**ROYAL CANADIAN AIR CADETS**

**PROFICIENCY LEVEL FOUR**

**INSTRUCTIONAL GUIDE**

**SECTION 5**

**EO C436.03 – ANALYZE WEATHER INFORMATION**

Total Time: 90 min

## PREPARATION

### PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-804/PG-001, *Proficiency Level Four Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare the slides located at Attachments A, C–G, I and J.

Photocopy the handouts located at Attachments B and H.

Make handouts of recent METARs, TAFs, FDs and GFAs in standard format from the NAV CANADA aviation weather website for each cadet.

Make a copy in plain language of the same METARs, TAFs, FDs and GFAs handouts from the NAV CANADA aviation weather website being given to each cadet.

### PRE-LESSON ASSIGNMENT

Nil.

### APPROACH

An interactive lecture was chosen for TPs 1–7 to introduce weather reports and forecasts, to give the cadets the basic material they need to decode and analyze the information and to generate interest in the subject.

An in-class activity was chosen for TP 8 as it is an interactive way for the cadets to practice analyzing weather information under supervision.

## INTRODUCTION

### REVIEW

Nil.

### OBJECTIVES

By the end of this lesson the cadet shall have analyzed weather information.



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**IMPORTANCE**

It is important for cadets to analyze weather information as this skill is used by cadets to analyze weather when preparing for day-to-day activities and to fly. Being able to analyze weather information provides knowledge for potential instructional duties and is part of the fundamentals that cadets pursing future aviation training will require.



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**Teaching point 1** **Describe a METAR.**

Time: 5 min Method: Interactive Lecture

**METARS**




Show the cadets the slide of Attachment A.

**DEFINITION**

METAR is the name given to the international meteorological code used in aviation routine weather reports. These reports describe the existing weather conditions at a specific time and location. In other words, the METAR is a snapshot of the current weather; it is not a forecast.

**Frequency of Reports**

METARS are normally issued every hour, on the hour as weather does not normally change much in this brief period of time. METARs are only valid at the time that they are issued, not for the hour between reports.

**Special Weather Reports (SPECI)**

There are times when the weather changes drastically in a short period of time. When this happens a SPECI is issued. SPECIs use the same code as a METAR, but start with SPECI.

**Where METARs are Available**

METARs can be found at several locations. The three most common locations are:

- NAV CANADA's aviation weather website,
- a Flight Services Station (FSS), and
- a Flight Information Centre (FIC) (normally accessed by phone).

**CONFIRMATION OF TEACHING POINT 1**

**QUESTIONS**:

Q1. What does a METAR describe?

Q2. How often are METARs normally issued?

Q3. When is a SPECI issued?

**ANTICIPATED ANSWERS**:

A1. A METAR describes the existing weather conditions at a specific time and location.

A2. METARS are normally issued every hour, on the hour.

A3. A SPECI is used when the weather changes drastically in a short period of time.



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**Teaching point 2** **Familiarize the cadets with METAR terminology.**

Time: 15 min Method: Interactive Lecture

**TERMINOLOGY USED IN METARS**




Indicate on the slide of Attachment A each of the following groupings as they are covered.

METAR is a code used in aviation weather reporting. This code is based on the World Meteorological Organization's (WMO) standards and conventions. A METAR is organized into sections with each section always in the same order.

**Report Type**

The report name is in the first line of the text. The name will show as either METAR or SPECI.

**Location Indicator**

Each weather reporting station in Canada is assigned a four-letter identifier, starting with the letter C. The second letter indicates the type of station and the last two letters identify the specific reporting station.

For example, CYOW is the reporting station at Ottawa / MacDonald-Cartier International Airport. The C means the station is Canadian, the Y means the station is co-located with an airport, and OW is the airport identifier.

**Date and Time of Observation**

The date and time of the observation are given as a six-digit grouping, based on Coordinated Universal Time (UTC / ZULU / Z). The first two digits signify the day of the current month, while the last four digits signify the time of the day. The official time of the observation is given for all METAR reports that do not deviate more than 10 minutes from the top of the hour. SPECIs will have the time reported to the exact minute.

For example, a METAR will show as 091000Z which means that the observation was taken on the ninth day of the month at 1000 hours UTC (or within 10 minutes of that hour).

For example, a SPECI will show as 091036Z, which means that a significant change in weather was observed on the ninth day of the month at 1036 hours UTC.

**Report Modifier**

This field may contain two possible codes: AUTO or CC* (where * is a letter from A–Z which represents corrections). AUTO indicates that the report is primarily based on observations from an automated weather observation station (AWOS). CC* is used to indicate corrected reports, where the first correction is CCA, the second is CCB, and so on. Both AUTO and CC* may be found in the same report.

**WIND**

This group reports the two-minute average wind direction and speed. Direction is always three digits, given in degrees true but rounded off to the nearest 10 degrees. Speed is normally two digits, and is given in knots (nautical miles per hour or kt). A reading of 00000KT indicates calm winds.

For example, 35016KT means winds are from 350 degrees true (rounded off) at 16 knots.



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If gust conditions exist, the direction and speed will be followed by a G and the maximum gust strength. A gust must be five knots stronger than the 10-minute average wind speed.

For example, 35016G25KT means winds are from 350 degrees true at 16 knots gusting to 25 knots.

**Prevailing Visibility**

Prevailing visibility is the average visibility at the reporting station. The prevailing visibility is reported in statute miles (SM) or fractions of a statute mile.

For example, 3SM means the prevailing visibility is 3 statute miles.

**Runway Visual Range**

This is only included if the prevailing visibility is less than 1 SM, or the runway visual range is less than 6 000 feet. This group will start with an R, then the runway number (eg, 06) and position (eg, L for left, R for right, C for centre), followed by the runway visual range in hundreds of feet. This is based on a 10-minute average. The runway visual range trend is indicated if there is a distinct upward or downward trend from the first to the second five-minute part-period. If the runway visual range changes by 300 feet or more it is indicated as /U for an upward trend or /D for a downward trend. No distinct change is indicated as /N. If it is not possible to determine the trend it will be left blank.

For example, R06L/4000FT/D means the runway visual range for runway 06 left is 4 000 feet with a downward trend.

