreviation VA CLD FCST **shall** be used.

Example (1): VA CLD OBS AT 0110Z
Example (2): VA CLD FCST

5.8.4.4 Extent of the cloud (element 5)

Vertical: Refer to 5.8.3.5.
Horizontal: Refer to 5.8.3.4.

5.8.4.5 Movement or expected movement (element 6)

Refer to 5.8.3.6.

Square brackets indicate that element 6 is optional. It can only be used if element 7 is not used. Given that parts of a VA cloud often have differing motion (speed and direction) this element is normally omitted. Movement of the VA cloud is inferred by the forecast position at the end of the period of validity (element 7).

If, at the end of the period of validity, the VA cloud is expected to have left entirely Canada's area of responsibility, then element 6 is used while element 7 is omitted.

5.8.4.6 Volcanic ash cloud forecast at the end of the period of validity (element 7)

[FCST AT <GGggZ>]

The "GGggZ" group should indicate the end of the validity period given in the first line of the SIGMET message. Geographical location of the phenomenon is given as per section 5.8.3.4.

Square brackets indicate that element 7 is optional. It can only be used if element 6 is not used. Specifically, if at the end of the period of validity the VA cloud is expected to have left Canada's area of responsibility entirely, then element 7 is omitted and element 6 is used.

5.8.4.7 Remark (element 8)

Refer to 5.8.3.8

5.8.4.8 Example of a WV SIGMET

Example**:**

WVCN01 CWAO 111200
CZVR SIGMET U1 VALID 111200/111800 CWEG-
CZVR VANCOUVER FIR VA ERUPTION MT KASATOCHI PSN N5210 W17530
VA CLD OBS AT 1200Z FL270/400 WI 60NM WID LINE BTN N5415 W13502 -
N5045 W13255 FCST AT 1800Z WI 60NM WID LINE BTN N5415 W13411 - N5156
W13213 - N4956 W13100=

5.8.4.9 Special case: VA event with limited information

In the case of a VA cloud event and that limited information is available to the forecaster (i.e. first issuance of a VA SIGMET), the following elements may be set as "UNKNOWN":

- Eruption unknown (element 3): VA ERUPTION MT UNKNOWN PSN UNKNOWN
- Extent of the cloud unknown (element 5): FL UNKNOWN WI UNKNOWN
- Movement unknown (element 6): MOV UNKNOWN

Example:

Eruption of Mount Garibaldi observed on satellite pictures, no AIREP and no volcanic ash advisory from Montréal VAAC.

WVCN01 CWAO 161220
CZVR SIGMET U1 VALID 161220/161820 CWEG-
CZVR VANCOUVER FIR VA ERUPTION MT GARIBALDI PSN N4951 W12300
VA CLD OBS AT 1205Z FL UNKNOWN WI 60NM OF N4951 W12300
MOV UNKNOWN=

5.8.5 Format of the meteorological part of a WC SIGMET

The meteorological part of a WC SIGMET consists of the following 12 elements (this table has been divided into three parts due to horizontal space constraints):

Table 19: Meteorological elements of a WC SIGMET

Element 1 **Location indicator of the FIR**	**Element 2** **Name of the FIR**	**Element 3** **Phenomenon Name and position of centre**		**Element 4** **Associated CBs**	**Element 5** **Observed or forecast**
<CCCC>	<name> FIR	TC <name>	PSN <Nnnnn Wnnnnn>	CB	OBS [AT <GGggZ>] *or* FCST

Element 6 **Location of CBs**	**Element 7** **Level of CBs**	**Element 8[1]** **Movement or expected movement**	**Element 9** **Change in intensity**
WI <nnn>NM OF TC CENTRE *or* WI Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn	TOP FL<nnn>	[MOV <direction speed>KT *or* STNR]	INTSF *or* WKN *or* NC

Element 10[1] **Forecast of TC centre at the end of the period of validity**		**Element 11[1 and 2]** **Forecast position of CBs at the end of the period of validity**	**Element 12** **Remark**
[FCST AT <GGggZ>]	[TC CENTRE PSN Nnnnn Wnnnnn]	[CB WI <nnn>NM OF TC CENTRE *or* CB WI Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn]	RMK

Note (1): Element 8 **shall not** be used in conjunction with elements 10 and 11 in the same bulletin**.**

Note (2): The shape (i.e. circle or polygon) of the forecast CB position **shall** be the same as the one used in element 6.

5.8.5.1 Location indicator and name of the FIR (element 1 and 2)

Refer to 5.8.3.1.

5.8.5.2 Phenomenon name and position of centre (element 3)

TC <name> PSN <Nnnnn Wnnnnn>

The name of the tropical cyclone consists of the abbreviation TC followed by the international name of the tropical cyclone given by the Tropical Cyclone Advisory Centre (TCAC).

The position consists of the abbreviation PSN followed by the coordinates of one point corresponding to the TC centre. Refer to section 5.8.3.4 regarding rules pertaining to coordinate points.

Example (1): International SIGMET

TC GLORIA PSN N4714 W05424

Example (2)**:** National SIGMET

TC GLORIA PSN /N4714 W05424/75 W CYYT

5.8.5.3 Associated CBs (element 4)

The TC name and centre position **shall** be followed by the abbreviation CB.

5.8.5.4 The phenomenon is either observed or forecast (element 5)

OBS [AT <GGggz>] or FCST

Refer to 5.8.3.3. Normally, time is taken from the forecaster's observations or from a TC advisory received from a Tropical Cyclone Advisory Centre (TCAC) such as the Canadian Hurricane Centre (CHC). If the TC is not yet observed in the FIR but the tropical cyclone advisory or TC forecast indicate that it is going to affect the FIR within the next 12 hours, a SIGMET may be issued where the abbreviation FCST **shall** be used.

5.8.5.5 Location of CBs (element 6)

The location of CBs is depicted as:

- A circle around the TC centre defined as the radial distance in nautical miles
  WI <nnn>NM OF TC CENTRE
- A closed polygon area using coordinate points where the last coordinate point is a repeat of the first one. The number of coordinates should be kept to a minimum and should not normally exceed seven. The TC centre position **shall** be within the boundaries of the polygon area, unless the TC centre position is located just outside of Canada's AOR.
  WI Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn

Refer to 5.8.3.4 for more details about the use of polygon area.

Example (1): Circle area - International or National SIGMET

WI 45NM OF TC CENTRE

Example (2): Polygon area – International SIGMET

WI N4502 W07345 – N4907 W07331 – N5345 W06943 – N5256 W06758 N4848 W07149 – N4508 W07206 – N4502 W07345

Example (3): Polygon area – National SIGMET

WI /N4502 W07345/25 SW CYUL – /N4907 W07331/60 SE CYMT – /N5345 W06943/150 E CYAH – /N5256 W06758/45 W CYWK – /N4848 W07149/25 NE CYRJ – /N4508 W07206/25 SW CYSC – /N4502 W07345/25 SW CYUL

5.8.5.6 Level of CB cloud formation (element 7)

TOP FL<nnn>

Example: TOP FL450

5.8.5.7 Movement or expected movement (element 8)

Refer to 5.8.3.6.

For TC SIGMETs, “forecast of TC centre at the end of the period of validity” (element 10) and “forecast position of CB” (element 11) are not to be used in conjunction with the “movement or expected movement” (element 8). If, at the end of the period of validity, the area described in the SIGMET is expected to have left Canada’s area of responsibility entirely, then element 10 and 11 are omitted and element 8 is included.

Example:

WCNT01 CWAO 161223
CZQX SIGMET U2 VALID 161220/161820 CWUL-
CZQX GANDER OCEANIC FIR TC OLIVIA PSN N4730 W03300 CB OBS AT 1200Z
WI 120NM OF TC CENTRE TOP FL360 MOV NE 25KT WKN=

5.8.5.8 Change in intensity (element 9)

Refer to 5.8.3.7.

5.8.5.9 Forecast of TC centre at the end of the period of validity (element 10)

[FCST AT <GGggZ> TC CENTRE PSN <Nnnnn Wnnnnn>]

The GGggZ group should indicate the end of the validity period given in the first line of the SIGMET message. The geographical location of the TC centre, always preceded by the abbreviations "TC CENTRE PSN", is as per 5.8.3.4.

For TC SIGMETs, "forecast of TC centre at the end of the period of validity" (element 10) and "forecast position of CB" (element 11) are not to be used in conjunction with the "movement or expected movement" (element 8). If, at the end of the period of validity, the area described in the SIGMET is expected to still be within Canada's area of responsibility, then element 10 and 11 are included and element 8 is omitted. Refer to 5.8.5.12 for examples.

5.8.5.10 Forecast position of CBs at the end of the period of validity (element 11)

[CB WI <nnn>NM OF TC CENTRE] *or* [CB WI Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn – Nnnnn Wnnnnn]

Element 11 **shall** be used in conjunction with element 10. However, element 10 can be used on its own in the event that the extent of the CB circle around the TC centre has not changed at the end of the period of validity; then repeating the area described in element 6 is not recommended. Refer to 5.8.5.5.

5.8.5.11 Remark (element 12)

Refer to 5.8.3.8.

5.8.5.12 Example of a WC SIGMET

Example (1): Tropical cyclone Bertha with centre inside Gander Oceanic FIR at N45º45' W041º30'. The area of CB around the TC centre is diminishing over time.

WCNT01 CWAO 161220
CZQX SIGMET W3 VALID 161220/161820 CWUL-
CZQX GANDER OCEANIC FIR TC BERTHA PSN N4545 W04130 CB OBS AT 1200Z WI 150NM OF TC CENTRE TOP FL380 WKN FCST AT 1820Z TC CENTRE PSN N5230 W03430 CB WI 120NM OF TC CENTRE=

Example (2): Tropical cyclone Alberto with centre outside of Gander Oceanic FIR and polygon of CB affecting FIR

WCNT01 CWAO 161422
CZQX SIGMET V3 VALID 161420/162020 CWUL-

CZQX GANDER OCEANIC FIR TC ALBERTO PSN N4417 W04707 CB OBS WI N4700 W04800 – N4354 W04817 – N4352 W04614 – N4630 W04530 – N4700 W04800 TOP FL390 WKN FCST AT 2020Z TC CENTRE PSN N4410 W04254 CB WI N4700 W04330 – N4325 W04411 – N4316 W 04210 - N4600 W04100 – N4700 W04330=

5.8.6 Correcting a SIGMET

In the event of a SIGMET message transmitted with an error, a correction is sent by updating the SIGMET according to 5.8.7.

5.8.7 Updating a SIGMET

An updated SIGMET, when issued, automatically replaces the previous SIGMET in the same series (i.e. the previous SIGMET with the same letter):

- A WS SIGMET must be updated every four hours (from date/time group in the WMO heading. (Refer to 5.8.1).
- A WV and a WC SIGMET must be updated every six hours (from date/time group in the WMO heading). (Refer to 5.8.1)
- However, a forecaster should update a SIGMET at any time if necessary or if the SIGMET becomes unrepresentative.

For rules regarding the alphanumeric sequence, refer to 5.8.2.1.

Example (1): For an ongoing phenomena:
WSCN05 CWAO 161220
CZUL SIGMET M3 VALID 161220/161620 CWUL-
Updated four hours later (i.e. before 1620Z) as:
WSCN05 CWAO 161605
CZUL SIGMET M4 VALID 161605/162005 CWUL-

Example (2): For an expected phenomenon (expected time of occurrence 0315Z):
WSCN01 CWAO 040115
CZVR SIGMET U1 VALID 040315/040715 CWEG-
Updated at 0245Z as event occurred earlier (30 minutes) than expected:
WSCN01 CWAO 040245
CZVR SIGMET U2 VALID 040245/040645 CWEG-

Example (3): For an expected VA event (expected time of occurrence 1800Z):
WVCN02 CWAO 280920
CZEG SIGMET J1 VALID 281800/290000 CWEG-

Updated six hours later (i.e. before 1520Z) as:

WVCN02 CWAO 281510

CZEG SIGMET J2 VALID 281800/290000 CWEG-

Updated voluntarily by the forecaster at the start of the occurrence as:

WVCN02 CWAO 281800

CZEG SIGMET J3 VALID 281800/290000 CWEG-

5.8.8 Cancelling a SIGMET

If, during the validity period of a SIGMET, the phenomenon for which the SIGMET had been issued is no longer occurring or no longer expected to occur, this SIGMET **shall** be cancelled by the issuing MWO. The cancellation is done by issuing the same type of SIGMET.

5.8.8.1 WMO header

Same data type designator. Refer to 5.8.1.

5.8.8.2 First line—CCCC SIGMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Table 20: CCCC SIGMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Symbol	Interpretation
CCCC	ICAO location indicator of the ATS unit serving the FIR to which the SIGMET refers
SIGMET	Message identifier
[n]nn	Daily alphanumeric sequence (refer to 5.8.2.1)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of SIGMET given by date/time group of the beginning and date/time group of the end of the period
CCCC-	ICAO location indicator of the MWO originating the message, and a hyphen "-" (without a space); separating the preamble from text (refer to 5.8.2.3).

5.8.8.2.1 Daily alphanumeric sequence

Number incremented by one. Refer to 5.8.2.1 for details.

5.8.8.2.2 Validity period of SIGMET

In the case of a SIGMET for an ongoing phenomenon:

- the date/time group indicating the start of the SIGMET period will be rounded back to five minutes from the filing time (date/time group in the WMO heading) while the date/time group indicating the end of the SIGMET period does not change from the SIGMET it cancels.
- if the validity period has expired, the date/time group indicating the start and end of the SIGMET period will all be the same, and those will be rounded back to five minutes from the filling time.

In the case of a SIGMET for an expected phenomenon (forecast event):

- the validity period remains unchanged.

5.8.8.3 Second line

The second line of a cancelled SIGMET consists of the following seven elements (this table has been divided into two parts due to horizontal space constraints):

Table 21: Meteorological elements of a cancelled SIGMET (any type)

Element 1 Location indicator of the FIR	Element 2 Name of the FIR	Element 3 Cancellation	Element 4 SIGMET message being cancelled
<CCCC>	<name> FIR	CNL	SIGMET [n]nn

Element 5 Validity period of SIGMET message being cancelled	Element 6 VA movement	Element 7 Remark
<YYGGgg/YYGGgg>	[VA MOV TO <CCCC> FIR]	RMK

5.8.8.3.1 Location indicator and name of the FIR (element 1 and 2)

Refer to 5.8.3.1.

5.8.8.3.2 Cancellation (element 3)

Indicated by the abbreviation CNL.

5.8.8.3.3 SIGMET message being cancelled (element 4)

The abbreviation SIGMET followed by the alphanumeric sequence of the message being cancelled.

5.8.8.3.4 Validity period of SIGMET message being cancelled (element 5)

A reference to the valid period for which the SIGMET is being cancelled.

5.8.8.3.5 VA movement (element 6)

Indication of VA moving into another FIR (optional). Coordination with neighbouring meteorological watch offices (MWO) is required if VA is moving into a FIR outside Canada's area of responsibility.

5.8.8.3.6 Remark (element 7)

Refer to 5.8.3.8.

Example (1): For an ongoing phenomena:
WSCN05 CWAO 161220
CZUL SIGMET M3 VALID 161220/161620 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled as:
WSCN05 CWAO 161430
CZUL SIGMET M4 VALID 161430/161620 CWUL-
CZUL MONTREAL FIR CNL SIGMET M3 161220/161620=

Example (2): For an ongoing phenomena:
WSCN05 CWAO 161220
CZUL SIGMET M3 VALID 161220/161620 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled late as the validity period had expired:
WSCN05 CWAO 161630
CZUL SIGMET M4 VALID 161630/161630 CWUL-
CZUL MONTREAL FIR CNL SIGMET M3 161220/161620=

Example (3): For an expected phenomenon (expected time of occurrence 1500Z):
WSCN05 CWAO 161220
CZUL SIGMET M1 VALID 161500/161900 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled before the expected time of commencement of the phenomenon as:
WSCN05 CWAO 161430
CZUL SIGMET M2 VALID 161500/161900 CWUL-
CZUL MONTREAL FIR CNL SIGMET M1 161500/161900=

5.8.9 Test SIGMET

There may be occasions when test SIGMET messages are transmitted by the MWO. The test SIGMET messages will be identifiable by the letter "T" in the alphanumeric sequence (refer to 5.8.2.1). Additionally, the word "TEST" will be added at the beginning of the message.

Examples of a test message:

International (ICAO)

WSCN03 CWAO 162225
CZWG SIGMET **T1** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR **TEST** SQL TSGR OBS WI 40NM WID LINE BTN N4929 W09449 - N5104 W09348 - N5209 W09120 TOP FL340 MOV E 15KT NC=

National

WSCN23 CWAO 162225
CZWG SIGMET **T1** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR **TEST** SQL TSGR OBS WI 40NM WID LINE BTN /N4929 W09449/25 SW CYQK - /N5104 W09348/CYRL - /N5209 W09120/60 NW CYPL TOP FL340 MOV E 15KT NC
RMK GFACN33=

Examples of a cancellation of a test message:

International (ICAO)

WSCN03 CWAO 162300
CZWG SIGMET **T2** VALID 162300/170225 CWEG-
CZWG WINNIPEG FIR TEST CNL SIGMET T1 162225/170225=

National

WSCN23 CWAO 162300
CZWG SIGMET **T2** VALID 162300/170225 CWEG-
CZWG WINNIPEG FIR TEST CNL SIGMET T1 162225/170225
RMK GFACN33=

5.8.10 Relationship to GFA and Sig Wx prognostic charts

A SIGMET will be issued to advise pilots on the occurrence or expected occurrence of specified weather phenomena, regardless of the fact that the phenomena may or may not be included in the Graphic Area Forecast (GFA). Once issued, a SIGMET message automatically amends the current GFA. Because a SIGMET may be covering a greater vertical extent than the GFA, it may also amend the Sig Wx prognostic charts.

5.8.11 Relationship to AIRMET

A SIGMET is always issued for specified weather phenomena whereas an AIRMET is issued for specified weather phenomena only if they are not included in the GFA.

In a situation where a phenomenon described in a SIGMET decreases in intensity to now meet the AIRMET criteria (e.g. SEV TURB becomes MOD TURB), the SIGMET **shall** then be cancelled. An AIRMET **shall** be issued, if and only if the phenomenon was not forecast in the current GFA. If the phenomenon was forecast in the currently valid GFA, the issuance of an AIRMET is not required.

Conversely, a phenomenon that had resulted in the issuance of an AIRMET may increase in intensity to the SIGMET criteria. In this situation, the AIRMET **shall** be cancelled while a SIGMET **shall** be issued.

Chapter 6 AIRMET Information

6.1 Definition

AIRMET: Information message issued by a meteorological watch office (MWO) to advise pilots of the occurrence or expected occurrence of specified weather phenomena which may affect the safety of aircraft operations and were not already included in a Graphic Area Forecast (GFA), and the development of those phenomena in time and space.

6.2 Domain

The message **shall** describe specified weather phenomena up to and including 24,000 feet (FL240) for the Canadian flight information regions (FIR) and a portion the Gander Oceanic flight information region. Refer to E.1 of Appendix E for the map of the Canadian AIRMET information domain. As with a GFA, the top of a weather phenomenon above FL240 is stated, provided that the base of such phenomenon is below FL240.

6.3 Projection

As per *WMO No. 49 - Technical Regulations, Volume II, Meteorological Service for International Air Navigation,* section [C.3.3] 3.2.2, the depiction of the location of the phenomenon **shall** use the polar stereographic projection true at 60 degrees latitude north with lines between coordinate points as orthodromes (great circles).

6.4 Language

An AIRMET message is prepared in abbreviated English language using approved MSC abbreviations as published in the *Manual of Word Abbreviations* (MANAB). Abbreviations to be used in AIRMET messages are given in E.2 of Appendix E.

6.5 Units

The only units explicitly stated are:

- nautical miles (NM) for a distance associated to the abbreviation “WI” (within)
- knots (KT) for speed
- Zulu (Z) for time in UTC, with midnight being indicated by the numerals zero and zero “00”
- statute miles (SM) for visibility
- feet (FT) for the height (above ground level) of the base and top of BKN or OVC cloud
- heights are otherwise stated in flight levels corresponding to hundreds of feet and preceded by the abbreviation “FL”.

6.6 Types of AIRMET

ICAO Annex 3 provides one AIRMET format which encompasses all of the specified weather phenomena. An AIRMET can be identified through the data type designator included in the WMO abbreviated heading of an AIRMET message as explained in section 6.7.

6.7 Structure of the AIRMET message

An AIRMET message consists of:

- WMO heading - an AIRMET is preceded by an appropriate WMO heading
- First line - containing location indicators of the relevant ATS unit serving the FIR and MWO, alphanumeric identification and period of validity.
- Meteorological part - containing meteorological information concerning the phenomenon for which the AIRMET is issued.
- Equal sign “=” - indicates the end of the message.

6.8 Format of AIRMET

Note: In the following text, square brackets [ ] are used to indicate an optional or conditional element, and angled brackets < > for symbolic representation of a variable element, which in the real AIRMET accepts concrete alphanumeric values.

6.8.1 WMO header

The *WMO No. 386 - Manual on the Global Telecommunication System* recommends the use of the following abbreviated headings for bulletins containing meteorological information.

Table 22: $T_1T_2A_1A_2$ii CCCC YYGGgg [CCx]

Symbol	Interpretation
T_1	Data type designator (refer to 6.8.1.1)
T_2	Data type designator (refer to 6.8.1.1)
A_1A_2	Geographical designator (where message applies not the issuing country) (refer to 6.8.1.2)
ii	Bulletin number (refer to 6.8.1.3)
CCCC	International four-letter location indicator of the centre originating or compiling the bulletins (refer to 6.8.1.4)
YYGGgg	International date-time group
CCx	Correction identifier (refer to 6.8.1.5)

6.8.1.1 Data type designator

T_1: W for Warnings (refer to *WMO-No. 386, table A, A.II 5/2*)

T_2: A for AIRMET (refer to *WMO-No. 386, table B1, A.II-5/6*)

6.8.1.2 Geographical designator

The geographic designator indicates where the meteorological information applies to, not the issuing country.

A_1A_2: CN for Canada (all FIRs but CZQX Oceanic) (refer to *WMO-No. 386, table C1, A.II-5/9*)

A_1A_2: NT for North Atlantic area (CZQX Oceanic) (refer to *WMO-No. 386, table C, A.II-5/12*)

6.8.1.3 Bulletin number

ii**:** number with two digits

- 01–19 for global distribution
- 20–39 for inter-regional distribution (as per WMO regions)

6.8.1.4 International four-letter location indicator of the centre originating or compiling the bulletins

CCCC: As standardized practice, all AIRMET messages issued by Canada will be under CWAO which refers to the Canadian Centre for Meteorological and Environmental Prediction/Network Operations (CCMEP/NETOPS) as the centre compiling the bulletins.

6.8.1.5 Correction identifier

CCx: Since there are no provisions in ICAO documentation for correcting an AIRMET, the correction identifier will not be used. Refer to 6.8.4 for details.

6.8.1.6 Bulletin scheme

AIRMET messages will be issued in a set of two bulletins. The first one is aimed at international distribution while the second one will contain additional information for national purposes. Refer to E.3 of Appendix E for the full bulletin scheme, as shown in this excerpt:

FIR	FIR name	Type	International (ICAO)	National
CZYZ	TORONTO	AIRMET	WACN04 CWAO	WACN24 CWAO

6.8.2 First line—CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Table 23: CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Symbol	Interpretation
CCCC	ICAO location indicator of the ATS unit serving the FIR to which the AIRMET refers
AIRMET	Message identifier
[n]nn	Daily alphanumeric sequence (refer to 6.8.2.1)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of AIRMET given by date/time group of the beginning and date/time group of the end of the period (refer to 6.8.2.2)
CCCC-	ICAO location indicator of the MWO originating the message and a hyphen "-" (without a space); separating the preamble from text (refer to 6.8.2.3).

6.8.2.1 Daily alphanumeric sequence

1) An AIRMET message **shall** be identified by a letter:
   - letter attribution rules and the lettering scheme are defined in section E.4 Appendix E.
2) An AIRMET message letter **shall** be numerically sequenced as follows:
   - numbering of an AIRMET message letter begins at one;
   - the number is incremented by one when updating the message, including cancellation;
   - the sequence number **shall** correspond with the number of AIRMET messages issued for an event within a FIR since 0000Z on the day concerned; and
   - the numbering is thus reset at 0000Z (messages are not updated at 0000Z for the sole purpose of resetting the number).

Example: CZVR AIRMET U1 VALID 040315/040715 CWEG-

6.8.2.2 Validity period and lead time of AIRMET

Table 24: Validity period and lead time of AIRMET

Symbol	Lead time – up to (hours)	Validity period (hours)
WA	4	4

1) The period of validity of an AIRMET is four hours.
2) In the case of an AIRMET for an ongoing phenomenon:
   - the date/time group indicating the start of the AIRMET period will be rounded back to five minutes from the filing time (date/time group in the WMO heading).
3) In the case of an AIRMET for an expected phenomenon (forecast event):
   - the beginning of the validity period will be the time of the expected commencement (occurrence) of the phenomenon.
   - For an AIRMET, the lead time (the time of issuance of the AIRMET) can be up to four hours before the start of the validity period (i.e. expected time of occurrence of the phenomenon).
   - An AIRMET for an expected phenomenon is issued only for the first appearance of an event in Canadian airspace (e.g. moving in from the U.S. or onset inside a Canadian FIR). A phenomenon moving from one Canadian FIR to another is treated as an ongoing phenomenon. No forecast event AIRMET message would be issued for the FIR in which the event is moving.

Example (1): For an ongoing phenomenon:
WACN05 CWAO 161220
CZUL AIRMET M1 VALID 161220/161620 CWUL-

Example (2): For an expected phenomenon (expected time of occurrence 0315Z):
WACN01 CWAO 040115
CZVR AIRMET U1 VALID 040315/040715 CWEG-

6.8.2.3 Meteorological Watch Office (MWO)

CWUL for Canadian Meteorological Aviation Center - East (CMAC-E) in Montréal.