**Present Weather**



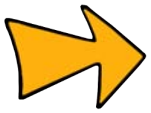

Distribute the handout of Attachment B to the cadets.

This group indicates the current weather phenomena at the reporting station. This may include precipitation, obscuration, or other phenomena.

Each phenomenon is represented by a code, which may be two to nine characters in length. Each code may include one or both of the following prefixes:

- **Intensity.** (-) indicates light, (+) indicates heavy, and no symbol indicates moderate.
- **Proximity.** Used primarily with precipitation or tornadoes. VC will precede certain phenomena, meaning that they are in the vicinity (5 SM) of the station, but not actually at the station.

For example, VCFZRABLSN+SNVA means in the vicinity of the airport there is freezing rain, blowing snow, heavy snow, and volcanic ash.



The abbreviations used for present weather are a mixture of English and French root words. FZ comes from freezing, while BR comes from brumé (mist), and FU comes from fumée (smoke).



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Verify against the official publication.

**Sky Conditions**

This group reports the sky condition for layers aloft. The group will include how much of the sky is covered, measured in oktas (eighths of the sky) and the height of the clouds in hundreds of feet above ground level (AGL). The sky cover is represented by the following abbreviations:

- **SKC.** Sky clear, no cloud present.
- **FEW.** Few, greater than zero to two-eighths cloud cover.
- **SCT.** Scattered, three-eighths to four-eighths cloud cover.
- **BKN.** Broken, five-eighths to less than eight-eighths cloud cover.
- **OVC.** Overcast, eight-eighths cloud cover.
- **CLR.** Clear, clear below 10 000 feet AGL.

Cloud height is represented by a three-digit number, which when multiplied by one hundred equals the actual height AGL. There will be one entry for every layer of cloud.

For example, SCT025 means scattered cloud at 2 500 feet AGL.

**Temperature and Dewpoint**

This group reports the air temperature and dewpoint temperature, rounded to the nearest whole degree Celsius. A negative value will be preceded by an M. A forward slash (/) will separate the two values.

For example, M05/M08 means the temperature is minus five degrees Celsius and the dewpoint is minus eight degrees Celsius.

**Altimeter Setting**

This group reports the altimeter setting at the reporting station in inches of mercury. The group starts with an A followed by four digits, which directly relate to the actual value of the altimeter setting. Place a decimal after the second digit in order to read this group.

For example, A3006 means the altimeter setting is 30.06 inches of mercury.

**Recent Weather**

This group reports recent weather of operational significance. The group indicator RE follows without a space, by the appropriate abbreviation(s) for weather observed during the period since the last METAR or SPECI, but not observed at the time of observation.

For example, RE+PL means although not observed now, there were heavy ice pellets recently reported.

**Wind Shear**

This group reports low level wind shear (within 1 600 feet AGL) along the takeoff or approach path of the designated runway. The two-number runway identifier is used, to which the letters L, C, or R may be appended. If the existence of wind shear applies to all runways, WS ALL RWY is used.



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**REMARKS**

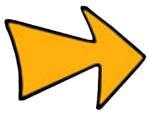
This group will usually include cloud types in each layer as well as opacity, general weather remarks, and sea level pressure measured in hectopascals (hPa). The sea level pressure will always be the last entry in a METAR, prefaced by SLP. Sea level pressure is translated by placing the decimal point between the last two digits and either adding a 9 or a 10 in front of the value given. The goal is to make the number as close to 1 000 as possible.

For example, SLP123 means sea level pressure is 1012.3 hPa.

For example, SLP998 means sea level pressure is 999.8 hPa.




SLP actually represents the station pressure or the theoretical sea level pressure at the reporting station.



The = symbol is used to indicate the end of information.

**CONFIRMATION OF TEACHING POINT 2**

**QUESTIONS**:

Q1. How are date and time expressed in a METAR?

Q2. What does the present weather section indicate?

Q3. What is the last entry of a METAR?

**ANTICIPATED ANSWERS**:

A1. The date and time of the observation are given in a six-digit grouping, based on universal coordinated time (UTC).

A2. This section indicates the current weather phenomena at the reporting station.

A3. The sea level pressure will always be the last entry in a METAR.

**Teaching point 3** **Describe a TAF.**

Time: 5 min Method: Interactive Lecture

**TAFS**




Show the cadets the slide of Attachment C.



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**DEFINITION**

TAF is the name given to the international meteorological code for an aerodrome forecast. These forecasts describe the expected weather conditions that will affect takeoff and landing at the aerodrome.

**Issue and Validity**

TAFs are prepared for approximately 180 aerodromes across Canada. They are limited to aerodromes for which METAR and SPECI reports are available. TAFs are generally prepared four times daily with periods of coverage from 12–24 hours. A TAF is valid from the time of issue until it is amended or until the next scheduled TAF is issued.

**Where TAFs are Available**

TAFs can be found at several locations. The three most common locations are:

- NAV CANADA's aviation weather website,
- a Flight Services Station (FSS), and
- a Flight Information Centre (FIC) (normally accessed by phone).

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**CONFIRMATION OF TEACHING POINT 3**

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**QUESTIONS**:

Q1. What do TAFs describe?

Q2. How often are TAFs generally prepared?

Q3. Where can TAFs be found?

**ANTICIPATED ANSWERS**:

A1. The expected weather conditions that will affect takeoff and landing at an aerodrome.

A2. Four times daily.

A3. TAFs can be found at:

- NAV CANADA's aviation weather website,
- an FSS, or
- an FIC.

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**Teaching point 4** **Familiarize the cadets with TAF terminology.**

Time: 15 min Method: Interactive Lecture

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**TERMINOLOGY USED IN TAFS**




Indicate on the slide of Attachment C each of the following groupings as they are covered.



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Much of this information will be a brief review as TAFs are similar to METARs in many ways. The abbreviations of expected weather conditions will follow the same form and order of the METAR, and will have the same meaning.

A TAF is organized into sections with each section always in the same order.

**Report Type**

The code name TAF is given in the first line of text. It may be followed by “AMD” for amended or corrected forecasts.

**Location Indicator**

A four-letter International Civil Aviation Organization (ICAO) location indicator is used, as in the METAR.

**Date and Time of Origin**

As with the METAR format, the day of the month and time (UTC) of origin are included in all forecasts. TAFs are issued approximately 30 minutes before the validity period. Some forecasts have update cycles as frequent as every three hours; however, the next issue time will always be indicated in the remarks group.

**Period of Validity**

The period of validity for the TAF is indicated by two four-digit date / time groups. The first four-digit group indicates the start date and time of the TAF, and the second four-digit group indicates the end date and time of the TAF. The maximum validity period for a TAF is 30 hours; however, some TAFs have staggered issue times and more frequent update cycles, which will affect their periods of validity.

**WIND**

The forecasted wind direction and speed are encoded as in a METAR.

**Low-Level Wind Shear**

This group is used if the forecaster has strong evidence to expect significant, non-convective wind shear that could adversely affect aircraft operation within 1 500 feet AGL over the aerodrome. The coded grouping begins with the letters WS followed by a three-digit grouping indicating the height in hundreds of feet AGL of the shear zone. A slash followed by a five-digit group indicates the wind speed and direction at that height.

For example, WS 015/20015KT means wind shear is forecast at 1 500 feet AGL over the aerodrome. The wind will be from 200 degrees true at 15 knots.

**Prevailing Visibility**

The prevailing visibility is encoded as in a METAR, except that visibility greater than six statute miles will be indicated by the code P6SM.

For example, 3/4SM means the visibility is forecast to be 3/4 statute mile.

**Significant Weather**




Refer the cadets to the handout of Attachment B.



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Significant weather is encoded with the same codes as present weather in METARs. Intensity and proximity qualifiers, descriptors, precipitation, and obscuration are included as required.

For example, -RA BR means light rain and mist.

**Sky Condition**

Sky condition is encoded as in a METAR. Possible codes for sky cover amounts are SKC, FEW, SCT, BKN, OVC, CLR, and VV. A vertical visibility (VV) is reported in hundreds of feet when the sky is obscured. Forecast cloud type is not identified except in the case of cumulonimbus layers.

For example, BKN040CB means broken cumulonimbus cloud at 4 000 feet.

**Change Groups**

There are four change groups:

- FM (from),
- BECMG (becoming),
- TEMPO (temporarily), and
- PROB (probability).

**FM.** Indicates the weather is forecast to change permanently and rapidly. 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 elements must be indicated, including those for which no change is forecast. The time group represents hours and minutes in UTC.

For example, FM280945 means from the 28th day of the month at 0945Z.

**BECMG.** Used when a permanent change in a few weather elements is forecast to occur gradually, with conditions evolving over a period of time (normally one to two hours, but not more than four hours). Normally only those elements for which a change is forecast to occur will follow BECMG. Any forecast weather element not indicated as part of the BECMG group remains the same as the period prior to the change.

The start and stop time of the change period is indicated by two four-digit date / time groups following BECMG. The first two digits of each group indicate the date, while the last two digits of each group indicate the time in whole UTC hours.

For example, BECMG 2808/2809 OVC030 means a change towards overcast sky conditions at 3 000 ft AGL occurring gradually between 0800Z and 0900Z on the 28th day of the month.

**TEMPO.** Used when a temporary fluctuation in some or all of the weather elements is forecast to occur during a specified period. When an element is not indicated after TEMPO, it is the same as the period prior to the change. The time period is indicated the same as with BECMG.

For example, TEMPO 2812/2815 1SM RA BR means temporarily between 1200Z and 1500Z on the 28th day of the month, visibility is forecast to be one statute mile with rain and mist.



If a significant change in weather or visibility is forecast, all weather groups are indicated following BECMG or TEMPO, including those that are unchanged. When the ending of significant weather is forecast, the abbreviation NSW (no significant weather) is used.

**PROB.** Used to indicate a 30 or 40 percent probability of changing conditions that would constitute a hazard to aviation, such as thunderstorms, freezing precipitation, and low-level wind shear. The time period is indicated the same as with BECMG and TEMPO.



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For example, PROB30 2817/2821 1/2SM +TSRAGR means there is a 30 percent probability between 1700Z and 2100Z on the 28th day of the month that visibility will be 1/2 statute mile with heavy thunderstorms, rain, and hail.

A probability of less than 30 percent is not considered to justify the use of the PROB group. When the probability is 50 percent or more, this shall be indicated by the use of BECMG, TEMPO, or FM, as appropriate.

**REMARKS**

Remarks will be prefaced by the abbreviation RMK. Remarks may include such information as when a TAF is based on observations taken by an Automated Weather Observation System (AWOS), and when there are significant discrepancies between the AWOS and a TAF. Remarks will indicate the issue date and time (UTC) of the next regular TAF.

**CONFIRMATION OF TEACHING POINT 4**

**QUESTIONS**:

Q1. What abbreviation will be used when the ending of significant weather is forecast?

Q2. What does the change group FM indicate?

Q3. In which section will the issue time for the next TAF be indicated?

**ANTICIPATED ANSWERS**:

A1. NSW.

A2. FM indicates the weather is forecast to change permanently and rapidly.

A3. The remarks section.

**Teaching point 5** **Describe an FD.**

Time: 5 min Method: Interactive Lecture

**FDS**




Show the cadets the slide of Attachment D.

**DEFINITION**

An FD is an forecast of upper wind conditions and temperatures at selected levels. Wind direction is given in degrees true to the nearest ten degrees and wind speed is in knots.



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**DECODING**



Temperatures are not forecast for 3 000 feet; in addition, this level is omitted if the terrain elevation is greater than 1 500 feet. All forecast temperatures for altitudes over 24 000 feet are negative.

When the forecast speed is less than five knots, the code group is 9900, which reads light and variable. Encoded wind speeds from 100–199 knots have 50 added to the direction code and 100 subtracted from the speed. Wind speeds that have had 50 added to the direction can be recognized when figures from 51–86 appear in the code. Since no such directions exist (eg, 510 degrees to 860 degrees), obviously they represent directions from 010 degrees to 360 degrees. Should the forecast wind speed be 200 knots or greater, the wind group is coded as 199 knots. For example, 7799 is decoded as 270 degrees at 199 knots or greater.




Show the cadets the slide of Attachment E.