CWEG for Canadian Meteorological Aviation Center - West (CMAC-W) in Edmonton.

6.8.3 Format of the meteorological part of an AIRMET

The meteorological part of an AIRMET consists of the following nine elements (this table has been divided into two parts due to horizontal space constraints).

Table 25: Meteorological elements of an AIRMET

Element 1 Location indicator of the FIR	Element 2 Name of the FIR	Element 3 Description of the phenomenon	Element 4 Observed or forecast	Element 5 Location
<CCCC>	<name> FIR	<Phenomenon>	OBS [AT <GGggZ>] FCST	Geographical location of the phenomenon

Element 6 Level	Element 7 Movement or expected movement	Element 8 Change in intensity	Element 9 Remark
[FL<nnn/nnn>] [SFC/FL<nnn>] [TOP FL<nnn>]	MOV <direction, speed>KT STNR	INTSF or WKN or NC	RMK

6.8.3.1 Location indicator and name of the FIR (element 1 and 2)

Example (1): CZUL MONTREAL FIR

Example (2): CZVR VANCOUVER FIR

6.8.3.2 Description of the phenomenon (element 3)

The description of the phenomenon consists of a qualifier and a phenomenon abbreviation. AIRMETs are issued for the following phenomena:

1) SFC WSPD - widespread mean surface wind speed above 30 kts
2) Surface visibility and/or cloud less than 3SM and/or BKN or OVC below 1000FT AGL over a widespread area
   - Visibilities are indicated in statute miles. Visibilities expressed with a whole mile and a fraction will include a space: e.g. 1 1/4SM
   - Heights for cloud bases and tops are indicated in FT above ground level for consistency with the GFA. In the AIRMET bulletin, FT is mentioned whereas AGL is implied.

3) Thunderstorm (TS) and/or Towering cumulus (TCU)
   - TCU if ISOL, OCNL, FRQ; or
   - TS if ISOL, OCNL, with hail as necessary; or
   - Both TS and TCU if both are present and the spatial amount of the TCU exceeds that of the TS, with the cumulative spatial amount not exceeding 100%. Otherwise only the TS is reported.
4) Turbulence (TURB) only MOD
5) Icing (ICE) only MOD
6) Mountain waves (MTW) only MOD

The appropriate abbreviations and combinations thereof, and their meaning are given in E.5 of Appendix E.

6.8.3.3 The phenomenon is either observed or forecast (element 4)

OBS [AT <GGggZ>] or FCST

The abbreviation OBS is used when:

- there has been a recent[1] direct observation of the phenomenon (e.g. METAR, PIREP); or
- there has been a recent[1] indirect observation of the phenomenon (i.e. remote sensing imagery) or the observation of a meteorological element (e.g. strong wind, freezing precipitation), which leads the forecaster to believe that the phenomenon is occurring.

OBS is optionally followed by the time group in the form of AT GGggZ, where GGgg is the time of the observation in hours and minutes UTC. If the exact time of the observation is not known, the time is not included. No additional information will be given, e.g. aircraft type reporting the phenomenon.

Note (1): recent means normally within a two hour period preceding the issuance time of the AIRMET and in no circumstance more than three hours preceding the issuance time of the AIRMET.

The use of FCST occurs if either:

- the phenomenon is not directly or indirectly observed but there is strong meteorological evidence (i.e. numerical guidance) to suggest that the phenomenon is occurring; or
- the phenomenon is expected. In other words, there is meteorological evidence (i.e. numerical guidance) to suggest that the phenomenon will be occurring within the prescribed lead time (refer to 6.8.2.2).

When FCST is used, it is assumed that the time of the occurrence or commencement of the phenomenon coincides with the beginning of the period of validity in the first line of the AIRMET.
Example (1): OBS AT 0140Z
Example (2): FCST

6.8.3.4 Location of the phenomenon (element 5)

The location of the phenomenon is depicted as an area using coordinate points:

- The description always begins with the abbreviation "WI" (within).
- The area can be described as a circle, a line or a polygon.
- Distances are in nautical miles (NM), direction to one of the eight points of compass (octants[1]).

Note (1): Refer to E.6 of Appendix E for details.

Table 26: Maximum coordinate points by AIRMET shape

Description	Recommended maximum number of coordinate points
Circle[1]	1
Line[2]	4
Polygon[3]	7

Note (1): A radial distance is used to define the size of the circle.
Note (2): The line is defined by the entire width of an area centered on a line between two or more points.
Note (3): Polygons shall be closed. The last coordinate point is a repeat of the first one.

Coordinate points:

- The international (ICAO) AIRMET message describes a coordinate point using a latitude and longitude only (resolution defined in E.6 of Appendix E)
- The national AIRMET message describes a coordinate point using a latitude and longitude. Additionally, an equivalent description with respect to an aviation reference site[3] is given corresponding to an approximation of the coordinate point in latitude and longitude.

There are two exceptions to this rule:

1) Any coordinate point located within Gander Oceanic FIR will be described in latitude and longitude only. These points will be limited to the resolution as defined in E.6 of Appendix E.
2) Any coordinate point north of N7200 will be described with respect to an aviation reference site only if within a 90 nautical mile radius of that site. Otherwise the coordinate point will be represented in latitude and longitude only. This is due to the sparse number of aviation reference sites over northern Canada.

Table 27: Format for coordinate points

Bulletin	Symbolic form	Examples
International (ICAO)	Nnnnn Wnnnnn	N4502 W07345
National	/Nnnnn Wnnnnn/[Distance[1] Direction[2]] Identifier[3]	/N4502 W07345/25 SW CYUL

Note (1): Distance is in nautical miles (NM) with units not explicitly stated.
Note (2): Direction to the eight point compass (octants). See E.6 of Appendix E for details
Note (3): Refer to E.7 of Appendix E for the list of available aviation reference sites.

Table 28: Examples of coordinate points

Description	International (ICAO)	National
Circle	WI 45NM OF N4643 W07345	WI 45NM OF /N4643 W07345/75 N CYUL
Line	WI 50NM WID LINE BTN N4459 W07304 - N4855 W07253 - N5256 W06904	WI 50NM WID LINE BTN /N4459 W07304/45 SE CYUL - /N4855 W07253/30 NW CYRJ - /N5256 W06904/75 W CYWK
Polygon	WI N4502 W07345 - N4907 W07331 - N5345 W06943 - N5256 W06758 - N4848 W07149 - N4508 W07206 - N4502 W07345	WI /N4502 W07345/25 SW CYUL - /N4907 W07331/60 SE CYMT - /N5345 W06943/150 E CYAH - /N5256 W06758/45 W CYWK - /N4848 W07149/25 NE CYRJ - /N4508 W07206/25 SW CYSC - /N4502 W07345/25 SW CYUL

6.8.3.5 Flight level and extent (element 6)

[FL<nnn/nnn>]
[SFC/FL<nnn>]
[TOP FL<nnn>]

The location and extent of the phenomenon in the vertical is given by one or more of the above abbreviations, as follows:

- A layer FL<nnn/nnn> where the lower level is reported first; this is used particularly in turbulence and icing AIRMETs
- A layer with reference to one FL using SFC/FL<nnn>
- The level of the tops of the TS and/or TCU clouds using the abbreviation TOP

Example (1): MOD TURB…FL220/270
Example (2): MOD ICE…SFC/FL030
Example (3): ISOL TS…TOP FL340

Square brackets "[ ]" indicate that element 6 is optional. Specifically, element 6 is not required for the three following phenomena:

1) SFC WSPD - widespread mean surface wind speed above 30 kts.
2) Surface visibility and/or cloud - visibility less than 3SM and/or BKN or OVC cloud below 1000FT AGL over a widespread area.
3) The level or extent of the phenomenon is either not required (i.e. phenomenon at the surface) or the information is contained within element 3 (i.e. low cloud description).

6.8.3.6 Movement or expected movement (element 7)

MOV <direction, speed>KT or STNR

Direction of movement is given with reference to one of the 16 points of compass (radials)[1]. Speed is given in knots (KT). The abbreviation STNR is used if no significant movement is expected.

Example (1): MOV SSE 15KT

Note (1): Refer to E.6 of Appendix E for details

6.8.3.7 Change in intensity (element 8)

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

- INTSF - intensifying
- WKN - weakening
- NC - no change

6.8.3.8 Remark (element 9)

The remark (RMK) is found only in the national AIRMET message. It begins on a new line. The purpose is to allow additional information of national interest to be conveyed in an AIRMET message. Items listed in the remark line will be separated by a forward slash "/":

- the GFA region(s) the AIRMET message applies to (refer to Figure 6),
- cross-referencing AIRMET messages when a phenomenon straddles one or several FIR boundaries (refer to Figure 6).
- for a phenomenon that has moved out of a FIR, the cancelled AIRMET message will refer to the continuing AIRMET message in neighbouring FIR(s) within Canada's AOR (refer to Figure 7).
- Additionally, for a phenomenon that has moved out of an FIR, the continuing AIRMET message in neighbouring FIR(s) within Canada's AOR will refer to the cancellation AIRMET message.

Symbolic form: RMK [GFACN<nn>] / [CCCC <name> FIR AIRMET[n]nn][1]

Note (1): Refer to 6.8.3.1 and 6.8.2.1 for the description.

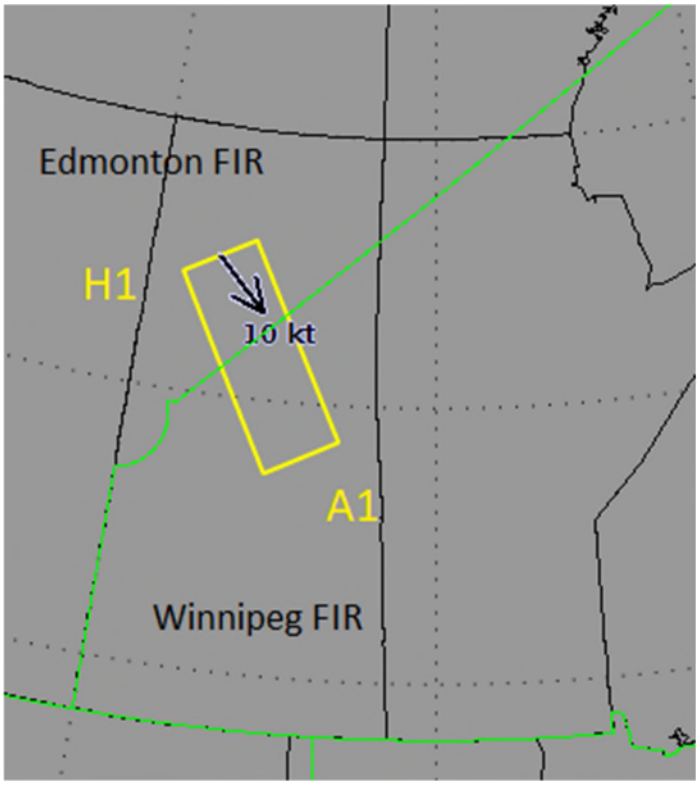


Figure 6: AIRMET phenomenon covering two FIR

The above phenomenon requires two AIRMET messages, one per FIR. The meteorological part will be identical in both messages (1) and (2).

Message (1):
WACN22 CWAO 161220
CZEG AIRMET H1 VALID 161220/161620 CWEG-
CZEG EDMONTON FIR «meteorological part»
RMK GFACN32/CZWG WINNIPEG FIR AIRMET A1=

Message (2):
WACN23 CWAO 161220
CZWG AIRMET A1 VALID 161220/161620 CWEG-
CZWG WINNIPEG FIR «meteorological part»
RMK GFACN32/CZEG EDMONTON FIR AIRMET H1=

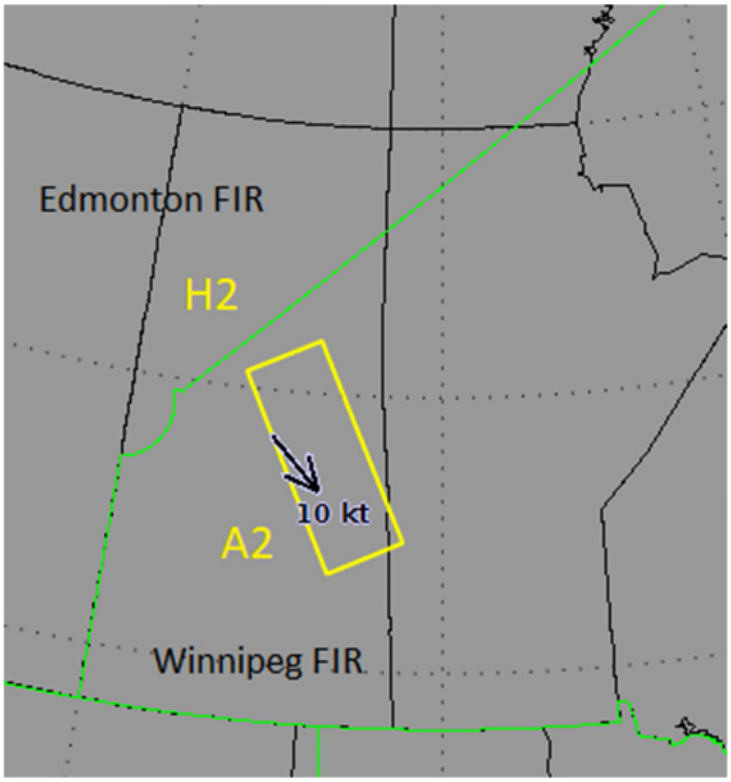


Figure 7: AIRMET phenomenon covering only one FIR

The above phenomenon is a continuation of Figure 6. In other words, the area has moved southeastward with time. AIRMET A2 is an update of A1 while AIRMET H2 is a cancellation of H1 since the phenomenon no longer affects the Edmonton FIR.

Message (1):
WACN22 CWAO 161530
CZEG AIRMET H2 VALID 161530/161620 CWEG-
CZEG EDMONTON FIR CNL AIRMET B1 161220/161620
RMK **GFACN32/CZWG WINNIPEG FIR AIRMET A2**=

Message (2):
WACN23 CWAO 161530
CZWG AIRMET A2 VALID 161530/161930 CWEG-
CZWG WINNIPEG FIR «meteorological part»
RMK **GFACN32/CZEG EDMONTON FIR AIRMET H2**=

6.8.4 Correcting an AIRMET

In the event of an AIRMET message transmitted with an error, a correction is issued by updating the AIRMET according to 6.8.5.

6.8.5 Updating of AIRMET

An updated AIRMET, when issued, automatically replaces the previous AIRMET in the same series (i.e. the previous AIRMET with the same letter):

- An AIRMET must be updated every four hours (from date/time group in the WMO heading, refer to 6.8.1); however,
- a forecaster should update an AIRMET at any time if necessary or if the AIRMET becomes unrepresentative.

For rules regarding the alphanumeric sequence, refer to 6.8.2.1.

Example (1): For an ongoing phenomena:
WACN05 CWAO 161220
CZUL AIRMET M3 VALID 161220/161620 CWUL-
Updated four hours later (i.e. before 1620Z) as:
WACN05 CWAO 161605
CZUL AIRMET M4 VALID 161605/162005 CWUL-

Example (2): For an expected phenomenon (expected time of occurrence 0315Z):
WACN01 CWAO 040115
CZVR AIRMET U1 VALID 040315/040715 CWEG-
Updated at 0245Z as event occurred earlier (30 minutes) than expected:
WACN01 CWAO 040245Z
CZVR AIRMET U2 VALID 040245/040645 CWEG-

6.8.6 Cancelling an AIRMET

Cancelling an AIRMET is required when:

- during the validity period of an AIRMET, the phenomenon for which the AIRMET had been issued is no longer occurring or no longer expected to occur (forecast AIRMET);
- during the validity period of an AIRMET, the phenomenon for which the AIRMET had been issued strengthens, such that a SIGMET is now required. Refer to 6.8.9 for details; and/or
- during the validity period of an AIRMET, the new issue of the Graphical Area Forecasts (GFA) has been transmitted and now includes the phenomenon. Refer to 6.8.8 for details.

An AIRMET does not cancel itself automatically at the end of its validity period.

6.8.6.1 WMO header

Other than for the date/time group, the WMO header remains the same. Refer to 6.8.1.

6.8.6.2 First line—CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Table 29: CCCC AIRMET [n]nn VALID YYGGgg/YYGGgg CCCC-

Symbol	Interpretation
CCCC	ICAO location indicator of the ATS unit serving the FIR to which the AIRMET refers
AIRMET	Message identifier
[n]nn	Daily alphanumeric sequence (refer to 6.8.2.1)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of AIRMET given by date/time group of the beginning and date/time group of the end of the period
CCCC-	ICAO location indicator of the MWO originating the message and hyphen "-" without a space; separating the preamble from text (refer to 6.8.2.3).

6.8.6.2.1 Daily alphanumeric sequence

Number incremented by one. Refer to 6.8.2.1 for details.

6.8.6.2.2 Validity period of AIRMET

When an AIRMET is for an ongoing phenomenon.

- The date/time group indicating the start of the AIRMET period will be rounded back to five minutes from the filing time (date/time group in the WMO heading) while the date/time group indicating the end of the AIRMET period does not change from previous AIRMET issued, it remains the same as the AIRMET it cancels.
- If the validity period has expired, the date/time group indicating the start and end of the AIRMET period will all be the same, and those will be rounded back to five minutes from the filling time

When an AIRMET is for an expected phenomenon.

- The validity period remains unchanged.

6.8.6.3 Second line

The second line of a cancelled AIRMET consists of six elements.

Table 30: Meteorological elements of a cancelled AIRMET

Element 1 Location indicator of the FIR	Element 2 Name of the FIR	Element 3 Cancellation	Element 4 AIRMET message being cancelled	Element 5 Validity period of AIRMET message being cancelled	Element 6 Remark
<CCCC>	<name> FIR	CNL	AIRMET [n]nn	<YYGGgg/YYGGgg>	RMK

6.8.6.3.1 Location indicator and name of the FIR (element 1 and 2)

Refer to 6.8.3.1.

6.8.6.3.2 Cancellation (element 3)

Indicated by the abbreviation CNL.

6.8.6.3.3 AIRMET message being cancelled (element 4)

The abbreviation AIRMET followed by the alphanumeric sequence of the message being cancelled.

6.8.6.3.4 Validity period of AIRMET message being cancelled (element 5)

A reference to the valid period for the AIRMET being cancelled.

6.8.6.3.5 Remark (element 6)

Refer to 6.8.3.8.

Example (1): For an ongoing phenomenon:
WACN05 CWAO 161220
CZUL AIRMET M3 VALID 161220/161620 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled as:
WACN05 CWAO 161430
CZUL AIRMET M4 VALID 161430/161620 CWUL-
CZUL MONTREAL FIR CNL AIRMET M3 161220/161620=

Example (2): For an ongoing phenomenon:
WACN05 CWAO 161220
CZUL AIRMET M3 VALID 161220/161620 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled late as the validity period had expired:
WACN05 CWAO 161630
CZUL AIRMET M4 VALID 161630/161630 CWUL-
CZUL MONTREAL FIR CNL AIRMET M3 161220/161620=

Example (3): For an expected phenomenon (expected time of occurrence 1500Z):
WACN05 CWAO 161220
CZUL AIRMET M1 VALID 161500/161900 CWUL-
CZUL MONTREAL FIR <<meteorological part>>
Cancelled before the expected time of commencement of the phenomenon as:
WACN05 CWAO 161430
CZUL AIRMET M2 VALID 161500/161900 CWUL-
CZUL MONTREAL FIR CNL AIRMET M1 161500/161900=

6.8.7 Test AIRMET

There may be occasions when test AIRMET messages are transmitted by the meteorological watch office (MWO). The test AIRMET messages will be identifiable by the letter T in the alphanumeric sequence (refer to 6.8.2.1). Additionally, the word “TEST” will be added at the beginning of the message.

Example (1):

International (ICAO)
WACN03 CWAO 162225
CZWG AIRMET **T1** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR **TEST** ISOL TS OBS WI 40NM WID LINE BTN N4929 W09449 - N5104 W09348 - N5209 W09120 TOP FL340 MOV E 15KT NC=

National
WACN23 CWAO 162225
CZWG AIRMET **T1** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR **TEST** ISOL TS OBS WI 40NM WID LINE BTN /N4929 W09449/25 SW CYQK - /N5104 W09348/CYRL - /N5209 W09120/60 NW CYPL TOP FL340 MOV E 15KT NC
RMK GFACN33=

Example (2):

International (ICAO)

WACN03 CWAO 162300
CZWG AIRMET **T2** VALID 162300/170225 CWEG-
CZWG WINNIPEG FIR **TEST** CNL AIRMET **T1** 162225/170225=

National

WACN23 CWAO 162300
CZWG AIRMET **T2** VALID 162300/170225 CWEG-
CZWG WINNIPEG FIR **TEST** CNL AIRMET **T1** 162225/170225
RMK GFACN33=

6.8.8 Relationship to GFA

An AIRMET is issued to advise pilots of the occurrence or expected occurrence of specified weather phenomena which may affect the safety of aircraft operations and were not already included in the Graphic Area Forecast (GFA). Once issued, an AIRMET message automatically amends the current GFA. If the phenomenon is included in the GFA, then there is no requirement to issue an AIRMET.

6.8.9 Relationship to SIGMET

A SIGMET is always issued for its specified weather phenomena. On the other hand, an AIRMET is issued for its specified weather phenomena if not included in the Graphic Area Forecast (GFA).

In a situation where a phenomenon described in a SIGMET decreases in intensity to now meet the AIRMET criteria (e.g. SEV TURB becomes MOD TURB), the SIGMET **shall** then be cancelled. An AIRMET **shall** be issued, if and only if the phenomenon was not forecast in the current GFA. If the phenomenon was forecast in the currently valid GFA, the issuance of an AIRMET is not required.

Conversely, a phenomenon that had resulted in the issuance of an AIRMET may increase in intensity to the SIGMET criteria. In this situation, the AIRMET **shall** be cancelled while a SIGMET **shall** be issued.

Chapter 7 Significant weather prognostic charts

7.1 Definition

Forecasts in chart or pictorial form depict, with greater clarity than verbal, the most probable forecast conditions over large areas. Forecast of significant enroute weather phenomena prepared as SIG WX charts are primarily designed to meet requirements for preflight planning.

7.2 Issuing centres

7.2.1 Canadian Meteorological Aviation Centres (CMAC)

The CMACs routinely issue a Graphic Area Forecast (GFA) in chart form as described in Chapter 4. Additionally, the CMACs routinely issue forecasts of significant weather (SIG WX) in chart form for the Canadian airspace and for the North Atlantic. These are detailed in 7.3.

7.3 CMAC prognostic charts

7.3.1 Canadian significant weather prognostic chart (CAN SIG WX)

7.3.1.1 Description

The chart is a depiction of forecast significant weather at mid-levels (700 hPa to 400 hPa or FL100 to FL240).

7.3.1.2 Issue and valid times

The charts are issued four times a day at approximately 0210, 0815, 1425 and 1940 UTC, and are valid at 12, 18, 00 and 06 UTC respectively. In other words, a chart is issued roughly 10 hours before its valid time.

7.3.1.3 Domain

The Canadian significant weather prognostic chart covers the seven GFA domains. Refer to 4.4 for details.

7.3.1.4 Units

Speeds are expressed in knots (KT) and heights in hundreds of feet. Mean sea level pressure is in hectopascals (hPa), and time is expressed in coordinated universal time (UTC).

7.3.1.5 Map projection and background

As per the *Technical Regulations (WMO-No. 49)*, Volume II, Meteorological Service for International Air Navigation, Section [C.3.3] 3.2.2, the map **shall** use the polar stereographic projection true at 60 degrees latitude north.

For clarity, the map background contains at least the following features:

- provincial, federal and territorial boundaries
- oceans, coastlines and major lakes

7.3.1.6 Content

The significant weather charts depict forecast surface positions of pressure centres and fronts, forecast areas of significant cloud, turbulence and icing, as well as forecast freezing levels. When applicable, information on tropical cyclones, volcanoes/volcanic ash and radioactive releases are also indicated.

1) Areas of clouds

   Areas of clouds are indicated by scalloped lines. Cloud type, amount and thickness are indicated by NCC hh/hh, where:

   - N indicates the cloud cover as BKN or OVC;
   - CC indicates the type of cloud or may be replaced by LYR in cases of multiple vertical layers; and
   - hh/hh indicates the heights, in hundreds of feet ASL, of the top and of the base of the cloud. XX indicates a base below the 700 hPa level.

2) Turbulence

   Turbulence is indicated by a symbol (see below) shown within a given area. A forecast of turbulence implies a greater than 50% chance of encountering turbulence somewhere within the area to which the symbol applies.

   Symbol indicating moderate turbulence:

   Symbol indicating severe turbulence:

   - hh/hh gives the heights of the top and of the base of the turbulent layer, in hundreds of feet ASL. XX indicates a base below the 700 hPa level.

Note: A forecast of CB, thunderstorms, TCU, or ACC automatically implies moderate or severe turbulence; in this case, no turbulence symbol is used.

3) Icing

Icing is indicated by a symbol (see below) appearing within a given area.

Symbol indicating moderate icing:

Symbol indicating severe icing:

- hh/hh gives the heights of the top and of the base of the icing layer, in hundreds of feet ASL. XX indicates a base below the 700 hPa level.

Note: A forecast of CB, thunderstorms, TCU, or ACC automatically implies moderate or severe icing; in this case, no icing symbol is used.

4) Freezing levels

The freezing levels are depicted by dashed lines drawn at intervals of 5,000 feet and labeled in hundreds of feet ASL.

5) Surface fronts

Surface fronts are depicted in the standard fashion. Refer to C.2 of Appendix C for examples.

6) Pressure centres

Low and high pressure centres are marked "**L**" or "**H**", as applicable, and values of the central pressure are labeled in hPa.

7) Tropical cyclones

Tropical cyclones are indicated using the appropriate symbol along with official name:

Symbol indicating a tropical storm:

Symbol indicating a hurricane:

Note: The forecast mean direction and speed of motion (in knots) of surface pressure centres, fronts and trowals are added if the speed is greater than five knots. The direction and speed are six-hour means centred at the valid time of the chart.

7.3.2 North Atlantic significant weather prognostic chart (NAT SIG WX)

7.3.2.1 Description

The chart is a depiction of forecast significant weather at low and mid-levels (SFC to 400 hPa or SFC to FL240).

7.3.2.2 Issue and valid times

These charts are valid at 00 UTC and 12 UTC and are transmitted at approximately 1315 UTC and 0115 UTC respectively.

7.3.2.3 Domain

The North Atlantic significant weather prognostic chart covers the north-eastern section of North America, the North Atlantic Ocean between latitude 30 and 70 degrees, including Greenland, and a section of Western Europe.

7.3.2.4 Units

Refer to 7.3.1.4.

7.3.2.5 Map projection and background

Refer to 7.3.1.5.

7.3.2.6 Content

Refer to 7.3.1.6.

7.4 Examples of forecasts in chart form

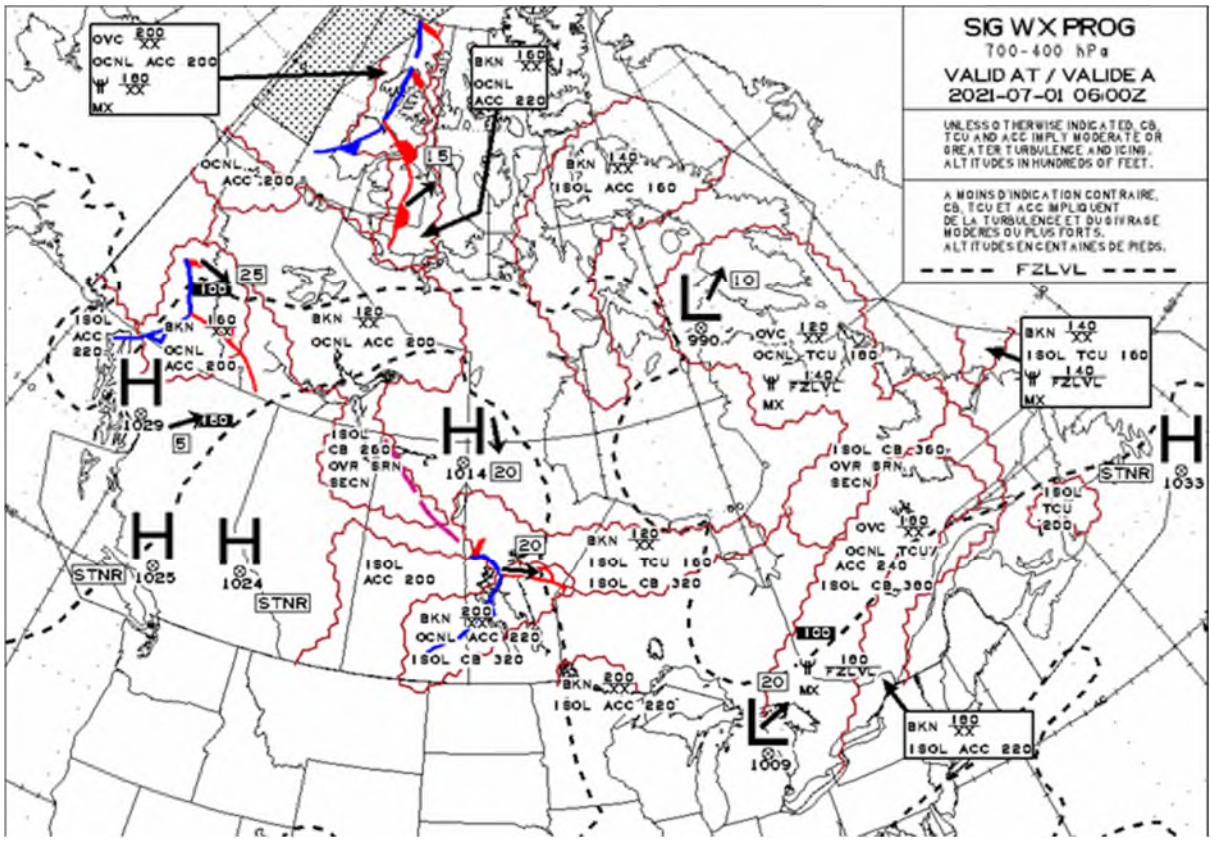


Figure 8: Canadian significant weather prognostic chart (CAN SIG WX)

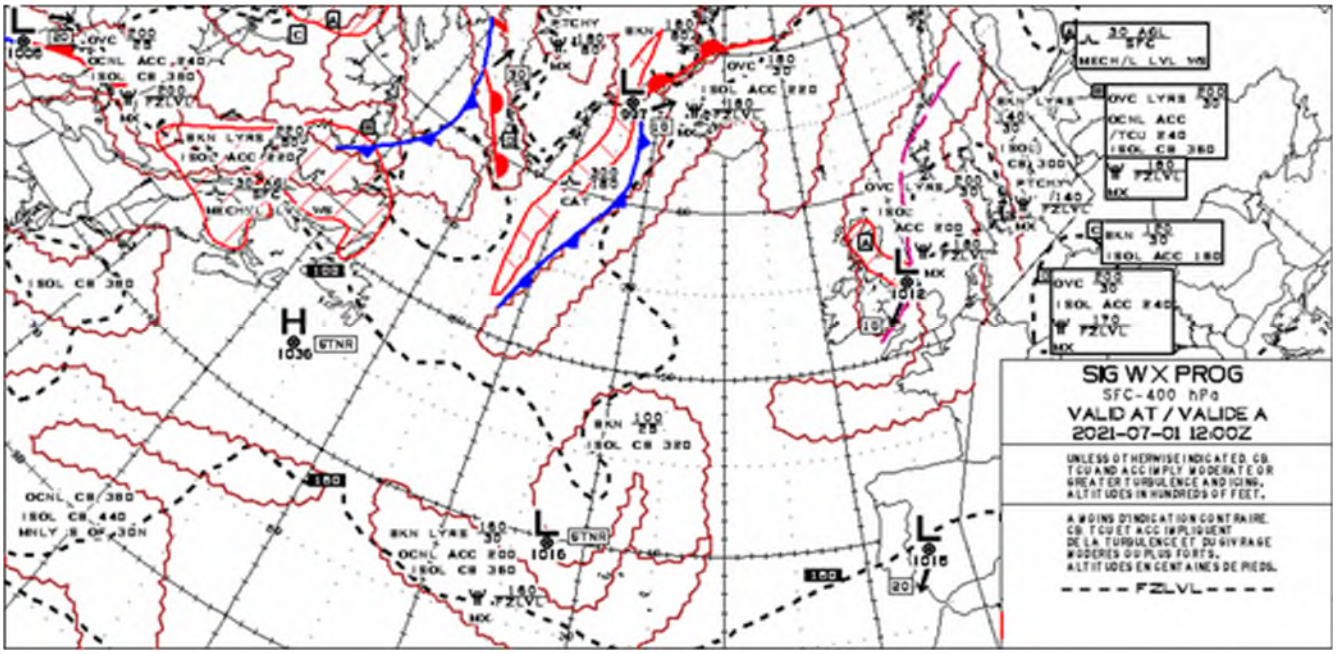


Figure 9: North Atlantic significant weather prognostic chart (NAT SIG WX)

Chapter 8 Definitions

The following terms are defined in accordance with their use in this manual. These definitions may not be appropriate for general use.

Abbreviated English: Abbreviated English language using approved Meteorological Service of Canada (MSC) abbreviations as published in *Manual of Word Abbreviations (*MANAB).

Aerodrome advisory: A forecast, in TAF code, issued for aerodromes which do not fully meet Environment and Climate Change Canada's (ECCC) weather observing standards.

Aerodrome forecast (TAF): A forecast, in TAF code, for a designated aerodrome usually issued on a routine basis. It consists of a concise statement of the expected meteorological conditions at the aerodrome for a specified period.

Aerodrome: Any area of land, water (including the frozen surface thereof) or other supporting surface used, designed, prepared, equipped or set apart for use, either in whole or in part, for the arrival, departure, movement or servicing of aircraft. This includes any buildings, installations and equipment situated thereon or associated therewith.

Aeronautical Meteorological Forecaster (AMF): An aeronautical meteorological forecaster is a meteorologist who meets, at a minimum, the definition and top-level competency standards as defined in the *Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology,* Volume I, Meteorology (WMO-No. 1083), as they pertain to aeronautical meteorology, who is continuously and actively responsible for the content of any aviation weather forecast service. Additional AMF competencies may be required that are in keeping with Canadian regulations.

Air traffic control (ATC): Service provided by ground-based controllers who direct aircraft on the ground and through controlled airspace. The primary purpose of ATC systems worldwide is to separate aircraft to prevent collisions, to organize and expedite the flow of traffic, and to provide information and other support for pilots when able.

Air traffic service (ATS): A service which regulates and assists aircraft in real-time to ensure their safe operations.

AIRMET: Information message issued by a meteorological watch office (MWO) to advise pilots of the occurrence or expected occurrence of specified weather phenomena which may affect the safety of aircraft operations, which were not already included in the Graphic Area Forecasts (GFA), and the development of those phenomena in time and space.

Alittude above ground level (AGL): The altitude expressed in feet measured above ground level.

Alternate aerodrome (ALTERNATE): An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or land at the aerodrome of intended landing.

Altitude above Sea Level (ASL): The altitude expressed in feet measured above sea level.

Altitude: The vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

Area of Responsibility (AOR): The geographical area over which Canada has the responsibility for providing aviation weather forecast services to civil aviation. This area is composed of all seven Canadian domestic Flight Information Regions (FIRs) as well as the Gander Oceanic FIR/CTA as per international agreement.

Automated Weather Observation System (AWOS): A set of meteorological sensors and associated systems designed to electronically collect and disseminate meteorological data.

Aerodrome routine meteorological report (METAR): An aviation report that describes the actual weather conditions at a specified location and at a specified time as observed from the ground. METAR is the name of the international meteorological code for an aviation routine weather report. METAR observations are normally taken and disseminated on the hour.

Aviation special weather report (SPECI): A SPECI, the name of the code for an aviation selected special weather report, will be reported when weather changes of significance to aviation are observed.

Aviation weather service: The provision of weather information intended primarily for the safe, regular and efficient conduct of aviation operations.

***Canadian Aviation Regulations* (CAR)**: The rules, enacted under the *Aeronautics Act*, that govern civil aviation in Canada. Replacing the Air Regulations and the Air Navigation Orders, the CARs and their associated standards came into force on October 10, 1996, after a comprehensive consultation process between Transport Canada and the aviation community. This cooperative and partnership approach to rule-making continues within the Canadian Aviation Regulation Advisory Council (CARAC), which discusses proposed amendments to the CARs and their associated standards.

Canadian Meteorological Aviation Centre (CMAC): A meteorological centre dedicated to production of aviation weather forecasts and the monitoring of meteorological conditions which may affect flight operations in Canada. As such a CMAC fulfills the role of a meteorological watch office (MWO).

Canadian Centre for Meteorological and Environmental Prediction (CCMEP): The component of the MSC responsible for the assimilation of weather data for objective and subjective analyses and forecasts and for generating numerical weather prediction products as guidance to support forecast production centres.

Ceiling: The lesser of the height above ground or water of the base of the lowest layer of cloud where the summation amount exceeds half the sky (more than four eights (4/8)) or the vertical visibility in a surface-based layer which completely obscures the sky.

Control area (CTA): A controlled airspace extending upwards vertically from a specified height above the surface of the earth.

Department of National Defence (DND): Federal government department with the authority and responsibility to provide and arrange the provision of meteorological services to support the safe, efficient conduct of military aviation operations and training.

Domestic aviation: All aviation operations taking place solely within Canada. It specifically excludes trans-border (Canada-United States) and all other international air transport operations.

Environment and Climate Change Canada (ECCC): Canadian federal government department responsible for providing meteorological information to Canadians to ensure their safety and promote informed decision making related to the environment.

Flight Information Region (FIR): An airspace of defined dimensions extending upwards from the surface of the earth within which Flight Information Service (FIS) and alerting service are provided.

Flight Level (FL): A standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the international standard pressure datum of 1013.25 hPa (29.92 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

Forecast: A statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace.

Graphic Area Forecast (GFA): A forecast in chart form describing the most probable meteorological conditions expected to occur between the surface and 24,000 feet over a given area at a specified time.

Height: The vertical distance of a level, a point or an object considered as a point, measured from a specified datum, e.g. above ground.

International Civil Aviation Organization (ICAO): A specialized agency of the United Nations, the objective of which is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

MANAB: Manual of word abbreviations authorized for use in transmissions over Environment and Climate Change Canada's Telecommunication Networks.

MANOBS: Manual of surface weather observation standards which prescribes the standard procedures of the Meteorological Service of Canada for observing, recording and reporting weather conditions.

Meteorological Service of Canada (MSC): The component of Environment and Climate Change Canada (ECCC) that leads, serves as the national focus, provides science, policy and service support to ECCC. MSC also provides ice services, including research, systematic observations and forecasts directly to clients. MSC coordinates nationally the standards for the delivery of the aviation weather program as required by Transport Canada and NAV CANADA. Furthermore, MSC prepares and delivers aviation and other forecast products required by the Department of National Defence (DND).

Meteorological Watch Office (MWO): An office that maintains a continuous watch over meteorological conditions affecting flight operations within its specified area of responsibility. An MWO is responsible for the provision of SIGMET and AIRMET information as well as pertinent information on volcanic activity and radioactive release to the Air Navigation Services provider.

NAV CANADA (NC): A private sector non-share capital corporation, financed through publicly-traded debt, which owns and operates Canada's civil air navigation system. NAV CANADA has the responsibility for the provision of aviation weather services in Canadian airspace and any airspace in respect of which Canada has the responsibility for the provision of air traffic control services. NAV CANADA also specifies the location and frequency of aviation weather observations and forecasts, and is responsible for the dissemination of this information for aviation purposes.

Part-period: A portion or a segment of the period of validity of a forecast.

Period of coverage: The span of time which a TAF program covers daily.

Period of validity: The span of time which a forecast encompasses. Also called "valid period," it is part of the aerodrome forecast. It must, however, be kept in mind that a forecast is only valid until another forecast (regular, amended or cancelled) is issued for the same area of responsibility or the same aerodrome.

Pilot report (PIREP): A report by a pilot pertaining to weather conditions encountered in flight.

Plain English: As used in this manual, the expression "Plain English" is intended to mean non-abbreviated English language in a telegraphic type format intended to convey meteorological information to the aviation community as effectively and as efficiently as possible.

Prognostic chart: A forecast of one or several specified meteorological element for a specified time or period and a specified surface or portion of airspace, depicted graphically on a chart.

RCAP (Restricted Canada Air Pilot): Approach plates for non-standard approaches or company specific approaches.

RNAV (Area navigation): A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based NAVAIDs or within the limits of the capability of self-contained aids, or a combination of these.

SIGMET: An information message issued by a meteorological watch office (MWO) to advise pilots of the occurrence or expected occurrence of specified weather phenomena, which may affect the safety of aircraft operations, and the development of those phenomena in time and space.

Transport Canada (TC): The federal authority responsible for the regulation of civil aviation.

Valid period: Alternate term for “Period of validity.”

Weather station: An establishment primarily responsible for the observing and reporting of weather conditions. The station may be operated by a human observer, a fully automated system or a combination of both. Complete or partial sets of meteorological parameters may be observed.

World Area Forecast System (WAFS): A worldwide satellite broadcast system by which World Area Forecast Centres (WAFC) provide meteorological information for aviation purposes. These broadcasts are supervised by the International Civil Aviation Organization (ICAO) in order to fulfill requirements of the ICAO Annex 3 covering meteorological information which is necessary for flights.

World Meteorological Organization (WMO): A specialized agency of the United Nations (UN). It is the UN system's authoritative voice on the state and behavior of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resource.

Appendices

Appendix A Aerodrome Forecast (TAF)—Supplement to Chapter 2

Notes: This table lists all Canadian aerodromes with a TAF or advisory program issued by Environment and Climate Change Canada, as well as their applicable bulletin number, IFR Approach and Alternate Limits. Additional information, such as the coordinates and elevations, has been provided for completeness. For information beyond the bulletin and limit values listed in the following table, pilots are advised to refer to the latest Canadian Flight Supplement (CFS) and Canadian Air Pilot (CAP).

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYXX	Abbotsford	BC	N49 01 31	W122 21 36	194	59.1	CZVR	31	31	CMAC-W	300	1	600	2	1 ILS RVR
CYLT	Alert	NU	N82 31 04	W062 16 50	100	30.5	CZEG	39	37	DWS	300	1	800	2	
CYAB	Arctic Bay	NU	N73 00 23	W085 02 50	72	21.9	CZEG	33	37	CMAC-W	600	1 ½	1200	3	RNAV only
CYEK	Arviat	NU	N61 05 38	W094 04 18	34	10.4	CZEG	22	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYAT	Attawapiskat	ON	N52 55 39	W082 25 55	30	9.1	CZYZ	24	33	CMAC-E	500	1 ½	800	2 ½	RNAV only
CYBG	Bagotville	QC	N48 19 50	W070 59 47	522	159.1	CZUL	39	33	DWS	200	½	600	2	
CYBC	Baie-Comeau	QC	N49 07 57	W068 12 16	71	21.6	CZUL	36	34	CMAC-E	200	½	600	2	1 ILS RVR
CYBK	Baker Lake	NU	N64 17 56	W096 04 40	61	18.6	CZEG	22	36	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CZBF	Bathurst	NB	N47 37 47	W065 44 20	193	58.8	CZQM	37	34	CMAC-E	300	1	800	2	NPA (RNAV)

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CBBC	Bella Bella (Campbell Island)	BC	N52 11 06	W128 09 24	141	43.0	CZVR	31	31	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYTL	Big Trout Lake	ON	N53 49 04	W089 53 49	730	222.5	CZWG	24	33	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYBN	Borden (Heli)	ON	N44 16 18	W079 54 45	729	222.2	CZYZ	39	33	DWS	500	½	800	2	A
CYBR	Brandon Muni	MB	N49 54 36	W099 57 07	1343	409.3	CZWG	34	32	CMAC-W	300	1	600	2	1 ILS
CYVT	Buffalo Narrows	SK	N55 50 31	W108 25 03	1423	433.7	CZEG	32	32	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYDB	Burwash	YT	N61 22 14	W139 02 24	2642	805.3	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYYC	Calgary Intl	AB	N51 07 21	W114 00 48	3606	1099.1	CZEG	32	32	CMAC-W	0	⅛	400	1	6 ILS 6 RVR CATIII
CYBW	Calgary/Springbank	AB	N51 06 19	W114 22 17	3940	1200.9	CZEG	32	32	CMAC-W	300	1	600	2	1 ILS RVR
CYCB	Cambridge Bay	NU	N69 06 29	W105 08 14	102	31.1	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYBL	Campbell River	BC	N49 57 02	W125 16 15	357	108.8	CZVR	31	31	CMAC-W	300	1	600	2	1 ILS RVR
CYCA	Cartwright	NL	N53 40 58	W057 02 31	40	12.2	CZQX	38	34	CMAC-W	600	2	900	3	NPA (RNAV)
CYCG	Castlegar/West Kootenay Regional	BC	N49 17 47	W117 37 57	1626	495.6	CZVR	31	31	CMAC-W	2800	3	3100	3	RNAV only
CYLD	Chapleau	ON	N47 49 13	W083 20 49	1470	448.1	CZYZ	25	33	CMAC-E	500	1 ½	800	2 ½	NPA (RNAV)
CYYG	Charlottetown	PE	N46 17 21	W063 07 09	160	48.8	CZQM	37	34	CMAC-E	200	½	600	2	1 ILS RVR

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYMT	Chibougamau/Chapais	QC	N49 46 19	W074 31 41	1270	387.1	CZUL	26	33	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CZUM	Churchill Falls	NL	N53 33 43	W064 06 23	1442	439.5	CZQX	38	34	CMAC-E	300	1	800	2 ½	RNAV only
CYYQ	Churchill	MB	N58 44 21	W094 03 59	96	29.3	CZWG	34	32	CMAC-W	200	½	600	2	1 ILS RVR
CYCY	Clyde River	NU	N70 29 09	W068 31 01	87	26.5	CZEG	33	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYOD	Cold Lake/Group Captain R.W. McNair	AB	N54 24 18	W110 16 46	1775	541.0	CZEG	39	32	DWS	200	½	600	2	1 ILS RVR
CYQQ	Comox	BC	N49 42 39	W124 53 12	84	25.6	CZVR	39	31	DWS	200	½	600	2	2 ILS 2 RVR
CYZS	Coral Harbour	NU	N64 11 36	W083 21 34	204	62.2	CZEG	22	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYXC	Cranbrook/Canadian Rockies Intl	BC	N49 36 44	W115 46 55	3084	940.0	CZVR	31	31	CMAC-W	200	½	600	2	1 ILS
CYDN	Dauphin (Lt. Col W.G. Barker VC Aprt)	MB	N51 06 03	W100 03 09	999	304.5	CZWG	34	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYDA	Dawson City	YT	N64 02 32	W139 07 49	1215	370.3	CZEG	23	35	CMAC-W	1500	3	1800	3	NPA (RNAV)
CYDQ	Dawson Creek	BC	N55 44 32	W120 10 59	2147	654.4	CZEG	22	31	CMAC-W	300	1	900	3	RNAV only
CYDL	Dease Lake	BC	N58 25 20	W130 01 56	2634	802.8	CZEG	22	31	CMAC-W	800	2 ¼	2100	3	RCAP only
CYDF	Deer Lake	NL	N49 12 40	W057 23 29	72	21.9	CZQX	38	34	CMAC-E	200	½	600	2	1 ILS

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYWJ	Déline	NT	N65 12 40	W123 26 11	703	214.3	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYHD	Dryden Regional	ON	N49 49 54	W092 44 39	1354	412.7	CZWG	24	33	CMAC-E	300	1	600	2	1 ILS RVR
CYXR	Earlton (Timiscaming Regional)	ON	N47 41 42	W079 50 56	800	243.8	CZYZ	25	33	CMAC-E	300	1	800	2 ½	RNAV only
CYEG	Edmonton Intl	AB	N53 18 35	W113 34 47	2373	723.3	CZEG	32	32	CMAC-W	200	½	400	1	3 ILS 3 RVR
CYED	Edmonton/Namao (Heli)	AB	N53 40 09	W113 28 32	2257	687.9	CZEG	39	32	DWS	600	2	900	3	A
CZVL	Edmonton/Villeneuve	AB	N53 40 06	W113 51 08	2256	687.6	CZEG	32	32	CMAC-W	200	½	600	2	1 ILS RVR
CYEN	Estevan Regional	SK	N49 12 37	W102 57 57	1905	580.6	CZWG	34	35	CMAC-W	300	1	800	2	RNAV only
CYEU	Eureka	NU	N79 59 40	W085 48 43	269	82.0	CZEG	33	37	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CZFA	Faro	YT	N62 12 25	W133 22 24	2350	716.3	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYPY	Fort Chipewyan	AB	N58 46 02	W111 07 02	781	238.0	CZEG	22	32	CMAC-W	300	1	800	2 ¼	RNAV only
CYGH	Fort Good Hope	NT	N66 14 26	W128 38 45	267	81.4	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYMM	Fort McMurray	AB	N56 39 12	W111 13 24	1211	369.1	CZEG	32	32	CMAC-W	200	½	600	2	1 ILS
CZFM	Fort McPherson	NT	N67 24 25	W134 51 35	115	35.1	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYYE	Fort Nelson	BC	N58 50 11	W122 35 49	1253	381.9	CZEG	22	31	CMAC-W	200	½	600	2	1 ILS

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYER	Fort Severn	ON	N56 01 08	W087 40 34	52	15.8	CZWG	24	33	CMAC-E	500	1 ½	800	2 ½	NPA (RNAV)
CYFS	Fort Simpson	NT	N61 45 37	W121 14 11	556	169.5	CZEG	33	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYSM	Fort Smith	NT	N60 01 13	W111 57 43	671	204.6	CZEG	22	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYXJ	Fort St. John	BC	N56 14 17	W120 44 25	2280	694.9	CZEG	22	34	CMAC-W	200	½	600	2	1 ILS RVR
CYFC	Fredericton Intl	NB	N45 52 08	W066 32 14	67	20.4	CZQM	37	34	CMAC-E	200	½	600	2	1 ILS RVR
CYCX	Gagetown (Heli)	NB	N45 50 00	W066 26 00	166	50.6	CZQM	39	34	DWS	500	½	-	-	A
CYRA	Gamèti/Rae Lakes	NT	N64 06 58	W117 18 35	723	220.4	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYQX	Gander Intl	NL	N48 56 13	W054 34 05	496	151.2	CZQX	38	34	CMAC-E	200	½	400	1	2 ILS 2 RVR
CYGP	Gaspé (Michel Pouliot)	QC	N48 46 31	W064 28 47	112	34.1	CZUL	36	34	CMAC-E	300	1	800	2	NPA (RNAV)
CYGQ	Geraldton (Greenstone Regional)	ON	N49 46 43	W086 56 19	1143	348.4	CZWG	24	33	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYGX	Gillam	MB	N56 21 28	W094 42 39	476	145.1	CZWG	24	32	CMAC-W	300	1	800	2 ¼	NPA (RNAV)
CYHK	Gjoa Haven	NU	N68 38 08	W095 51 01	154	46.9	CZEG	33	36	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYYR	Goose Bay	NL	N53 19 09	W060 25 33	160	48.8	CZQX	39	34	DWS	200	½	600	2	1 ILS RVR
CYZE	Gore Bay-Manitoulin	ON	N45 52 54	W082 34 02	613	186.8	CZYZ	25	33	CMAC-E	300	1	800	2 ¼	RNAV only