Examples of decoding FD winds and temperatures are as follows (the third and fourth examples are for altitudes above 24 000 feet):

| EXAMPLE | DECODED |
|---|---|
| 9900+00 | Wind light and variable. Temperature zero degrees Celsius. |
| 2523 | Wind 250 degrees true at 23 knots. |
| 791159 | Wind 290 degrees true (79 - 50 = 29) at 111 knots (11 + 100 = 111). Temperature minus 59 degrees Celsius. |
| 859950 | Wind 350 degrees true (85 - 50 = 35) at 199 knots or greater, temperature minus 50 degrees Celsius. |

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 1 FD Decoding

**Where FDs are Available**

FDs can be found at several locations. The three most common locations are:

- NAV CANADA's aviation weather website,
- a Flight Services Station (FSS), and
- a Flight Information Centre (FIC) (normally accessed by phone).

**CONFIRMATION OF TEACHING POINT 5**

**QUESTIONS**:

Q1. What is an FD?

Q2. At which level are temperatures not forecast?

Q3. What does the code group 9900 mean?



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Verify against the official publication.

**ANTICIPATED ANSWERS**:

A1. An FD is a forecast of upper wind conditions and temperatures at selected levels.

A2. 3 000 feet.

A3. Winds are light and variable.

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**Teaching point 6** **Describe a GFA.**

Time: 10 min Method: Interactive Lecture

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**GFAS**




Show the cadets the slide of Attachment F.

**DEFINITION**

A GFA consists of a series of weather charts, each depicting the most probable meteorological conditions expected to occur below 24 000 feet, over a given area at a specified time.

**Issue and Validity**

GFA charts are issued four times daily, approximately 30 minutes before the beginning of the forecast period. GFAs are issued at approximately 2330, 0530, 1130, and 1730 UTC and are valid at 0000, 0600, 1200, and 1800 UTC respectively.




Each issue of the GFA is a collection of six charts; two charts valid at the beginning of the forecast period, two charts valid six hours into the forecast period and the final two charts valid twelve hours into the forecast period. Of the two charts valid at each of the three forecast periods, one chart depicts clouds and weather while the other chart depicts icing, turbulence, and freezing level. The cadets will learn to read only the GFA Clouds and Weather Chart.

**Coverage Area**

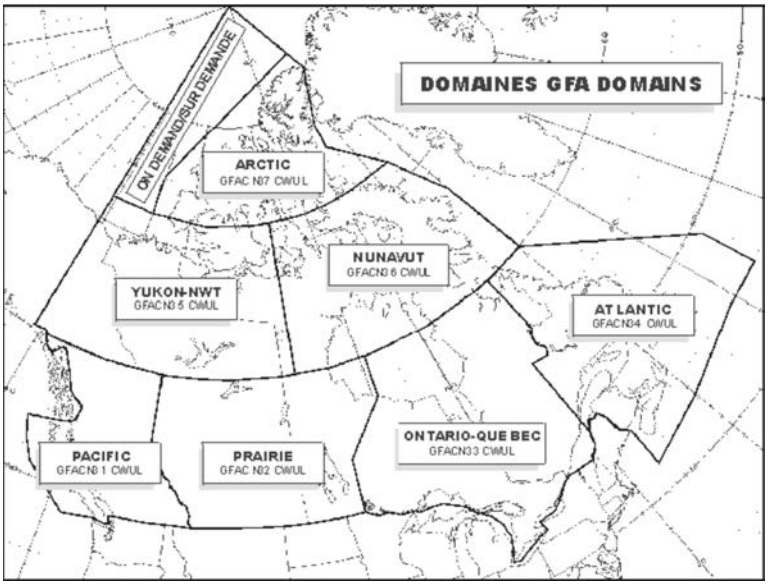



Show the cadets the slide of Attachment G.

There are seven distinct GFA areas covering the entire Canadian Domestic Airspace.



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Verify against the official publication.




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 2 GFA Domains

**Units of Measure**

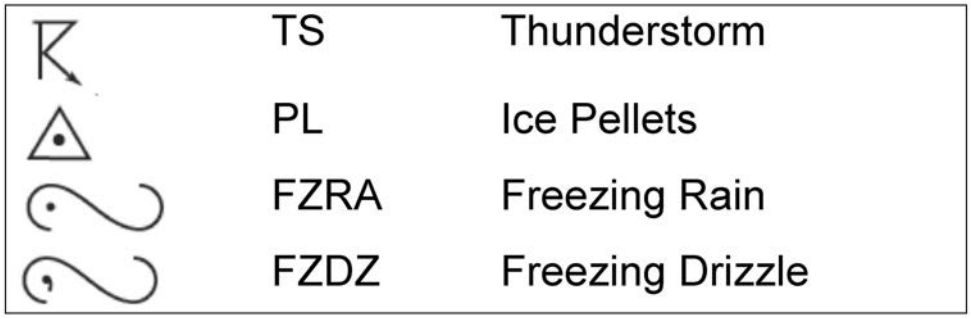
Speeds in a GFA are expressed in knots (kt). Horizontal visibility is measured in statute miles (SM). Times are stated in Co-ordinated Universal Time (UTC). A nautical-mile (NM) scale bar is included to assist in determining approximate distances on the chart. All heights are measured in hundreds of feet above sea level (ASL) unless otherwise noted.

**Abbreviations and Symbols**




Distribute the handout of Attachment H to the cadets. Show the cadets the slide of Attachment I.

Only standard meteorological abbreviations are used in a GFA. Figure 3 is a list of common weather symbols that may be found in a GFA.




*Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.*

Figure 3 Weather Symbols



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Verify against the official publication.

**Where GFAs are Available**

GFAs can be found at several locations. The three most common locations are:

- NAV CANADA's aviation weather website,
- a Flight Services Station (FSS), and
- a Flight Information Centre (FIC) (normally accessed by phone).

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**CONFIRMATION OF TEACHING POINT 6**

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**QUESTIONS**:

Q1. How often are GFAs issued?

Q2. How are heights measured in GFAs unless otherwise noted?

Q3. How many distinct GFA coverage areas are there in Canada?

**ANTICIPATED ANSWERS**:

A1. Four times daily.

A2. In hundreds of feet above sea level (ASL).