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYQU	Grande Prairie	AB	N55 10 47	W118 53 06	2195	669.0	CZEG	32	32	CMAC-W	200	½	600	2	1 ILS
CYZX	Greenwood	NS	N44 59 04	W064 55 01	92	28.0	CZQM	39	34	DWS	200	½	600	2	1 ILS RVR
CYAW	Halifax/Shearwater (Heli)	NS	N44 38 14	W063 30 08	144	43.9	CZQM	39	34	DWS	200	½	600	2	A
CYHZ	Halifax/Stanfield Intl	NS	N44 52 52	W063 30 31	477	145.4	CZQM	37	34	CMAC-E	100	¼	400	1	2 ILS 2 RVR CAT II
CYHM	Hamilton	ON	N43 10 25	W079 56 06	780	237.7	CZYZ	35	33	CMAC-E	100	¼	600	2	1 ILS RVR CAT II
CYGV	Havre St-Pierre	QC	N50 16 55	W063 36 41	124	37.8	CZUL	36	34	CMAC-E	300	1	800	2	RNAV only
CYHY	Hay River/Merlyn Carter Airport	NT	N60 50 23	W115 46 58	541	164.9	CZEG	22	35	CMAC-W	300	1	600	2	1 ILS
CYOJ	High Level	AB	N58 37 17	W117 09 53	1105	336.8	CZEG	22	32	CMAC-W	300	1	800	2 ¼	NPA (RNAV)
CYGT	Igloolik	NU	N69 21 53	W081 48 59	173	52.7	CZEG	33	36	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYGR	Îles-de-la-Madeleine	QC	N47 25 30	W061 46 41	35	10.7	CZQM	37	34	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYPH	Inukjuak	QC	N58 28 19	W078 04 37	83	25.3	CZUL	26	33	CMAC-E	300	1	800	2	RNAV only
CYEV	Inuvik (Mike Zubko)	NT	N68 18 14	W133 28 59	222	67.7	CZEG	23	35	CMAC-W	200	½	600	2	1 ILS RVR
CYFB	Iqaluit	NU	N63 45 23	W068 33 21	110	33.5	CZUL	36	36	CMAC-W	200	¾	600	2	1 ILS RVR
CYIV	Island Lake	MB	N53 51 26	W094 39 13	773	235.6	CZWG	24	32	CMAC-W	300	1	800	2 ¼	NPA (RNAV)

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYIK	Ivujivik	QC	N62 25 02	W077 55 31	126	38.4	CZUL	26	36	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYKA	Kamloops	BC	N50 42 09	W120 26 55	1133	345.3	CZVR	31	31	CMAC-W	2000	3	2300	3	NPA (RNAV)
CYKG	Kangiqsujuaq (Wakeham Bay)	QC	N61 35 19	W071 55 46	517	157.6	CZUL	26	36	CMAC-W	300	1	900	3	RNAV only
CYAS	Kangirsuk	QC	N60 01 38	W069 59 57	406	123.7	CZUL	26	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYYU	Kapuskasing	ON	N49 24 42	W082 28 07	743	226.5	CZYZ	25	33	CMAC-E	300	1	800	2	RNAV only
CYLW	Kelowna	BC	N49 57 26	W119 22 40	1421	433.1	CZVR	31	32	CMAC-W	800	2 ¼	1100	3	NPA (RNAV)
CYQK	Kenora	ON	N49 47 18	W094 21 47	1686	513.9	CZWG	34	33	CMAC-E	300	1	800	2	RNAV only
CYKJ	Key Lake	SK	N57 15 23	W105 37 03	1344	409.7	CZEG	32	32	CMAC-W	300	1	800	2 ½	RNAV only
CYGK	Kingston	ON	N44 13 33	W076 35 48	303	92.4	CYZY	35	33	CMAC-E	300	1	600	2	1 ILS
CYTE	Kinngait	NU	N64 13 49	W076 31 30	158	48.1	CZEG	33	36	CMAC-W	300	1	900	3	NPA (RNAV)
CYKF	Kitchener/Waterloo	ON	N43 27 39	W080 22 43	1055	321.6	CYZY	35	33	CMAC-E	200	½	600	2	1 ILS
CYBB	Kugaaruk	NU	N68 32 09	W089 48 19	51	15.5	CZEG	33	36	CMAC-W	500	1 ¾	900	3	NPA (RNAV)
CYCO	Kugluktuk	NU	N67 49 00	W115 08 38	74	22.6	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYVP	Kuujjuaq	QC	N58 05 42	W068 25 20	131	39.9	CZUL	26	33	CMAC-E	200	½	600	2	1 ILS RVR

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYGW	Kuujjuarapik	QC	N55 16 55	W077 45 55	34	10.4	CZUL	26	33	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CYGL	La Grande Rivière	QC	N53 37 31	W077 42 15	639	194.8	CZUL	36	33	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYAH	La Grande-4	QC	N53 45 17	W073 40 31	1005	306.3	CZUL	26	33	CMAC-E	300	1	800	2 ½	RNAV only
CYVC	La Ronge (Barber Field)	SK	N55 09 05	W105 15 43	1242	378.6	CZWG	24	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYQL	Lethbridge County	AB	N49 37 49	W112 47 59	3048	929.0	CZEG	32	32	CMAC-W	200	½	600	2	1 ILS
CYLL	Lloydminster	AB	N53 18 33	W110 04 21	2194	668.7	CZEG	32	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYXU	London	ON	N43 01 59	W081 09 04	912	278.0	CYZY	35	33	CMAC-E	200	½	600	2	1 ILS RVR
CYBX	Lourdes-de-Blanc-Sablon	QC	N51 26 37	W057 11 07	121	36.9	CZUL	36	34	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CYLK	Lutselk'e	NT	N62 25 06	W110 40 56	586	178.6	CZEG	22	35	CMAC-W	500	1 ¾	900	3	RNAV only
CYYL	Lynn Lake	MB	N56 51 50	W101 04 34	1170	356.6	CZWG	24	32	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYZY	MacKenzie	BC	N55 17 58	W123 08 00	2264	690.1	CZVR	21	31	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYSP	Marathon	ON	N48 45 19	W086 20 40	1035	315.5	CZYZ	25	33	CMAC-E	600	1 ¾	900	3	RNAV only
CYMH	Mary's Harbour	NL	N52 18 10	W055 50 52	35	10.7	CZQX	38	34	CMAC-E	600	2	900	3	NPA (RNAV)
CZMT	Masset	BC	N54 01 38	W132 07 30	19	5.8	CZVR	21	31	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYMA	Mayo	YT	N63 36 59	W135 52 06	1653	503.8	CZEG	23	35	CMAC-W	500	1 ½	800	3	NPA (RNAV)

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYXH	Medicine Hat	AB	N50 01 08	W110 43 15	2352	716.9	CZEG	32	32	CMAC-W	300	1	800	2	RNAV only
CYQM	Moncton/Greater Moncton Intl	NB	N46 06 44	W064 40 43	232	70.7	CZQM	37	34	CMAC-E	200	½	400	1	2 ILS 2 RVR
CYYY	Mont-Joli	QC	N48 36 32	W068 12 29	172	52.4	CZUL	36	34	CMAC-E	300	1	800	2	NPA (RNAV)
CYMX	Montréal Intl (Mirabel)	QC	N45 40 50	W074 02 19	270	82.3	CZUL	36	33	CMAC-E	100	¼	400	1	2 ILS 3 RVR CAT II
CYUL	Montréal/Pierre Elliott Trudeau Intl	QC	N45 28 14	W073 44 27	118	36.0	CZUL	36	33	CMAC-E	100	¼	400	1	4 ILS 4 RVR CAT II
CYHU	Montréal/St-Hubert	QC	N45 31 03	W073 25 01	90	27.4	CZUL	36	33	CMAC-E	200	½	600	2	1 ILS RVR
CYMJ	Moose Jaw/R Vice Marshal C.M. McEwen	SK	N50 19 49	W105 33 33	1892	576.7	CZWG	39	32	DWS	200	½	400	1	2 ILS 1 RVR
CYMO	Moosonee	ON	N51 17 28	W080 36 28	30	9.1	CZYZ	25	33	CMAC-E	300	1	800	2	NPA (RNAV)
CYQA	Muskoka	ON	N44 58 29	W079 18 12	922	281.0	CZYZ	25	33	CMAC-E	500	1 ½	800	2 ½	RNAV only
CZMD	Muskrat Dam	ON	N53 26 29	W091 45 46	911	277.7	CZWG	24	33	CMAC-E	500	1 ½	800	2 ½	RNAV only
CYDP	Nain	NL	N56 33 02	W061 40 56	22	6.7	CZQX	38	34	CMAC-E	1100	3	1400	3	NPA (RNAV)
CYCD	Nanaimo	BC	N49 03 16	W123 52 12	92	28.0	CZVR	31	31	CMAC-W	500	1	800	2	1 ILS
CYNA	Natashquan	QC	N50 11 24	W061 47 20	39	11.9	CZUL	36	34	CMAC-E	300	1	800	2	NPA (RNAV)

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYUT	Naujaat	NU	N66 31 14	W086 13 29	75	22.9	CZEG	33	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYVQ	Norman Wells	NT	N65 16 53	W126 47 55	238	72.5	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYQW	North Battleford (Cameron McIntosh)	SK	N52 46 09	W108 14 37	1799	548.3	CZWG	34	32	CMAC-W	300	1	800	2 ½	RNAV only
CYYB	North Bay	ON	N46 21 50	W079 25 27	1215	370.3	CZYZ	25	33	CMAC-E	200	½	600	2	1 ILS RVR
CYNE	Norway House	MB	N53 57 30	W097 50 39	734	223.7	CZWG	24	32	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYOC	Old Crow	YT	N67 34 12	W139 50 24	814	248.1	CZEG	23	35	CMAC-W	500	1 ¾	900	3	NPA (RNAV)
CYND	Ottawa/Gatineau	QC	N45 31 18	W075 33 49	211	64.3	CZUL	26	33	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CYOW	Ottawa/MacDonald -Cartier Intl	ON	N45 19 21	W075 40 09	374	114.0	CZUL	36	33	CMAC-E	200	½	400	1	2 ILS 2 RVR
CYXP	Pangnirtung	NU	N66 08 42	W065 42 49	79	24.1	CZEG	33	36	CMAC-W	2100	3	2400	3	NPA (RNAV)
CYPC	Paulatuk (Nora Aliqatchialuk Ruben)	NT	N69 21 38	W124 04 33	15	4.6	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYPE	Peace River	AB	N56 13 37	W117 26 50	1872	570.6	CZEG	32	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYYF	Penticton	BC	N49 27 45	W119 36 08	1130	344.4	CZVR	31	31	CMAC-W	2100	3	2400	3	RNAV only
CYWA	Petawawa	ON	N45 57 08	W077 19 09	427	130.1	CZYZ	39	33	DWS	700	2	1000	3	

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYPQ	Peterborough	ON	N44 13 48	W078 21 48	628	191.4	CZYZ	35	33	CMAC-E	500	1 ½	800	2 ½	NPA (RNAV)
CYPL	Pickle Lake	ON	N51 26 47	W090 12 51	1267	386.2	CZWG	24	33	CMAC-E	300	1	800	2	NPA (RNAV)
CYIO	Pond Inlet	NU	N72 41 22	W077 58 08	202	61.6	CZEG	33	36	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYZT	Port Hardy	BC	N50 40 50	W127 22 00	71	21.6	CZVR	31	31	CMAC-W	300	1	600	2	1 ILS
CYPG	Portage La Prairie/Southport	MB	N49 54 11	W098 16 26	885	269.7	CZWG	39	32	DWS	200	½	600	2	1 ILS
CYPA	Prince Albert (Glassfield)	SK	N53 12 52	W105 40 23	1405	428.2	CZWG	24	32	CMAC-W	200	½	600	2	1 ILS RVR
CYXS	Prince George	BC	N53 53 03	W122 40 39	2266	690.7	CZVR	21	31	CMAC-W	200	½	600	2	1 ILS RVR
CYPR	Prince Rupert	BC	N54 17 09	W130 26 41	116	35.4	CZVR	21	31	CMAC-W	200	½	600	2	1 ILS
CYPX	Puvirnituk	QC	N60 03 08	W077 17 15	83	25.3	CZUL	26	36	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYVM	Qikiqtarjuaq	NU	N67 32 48	W064 01 54	18	5.5	CZEG	33	36	CMAC-W	1700	3	2000	3	NPA (RNAV)
CYHA	Quaqtaq	QC	N61 02 47	W069 37 04	103	31.4	CZUL	26	36	CMAC-E	300	1	800	2	RNAV only
CYQB	Québec/Jean Lesage Intl	QC	N46 47 28	W071 23 36	244	74.4	CZUL	36	33	CMAC-E	200	½	600	2	1 ILS RVR
CYQZ	Quesnel	BC	N53 01 34	W122 30 37	1788	545.0	CZVR	21	31	CMAC-W	500	1 ½	1000	3	RNAV only
CYRT	Rankin Inlet	NU	N62 48 38	W092 06 53	106	32.3	CZEG	22	36	CMAC-W	300	1	800	2	NPA (RNAV)

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYQF	Red Deer Regional	AB	N52 10 56	W113 53 40	2968	904.6	CZEG	32	32	CMAC-W	300	1	800	2 ¼	NPA (RNAV)
CYRL	Red lake	ON	N51 04 02	W093 47 35	1266	385.9	CZWG	34	33	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CYQR	Regina Intl	SK	N50 25 56	W104 39 58	1895	577.6	CZWG	34	32	CMAC-W	200	½	600	2	1 ILS RVR
CYRB	Resolute Bay	NU	N74 43 01	W094 58 10	222	67.7	CZEG	33	37	CMAC-W	200	½	600	2	1 ILS RVR
CYRJ	Roberval	QC	N48 31 12	W072 15 56	586	178.6	CZUL	36	33	CMAC-E	300	1	800	2 ½	NPA (RNAV)
CYUY	Rouyn-Noranda	QC	N48 12 22	W078 50 08	988	301.1	CZUL	26	33	CMAC-E	200	½	800	2	NPA (RNAV)
CWSA	Sable Island	NS	N43 55 46	W059 57 35	4	1.2	CZQM	37	34	CMAC-E	300	1	800	2	RNAV only
CYSY	Sachs Harbour (David Nasogaluak JR. Saaryuaq)	NT	N71 59 37	W125 14 29	283	86.3	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYSJ	Saint John	NB	N45 18 57	W065 53 24	357	108.8	CZQM	37	34	CMAC-E	200	½	600	2	1 ILS 2 RVR
CYZG	Salluit	QC	N62 10 46	W075 40 02	745	227.1	CZUL	26	36	CMAC-W	300	1	800	2 ½	RNAV only
CYZP	Sandspit	BC	N53 15 15	W131 48 50	21	6.4	CZVR	21	31	CMAC-W	300	1	600	2	1 ILS
CZSJ	Sandy Lake	ON	N53 03 51	W093 20 40	951	289.9	CZWG	24	33	CMAC-E	500	1 ½	800	2 ½	NPA (RNAV)
CYUX	Sanirajak	NU	N68 46 33	W081 14 33	30	9.1	CZEG	33	36	CMAC-W	300	1	800	2	NPA (RNAV)
CYZR	Sarnia (Chris Hadfield)	ON	N42 59 58	W082 18 32	595	181.4	CZYZ	35	33	CMAC-E	300	1	800	2	RNAV only

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYXE	Saskatoon/John G. Diefenbaker Intl	SK	N52 10 15	W106 41 59	1654	504.1	CZWG	34	32	CMAC-W	200	½	600	2	1 ILS RVR
CYAM	Sault Ste. Marie	ON	N46 29 06	W084 30 35	630	192.0	CZYZ	25	33	CMAC-E	200	½	600	2	1 ILS RVR
CYKL	Schefferville	QC	N54 48 19	W066 48 19	1709	520.9	CZUL	26	34	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYZV	Sept-Îles	QC	N50 13 24	W066 15 56	180	54.9	CZUL	36	34	CMAC-E	200	½	600	2	1 ILS RVR
CYSC	Sherbrooke	QC	N45 26 19	W071 41 29	792	241.4	CZUL	36	33	CMAC-E	300	1	800	2	RNAV only
CYXL	Sioux Lookout	ON	N50 06 50	W091 54 19	1257	383.1	CZWG	34	33	CMAC-E	300	1	800	2 ¼	NPA (RNAV)
CYZH	Slave Lake	AB	N55 17 35	W114 46 38	1912	582.8	CZEG	32	32	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYYD	Smithers	BC	N54 49 31	W127 10 58	1716	523.0	CZVR	21	31	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYAY	St. Anthony	NL	N51 23 31	W056 04 59	108	32.9	CZQX	38	34	CMAC-E	400	1 ¼	800	2 ¼	NPA (RNAV)
CYSN	St Catharines/Niagara District)	ON	N43 11 30	W079 10 18	321	97.8	CZYZ	35	33	CMAC-E	300	1	800	2	RNAV only
CYYT	St. John's Intl	NL	N47 37 07	W052 45 09	461	140.5	CZQX	38	34	CMAC-E	0	⅛	400	1	3 ILS 3 RVR CAT III
CYJT	Stephenville	NL	N48 32 29	W058 33 00	81	24.7	CZQX	38	34	CMAC-E	300	1	600	2	1 ILS RVR
CYSF	Stony Rapids	SK	N59 15 01	W105 50 29	819	249.6	CZEG	22	32	CMAC-W	600	1 ¾	900	3	NPA (RNAV)
CYSB	Sudbury	ON	N46 37 30	W080 47 56	1143	348.4	CZYZ	25	33	CMAC-E	200	½	600	2	1 ILS RVR

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYYN	Swift Current	SK	N50 17 31	W107 41 26	2680	816.9	CZWG	34	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYQY	Sydney/J.A. Douglas McCurdy	NS	N46 09 41	W060 02 53	203	61.87	CZQM	37	34	CMAC-E	200	½	600	2	1 ILS RVR
CYYH	Taloyoak	NU	N69 32 48	W093 34 37	90	27.4	CZEG	33	36	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYTQ	Tasiujaq	QC	N58 40 04	W069 57 21	122	37.2	CZUL	26	33	CMAC-E	300	1	800	2	NPA (RNAV)
CYXT	Terrace	BC	N54 28 07	W128 34 42	713	217.3	CZVR	21	31	CMAC-W	300	1	600	2	1 ILS
CYZW	Teslin	YT	N60 10 23	W132 44 30	2313	705.0	CZEG	33	35	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYQD	The Pas	MB	N53 58 17	W101 05 28	888	270.7	CZWG	24	32	CMAC-W	300	1	800	2	RNAV only
CYTH	Thompson	MB	N55 48 17	W097 51 45	735	224.0	CZWG	24	32	CMAC-W	200	½	600	2	1 ILS RVR
CYQT	Thunder Bay	ON	N48 22 19	W089 19 18	654	199.3	CZWG	34	33	CMAC-E	200	½	600	2	1 ILS RVR
CYTS	Timmins/Victor M. Power	ON	N48 34 11	W081 22 36	967	294.7	CZYZ	25	33	CMAC-E	200	½	600	2	1 ILS RVR
CYAZ	Tofino/Long Beach	BC	N49 04 56	W125 46 21	80	24.4	CZVR	31	31	CMAC-W	600	1 ¾	900	3	RNAV only
CYOO	Toronto/Oshawa	ON	N43 55 22	W078 53 47	460	140.2	CZYZ	35	33	CMAC-E	300	1	800	2 ¼	RNAV only
CYTZ	Toronto/Billy Bishop Toronto City Airport	ON	N43 37 39	W079 23 46	252	76.8	CZYZ	35	33	CMAC-E	300	1	600	2	1 ILS RVR
CYYZ	Toronto/Lester B. Pearson Intl	ON	N43 40 38	W079 37 50	569	173.4	CYZY	35	33	CMAC-E	0	⅛	400	1	10 ILS RVR CAT III

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYTR	Trenton	ON	N44 07 08	W077 31 41	283	86.3	CZYZ	39	33	DWS	200	½	600	2	2 ILS 2 RVR
CYRQ	Trois-Rivières	QC	N46 21 06	W072 40 50	199	60.7	CZUL	26	33	CMAC-E	200	½	800	2	NPA (RNAV)
CYUB	Tuktoyaktuk/James Gruben	NT	N69 26 00	W133 01 35	14	4.3	CZEG	23	35	CMAC-W	300	1	800	2	NPA (RNAV)
CYHI	Ulukhaktok/Holman	NT	N70 45 46	W117 48 22	117	35.7	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYOY	Valcartier (W/C J.H.L. (Joe) Lecomte) (Heli)	QC	N46 54 00	W071 30 00	550	167.6	CZUL	39	33	DWS	-	-	-	-	A
CYVO	Val-d'Or	QC	N48 03 12	W077 46 58	1107	337.4	CZUL	26	33	CMAC-E	200	½	600	2	1 ILS RVR
CYVR	Vancouver Intl	BC	N49 11 41	W123 11 02	14	4.3	CZVR	31	31	CMAC-W	0	⅛	400	1	5 ILS 4 RVR CAT III
CYWH	Victoria Harbour (Water Aerodrome)	BC	N48 25 22	W123 23 15	0	0	CZVR	31	31	CMAC-W	500	1	800	2	NPA (RNAV)
CYYJ	Victoria Intl	BC	N48 38 50	W123 25 33	64	19.5	CZVR	31	31	CMAC-W	200	½	600	2	NPA (RNAV) 2 ILS RVR
CYWK	Wabush	NL	N52 55 22	W066 51 53	1808	551.1	CZUL	36	34	CMAC-E	300	1	600	2	1 ILS
CYKQ	Waskaganish	QC	N51 28 24	W078 45 30	79	24.1	CZUL	26	33	CMAC-E	300	1	800	2	NPA (RNAV)
CYQH	Watson Lake	YT	N60 06 59	W128 49 21	2255	687.3	CZEG	33	35	CMAC-W	300	¾	600	2	1 ILS RVR

ID	Aerodrome's Name	Province	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	FTCN bulletin	GFA region	Issuing Centre	IFR Approach CIG	IFR Approach VIS	Alternate CIG	Alternate VIS	Notes
CYXZ	Wawa	ON	N47 58 01	W084 47 11	944	287.7	CZYZ	25	33	CMAC-E	600	1 ¾	900	3	RNAV only
CYWE	Wekweèti	NT	N64 11 27	W114 04 36	1208	368.2	CZEG	23	35	CMAC-W	500	1 ½	800	2 ½	RNAV only
CYZU	Whitecourt	AB	N54 08 38	W115 47 12	2567	782.4	CZEG	32	32	CMAC-W	300	1	800	2	NPA (RNAV)
CYXY	Whitehorse/Erik Nielsen Intl.	YT	N60 42 34	W135 04 02	2317	706.2	CZEG	33	35	CMAC-W	200	½	600	2	1 ILS RVR
CYVV	Wiarton	ON	N44 44 45	W081 06 26	729	222.2	CZYZ	35	33	CMAC-E	300	1	800	2	NPA (RNAV)
CYWL	Williams Lake	BC	N52 11 00	W122 03 16	3083	939.7	CZVR	21	31	CMAC-W	500	1 ½	800	2 ½	NPA (RNAV)
CYQG	Windsor	ON	N42 16 32	W082 57 20	622	189.6	CYZY	35	33	CMAC-E	200	½	600	2	1 ILS RVR
CYWG	Winnipeg/James Armstrong Richardson Intl	MB	N49 54 36	W097 14 24	784	239.0	CZWG	34	32	CMAC-W	100	¼	400	1	3 ILS 3 RVR CAT II
CYQI	Yarmouth	NS	N43 49 37	W066 05 17	141	43.0	CZQM	37	34	CMAC-E	300	1	800	2	RNAV only
CYZF	Yellowknife	NT	N62 27 46	W114 26 25	675	205.7	CZEG	33	35	CMAC-W	200	½	600	2	1 ILS RVR
CYQV	Yorkton Muni	SK	N51 15 53	W102 27 41	1635	498.3	CZWG	34	32	CMAC-W	300	1	800	2	RNAV only

Legend:

A = Landing limits at heliports are best IFR approach limits.
Gagetown CYCX, Borden CYBN, Namao CYED, Petawawa CYWA, and Valcartier CYOY are not IFR aerodromes.
CAP = Canada Air Pilot
CAT (I, II or III) = ILS Categories I, II or III
CMAC-E = Canadian Meteorological Aviation Centre – East
CMAC-W = Canadian Meteorological Aviation Centre – West
DWS = Defense Weather Services
ILS = Instrument Landing System;
NPA = Non Precision Approach
RCAP = Restricted Canada Air Pilot
RNAV = Area Navigation
RVR = Runway Visual Range

Appendix B Forecasts in digital form of the winds and the temperatures aloft—Supplement to Chapter 3

Note: This table lists the sites for which a forecast in digital form of the winds and the temperatures aloft is produced. Additional information, such as the coordinates and elevations, have been provided for completeness. Pilots are advised to refer to the latest Canadian Flight Supplement (CFS) for information about sites that are aerodromes as well.