A3. Seven.

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**Teaching point 7** **Familiarize the cadets with GFA Clouds and Weather Chart layout.**

Time: 15 min Method: Interactive Lecture

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**GFA CLOUDS AND WEATHER CHART LAYOUT**




Indicate on the slide of Attachment F each of the following groupings as they are covered.

Each GFA chart is divided into four parts: title box, legend box, comments box, and weather information section.

| | |
|---|---|
| Weather Information Section | Title Box |
| | Legend Box |
| | Comments Box |

*Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.*

Figure 4 GFA Chart Layout



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**Title Box**

The title box includes the chart name, issuing office four-letter identification, name of the GFA region, chart type, the date and time of issue, and the validity period.

**Legend Box**

The legend box includes weather symbols that may be used in the weather information part of the GFA chart. It also includes a nautical-mile scale bar to facilitate determining distances.

**Comments Box**

The comments box provides information that the weather forecaster considers important (eg, formation or dissipation of fog, increasing or decreasing visibility). It is also used to describe elements that are difficult to render pictorially or, if added to the depiction, would cause the chart to become cluttered (eg, light icing). The following standard phrases are also included in the comments box:

- HGTS ASL UNLESS NOTED,
- CB TCU AND ACC IMPLY SIG TURB AND ICG, and
- CB IMPLIES LLWS.

The comments box of the 12-hour GFA Clouds and Weather Chart also includes an Instrument Flight Rules (IFR) outlook for an additional 12-hour period in the lower section of the box. The IFR outlook is always general in nature, indicating the main areas where IFR weather is expected, the cause for the IFR weather, and any associated weather hazards.

**Weather Information Section**

The weather information section of the chart depicts a forecast of the clouds and weather conditions.



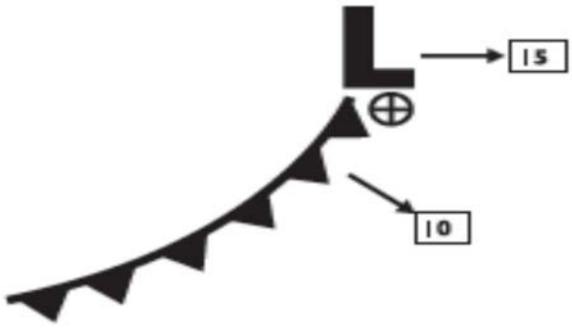

Show the slide of figures located at Attachment J as they are covered.

**Synoptic features.** The motion of synoptic features, when the speed of movement is forecast to be five knots or more, will be indicated by an arrow and a speed value. For speeds less than five knots, the letters QS (quasi-stationary) are used.

For example, a low pressure centre moving eastwards at 15 knots with an associated cold front moving southeast at 10 knots would be indicated as follows:



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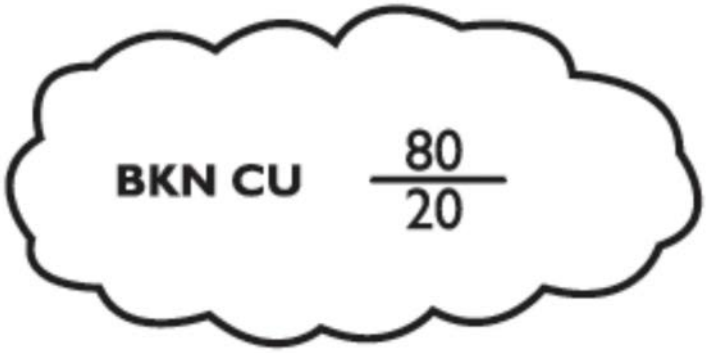

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 5 Synoptic Features

**Clouds.** The bases and tops of forecast clouds between the surface and 24 000 feet ASL will be indicated. The tops of convective clouds (eg, TCU, ACC, CB) are indicated, even if they extend above 24 000 feet ASL. Cirrus clouds are not depicted on the chart. The cloud type will be indicated if considered significant, however, convective clouds such as CU, TCU, ACC, and CB will always be stated when forecast to be present.

A scalloped border encloses organized areas of clouds where the sky condition is either broken (BKN) or overcast (OVC).

For example, an organized area of broken cumulus clouds based at 2 000 feet ASL with tops at 8 000 feet ASL would be indicated as follows:




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 28, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

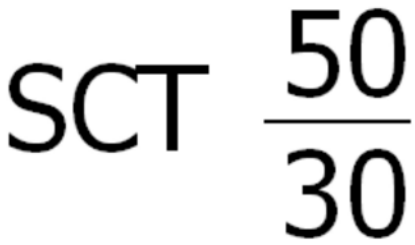
Figure 6 Broken Cumulus Clouds

In areas where organized clouds are not forecast and the visibility is expected to be greater than six statute miles a scalloped border is not used.

For example, unorganized scattered clouds based at 3 000 feet ASL with tops at 5 000 feet ASL would be indicated as follows:



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Verify against the official publication.

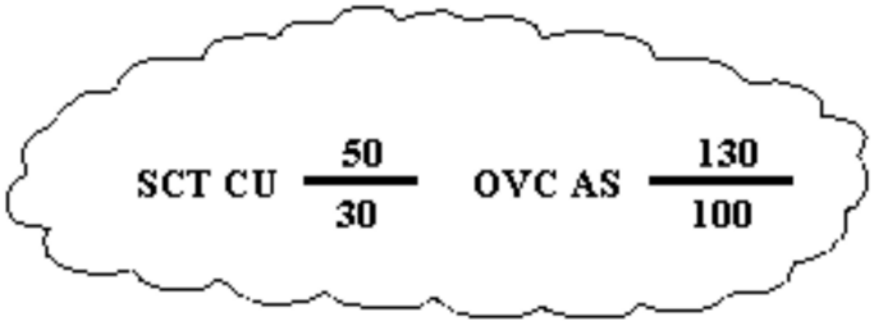



*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 28, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 7 Scattered Clouds

When multiple cloud layers are forecast, the bases and tops of each layer are indicated.

For example, a scattered layer of cumulus cloud based at 3 000 feet ASL with tops at 5 000 feet ASL and a higher overcast layer of altostratus cloud based at 10 000 feet ASL with tops at 13 000 feet ASL would be indicated as follows:




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 28, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 8 Multiple Cloud Layers

**Surface-based layers.** The abbreviation OBSCD (obscured) is used to describe surface-based layers. The vertical visibility in surface-based layers is measured in hundreds of feet AGL.

For example, local obscured ceilings with a vertical visibility between 300 and 500 feet AGL would be indicated as: LCL OBSCD CIG 3 - 5 AGL.

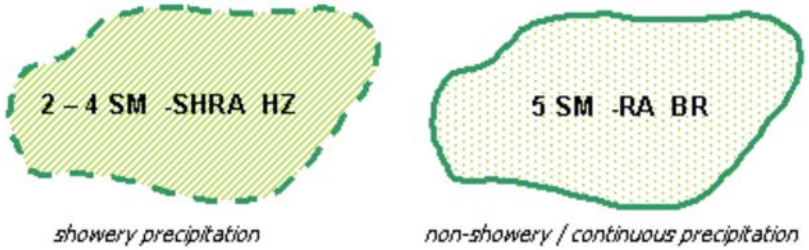
**Visibility.** The forecast visibility is measured in statute miles. When the visibility is expected to be greater than six statute miles, it is indicated as P6SM.

For example, a forecast visibility that is expected to vary between two and four statute miles with light rain showers would be indicated as: 2 - 4 SM - SHRA.

**Weather and obstructions to vision.** Forecast weather is always included immediately after the visibility. Obstructions to vision are only mentioned when the visibility is forecast to be six statute miles or less (eg, 2 - 4SM - RA BR). Areas of showery or intermittent precipitation are shown as hatched areas enclosed by a dashed green line. Areas of continuous precipitation are shown as stippled areas enclosed by a solid green line. Areas of obstruction to vision not associated with precipitation, where visibility is six statute miles or less, are enclosed by a dashed orange line. Areas of freezing precipitation are depicted in red and enclosed by a solid red line.



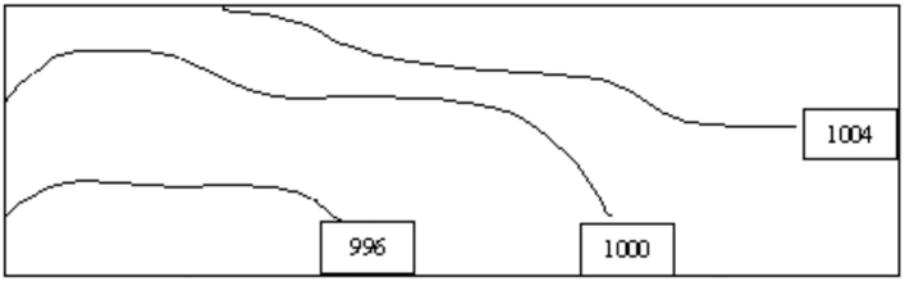
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*Note. From Nav Canada, 2007, Aviation Weather Website. Retrieved October 28, 2008, from http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Page=info-gfa&NoSession=NS_Inconnu&TypeDoc=gfa&Langue=anglais#abbr_symb*

Figure 9 Weather and Obstructions to Vision

**Isobars.** Lines joining points of equal surface pressure. They are included in the GFA Clouds and Weather Chart at four-millibar intervals.




*Note. From Nav Canada, 2007, Aviation Weather Website. Retrieved October 28, 2008, from http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Page=info-gfa&NoSession=NS_Inconnu&TypeDoc=gfa&Langue=anglais#abbr_symb*

Figure 10 Isobars

**Surface winds.** The speed and direction of forecast surface winds with a sustained speed of at least 20 knots are indicated by wind barbs and an associated wind speed value. Wind gusts are indicated by the letter G, followed by the peak gust speed in knots.

For example, surface winds forecast to be from the west (270 degrees true) with a speed of 25 knots and a peak gust speed of 35 knots would be indicated as:




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 28, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure 11 Surface Winds

## CONFIRMATION OF TEACHING POINT 7

**QUESTIONS**:

Q1. In which section of a GFA Clouds and Weather Chart would an IFR outlook be found?

Q2. How are areas of showery or intermittent precipitation shown?

Q3. How are organized areas of clouds where the sky condition is either broken or overcast shown?



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**ANTICIPATED ANSWERS**:

A1. Comments box.

A2. As hatched areas enclosed by a dashed green line.

A3. Enclosed by a scalloped border.

---

**Teaching point 8** **Conduct an activity to have the cadets read METARs, TAFs, FDs and GFA Clouds and Weather Charts.**

Time: 15 min Method: In-Class Activity

---

## ACTIVITY

---

### OBJECTIVE

The objective of this activity is to have the cadets read METARs, TAFs, FDs and GFA Clouds and Weather Charts.

### RESOURCES

- Handouts of two or three copies of METARs, TAFs, FDs and GFA Clouds and Weather Charts in standard format,
- Copies of the same METARs, TAFs, FDs and GFA Clouds and Weather Charts in plain language format for review, and
- Abbreviations handout located at Attachment H.

### ACTIVITY LAYOUT

Nil.

### ACTIVITY INSTRUCTIONS

1. Divide the cadets into pairs.

2. Distribute the handouts of METARs, TAFs, FDs and GFA Clouds and Weather Charts in standard format among the pairs.

3. Show the cadets a sample METAR, TAF, FD and GFA Clouds and Weather Chart and demonstrate reading it.

4. Indicate a section of a METAR, TAF, FD and GFA Cloud and Weather Chart and have the cadets read it.

5. Display the copies of the same METARs, TAFs, FDs and GFA Clouds and Weather Charts in plain language format to correct the cadets' work.

6. Repeat Steps 3–5 as time permits.

### SAFETY

Nil.

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## CONFIRMATION OF TEACHING POINT 8

---

The cadets' participation in the activity will serve as the confirmation of this TP.

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## END OF LESSON CONFIRMATION

The cadets' participation in the activity will serve as the confirmation of this lesson.

## CONCLUSION

### HOMEWORK / READING / PRACTICE

Nil.

### METHOD OF EVALUATION

Nil.