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
VBI	N/A	ON	N49 28 00	W094 03 00	1184	361	CZWG	33
WCK	N/A	NT	N74 00 00	W135 00 00	0	0	CZEG	37
WCM	N/A	NT	N70 00 00	W115 00 00	846	258	CZEG	35
WDG	N/A	NT	N80 00 00	W115 00 00	0	0	CZEG	37
WFA	N/A	GL	N62 00 00	W056 00 00	0	0	CZQX-O	N/A
WFB	N/A	GL	N72 00 00	W062 00 00	0	0	N/A	N/A
WFC	N/A	GL	N66 00 00	W054 00 00	0	0	N/A	N/A
WFK	N/A	NU	N89 00 00	W075 00 00	0	0	CZEG	37
WJQ	N/A	NT	N76 00 00	W140 00 00	0	0	CZEG	37
WKJ	N/A	NT	N63 00 00	W107 00 00	1250	381	CZEG	35
WKQ	N/A	NU	N85 00 00	W070 00 00	0	0	CZEG	37
WKZ	N/A	NU	N57 00 00	W089 00 00	0	0	CZWG	32
WLL	N/A	NT	N82 00 00	W140 00 00	0	0	CZEG	37
WLR	N/A	NU	N61 00 00	W080 00 00	0	0	CZWG	36
WOM	N/A	NL	N58 00 00	W060 00 00	0	0	CZQX	34
WOP	N/A	GL	N67 00 00	W050 00 00	1030	314	N/A	N/A
WOX	N/A	NL	N59 00 00	W050 00 00	0	0	CZQX-O	N/A

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
WPM	N/A	NL	N47 00 00	W049 00 00	0	0	CZQX-O	34
WPV	N/A	NU	N67 00 00	W060 00 00	0	0	CZEG	36
WRS	N/A	NT	N78 00 00	W130 00 00	0	0	CZEG	37
WUA	N/A	NU	N73 00 00	W110 00 00	0	0	CZEG	37
WUB	N/A	NU	N65 00 00	W105 00 00	991	302	CZEG	35
WUC	N/A	MB	N55 00 00	W095 00 00	600	183	CZWG	32
WUD	N/A	NU	N60 00 00	W085 00 00	0	0	CZWG	33
WUE	N/A	ON	N55 00 00	W085 00 00	98	30	CZWG	33
WUF	N/A	QB	N51 00 00	W075 00 00	1201	366	CZUL	33
WUG	N/A	QB	N57 00 00	W073 00 00	499	152	CZUL	33
WUI	N/A	MB	N52 00 00	W101 00 00	299	91	CZWG	32
WUJ	N/A	MB	N53 00 00	W097 36 00	712	217	CZWG	32
WZJ	N/A	NU	N81 06 00	W070 18 00	4268	1301	CZEG	37
XAA	N/A	NT	N85 00 00	W140 00 00	0	0	CZEG	37
XAB	N/A	NT	N85 00 00	W120 00 00	0	0	CZEG	37
XAD	N/A	NU	N85 00 00	W090 00 00	0	0	CZEG	37
XAE	N/A	GL	N85 00 00	W060 00 00	0	0	CZEG	37
XBA	N/A	NT	N80 00 00	W140 00 00	0	0	CZEG	37
XBB	N/A	NT	N80 00 00	W120 00 00	0	0	CZEG	37
XBM	N/A	NU	N80 00 00	W100 00 00	3	1	CZEG	37
XBS	N/A	GL	N80 00 00	W060 00 00	1024	312	N/A	N/A
XBT	N/A	NU	N84 00 00	W100 00 00	0	0	CZEG	37
XCB	N/A	NT	N77 30 00	W130 00 00	0	0	CZEG	37

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
XCC	N/A	NU	N77 30 00	W110 00 00	0	0	CZEG	37
XCE	N/A	NU	N77 30 00	W090 00 00	66	20	CZEG	37
XCF	N/A	GL	N77 30 00	W075 00 00	0	0	N/A	N/A
XCN	N/A	GL	N76 30 00	W068 50 00	528	161	N/A	N/A
XDA	N/A	NT	N75 00 00	W140 00 00	0	0	CZEG	37
XDB	N/A	NT	N75 00 00	W130 00 00	0	0	CZEG	37
XDC	N/A	NT	N75 00 00	W120 00 00	0	0	CZEG	37
XDD	N/A	NU	N75 00 00	W110 00 00	469	143	CZEG	37
XDF	N/A	GL	N75 00 00	W070 00 00	0	0	N/A	N/A
XDH	N/A	NU	N74 30 00	W082 30 00	0	0	CZEG	37
XDJ	N/A	NT	N89 00 00	W140 00 00	0	0	CZEG	37
XEE	N/A	NT	N70 00 00	W140 00 00	0	0	CZEG	35
XEF	N/A	NT	N70 00 00	W130 00 00	3	1	CZEG	35
XEH	N/A	NT	N70 00 00	W120 00 00	0	0	CZEG	35
XEJ	N/A	NU	N70 00 00	W090 00 00	0	0	CZEG	36
XEK	N/A	GL	N70 00 00	W060 00 00	0	0	N/A	N/A
XUH	N/A	QC	N48 00 00	W075 00 00	1001	305	CZUL	33
YEI	N/A	NU	N61 08 00	W100 55 00	1158	353	CZEG	35
YFN	N/A	SK	N57 22 00	W107 08 00	1588	484	CZWG	32
YIX	N/A	NT	N66 06 00	W117 56 00	512	156	CZEG	35
YVN	N/A	NU	N66 36 00	W061 34 00	2369	722	CZEG	36
YLT	Alert	NU	N82 31 04	W062 16 50	100	30.5	CZEG	37
YTF	Alma	QC	N48 30 31	W071 38 29	449	136.9	CZUL	33

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
YAB	Arctic Bay	NU	N73 00 23	W085 02 50	72	21.9	CZEG	37
YYW	Armstrong	ON	N50 17 25	W088 54 35	1058	322.5	CZWG	33
YBK	Baker Lake	NU	N64 17 56	W096 04 40	61	18.6	CZEG	36
YTL	Big Trout Lake	ON	N53 49 04	W089 53 49	730	222.5	CZWG	33
YBR	Brandon Muni	MB	N49 54 36	W099 57 07	1343	409.3	CZWG	32
YDB	Burwash	YT	N61 22 14	W139 02 24	2642	805.3	CZEG	35
YYC	Calgary Intl	AB	N51 06 50	W114 01 13	3557	1084.2	CZEG	32
YCB	Cambridge Bay	NU	N69 06 29	W105 08 14	102	31.1	CZEG	35
YTE	Kinngait	NU	N64 13 49	W076 31 30	158	48.1	CZEG	36
YMT	Chibougamau/Chapais	QC	N49 46 19	W074 31 41	1270	387.1	CZUL	33
YYQ	Churchill	MB	N58 44 21	W094 03 59	96	29.3	CZWG	32
YOD	Cold Lake/Group Captain R.W. McNair	AB	N54 24 18	W110 16 46	1775	541.0	CZEG	32
YZS	Coral Harbour	NU	N64 11 36	W083 21 34	204	62.2	CZEG	36
YXC	Cranbrook/Canadian Rockies Intl	BC	N49 36 44	W115 46 55	3084	940.0	CZVR	31
YDL	Dease Lake	BC	N58 25 20	W130 01 56	2634	802.8	CZEG	31
YUW	Dewar Lakes	NU	N68 39 00	W071 10 00	1729	527.0	CZEG	36
YEG	Edmonton Intl	AB	N53 18 35	W113 34 47	2373	723.3	CZEG	32
YEA	Empress	AB	N50 56 00	W110 00 47	2211	673.9	CZEG	32
YEU	Eureka	NU	N79 59 40	W085 48 43	269	82.0	CZEG	37
YMM	Fort McMurray	AB	N56 39 12	W111 13 24	1211	369.1	CZEG	32
YYE	Fort Nelson	BC	N58 50 11	W122 35 49	1253	381.9	CZEG	31
YFS	Fort Simpson	NT	N61 45 37	W121 14 11	556	169.5	CZEG	35
YSM	Fort Smith	NT	N60 01 13	W111 57 43	671	204.6	CZEG	35

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
YXJ	Fort St. John	BC	N56 14 17	W120 44 25	2280	694.9	CZEG	34
YFC	Fredericton Intl	NB	N45 52 08	W066 32 14	67	20.4	CZQM	34
YQX	Gander Intl	NL	N48 56 13	W054 34 05	496	151.2	CZQX	34
YGP	Gaspé (Michel Pouliot)	QC	N48 46 31	W064 28 47	112	34.1	CZUL	34
YYR	Goose Bay	NL	N53 19 09	W060 25 33	160	48.8	CZQX	34
YHZ	Halifax/Stanfield Intl	NS	N44 52 52	W063 30 31	477	145.4	CZQM	34
YUX	Sanirajak	NU	N68 46 33	W081 14 33	30	9.1	CZEG	36
YOJ	High Level	AB	N58 37 17	W117 09 53	1105	336.8	CZEG	32
YHO	Hopedale	NL	N55 26 56	W060 13 41	46	14.0	CZQX	34
YGR	Îles-de-la-Madeleine	QC	N47 25 30	W061 46 41	35	10.7	CZQM	34
YPH	Inukjuak	QC	N58 28 19	W078 04 37	83	25.3	CZUL	33
YEV	Inuvik (Mike Zubko)	NT	N68 18 14	W133 28 59	222	67.7	CZEG	35
YFB	Iqaluit	NU	N63 45 23	W068 33 21	110	33.5	CZUL	36
YIC	Isachsen	NU	N78 47 00	W103 33 00	190	58	CZEG	37
YJA	Jasper	AB	N52 59 48	W118 03 34	3350	1021.1	CZEG	32
YKA	Kamloops	BC	N50 42 09	W120 26 55	1133	345.3	CZVR	31
YYU	Kapuskasing	ON	N49 24 42	W082 28 07	743	226.5	CZYZ	33
YCO	Kugluktuk	NU	N67 49 00	W115 08 38	74	22.6	CZEG	35
YVP	Kuujjuaq	QC	N58 05 46	W068 25 37	129	39.3	CZUL	33
YGW	Kuujjuarapik	QC	N55 16 55	W077 45 55	34	10.4	CZUL	34
YEO	Lac Eon	QC	N51 52 00	W063 17 00	1932	588.9	CZUL	33
YAH	La Grande-4	QC	N53 45 17	W073 40 31	1005	306.3	CZUL	33
YVC	La Ronge (Barber Field)	SK	N55 09 05	W105 15 43	1242	378.6	CZWG	32

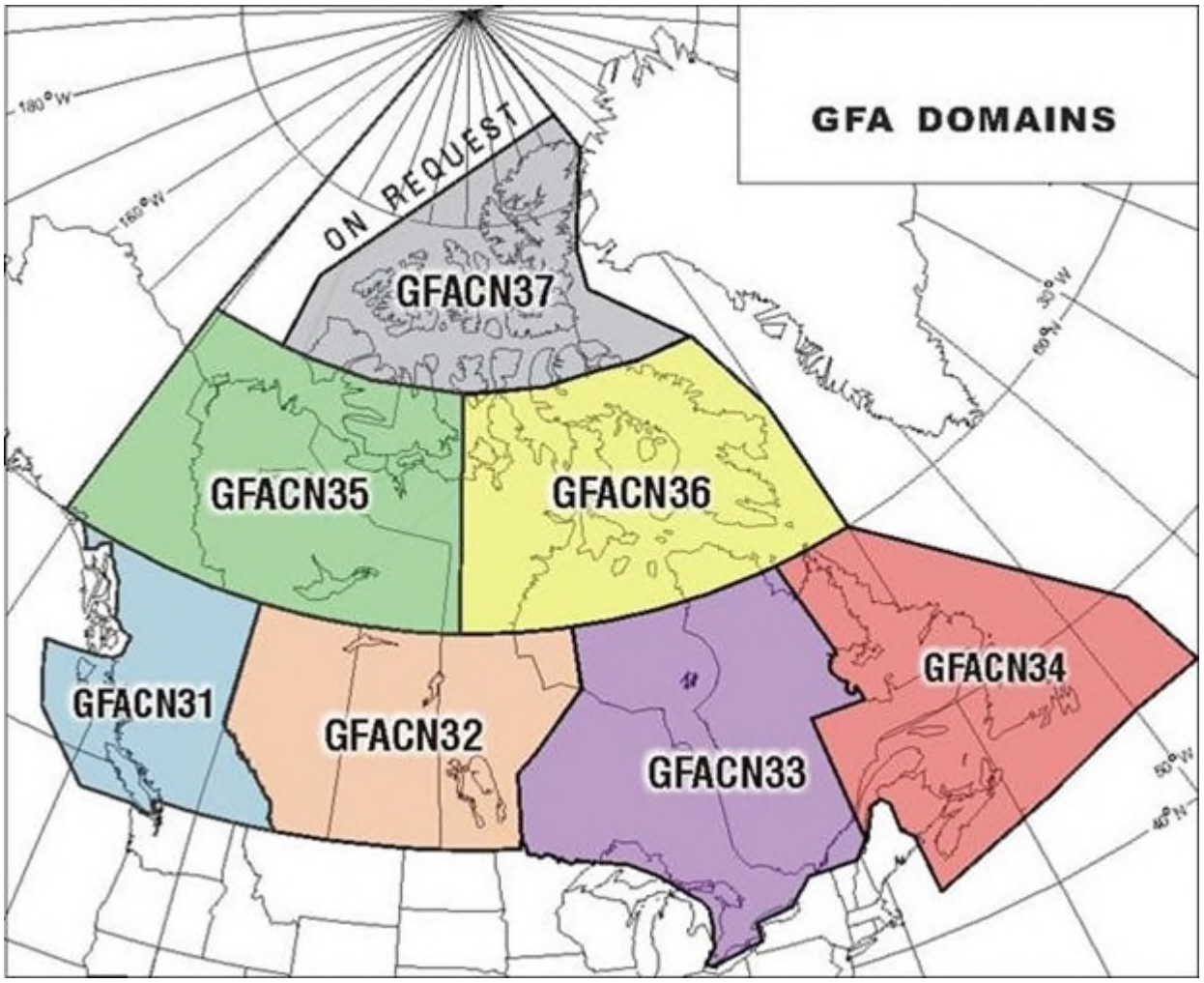
ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
YQL	Lethbridge County	AB	N49 37 49	W112 47 59	3048	929.0	CZEG	32
YYL	Lynn Lake	MB	N56 51 50	W101 04 34	1170	356.6	CZWG	32
YMV	Manicouagan	QC	N50 40 00	W068 50 00	1309	399	CZUL	34
YMW	Maniwaki	QC	N46 16 22	W075 59 26	658	200.6	CZUL	33
YNM	Matagami	QC	N49 45 42	W077 48 10	918	279.8	CZUL	33
YMA	Mayo	YT	N63 36 59	W135 52 06	1653	503.8	CZEG	35
YQM	Moncton/Greater Moncton Intl	NB	N46 06 44	W064 40 43	232	70.7	CZQM	34
YYY	Mont-Joli	QC	N48 36 32	W068 12 27	172	52.4	CZUL	34
YUL	Montréal/Pierre Elliott Trudeau Intl	QC	N45 28 14	W073 44 27	118	36.0	CZUL	33
YMO	Moosonee	ON	N51 17 28	W080 36 28	30	9.1	CZYZ	33
YMD	Mould Bay	NT	N76 14 00	W119 20 00	7	2	CWEG	37
YNA	Natashquan	QC	N50 11 24	W061 47 20	39	11.9	CZUL	34
YNI	Nitchecon	QC	N53 17 00	W070 54 00	1604	489	CZUL	34
YVQ	Norman Wells	NT	N65 16 53	W126 47 55	238	72.5	CZEG	35
YYB	North Bay	ON	N46 21 50	W079 25 27	1215	370.3	CZYZ	33
YOC	Old Crow	YT	N67 34 12	W139 50 24	814	248.1	CZEG	35
YOW	Ottawa/MacDonald-Cartier Intl	ON	N45 19 21	W075 40 09	374	114.0	CZUL	33
YYF	Penticton	BC	N49 27 45	W119 36 08	1130	344.4	CZVR	31
YZT	Port Hardy	BC	N50 40 50	W127 22 00	71	21.6	CZVR	31
YXS	Prince George	BC	N53 53 03	W122 40 39	2266	690.7	CZVR	31
YPU	Puntzi Mountain	BC	N52 06 46	W124 08 41	2985	909.8	CZVR	31
YHA	Quaqtaq	QC	N61 02 47	W069 37 04	103	31.4	CZUL	36
YQB	Québec/Jean Lesage Intl	QC	N46 47 28	W071 23 36	244	74.4	CZUL	33

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
YRT	Rankin Inlet	NU	N62 48 38	W092 06 53	106	32.3	CZEG	36
YRL	Red Lake	ON	N51 04 02	W093 47 35	1266	385.9	CZWG	33
YQR	Regina Intl	SK	N50 25 56	W104 39 58	1895	577.6	CZWG	32
YRB	Resolute Bay	NU	N74 43 01	W094 58 10	222	67.7	CZEG	37
YRI	Rivière-du-Loup	QC	N47 45 52	W069 35 04	426	129.8	CWUL	34
YSA	Sable Island	NS	N43 55 46	W059 57 35	4	1.2	CZQM	34
YSY	Sachs Harbour (David Nasogaluak JR. Saaryuaq)	NT	N71 59 38	W125 14 33	282	86.0	CZEG	35
YSV	Saglek	NL	N58 28 00	W062 39 00	1693	516	CZQX	34
YZG	Salluit	QC	N62 10 46	W075 40 02	743	226.5	CZUL	36
YZP	Sandspit	BC	N53 15 15	W131 48 50	21	6.4	CZVR	31
YXE	Saskatoon/John G. Diefenbaker Intl	SK	N52 10 15	W106 41 59	1654	504.1	CZWG	32
YAM	Sault Ste. Marie	ON	N46 29 06	W084 30 35	630	192.0	CZYZ	33
YKL	Schefferville	QC	N54 48 19	W066 48 19	1709	520.9	CZUL	34
YZV	Sept-Îles	QC	N50 13 24	W066 15 56	180	54.9	CZUL	34
YSC	Sherbrooke	QC	N45 26 19	W071 41 29	792	241.4	CZUL	33
YZH	Slave Lake	AB	N55 17 35	W114 46 38	1912	582.8	CZEG	32
YYD	Smithers	BC	N54 49 31	W127 10 58	1716	523.0	CZVR	31
YAY	St. Anthony	NL	N51 23 31	W056 04 59	108	32.9	CZQX	34
YIF	St-Augustin	QC	N51 12 35	W058 39 27	19	5.8	CZUL	34
YYT	St. John's Intl	NL	N47 37 07	W052 45 09	461	140.5	CZQX	34
FVP	St-Pierre	FR	N46 45 47	W056 10 27	28	8.5	CZQX	34
YJT	Stephenville	NL	N48 32 29	W058 33 00	81	24.7	CZQX	34

ID	Site Name	Province or Country	Coordinates Latitude (degrees-minutes-seconds)	Coordinates Longitude (degrees-minutes-seconds)	Elevation (feet)	Elevation (metres)	FIR	GFA Region
YQY	Sydney/J.A. Douglas McCurdy	NS	N46 09 41	W060 02 53	203	61.87	CZQM	34
YYH	Taloyoak	NU	N69 32 48	W093 34 37	90	27.4	CZEG	36
YQD	The Pas	MB	N53 58 17	W101 05 28	888	270.7	CZWG	32
YQT	Thunder Bay	ON	N48 22 19	W089 19 18	654	199.3	CZWG	33
YYZ	Toronto/Lester B. Pearson Intl	ON	N43 40 38	W079 37 50	569	173.4	CYZY	33
YVO	Val-d'Or	QC	N48 03 12	W077 46 58	1107	337.4	CZUL	33
YVR	Vancouver Intl.	BC	N49 11 41	W123 11 02	14	4.3	CZVR	31
YWK	Wabush	NL	N52 55 22	W066 51 53	1808	551.1	CZUL	34
YQH	Watson Lake	YT	N60 06 59	W128 49 21	2255	687.3	CZEG	35
YNC	Wemindji	QC	N53 00 38	W78 49 52	66	20.1	CZUL	33
YXY	Whitehorse/Erik Nielsen Intl.	YT	N60 42 34	W135 04 02	2317	706.2	CZEG	35
YVV	Wiarton	ON	N44 44 45	W081 06 26	729	222.2	CZYZ	33
YQG	Windsor	ON	N42 16 32	W082 57 20	622	189.6	CYZY	33
YWG	Winnipeg/James Armstrong Richardson Intl.	MB	N49 54 36	W097 14 24	784	239.0	CZWG	32
YQI	Yarmouth	NS	N43 49 37	W066 05 17	141	43.0	CZQM	34
YZF	Yellowknife	NT	N62 27 46	W114 26 25	675	205.7	CZEG	35

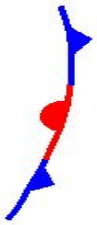
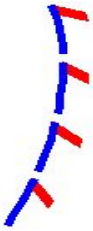
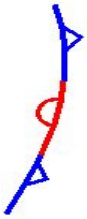
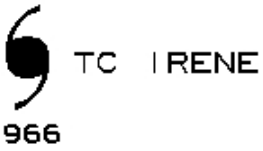
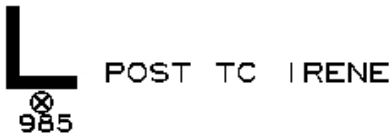
Appendix C Graphic Area Forecast (GFA)—Supplement to Chapter 4

C.1 GFA domain names



Legend:
GFACN31: Pacific region
GFACN32: Prairie region
GFACN33: Ontario Quebec region
GFACN34: Atlantic region
GFACN35: Yukon-Northwest territories region
GFACN36: Nunavut region
GFACN37: Arctic region

C.2 Examples of GFA content

<table>
<tr><th colspan="4">Synoptic features</th></tr>
<tr><td>low / tropical depression
 
</td><td>high
 
</td><td>warm front
  </td><td>cold front
  </td></tr>
<tr><td>stationary front
  </td><td>trowal
  </td><td>trough
  </td><td>upper warm front
  </td></tr>
<tr><td>upper cold front
  </td><td>upper stationary front
  </td><td>upper trough
  </td><td>speed and direction
 
</td></tr>
<tr><td>tropical cyclone (storm)
 
</td><td>tropical cyclone (hurricane)
 
</td><td colspan="2">tropical cyclone (post)
 
</td></tr>
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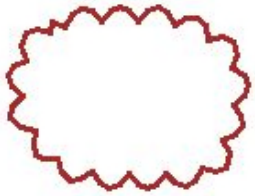
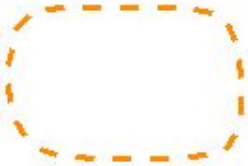
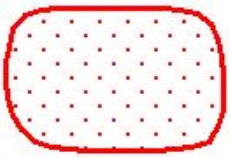
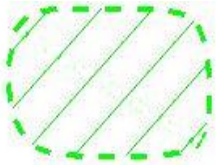
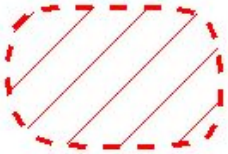
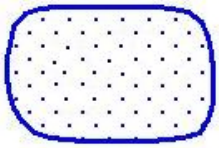
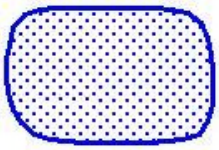
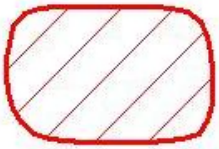
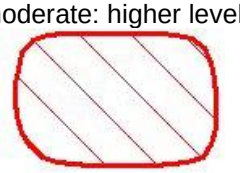
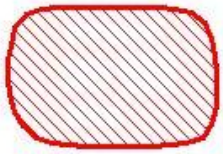
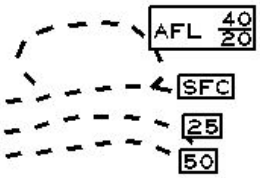
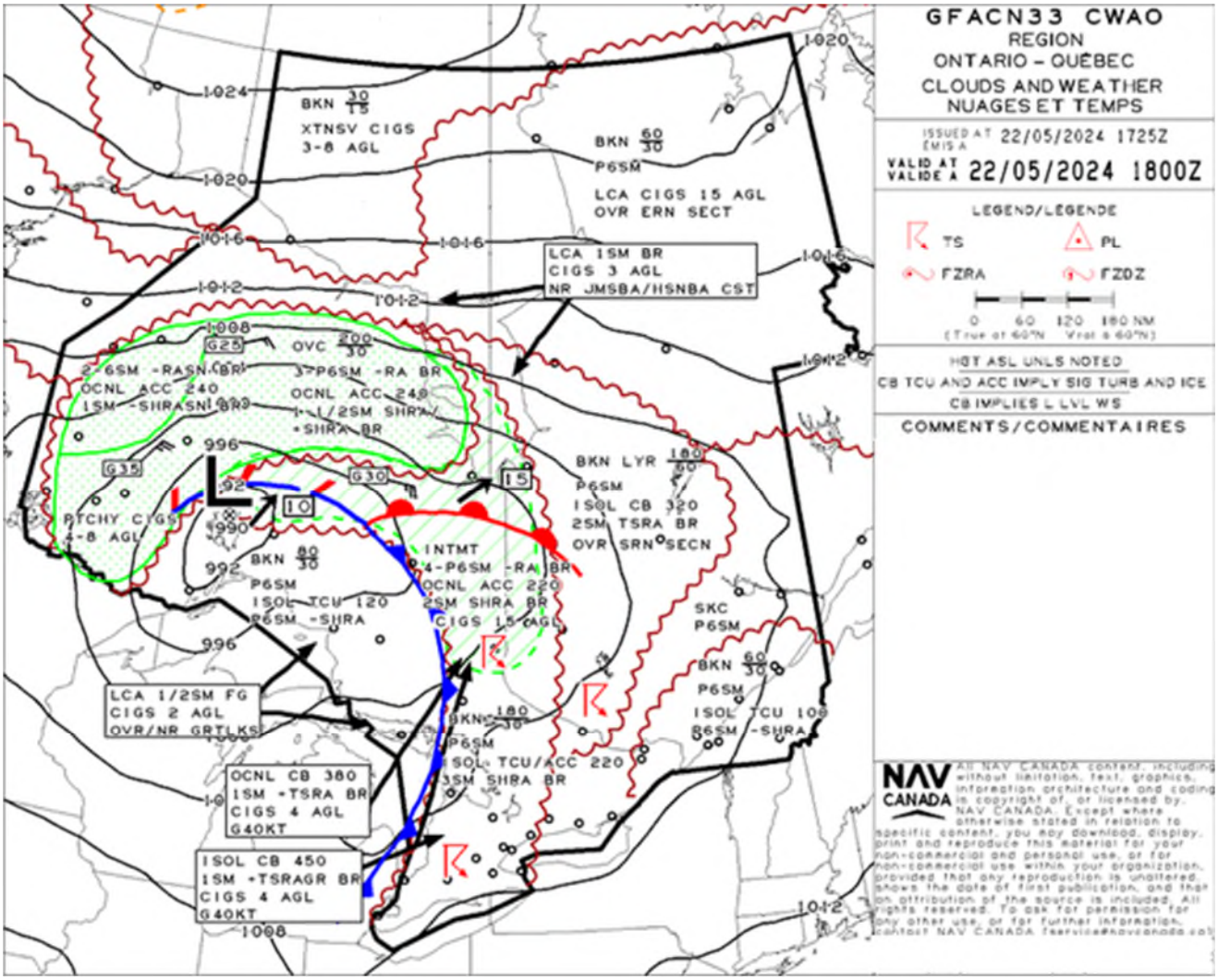
Cloud and restriction to visibility		Surface wind and low level jet	
organized cloud area 	area of obstruction to vision 	Surface wind 	low level jet 
Continuous precipitation		**Intermittent precipitation or shower**	
rain, drizzle, snow 	freezing rain, freezing drizzle, ice pellets 	rain, drizzle, snow 	freezing rain, freezing drizzle, ice pellets 
Icing		**Turbulence**	
moderate 	severe 	moderate: lower level  moderate: higher level 	severe: lower level  severe: higher level 
Freezing level		**Volcano**	**Radioactive release**
			