### CLOSING STATEMENT

Weather is a major factor in aviation. Pilots must constantly watch the weather around them as it will affect the operation and navigation of an aircraft. In particular, pilots must analyze weather information prior to flying to decide whether it is safe to fly.

### INSTRUCTOR NOTES / REMARKS

Recent METARs, TAFs, FDs, and GFAs can be found at http://www.flightplanning.navcanada.ca. Click on the METAR / TAF, UPR WNDS (FDs), or Graphical FA icon and choose the desired region. METARs, TAFs, FDs, and GFAs can be printed in standard and plain language format.

It is recommended that the three periods required for this EO be scheduled consecutively.

Cadets who are qualified Advanced Aviation may assist with this instruction.

## REFERENCES

C2-044 *Aeronautical Information Manual*. by Transport Canada, 2008, Retrieved September 29, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF

C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Peppler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.



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# SAMPLE METARS AND SPECIS

**METAR CYHZ 111700Z 28009G16KT 15SM FEW250 00/M11 A2990 RMK CS0 SLP134=**

**METAR CYHZ 111800Z 29015KT 15SM FEW250 01/M10 A2989 RMK CI0 SLP128=**

**METAR CYHZ 111900Z 30008KT 15SM FEW250 02/M12 A2987 RMK CI0 SLP123=**

**SPECI CYYJ 111744Z CCA 23019G24KT 20SM -SHRA BKN014 BKN030 BKN120 09/07 RMK SC5SC1AC1=**

**SPECI CYYJ 111744Z 23019G24KT 20SM -RA BKN014 BKN030 BKN120 09/07 RMK SC5SC1AC1=**



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# WORLD METEOROLOGICAL ORGANIZATION CODE FOR PRESENT WEATHER

| QUALIFIER | | | | | WEATHER PHENOMENA | | | |
|---|---|---|---|---|---|---|---|---|
| INTENSITY or PROXIMITY 1 | DESCRIPTOR 2 | | PRECIPITATION 3 | | OBSCURATION 4 | | OTHER 5 | |
| Note: Precipitation intensity refers to all forms combined. | **MI** | Shallow | **DZ** | Drizzle | **BR** | Mist (Vis ≥ 5/8 SM) | **PO** | Dust/ Sand Whirls (Dust Devils) |
| | **BC** | Patches | **RA** | Rain | **FG** | Fog (Vis < 5/8 SM) | **SQ** | Squalls |
| | **PR** | Partial | **SN** | Snow | **FU** | Smoke (Vis ≤ 6 SM) | **+FC** | Tornado or Waterspout |
| | **DR** | Drifting | **SG** | Snow Grains | | | | |
| - Light | **BL** | Blowing | **IC** | Ice Crystals (Vis ð 6 SM) | **DU** | Dust (Vis ≤ 6 SM) | **FC** | Funnel Cloud |
| | **SH** | Shower(s) | | | | | | |
| Moderate (no qualifier) | **TS** | Thunderstorm | **PL** | Ice Pellets | **SA** | Sand (Vis ≤ 6 SM) | **SS** | Sandstorm (Vis < 5/8 SM) (+SS Vis < 516 SM) |
| | | | **GR** | Hail | | | | |
| + Heavy | **FZ** | Freezing | **GS** | Snow Pellets | **HZ** | Haze (Vis ≤ 6 SM) | **DS** | Dust storm (Vis < 5/8 SM) (+DS Vis < 516 SM) |
| VC In the vicinity | | | **UP** | Unknown precipitation (AWOS only) | **VA** | Volcanic Ash (with any visibility) | | |

*Note. From Aeronautical Information Manual (p. 145), by Transport Canada, 2008, Ottawa, ON: Transport Canada. Copyright 2007 by Her Majesty the Queen in Right of Canada.*

Figure B-1 World Meteorological Organization Code for Present Weather



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# SAMPLE TAFS

**TAF CYHZ 201738Z 2018/2118 25008KT P6SM OVC015**
**TEMPO 2018/2020 OVC025**
**FM202000 24010KT P6SM OVC025 TEMPO 2020/2022 OVC020**
**FM202200 23012KT P6SM BKN030**
**FM210200 23010KT P6SM SCT030**
**RMK NXT FCST BY 202100Z=**

**TAF CYVR 201739Z 2018/2124 10012G22KT P6SM -RA SCT025**
**OVC050 TEMPO 2021/2103 5SM -RA BR BKN020**
**BECMG 2021/2022 16012G22KT**
**BECMG 2101/2102 28020G30KT**
**FM210300 28020G30KT P6SM FEW030 SCT060**
**BECMG 2103/2104 26012KT**
**FM210800 11005KT P6SM -SHRA BKN030**
**BECMG 2110/2112 16010G20KT**
**FM211600 12012G22KT 5SM -RA BR SCT008 BKN012**
**RMK NXT FCST BY 202100Z=**

**TAF CYYG 201738Z 2018/2106 25012KT P6SM FEW009 OVC015**
**TEMPO 2018/2020 6SM -SHSN BKN009**
**FM202300 24012KT P6SM BKN025 TEMPO 2023/2102 BKN020**
**FM210200 26008KT P6SM SCT025 TEMPO 2102/2106 BKN025**
**RMK NXT FCST BY 210000Z=**

**TAF CYOW 201738Z 2018/2118 34012KT P6SM BKN040**
**FM202200 31005KT P6SM FEW050 SCT100**
**FM211600 31012KT P6SM BKN030**
**RMK NXT FCST BY 202100Z=**