C.3 Guidelines for GFA correction

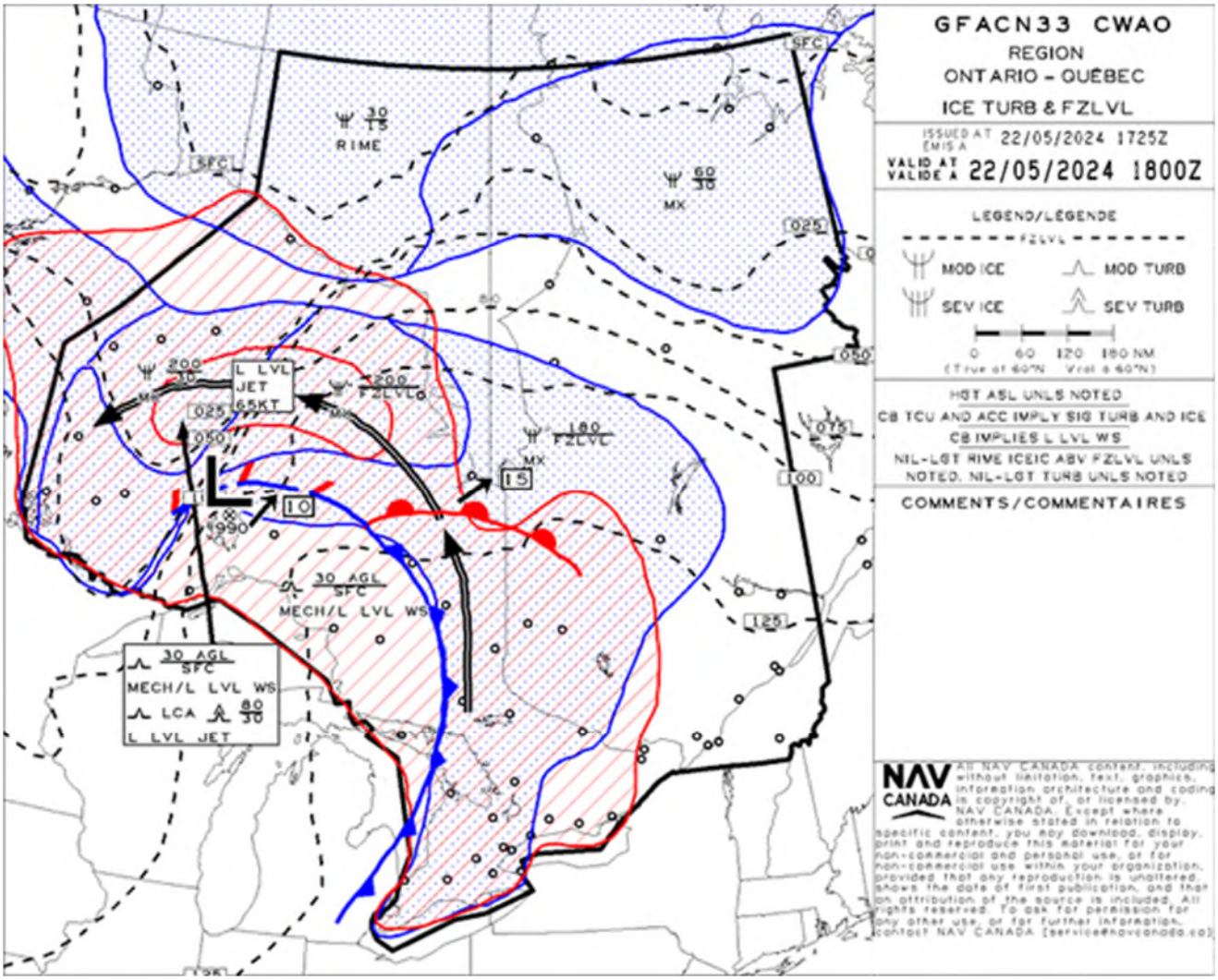
GFA correction	Detailed guidelines
Any unforecast weather phenomena not requiring an AIRMET (i.e. below AIRMET criteria threshold) or any other unforecast weather phenomena that, according to the forecaster, should be depicted in the GFA	Widespread area of BKN or OVC cloud with height of the base between 1000 and 5000 feet AGL Widespread area affected by the reduction of visibility between 3 and 6SM, including the weather phenomenon causing the reduction in visibility Widespread mean surface wind speed between 20 KT and 30 KT, or peak wind gust of 30 KT or more
Forecast phenomena (in the GFA chart) that fail to occur	Removal of forecast weather phenomena in the GFA chart that are no longer occurring or no longer expected to occur
A significant error was made in a GFA chart	A significant error is one which, if uncorrected, would result in an erroneous interpretation of the GFA and create a potential hazard to aviation

C.4 Examples of GFA

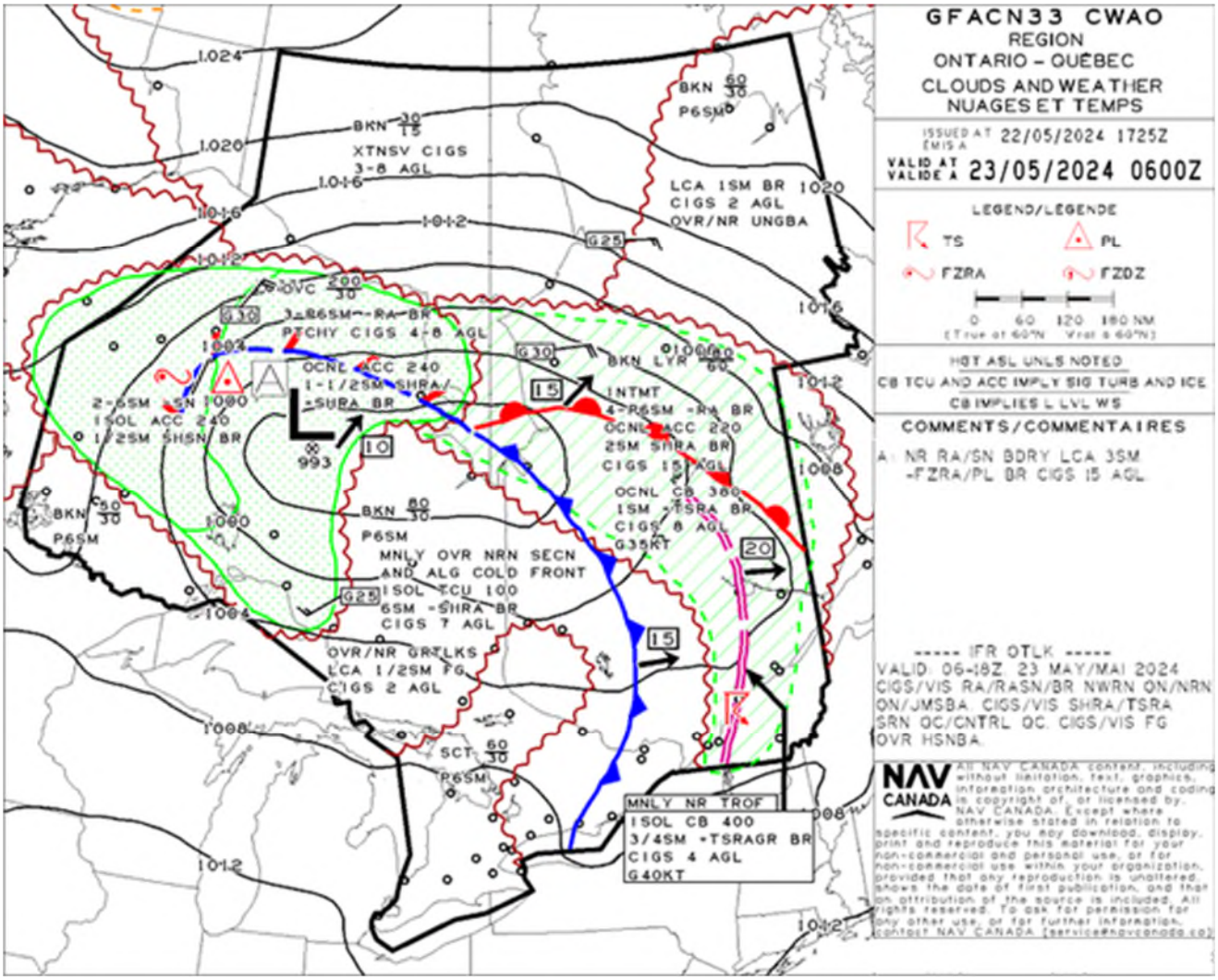
Example (1): GFACN33 T_0+0 hr clouds and weather panel



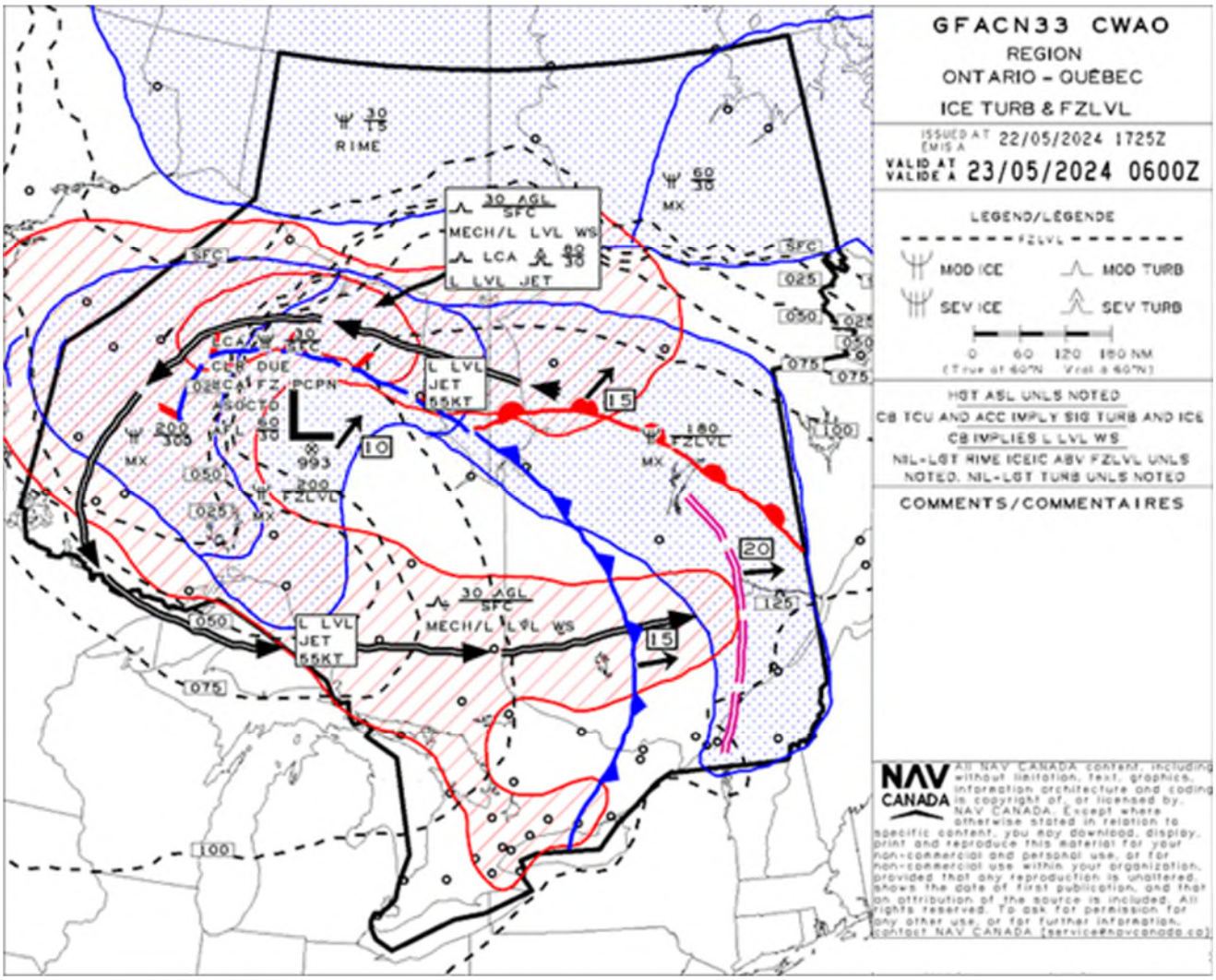
Example (2): GFACN33 T_0+0 hr icing and turbulence panel



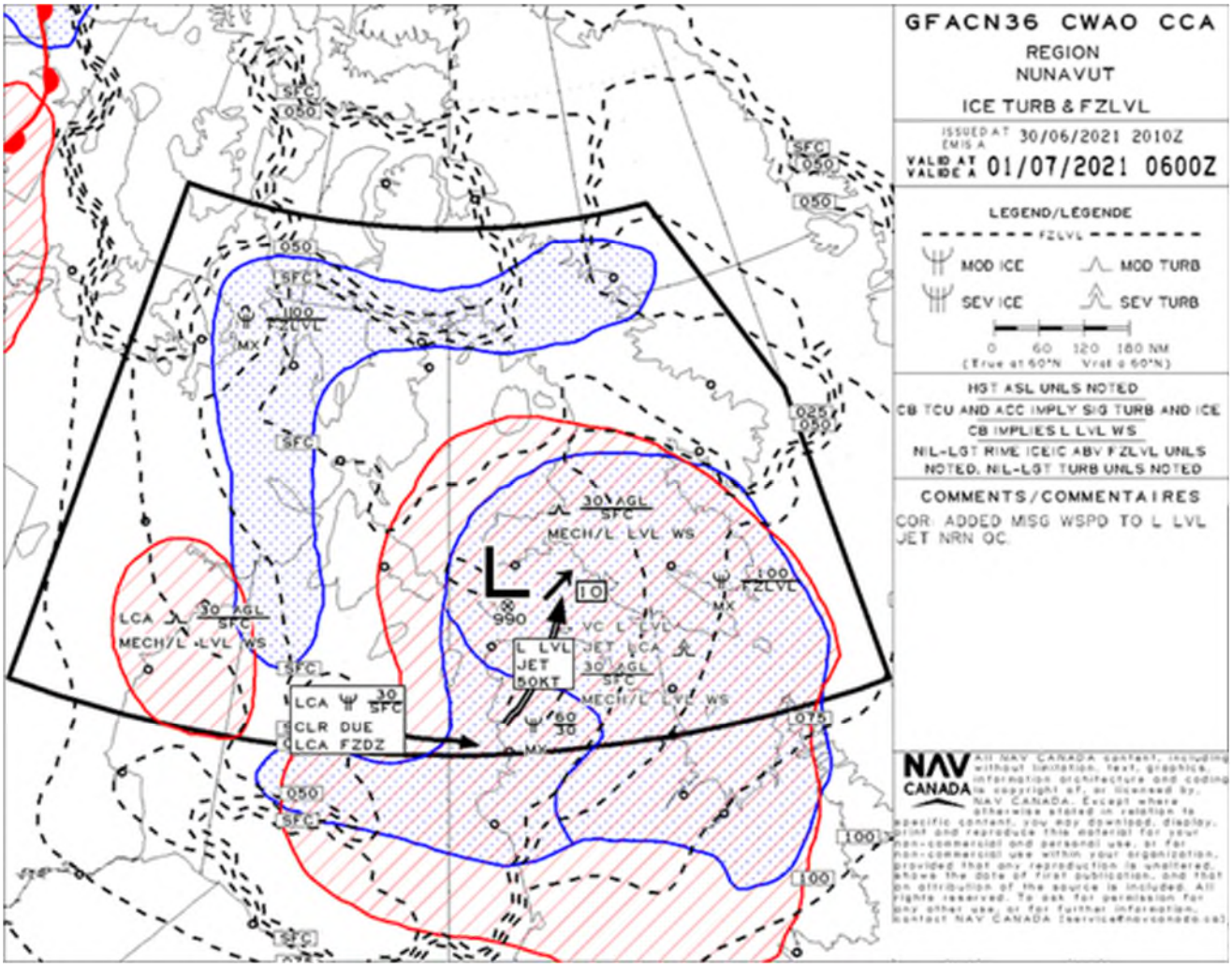
Example (3): GFACN33 T_0+12 hr clouds and weather panel



Example (4): GFACN33 T_0+12 hr icing and turbulence panel

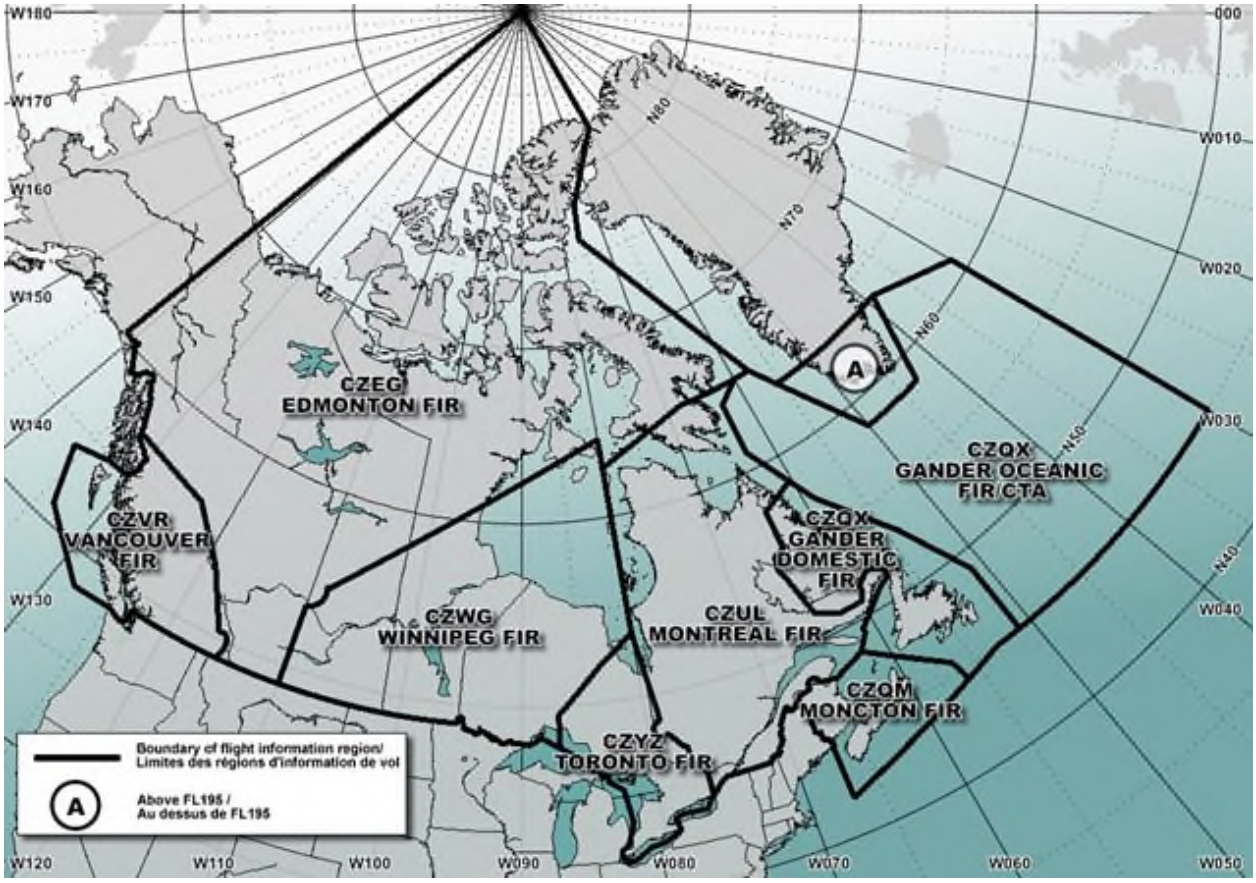


Example (5): Corrected GFACN36 T_0+12 hr icing and turbulence panel



Appendix D SIGMET information—Supplement to Chapter 5

D.1 Canadian SIGMET information domain



The summation of all flight information regions represents Canada's area of responsibility (domain) for the provision of SIGMET information.

D.2 Abbreviations and decode used in SIGMET

Code	Description
APRX	Approximate, Approximately
AT	At (followed by time)
CB	Cumulonimbus
CLD	Cloud(s)
CNL	Cancel, Cancelling
DS	Dust storm
E	East, Eastern longitude
ENE	East-Northeast
ESE	East-Southeast
+FC	Tornado(es)/Waterspout(s)
FCST	Forecast(s)
FIR	Flight Information Region
FL	Flight Level
FRQ	Frequent
FZRA	Freezing Rain
GFA	Graphic Area Forecast
GR	Hail
HVY	Heavy
ICE	Icing
INTSF	Intensifying
INTST	Intensity
KT	Knots
L LVL WS	Low level wind shear
MOV	Move, Moving, Movement
MT	Mountain(s)
MTW	Mountain waves
N	North, Northern latitude
NC	No change
NE	Northeast

Code	Description
NM	Nautical mile(s)
NNE	North-Northeast
NNW	North-Northwest
NW	Northwest
OBS	Observed
POSS	Possible, Possibly
PSN	Position
RDOACT	Radioactive
RMK	Remark(s)
S	South, Southern latitude
SE	Southeast
SEV	Severe
SFC	Surface
SIGMET	Refer to 5.1 of chapter 5
SQL	Squall line
SS	Sandstorm
SSE	South-Southeast
SSW	South-Southwest
STNR	Stationary
SW	Southwest
TC	Tropical cyclone
TS	Thunderstorm(s)
TURB	Turbulence
VA	Volcanic ash
W	West, Western longitude
WKN	Weakening
WNW	West-Northwest
WSW	West-Southwest
WI	Within
WID	Wide

Code	Description
Z	Zulu (UTC) Universal Time Coordinated

D.3 SIGMET Bulletin scheme

FIR indicator	FIR name	Type	International (ICAO)	National
CZVR	Vancouver	SIGMET SIGMET (TC) SIGMET (VA)	WSCN01 CWAO WCCN01 CWAO WVCN01 CWAO	WSCN21 CWAO WCCN21 CWAO WVCN21 CWAO
CZEG	Edmonton	SIGMET SIGMET (TC) SIGMET (VA)	WSCN02 CWAO WCCN02 CWAO WVCN02 CWAO	WSCN22 CWAO WCCN22 CWAO WVCN22 CWAO
CZWG	Winnipeg	SIGMET SIGMET (TC) SIGMET (VA)	WSCN03 CWAO WCCN03 CWAO WVCN03 CWAO	WSCN23 CWAO WCCN23 CWAO WVCN23 CWAO
CZYZ	Toronto	SIGMET SIGMET (TC) SIGMET (VA)	WSCN04 CWAO WCCN04 CWAO WVCN04 CWAO	WSCN24 CWAO WCCN24 CWAO WVCN24 CWAO
CZUL	Montréal	SIGMET SIGMET (TC) SIGMET (VA)	WSCN05 CWAO WCCN05 CWAO WVCN05 CWAO	WSCN25 CWAO WCCN25 CWAO WVCN25 CWAO
CZQM	Moncton	SIGMET SIGMET (TC) SIGMET (VA)	WSCN06 CWAO WCCN06 CWAO WVCN06 CWAO	WSCN26 CWAO WCCN26 CWAO WVCN26 CWAO
CZQX	Gander Domestic	SIGMET SIGMET (TC) SIGMET (VA)	WSCN07 CWAO WCCN07 CWAO WVCN07 CWAO	WSCN27 CWAO WCCN27 CWAO WVCN27 CWAO
CZQX	Gander Oceanic	SIGMET SIGMET (TC) SIGMET (VA)	WSNT01 CWAO WCNT01 CWAO WVNT01 CWAO	WSNT21 CWAO WCNT21 CWAO WVNT21 CWAO

D.4 Alphanumeric sequence

Rules for the use of letters:

- 25 letters of the alphabet will be shared by all 8 FIRs; T is exclusively used for test messages - refer to 5.8.9.
- A letter can be used if not currently in service in any FIR and if it was retired for a minimum of 24 hours (regardless of the date). Otherwise, the next letter is used. Letter Z wraps back to letter A if necessary.
- If all letters are unavailable according to the above rules, then the letter that has had the longest retirement is used.
- The letter attributed to a SIGMET message will not change during its lifespan (updates and cancellation).
- WS, WV and WC messages share the same alphabet. If letter A is used in a WS, then a subsequent WV would have to use letter B.
- WS, WV and WC messages do not share the alphabet with WA (AIRMET). Letter A may be used simultaneously in both a WS and a WA.

D.5 Meteorological phenomena to be included in SIGMET

Thunderstorm	frequent frequent, with hail frequent, with hail and possible tornado/waterspout frequent, with hail and tornado/waterspout squall line squall line, with hail squall line, with hail and possible tornado/waterspout squall line, with hail and tornado/waterspout	FRQ[2] TS FRQ[2] TSGR[4] FRQ[2] TSGR[4] POSS +FC[5] FRQ[2] TSGR[4] +FC[5] SQL[3] TS SQL[3] TSGR[4] SQL[3] TSGR[4] POSS +FC[5] SQL[3] TSGR[4] +FC[5]
Turbulence	severe turbulence	SEV TURB[6]
Icing	severe icing severe icing due to freezing rain	SEV ICE[7] SEV ICE (FZRA)[7]
Mountain wave	severe mountain wave	SEV MTW
Low-level wind shear	low-level wind shear	L LVL WS
Dust storm	heavy dust storm	HVY DS
Sand storm	heavy sand storm	HVY SS
Radioactive cloud	Radioactive cloud	RDOACT CLD
Volcanic ash	volcanic ash	VA
Tropical cyclone	tropical cyclone with 10-minute mean surface wind speed of 63 km/h (34 KT) or more	TC

Note (1): Only one of the weather phenomena listed **shall** be selected and included in each SIGMET.

Note (2): Frequent (**FRQ**) indicates an area of thunderstorms within which there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 50% of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).

Note (3): Squall line (**SQL**) indicates thunderstorms along a line with little or no space between individual clouds.

Note (4): Hail (**GR**) should be used as a further description of the thunderstorm, as necessary.

Note (5): Tornado and/or waterspout (**+FC**) should be used as a further description of the thunderstorm, as necessary.

Note (6): Severe (**SEV**) turbulence (**TURB**) refers only to:

- low-level turbulence associated with strong surface winds
- rotor streaming
- high-level turbulence whether in cloud or not in cloud (CAT)

Turbulence **shall** not be used in connection with convective clouds.

Note (7): Severe (**SEV**) icing (**ICE**) **shall** refer to icing in other than convective clouds. Freezing rain (**FZRA**) **shall** refer to severe icing conditions caused by freezing rain.

D.6 Resolution

Distance

Every 5 NM from 10 to 30 NM (5, 10, 15, 20, 25, 30)

Every 15 NM from 30 to 90 NM (30, 45, 60, 75, 90)

Every 30 NM above 90 NM (90, 120, 150, 180, 210, etc.)

Direction 8 point compass (octants*)

Octants (degrees true):

N: directions greater than 337.5 degrees to 22.5 degrees

NE: directions greater than 22.5 degrees to 67.5 degrees

E: directions greater than 67.5 degrees to 112.5 degrees

SE: directions greater than 112.5 degrees to 157.5 degrees

S: directions greater than 157.5 degrees to 202.5 degrees

SW: directions greater than 202.5 degrees to 247.5 degrees

W: directions greater than 247.5 degrees to 292.5 degrees

NW: directions greater than 292.5 degrees to 337.5 degrees

Latitude and longitude (all FIRs except Gander Oceanic)

Degrees and minutes (1 minute)

Latitude and longitude (Gander Oceanic FIR)

Degrees and minutes (15 minutes)[1]

Level (FL)

Every FL001 (corresponding to 100 feet) – up to FL015

Every FL005 – FL015 to FL030

Every FL010 – above FL030

Movement (direction/speed) 16 point compass (radials*)/ 5 KT increments

Radials (degrees true):

N:	360 degrees
NNE:	22.5 degrees
NE:	45 degrees
ENE:	67.5 degrees
E:	90 degrees
ESE:	112.5 degrees
SE:	135 degrees
SSE:	157.5 degrees
S:	180 degrees
SSW:	202.5 degrees
SW:	225 degrees
WSW:	247.5 degrees
W:	270 degrees
WNW:	292.5 degrees
NW:	315 degrees
NNW:	337.5 degrees

Note (1): U.S. National Weather Service (NWS) uses a 15 minute resolution over oceanic areas such as New York Oceanic FIR. This harmonizes the practice with our southern neighbouring FIR. UK Met Service, over Shanwick Oceanic FIR, may use up to the minute but in reality, rarely go beyond 30 minutes resolution. An exception is made for the location of a TC centre which will be stated to 1 minute resolution in order to match TCAC guidance (refer to 5.8.5).

D.7 Aviation reference sites used in National SIGMET

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYXX	Abbotsford	BC	CZVR	31	N49 01 31	W122 21 36
CYXC	Cranbrook/Canadian Rockies Intl	BC	CZVR	31	N49 36 44	W115 46 55
CYKA	Kamloops	BC	CZVR	31	N50 42 09	W120 26 55
CYLW	Kelowna	BC	CZVR	31	N49 57 26	W119 22 41
CYYF	Penticton	BC	CZVR	31	N49 27 45	W119 36 08
CYZT	Port Hardy	BC	CZVR	31	N50 40 50	W127 22 00
CYXS	Prince George	BC	CZVR	31	N53 53 03	W122 40 39
CYPR	Prince Rupert	BC	CZVR	31	N54 17 09	W130 26 41
CYZP	Sandspit	BC	CZVR	31	N53 15 15	W131 48 50
CYXT	Terrace	BC	CZVR	31	N54 28 07	W128 34 42
CYVR	Vancouver Intl	BC	CZVR	31	N49 11 41	W123 11 02
CYYJ	Victoria Intl	BC	CZVR	31	N48 38 50	W123 25 33
CYWL	Williams Lake	BC	CZVR	31	N52 11 00	W122 03 16
CBBC	Bella Bella (Campbell Island)	BC	CZVR	31	N52 11 06	W128 09 24
CYBL	Campbell River	BC	CZVR	31	N49 57 07	W125 16 23
CYCG	Castlegar/West Kootenay Regional	BC	CZVR	31	N49 17 46	W117 37 57

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYZY	MacKenzie	BC	CZVR	31	N55 17 58	W123 08 00
CZMT	Masset	BC	CZVR	31	N54 01 38	W132 07 30
CYCD	Nanaimo	BC	CZVR	31	N49 03 16	W123 52 12
CYQZ	Quesnel	BC	CZVR	31	N53 01 34	W122 30 37
CYYD	Smithers	BC	CZVR	31	N54 49 31	W127 10 58
CYAZ	Tofino/Long Beach	BC	CZVR	31	N49 04 55	W125 46 21
CYQQ	Comox	BC	CZVR	31	N49 42 39	W124 53 12
CZST	Stewart	BC	CZVR	31	N55 56 00	W129 59 00
CAV4	McBride/Charlie Leake Field	BC	CZVR	31	N53 18 54	W120 10 14
CYCP	Blue River	BC	CZVR	31	N52 07 29	W119 17 34
CYRV	Revelstoke	BC	CZVR	31	N50 57 44	W118 11 04
CYPZ	Burns Lake	BC	CZVR	31	N54 22 35	W125 57 05
CYPS	Pemberton	BC	CZVR	31	N50 18 09	W122 44 16
CBT3	Tsetzi Lake (Pan Phillips)	BC	CZVR	31	N52 58 19	W125 01 36
CAG3	Chilko Lake (Tsylos Park Lodge)	BC	CZVR	31	N51 37 34	W124 08 31
CYYE	Fort Nelson	BC	CZEG	31	N58 50 11	W122 35 49
CYXJ	Fort St. John	BC	CZEG	31	N56 14 18	W120 44 25

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYYC	YYC Calgary Intl	AB	CZEG	32	N51 07 21	W114 00 48
CYEG	Edmonton Intl	AB	CZEG	32	N53 18 36	W113 34 46
CYMM	Fort McMurray	AB	CZEG	32	N56 39 12	W111 13 24
CYQU	Grande Prairie	AB	CZEG	32	N55 10 55	W118 53 14
CYOJ	High Level	AB	CZEG	32	N58 37 18	W117 09 53
CYQL	Lethbridge County	AB	CZEG	32	N49 37 49	W112 47 59
CYLL	Lloydminster	AB	CZEG	32	N53 18 38	W110 04 27
CYXH	Medicine Hat	AB	CZEG	32	N50 01 08	W110 43 14
CYPE	Peace River	AB	CZEG	32	N56 13 38	W117 26 54
CYQF	Red Deer Regional	AB	CZEG	32	N52 11 06	W113 53 40
CYDB	Burwash	YT	CZEG	35	N61 22 14	W139 02 24
CYCB	Cambridge Bay	NU	CZEG	35	N69 06 29	W105 08 14
CYFS	Fort Simpson	NT	CZEG	35	N61 45 37	W121 14 12
CYSM	Fort Smith	NT	CZEG	35	N60 01 13	W111 57 43
CGS2	Goose Lake	NU	CZEG	35	N65 33 07	W106 26 09
CYHY	Hay River/Merlyn Carter Airport	NT	CZEG	35	N60 50 23	W115 46 58
CHB3	Hope Bay	NU	CZEG	35	N68 09 40	W106 36 56

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYEV	Inuvik (Mike Zubko)	NT	CZEG	35	N68 18 14	W133 28 59
CYCO	Kugluktuk	NU	CZEG	35	N67 49 00	W115 08 38
CYMA	Mayo	YT	CZEG	35	N63 37 00	W135 52 08
CYVQ	Norman Wells	NT	CZEG	35	N65 16 53	W126 47 55
CYQH	Watson Lake	YT	CZEG	35	N60 06 59	W128 49 21
CYXY	Whitehorse/Erik Nielsen Intl	YT	CZEG	35	N60 42 34	W135 04 02
CYZF	Yellowknife	NT	CZEG	35	N62 27 47	W114 26 25
CYEK	Arviat	NU	CZEG	36	N61 05 38	W094 04 18
CYBK	Baker Lake	NU	CZEG	36	N64 17 56	W096 04 40
CYTE	Kinngait	NU	CZEG	36	N64 13 49	W076 31 30
CYCY	Clyde River	NU	CZEG	36	N70 29 09	W068 31 01
CYZS	Coral Harbour	NU	CZEG	36	N64 11 36	W083 21 34
CYUX	Sanirajak	NU	CZEG	36	N68 46 33	W081 14 33
CHC5	Hayes Camp	NU	CZEG	36	N66 39 06	W091 32 39
CYIO	Pond Inlet	NU	CZEG	36	N72 41 22	W077 58 08
CYVM	Qikiqtarjuaq	NU	CZEG	36	N67 32 48	W064 01 54
CYRT	Rankin Inlet	NU	CZEG	36	N62 48 38	W092 06 53

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYYH	Taloyoak	NU	CZEG	36	N69 32 48	W093 34 37
CYHK	Gjoa Haven	NU	CZEG	36	N68 38 08	W095 51 01
CYRB	Resolute Bay	NU	CZEG	37	N74 43 01	W094 58 10
CYDQ	Dawson Creek	BC	CZEG	31	N55 44 32	W120 10 59
CYDL	Dease Lake	BC	CZEG	31	N58 25 20	W130 01 53
CYVT	Buffalo Narrows	SK	CZEG	32	N55 50 31	W108 25 03
CYPY	Fort Chipewyan	AB	CZEG	32	N58 46 03	W111 07 03
CYZH	Slave Lake	AB	CZEG	32	N55 17 35	W114 46 38
CYSF	Stony Rapids	SK	CZEG	32	N59 15 01	W105 50 29
CYZU	Whitecourt	AB	CZEG	32	N54 08 38	W115 47 12
CYDA	Dawson City	YT	CZEG	35	N64 02 32	W139 07 48
CYWJ	Déline	NT	CZEG	35	N65 12 40	W123 26 11
CZFA	Faro	YT	CZEG	35	N62 12 25	W133 22 24
CYGH	Fort Good Hope	NT	CZEG	35	N66 14 26	W128 38 51
CZFM	Fort McPherson	NT	CZEG	35	N67 24 25	W134 51 35
CYRA	Gamèti/Rae Lakes	NT	CZEG	35	N64 06 58	W117 18 35
CYLK	Lutselk'e	NT	CZEG	35	N62 25 06	W110 40 56

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYOA	Ekati	NT	CZEG	35	N64 41 56	W110 36 53
CYOC	Old Crow	YT	CZEG	35	N67 34 12	W139 50 24
CYPC	Paulatuk (Nora Aliqatchialuk Ruben)	NT	CZEG	35	N69 21 38	W124 04 33
CYSY	Sachs Harbour (David Nasogaluak JR. Saaryuaq)	NT	CZEG	35	N71 59 37	W125 14 29
CYZW	Teslin	YT	CZEG	35	N60 10 23	W132 44 30
CYUB	Tuktoyaktuk/James Gruben	NT	CZEG	35	N69 26 00	W133 01 35
CYHI	Ulukhaktok/Holman	NT	CZEG	35	N70 45 46	W117 48 22
CYGT	Igloolik	NU	CZEG	36	N69 21 53	W081 48 59
CYBB	Kugaaruk	NU	CZEG	36	N68 32 09	W089 48 19
CYXP	Pangnirtung	NU	CZEG	36	N66 08 42	W065 42 49
CYUT	Naujaat	NU	CZEG	36	N66 31 14	W086 13 29
CYEU	Eureka	NU	CZEG	37	N79 59 40	W085 48 43
CYAB	Arctic Bay	NU	CZEG	37	N73 00 23	W085 02 50
CYLT	Alert	NU	CZEG	37	N82 31 04	W062 16 50
CYOD	Cold Lake/Group Captain R.W. McNair	AB	CZEG	32	N54 24 18	W110 16 46
CYCS	Chesterfield Inlet	NU	CZEG	36	N63 20 50	W090 43 52
CMR2	Mary River	NU	CZEG	36	N71 19 25	W079 21 14

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYGZ	Grise Fiord	NU	CZEG	37	N76 25 33	W082 54 29
CJQ6	Tanquary Fiord	NU	CZEG	37	N81 24 34	W076 52 54
CYVL	Colville Lake/Tommy Kochon	NT	CZEG	35	N67 01 16	W126 07 43
CFF4	Great Bear Lake	NT	CZEG	35	N66 42 11	W119 43 02
CYXQ	Beaver Creek	YT	CZEG	35	N62 24 37	W140 52 08
CMN4	Minto	YT	CZEG	35	N62 36 17	W137 13 19
CFC4	MacMillan Pass	YT	CZEG	35	N63 10 34	W130 12 13
CYWY	Wrigley	NT	CZEG	35	N63 12 35	W123 26 12
CYWE	Wekweètì	NT	CZEG	35	N64 11 27	W114 04 36
CBX5	Tungsten (Cantung)	NT	CZEG	35	N61 57 24	W128 12 09
CBH4	Prairie Creek	NT	CZEG	35	N61 33 53	W124 48 54
CKV4	Obre Lake / North of sixty	NT	CZEG	35	N60 18 56	W103 07 54
CFT3	Finlayson Lake	YT	CZEG	35	N61 41 29	W130 46 26
CYJP	Fort Providence	NT	CZEG	35	N61 19 09	W117 36 22
CYFR	Fort Resolution	NT	CZEG	35	N61 10 51	W113 41 23
CYJF	Fort Liard	NT	CZEG	31	N60 14 08	W123 28 12
CBS4	Mule Creek	BC	CZEG	31	N59 46 29	W136 35 41

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYSQ	Atlin	BC	CZEG	31	N59 34 35	W133 40 17
CBA9	Ospika	BC	CZEG	31	N56 16 15	W124 03 50
CBQ7	Kemess Creek	BC	CZEG	31	N56 58 28	W126 44 27
CBX7	Tumbler Ridge	BC	CZEG	31	N55 01 38	W120 55 52
CGC2	Galore Creek (Heli)	BC	CZEG	31	N57 07 24	W131 27 09
CYJA	Jasper	AB	CZEG	32	N52 59 48	W118 03 34
CYBA	Banff	AB	CZEG	32	N51 12 00	W115 32 00
CYLB	Lac La Biche	AB	CZEG	32	N54 46 13	W112 01 54
CYOP	Rainbow Lake	AB	CZEG	32	N58 29 28	W119 24 24
CFU4	Garden River	AB	CZEG	32	N58 42 50	W113 52 34
CYBE	Uranium City	SK	CZEG	32	N59 33 41	W108 28 53
CNL9	Nueltin Lake	MB	CZEG	32	N59 42 29	W100 07 38
CZWL	Wollaston Lake	SK	CZEG	32	N58 06 25	W103 10 21
CYKJ	Key Lake	SK	CZEG	32	N57 15 23	W105 37 03
CFS6	Loon River	AB	CZEG	32	N57 08 31	W115 04 31
CAX2	Axe Lake	SK	CZEG	32	N57 16 09	W109 50 51
CFS4	Ogilvie	YT	CZEG	35	N65 40 28	W138 06 56

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CEL4	Hanna	AB	CZEG	32	N51 37 53	W111 54 15
CYBR	Brandon Muni	MB	CZWG	32	N49 54 36	W099 57 08
CYYQ	Churchill	MB	CZWG	32	N58 44 21	W094 03 59
CYDN	Dauphin (Lt.Col WG. (Billy) Barker VC Aprt)	MB	CZWG	32	N51 06 05	W100 03 12
CYGX	Gillam	MB	CZWG	32	N56 21 28	W094 42 39
CYIV	Island Lake	MB	CZWG	32	N53 51 26	W094 39 13
CYVC	La Ronge (Barber Field)	SK	CZWG	32	N55 09 05	W105 16 01
CYYL	Lynn Lake	MB	CZWG	32	N56 51 52	W101 04 34
CYQW	North Battleford (Cameron McIntosh)	SK	CZWG	32	N52 46 09	W108 14 40
CYNE	Norway House	MB	CZWG	32	N53 57 30	W097 50 39
CYPA	Prince Albert (Glassfield)	SK	CZWG	32	N53 12 52	W105 40 23
CYQR	Regina Intl	SK	CZWG	32	N50 25 56	W104 39 58
CYXE	Saskatoon/John G. Diefenbaker Intl	SK	CZWG	32	N52 10 15	W106 42 00
CYQD	The Pas	MB	CZWG	32	N53 58 17	W101 05 28
CYTH	Thompson	MB	CZWG	32	N55 48 17	W097 51 45
CYWG	Winnipeg/James Armstrong Richardson Intl	MB	CZWG	32	N49 54 36	W097 14 24
CYTL	Big Trout Lake	ON	CZWG	33	N53 49 04	W089 53 49

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYQK	Kenora	ON	CZWG	33	N49 47 18	W094 21 47
CYHD	Dryden Regional	ON	CZWG	33	N49 49 53	W092 44 37
CYXL	Sioux Lookout	ON	CZWG	33	N50 06 51	W091 54 20
CYQT	Thunder Bay	ON	CZWG	33	N48 22 19	W089 19 18
CYGQ	Geraldton (Greenstone Regional)	ON	CZWG	33	N49 46 43	W086 56 19
CYYN	Swift Current	SK	CZWG	32	N50 17 33	W107 41 27
CYQV	Yorkton Muni	SK	CZWG	32	N51 15 53	W102 27 41
CYPL	Pickle Lake	ON	CZWG	33	N51 26 47	W090 12 48
CYRL	Red lake	ON	CZWG	33	N51 04 02	W093 47 35
CYMJ	Moose Jaw/R Vice Marshal C.M. McEwen	SK	CZWG	32	N50 19 49	W105 33 33
CYPG	Portage La Prairie/Southport	MB	CZWG	32	N49 54 11	W098 16 26
CYBQ	Tadoule Lake	MB	CZWG	32	N58 42 22	W098 30 44
CKA9	Southend/Hans Ulricksen field	SK	CZWG	32	N56 20 11	W103 17 37
CZTM	Shamattawa	MB	CZWG	32	N55 51 47	W092 04 53
CYBV	Berens River	MB	CZWG	32	N52 21 32	W097 01 05
CYHB	Hudson Bay	SK	CZWG	32	N52 49 06	W102 18 40
CYFO	Flin Flon	MB	CZWG	32	N54 40 41	W101 40 55

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYYO	Wynyard	SK	CZWG	32	N51 48 36	W104 10 12
CYEN	Estevan Regional	SK	CZWG	32	N49 12 37	W102 57 57
CYKY	Kindersley Regional	SK	CZWG	32	N51 30 55	W109 10 50
CYLH	Lansdowne House	ON	CZWG	33	N52 11 44	W087 56 03
CKQ3	North Spirit Lake	ON	CZWG	33	N52 29 24	W092 58 16
CYKP	Ogoki Post	ON	CZWG	33	N51 39 31	W085 54 04
CYYW	Armstrong	ON	CZWG	33	N50 17 38	W088 54 36
CYIB	Atikokan Muni	ON	CZWG	33	N48 46 27	W091 38 20
CJV8	Grand Rapids	MB	CZWG	32	N53 10 21	W099 19 23
CZSN	South Indian Lake	MB	CZWG	32	N56 47 34	W098 54 26
CYER	Fort Severn	ON	CZWG	33	N56 01 08	W087 40 34
CYPO	Peawanuck	ON	CZWG	33	N54 59 17	W085 26 36
CYAT	Attawapiskat	ON	CZWG	33	N52 55 39	W082 25 55
CYLJ	Meadow Lake	SK	CZWG	32	N54 07 31	W108 31 22
CYYU	Kapuskasing	ON	CZYZ	33	N49 24 42	W082 28 10
CYTS	Timmins/Victor M. Power	ON	CZYZ	33	N48 34 14	W081 22 36
CYAM	Sault Ste. Marie	ON	CZYZ	33	N46 29 06	W084 30 34

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYSB	Sudbury	ON	CZYZ	33	N46 37 32	W080 47 52
CYYB	North Bay	ON	CZYZ	33	N46 21 50	W079 25 27
CYYZ	Toronto/Lester B. Pearson Intl	ON	CYZY	33	N43 40 36	W079 37 50
CYHM	Hamilton	ON	CZYZ	33	N43 10 25	W079 56 06
CYQG	Windsor	ON	CYZY	33	N42 16 34	W082 57 19
CYGK	Kingston	ON	CYZY	33	N44 13 35	W076 35 48
CYKF	Kitchener/Waterloo	ON	CYZY	33	N43 27 39	W080 22 43
CYXU	London	ON	CYZY	33	N43 01 59	W081 09 04
CYLD	Chapleau	ON	CZYZ	33	N47 49 13	W083 20 49
CYXR	Earlton (Timiskaming Regional)	ON	CZYZ	33	N47 41 42	W079 50 56
CYZE	Gore Bay-Manitoulin	ON	CZYZ	33	N45 53 03	W082 34 06
CYSP	Marathon	ON	CZYZ	33	N48 45 26	W086 20 45
CYMO	Moosonee	ON	CZYZ	33	N51 17 31	W080 36 30
CYQA	Muskoka	ON	CZYZ	33	N44 58 30	W079 18 14
CYPQ	Peterborough	ON	CZYZ	33	N44 13 50	W078 21 48
CYSN	St Catharines/Niagara District	ON	CZYZ	33	N43 11 30	W079 10 16
CYZR	Sarnia (Chris Hadfield)	ON	CZYZ	33	N42 59 59	W082 18 34

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYXZ	Wawa	ON	CZYZ	33	N47 58 01	W084 47 11
CYVV	Wiarton	ON	CZYZ	33	N44 44 39	W081 06 31
CYWA	Petawawa	ON	CZYZ	33	N45 57 00	W077 19 03
CYTR	Trenton	ON	CZYZ	33	N44 07 08	W077 31 41
CYHF	Hearst (René Fontaine) Muni	ON	CZYZ	33	N49 42 50	W083 41 13
CYGD	Goderich	ON	CZYZ	33	N43 46 04	W081 42 39
CYVP	Kuujjuaq	QC	CZUL	33	N58 05 42	W068 25 20
CYPH	Inukjuak	QC	CZUL	33	N58 28 19	W078 04 37
CYGW	Kuujjuarapik	QC	CZUL	33	N55 16 55	W077 45 55
CYGL	La Grande Rivière	QC	CZUL	33	N53 37 31	W077 42 15
CYUY	Rouyn-Noranda	QC	CZUL	33	N48 12 22	W078 50 08
CYVO	Val-d'Or	QC	CZUL	33	N48 03 12	W077 46 58
CYRJ	Roberval	QC	CZUL	33	N48 31 12	W072 15 57
CYQB	Québec/Jean Lesage Intl	QC	CZUL	33	N46 47 28	W071 23 36
CYOW	Ottawa/MacDonald-Cartier Intl	ON	CZUL	33	N45 19 21	W075 40 02
CYUL	Montréal/Pierre Elliott Trudeau Intl	QC	CZUL	33	N45 28 14	W073 44 27
CYSC	Sherbrooke	QC	CZUL	33	N45 26 19	W071 41 29

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYKL	Schefferville	QC	CZUL	34	N54 48 19	W066 48 19
CYWK	Wabush	NL	CZUL	34	N52 55 22	W066 51 53
CYBX	Lourdes-de-Blanc-Sablon	QC	CZUL	34	N51 26 31	W057 11 10
CYZV	Sept-Îles	QC	CZUL	34	N50 13 24	W066 15 56
CYGV	Havre St-Pierre	QC	CZUL	34	N50 16 55	W063 36 40
CYNA	Natashquan	QC	CZUL	34	N50 11 24	W061 47 20
CYBC	Baie-Comeau	QC	CZUL	34	N49 07 57	W068 12 16
CYYY	Mont-Joli	QC	CZUL	34	N48 36 32	W068 12 29
CYGP	Gaspé (Michel-Pouliot)	QC	CZUL	34	N48 46 30	W064 28 54
CYFB	Iqaluit	NU	CZUL	36	N63 45 24	W068 33 22
CYMT	Chibougamau/Chapais	QC	CZUL	33	N49 46 19	W074 31 41
CYAH	La Grande-4	QC	CZUL	33	N53 45 17	W073 40 31
CYTQ	Tasiujaq	QC	CZUL	33	N58 40 04	W069 57 21
CYKQ	Waskaganish	QC	CZUL	33	N51 28 24	W078 45 30
CYIK	Ivujivik	QC	CZUL	36	N62 25 02	W077 55 31
CYPX	Puvirnituk	QC	CZUL	36	N60 03 08	W077 17 15
CYHA	Quaqtaq	QC	CZUL	36	N61 02 47	W069 37 04

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYBG	Bagotville	QC	CZUL	33	N48 19 50	W070 59 47
CYRQ	Trois-Rivières	QC	CZUL	33	N46 21 06	W072 40 50
CYMW	Maniwaki	QC	CZUL	33	N46 16 22	W075 59 26
CYKO	Akulivik	QC	CZUL	36	N60 49 07	W078 08 55
CYAS	Kangirsuk	QC	CZUL	36	N60 01 38	W069 59 57
CYZG	Salluit	QC	CZUL	36	N62 10 46	W075 40 02
CYKG	Kangiqsujuaq (Wakeham Bay)	QC	CZUL	36	N61 35 19	W071 55 46
CYLC	Kimmirut	NU	CZUL	36	N62 50 53	W069 52 38
CYNM	Matagami	QC	CZUL	33	N49 45 42	W077 48 10
CYPP	Parent	QC	CZUL	33	N47 55 55	W074 36 29
CYSK	Sanikiluaq	NU	CZUL	33	N56 32 13	W079 15 00
CYMU	Umiujaq	QC	CZUL	33	N56 32 10	W076 31 06
CTU2	Fontanges	QC	CZUL	33	N54 33 14	W071 10 24
CYHH	Nemiscau	QC	CZUL	33	N51 41 28	W076 08 08
CRB4	Rivière Bonnard	QC	CZUL	33	N50 42 16	W071 09 45
CYLU	Kangiqsualujjuaq (Georges River)	QC	CZUL	34	N58 42 41	W065 59 34
CSF3	Poste Montagnais (Mile 134)	QC	CZUL	34	N51 53 19	W065 42 54

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYHR	Chevery	QC	CZUL	34	N50 28 08	W059 38 12
CYYG	Charlottetown	PE	CZQM	34	N46 17 21	W063 06 55
CYQY	Sydney/J.A. Douglas McCurdy	NS	CZQM	34	N46 09 41	W060 02 53
CYQM	Moncton/Greater Moncton Intl	NB	CZQM	34	N46 06 58	W064 40 43
CYSJ	Saint John	NB	CZQM	34	N45 18 57	W065 53 24
CYFC	Fredericton Intl	NB	CZQM	34	N45 52 08	W066 32 14
CYHZ	Halifax/Stanfield Intl	NS	CZQM	34	N44 52 47	W063 30 37
CYQI	Yarmouth	NS	CZQM	34	N43 49 38	W066 05 18
CYZX	Greenwood	NS	CZQM	34	N44 59 04	W064 55 01
CZBF	Bathurst	NB	CZQM	34	N47 37 46	W065 44 25
CYGR	Îles-de-la-Madeleine	QC	CZQM	34	N47 25 30	W061 46 41
CSB2	Sable Island	NS	CZQM	34	N43 55 46	W059 57 35
CYPD	Port Hawkesbury	NS	CZQM	34	N45 39 23	W061 22 06
CYSL	St-Leonard	NB	CZQM	34	N47 09 26	W067 50 11
CZUM	Churchill Falls	NL	CZQX	34	N53 33 45	W064 06 21
CYCA	Cartwright	NL	CZQX	34	N53 40 57	W057 02 31
CYDF	Deer Lake	NL	CZQX	34	N49 12 33	W057 23 40

Id	Name	Province	FIR	GFA	Coordinates Latitude (degrees – minutes – seconds)	Coordinates Longitude (degrees – minutes – seconds)
CYQX	Gander Intl	NL	CZQX	34	N48 56 13	W054 34 05
CYJT	Stephenville	NL	CZQX	34	N48 32 40	W058 33 00
CYYT	St. John's Intl	NL	CZQX	34	N47 37 07	W052 45 09
CYMH	Mary's Harbour	NL	CZQX	34	N52 18 10	W055 50 52
CYDP	Nain	NL	CZQX	34	N56 33 02	W061 40 56
CYAY	St. Anthony	NL	CZQX	34	N51 23 31	W056 04 59
CYYR	Goose Bay	NL	CZQX	34	N53 19 09	W060 25 33
LFVP	St-Pierre France	FR	CZQX	34	N46 45 47	W056 10 27
CDA5	St. Andrews (Codroy Valley)	NL	CZQX	34	N47 46 32	W059 18 45
CYFT	Makkovik	NL	CZQX	34	N55 04 38	W059 11 16

D.8 Examples of SIGMET messages

Example (1): A line of thunderstorms is observed over northwestern Ontario late in the day. This is the fourth SIGMET message issued for this event.

International (ICAO)

WSCN03 CWAO 162225
CZWG SIGMET **A4** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR SQL TS OBS WI 40NM WID LINE BTN N4929 W09449 – N5104 W09348 – N5209 W09120 TOP FL340 MOV E 15KT NC=

National

WSCN23 CWAO 162225
CZWG SIGMET **A4** VALID 162225/170225 CWEG-
CZWG WINNIPEG FIR SQL TS OBS WI 40NM WID LINE BTN /N4929 W09449/25 SW CYQK – /N5104 W09348/CYRL – /N5209 W09120/60 NW CYPL TOP FL340 MOV E 15KT NC
RMK GFACN33=

This SIGMET is updated after 00Z on the 17th such that there is a reset of the SIGMET number while the letter remains the same.

International (ICAO)

WSCN03 CWAO 170205
CZWG SIGMET **A1** VALID 170205/170605 CWEG-
CZWG WINNIPEG FIR SQL TS OBS WI 40NM WID LINE BTN N4915 W09332 – N5103 W09212 – N5144 W08943 TOP FL310 MOV E 15KT WKN=

National

WSCN23 CWAO 170205
CZWG SIGMET **A1** VALID 170205/170605 CWEG-
CZWG WINNIPEG FIR SQL TS OBS WI 40NM WID LINE BTN /N4915 W09332/45 SE CYQK – /N5103 W09212/60 E CYRL – /N5144 W08943/25 NE CYPL TOP FL310 MOV E 15KT WKN
RMK GFACN33=

Example (2): Severe mountain waves (lee waves) along the eastern side of the Rockies. The line falls entirely within the Edmonton FIR but covers two GFA regions. The remark line in the National SIGMET message will mention the affected GFACNs.

International (ICAO)

WSCN02 CWAO 161220
CZEG SIGMET L1 VALID 161220/161620 CWEG-
CZEG EDMONTON FIR SEV MTW FCST WI 60NM WID LINE BTN N5614 W12155 – N5105 W11440 FL070/140 STNR INTSF=

National

WSCN22 CWAO 161220
CZEG SIGMET L1 VALID 161220/161620 CWEG-
CZEG EDMONTON FIR SEV MTW FCST WI 60NM WID LINE BTN /N5614 W12155/45 W CYXJ – /N5105 W11440/25 W CYYC FL070/140 STNR INTSF
RMK **GFACN31/GFACN32**=

Example (3): Following an AIREP for severe turbulence encounter over the Northern Atlantic, the following SIGMET messages are issued. This event spans over Gander Domestic and Gander Oceanic FIRs as well as GFACN34.

International (ICAO)

CZQX

WSCN07 CWAO 161220
CZQX SIGMET **E1** VALID 161220/161620 CWUL-
CZQX GANDER DOMESTIC FIR SEV TURB OBS AT 1155Z WI 90NM WID LINE BTN N5319 W06025 – N5615 W05245 – N5930 W04715 FL280/350 MOV NE 20KT NC=

CZQX (Oceanic)

WSNT01 CWAO 161220
CZQX SIGMET **U1** VALID 161220/161620 CWUL-
CZQX GANDER OCEANIC FIR/CTA SEV TURB OBS AT 1155Z WI 90NM WID LINE BTN N5319 W06025 - N5615 W05245 N5930 W04715 FL280/350 MOV NE 20KT NC=

National

CZQX

WSCN27 CWAO 161220
CZQX SIGMET **E1** VALID 161220/161620 CWUL-
CZQX GANDER DOMESTIC FIR SEV TURB OBS AT 1155Z WI 90NM WID LINE BTN /N5319 W06025/CYYR – /N5615 W05245/ – /N5930 W04715/ FL280/350 MOV NE 20KT NC
RMK GFACN34/**CZQX GANDER OCEANIC FIR/CTA SIGMET U1**=

CZQX (Oceanic)

WSNT21 CWAO 162225
CZQX SIGMET **U1** VALID 161220/161620 CWUL-
CZQX GANDER OCEANIC FIR/CTA SEV TURB OBS AT 1155Z WI 90NM WID LINE BTN /N5319 W06025/CYYR – /N5615 W05245/ – /N5930 W04715/ FL280/350 MOV NE 20KT NC
RMK GFACN34/**CZQX GANDER DOMESTIC FIR SIGMET E1**

Since this event spans over two FIRs, the remark line cross-references the SIGMET messages. Note that only the first coordinate point relates to an aviation reference site. The other two coordinate points being into Gander Oceanic FIR, they are defined only in latitudes and longitudes as per section 5.8.3.4.

Example (4): The centre of hurricane Maria is about to move across the Avalon Peninsula. The tropical cyclone SIGMET (WCCN) is updated and only covers the Gander Domestic FIR and GFACN34 since the CB activity is confined with a radius of 150NM from the centre of the hurricane. The radius of CB is not expected to change between the initial and forecast time.

International (ICAO)

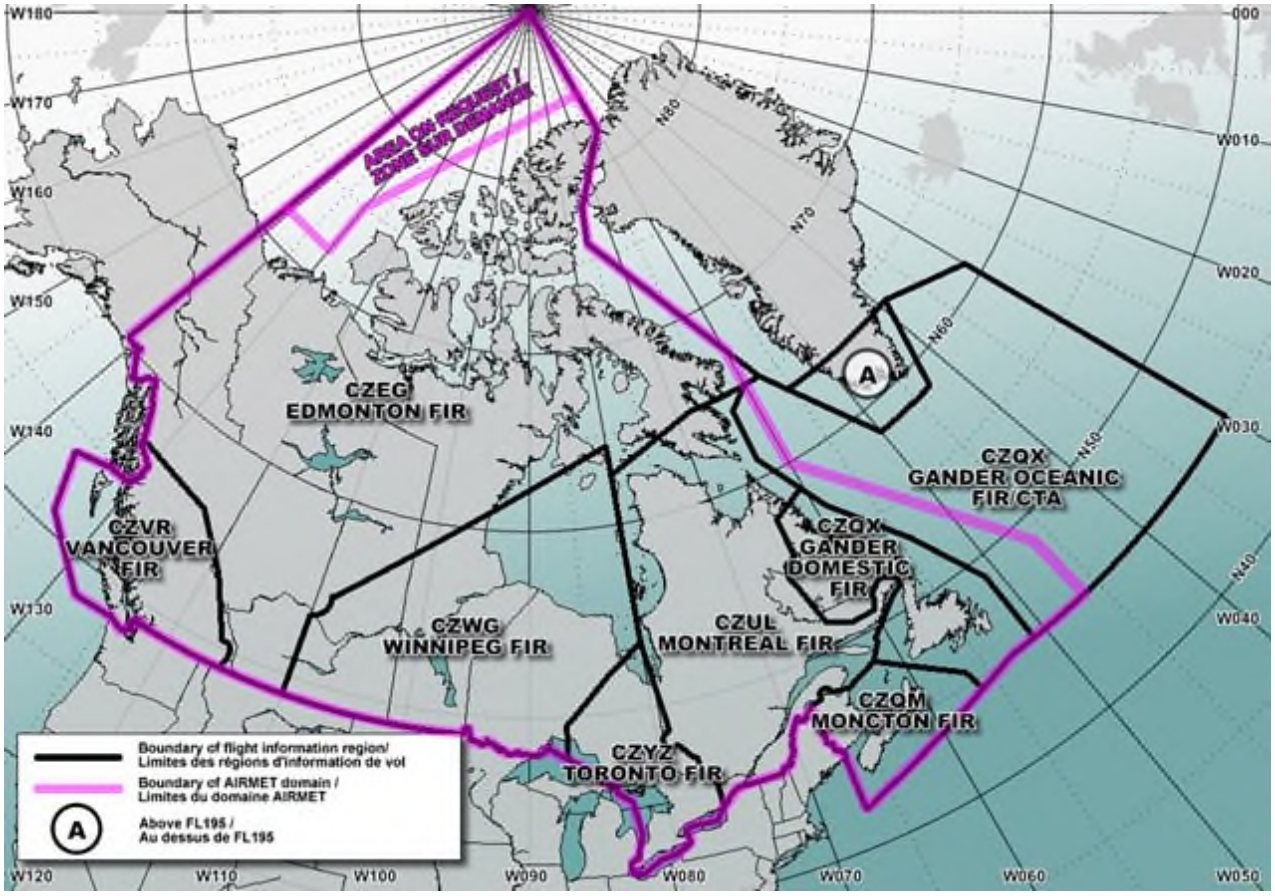
WCCN07 CWAO 161802
CZQX SIGMET G3 VALID 1601800/170000 CWUL-
CZQX GANDER DOMESTIC FIR TC MARIA PSN N4720 W05430 CB OBS AT 1800Z WI 150NM OF TC CENTRE TOP FL360 WKN FCST AT 0000Z TC CENTRE PSN N5110 W05030=

National

WCCN27 CWAO 161802
CZQX SIGMET G3 VALID 161800/170000 CWUL-
CZQX GANDER DOMESTIC FIR TC MARIA PSN /N4720 W05430/75 SW CYYT CB OBS AT 1800Z WI 150NM OF TC CENTRE TOP FL360 WKN FCST AT 0000Z TC CENTRE PSN /N5110 W05030/180 NE CYYT
RMK GFACN34=

Appendix E AIRMET information—Supplement to Chapter 6

E.1 Canadian AIRMET information domain



The pink boundary contours Canada's area of responsibility for the provision of AIRMET information and corresponds to the summation of all GFA domains. Refer to C.1 of Appendix C.

E.2 Abbreviations and decode used in AIRMET

Code	Description
AIRMET	See section 6.1
AT	At *(followed by time)*
BKN	Broken
BL	Blowing
BR	Mist
BTN	Between
CLD	Cloud
CNL	Cancel/Cancelled
DS	Dust storm
DU	Dust
DZ	Drizzle
E	East *or* Eastern longitude
ENE	East-north-east
ESE	East-south-east
FC	Funnel cloud
FCST	Forecast(s)
FG	Fog
FIR	Flight information region
FL	Flight level
FRQ	Frequent
FU	Smoke
FZ	Freezing (when associated with RA, DZ or FG)
GFA	Graphic area forecast
GR	Hail
GS	Snow pellets
HZ	Haze
IC	Ice crystal
ICE	Icing
INTSF	Intensifying
ISOL	Isolated
KT	Knots
MOD	Moderate
MOV	Move

Code	Description
MT	Mountain(s)
MTW	Mountain waves
N	North *or* Northern latitude
NC	No change
NE	North-east
NM	Nautical miles
NNE	North-north-east
NNW	North-north-west
NW	North-west
OBS	Observed
OCNL	Occasional
OVC	Overcast
PL	Ice pellets
PO	Dust/sand whirls
STNR	Stationary
RA	Rain
RMK	Remark(s)
S	South *or* Southern latitude
SA	Sand
SE	South-east
SFC	Surface
SG	Snow grain
SH	Shower
SN	Snow
SQ	Squall
SS	Sand storm
SSE	South-south-east
SSW	South-south-west
SW	South-west
TCU	Towering cumulus
TS	Thunderstorm
TURB	Turbulence
VA	Volcanic ash
VIS	Visibility

Code	Description
W	West *or* Western longitude
WKN	Weakening
WSPD	Wind speed
WNW	West-north-west
WSW	West-south-west
WI	Within
WID	Wide
Z	Coordinated universal time

E.3 AIRMET Bulletin scheme

FIR indicator	FIR name	Type	International (ICAO)	National
CZVR	Vancouver	AIRMET	WACN01 CWAO	WACN21 CWAO
CZEG	Edmonton	AIRMET	WACN02 CWAO	WACN22 CWAO
CZWG	Winnipeg	AIRMET	WACN03 CWAO	WACN23 CWAO
CZYZ	Toronto	AIRMET	WACN04 CWAO	WACN24 CWAO
CZUL	Montréal	AIRMET	WACN05 CWAO	WACN25 CWAO
CZQM	Moncton	AIRMET	WACN06 CWAO	WACN26 CWAO
CZQX	Gander domestic	AIRMET	WACN07 CWAO	WACN27 CWAO
CZQX	Gander oceanic	AIRMET	WANT01 CWAO	WANT21 CWAO

E.4 Alphanumeric sequence

Rules for the use of letters:

- 25 letters of the alphabet will be shared by all 8 FIRs; T is exclusively used for test messages - refer to 6.8.7.
- A letter can be used if not currently in service in any FIR and if it was retired for a minimum of 24 hours (regardless of the date). Otherwise, the next letter is used. Letter Z wraps back to letter A if necessary.
- If all letters are unavailable according to the above rules, then the letter that has had the longest retirement is used.
- The letter attributed to an AIRMET message will not change during its lifespan (updates and cancellation).
- WA (AIRMET) messages do not share the alphabet with WS, WV and WC (SIGMET) messages. Letter A may be used simultaneously in both a WA and a WS.

E.5 Meteorological phenomena to be included in AIRMET

Surface wind speed	Widespread[1] mean surface wind speed above 30 KT	SFC WIND (+ wind speed or wind speed range and units)
Surface visibility and/or Cloud	widespread[1] areas affected by reductions of visibility to less than three statute miles (5 000 m), including the weather phenomena causing the reduction of visibility and / or	SFC VIS (+ visibility or visibility range) (+ weather phenomena or combinations of) and / or
	widespread[1] areas of broken or overcast cloud with height of base less than 1,000 ft (300 m) above ground level	BKN CLD[2] (+ height or height range of the base, top and units) OVC CLD[2] (+ height or height range of the base, top and units)
Thunderstorms and/or Towering cumulus	isolated thunderstorms occasional thunderstorms isolated thunderstorms with hail occasional thunderstorms with hail isolated towering cumulus occasional towering cumulus frequent towering cumulus occasional towering cumulus and isolated thunderstorms frequent towering cumulus and isolated thunderstorms occasional towering cumulus and isolated thunderstorms with hail frequent towering cumulus and isolated thunderstorms with hail	ISOL TS[3] OCNL TS[4] ISOL TSGR[3,6] OCNL TSGR[4,6] ISOL TCU[3] OCNL TCU[4] FRQ TCU[5] OCNL TCU[4] – ISOL TS[3] FRQ TCU[5] – ISOL TS[3] OCNL TCU[4] – ISOL TSGR[3,6] FRQ TCU[5] – ISOL TSGR[3,6]
Turbulence	moderate turbulence (except for turbulence in convective clouds)	MOD TURB[5]
Icing	moderate icing (except for icing in convective clouds)	MOD ICE[6]
Mountain wave	moderate mountain wave	MOD MTW

Note (1): Widespread indicates that 50% or greater of the area is affected.
Note (2): Heights for cloud bases and tops are all indicated in FT above ground level for consistency with GFA. In the final bulletin, FT is indicated whereas AGL is implied.
Note (3): Isolated (**ISOL**) if it consists of individual features which affect, or are forecast to affect, an area with a maximum spatial coverage of 25% or less of the area concerned (at a fixed time or during the period of validity).
Note (4): Occasional (**OCNL**) if it consists of well separated features which affect, or are forecast to affect, an area with a maximum spatial coverage greater than 25% and up to 50% of the area concerned (at a fixed time or during the period of validity).
Note (5): Frequent (**FRQ**) indicates an area of towering cumulus (TCU) within which there is little or no separation between adjacent clouds with a maximum spatial coverage greater than 50% of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).
Note (6): Hail (**GR**) should be used as a further description of the thunderstorm as necessary.
Note (7): Moderate (**MOD**) turbulence (**TURB**) refers only to low-level turbulence associated with surface winds, rotor streaming and (**CAT**) turbulence, whether in cloud or not, near to jet streams. Turbulence **shall** not be used in connection with convective clouds.
Note (8): Moderate (**MOD**) icing (**ICE**) **shall** refer to icing in other than in convective clouds.

E.6 Resolution

Distance

Every 5 NM from 10 to 30 NM (5, 10, 15, 20, 25, 30)
Every 15 NM from 30 to 90 NM (30, 45, 60, 75, 90)
Every 30 NM above 90 NM (90, 120, 150, 180, 210, etc.)

Direction 8 point compass (octants*)

*Octants (degrees true):

N:	directions greater than 337.5 degrees to 22.5 degrees
NE:	directions greater than 22.5 degrees to 67.5 degrees
E:	directions greater than 67.5 degrees to 112.5 degrees
SE:	directions greater than 112.5 degrees to 157.5 degrees
S:	directions greater than 157.5 degrees to 202.5 degrees
SW:	directions greater than 202.5 degrees to 247.5 degrees
W:	directions greater than 247.5 degrees to 292.5 degrees
NW:	directions greater than 292.5 degrees to 337.5 degrees

Latitude and longitude (all FIRs except Gander Oceanic)

Degrees and minutes (1 minute)

Latitude and longitude (Gander Oceanic FIR)

Degrees and minutes (15 minutes)[1]

Level (FL)

Every FL001 (corresponding to 100 feet) - up to FL015
Every FL005 – FL015 to FL030
Every FL010 – above FL030

Cloud height (FT)

Every 100 feet – up to 1,500 feet
Every 500 feet – 1500 to 3,000 feet
Every 1,000 feet – above 3,000 feet

Visibility (SM)

Every ⅛ statute mile – 0 to ¾ statute mile
Every ¼ statute mile – ¾ to 3 statute mile

Movement (direction/speed) 16 point compass (radials*)/ 5 KT increments

*Radials (degrees true):

N:	360 degrees
NNE:	22.5 degrees
NE:	45 degrees
ENE:	67.5 degrees
E:	90 degrees
ESE:	112.5 degrees
SE:	135 degrees
SSE:	157.5 degrees
S:	180 degrees
SSW:	202.5 degrees
SW:	225 degrees
WSW:	247.5 degrees
W:	270 degrees
WNW:	292.5 degrees
NW:	315 degrees
NNW:	337.5 degrees

Note (1): U.S. National Weather Service (NWS) uses a 15 minute resolution over oceanic areas such as New York Oceanic FIR. This harmonizes the practice with our southern neighbouring FIR.

E.7 Aviation reference sites used in National AIRMET

Refer to table D.7 of Appendix D.

E.8 Examples of AIRMET messages

Example (1): At 1305Z a PIREP from a Beechcraft 1900 (B190) indicated moderate turbulence. This event not being forecast in the GFACN32 leads the forecaster to issue the following AIRMET messages.

International (ICAO)

WACN02 CWAO 251315
CZEG AIRMET H1 VALID 251315/251715 CWEG-
CZEG EDMONTON FIR MOD TURB OBS AT 1305Z WI 90NM WID LINE BTN
N6228 W11427 - N6441 W10840 - N6453 W09605 FL190/340 MOV NE 10KT NC=

National

WACN22 CWAO 251315
CZEG AIRMET H1 VALID 251315/251715 CWEG-
CZEG EDMONTON FIR MOD TURB OBS AT 1305Z WI 90NM WID LINE BTN
/N6228 W11427/CYZF - /N6441 W10840/45 W CYOA - /N6453 W09605/30 W CYBK
FL190/340 MOV NE 10KT NC
RMK GFACN32=

Example (2): Freezing drizzle (FZDZ) was observed at 0700Z at Churchill, Manitoba (CYYQ). Icing not being forecast in the GFACN32 leads the forecaster to issue the following AIRMET messages.

International (ICAO)

WACN03 CWAO 250725
CZWG AIRMET A1 VALID 250725/251125 CWEG-
CZWG WINNIPEG FIR MOD ICE OBS AT 0700Z WI 90NM WID LINE BTN
N5955 W09403 - N5845 W09404 - N5646 W08903 SFC/FL020 STNR NC=

National

WACN23 CWAO 250725
CZWG AIRMET A1 VALID 250725/251125 CWEG-
CZWG WINNIPEG FIR MOD ICE OBS AT 0700Z WI 90NM WID LINE BTN
/N5955 W09403/75 S CYEK - /N5845 W09404/CYYQ - /N5646 W08903/60 NW
CYER SFC/FL020 STNR NC
RMK GFACN32=

Example (3): Unforecast convective activity (CB) in GFACN31 area required the issuance of the following AIRMET messages.

International (ICAO)

WACN01 CWAO 301925
CZVR AIRMET U1 VALID 301925/302325 CWEG-
CZVR VANCOUVER FIR ISOL TS OBS WI N5138 W12321 - N4903 W11759 - N4900 W11546 - N5000 W11546 - N5123 W11811 - N5138 W12321 TOP FL240 STNR WKN=

National

WACN21 CWAO 301925
CZVR AIRMET U1 VALID 301925/302325 CWEG-
CZVR VANCOUVER FIR ISOL TS OBS WI /N5138 W12321/45 SE CYPU - /N4903 W11759/20 SW CYCG - /N4900 W11546/30 S CYXC - /N5000 W11546/25 N CYXC - /N5123 W11811/25 N CYRV - /N5138 W12321/45 SE CYPU TOP FL240 STNR WKN RMK GFACN31=

Example (4): Satellite pictures and surface observations indicate an area of stratus and fog along the Quebec Lower North Shore. This is not well represented in GFACN34 and requires the issuance of AIRMET messages.

International (ICAO)

WACN05 CWAO 301925
CZUL AIRMET J1 VALID 301925/302325 CWEG-
CZUL MONTREAL FIR SFC VIS 1/4-1 1/4SM FG/BR - OVC CLD 100-500/1200FT OBS WI N5013 W06536 - N5011 W06046 -N4906 W06148 - N4932 W06444 - N5013 W06536 STNR NC=

National

WACN25 CWAO 301925
CZUL AIRMET J1 VALID 301925/302325 CWEG-
CZUL MONTREAL FIR SFC VIS 1/4-1 1/4SM FG/BR - OVC CLD 100-500/1200FT OBS WI /N5013 W06536/25 E CYZV -/N5011 W06046/45 E CYNA -/N4906 W06148/60 SE CYNA - /N4932 W06444/25 SW CYPN - /N5013 W06536/25 E CYZV STNR NC
RMK GFACN34=