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# SAMPLE FDS

| **STN YNA - NATASHQUAN. QUEBEC** | **for use** | **3000** | **6000** | **9000** | **12000** | **18000** |
|---|---|---|---|---|---|---|
| FDCN01 CWAO FCST BASED ON 271200 DATA **VALID 271800** | **17-21** | 2130 | 2129+05 | 2131+03 | 2140-03 | 2158-11 |
| FDCN02 CWAO FCST BASED ON 271200 DATA **VALID 280000** | **21-06** | 1916 | 1917+06 | 2023+03 | 2130-02 | 2152-11 |
| FDCN03 CWAO FCST BASED ON 271200 DATA **VALID 281200** | **06-17** | 1635 | 1633+05 | 1929+03 | 1936+00 | 1838-11 |

| **STN YQI - YARMOUTH. NS** | **for use** | **3000** | **6000** | **9000** | **12000** | **18000** |
|---|---|---|---|---|---|---|
| FDCN01 CWAO FCST BASED ON 271200 DATA **VALID 271800** | **17-21** | 1616 | 1919+10 | 1936+05 | 1934+00 | 2043-10 |
| FDCN02 CWAO FCST BASED ON 271200 DATA **VALID 280000** | **21-06** | 1842 | 1843+11 | 1843+06 | 1842+00 | 1842-10 |
| FDCN03 CWAO FCST BASED ON 271200 DATA **VALID 281200** | **06-17** | 1451 | 1551+10 | 1537+04 | 1651+00 | 1865-08 |

| **STN YQI - YARMOUTH. NS** | **for use** | **24000** | **30000** | **34000** | **39000** | **45000** | **53000** |
|---|---|---|---|---|---|---|---|
| FDCN01 KWBC DATA BASED ON 271200Z **VALID 271800Z** | **1700-2100Z.** | 2145-24 | 225139 | 225248 | 206558 | 215363 | 213964 |
| FDCN02 KWBC DATA BASED ON 271200Z **VALID 280000Z** | **2100-0600Z.** | 2043-23 | 215140 | 215149 | 214558 | 215062 | 213864 |
| FDCN03 KWBC DATA BASED ON 271200Z **VALID 281200Z** | **0600-1700Z.** | 1855-23 | 195738 | 205047 | 226656 | 216062 | 204264 |



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# DECODING FDS

| EXAMPLE | DECODED |
|---|---|
| 9900+00 | Wind light and variable, temperature zero degrees Celsius. |
| 2523 | Wind 250 degrees true at 23 knots. |
| 791159 | Wind 290 degrees true (79 - 50 = 29) at 111 knots (11+ 100 = 111), temperature -59 degrees Celsius. |
| 859950 | Wind 350 degrees true (85 - 50 = 35) at 199 knots or greater, temperature -50 degrees Celsius. |

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure E-1 FD Decoding

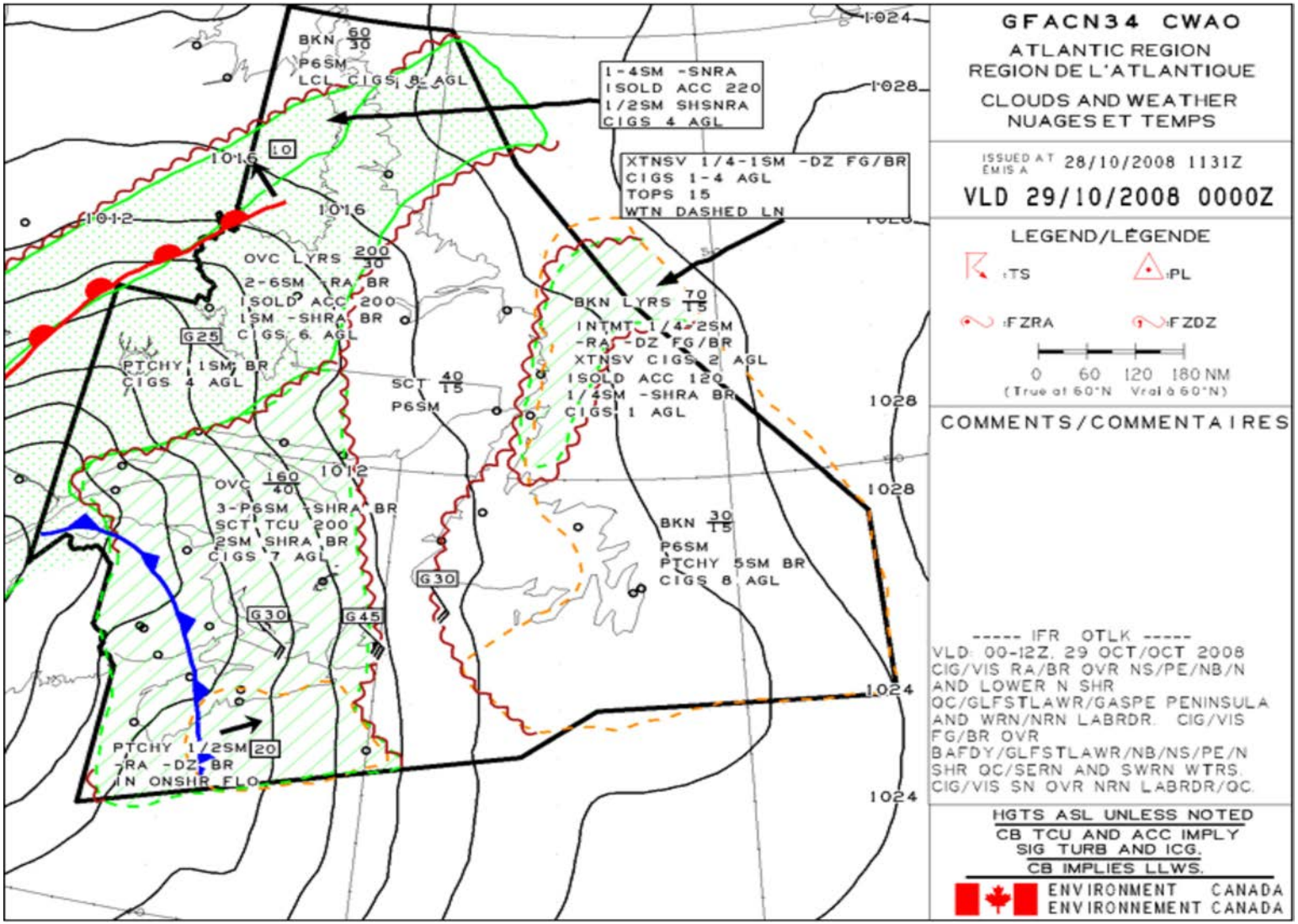


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*Note. From Nav Canada, 2007, Aviation Weather Website. Retrieved October 28, 2008, from http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Langue=anglais&NoSession=NS_Inconnu&Page=forecast-observation&TypeDoc=html*

Figure F-1 GFA Clouds and Weather Chart

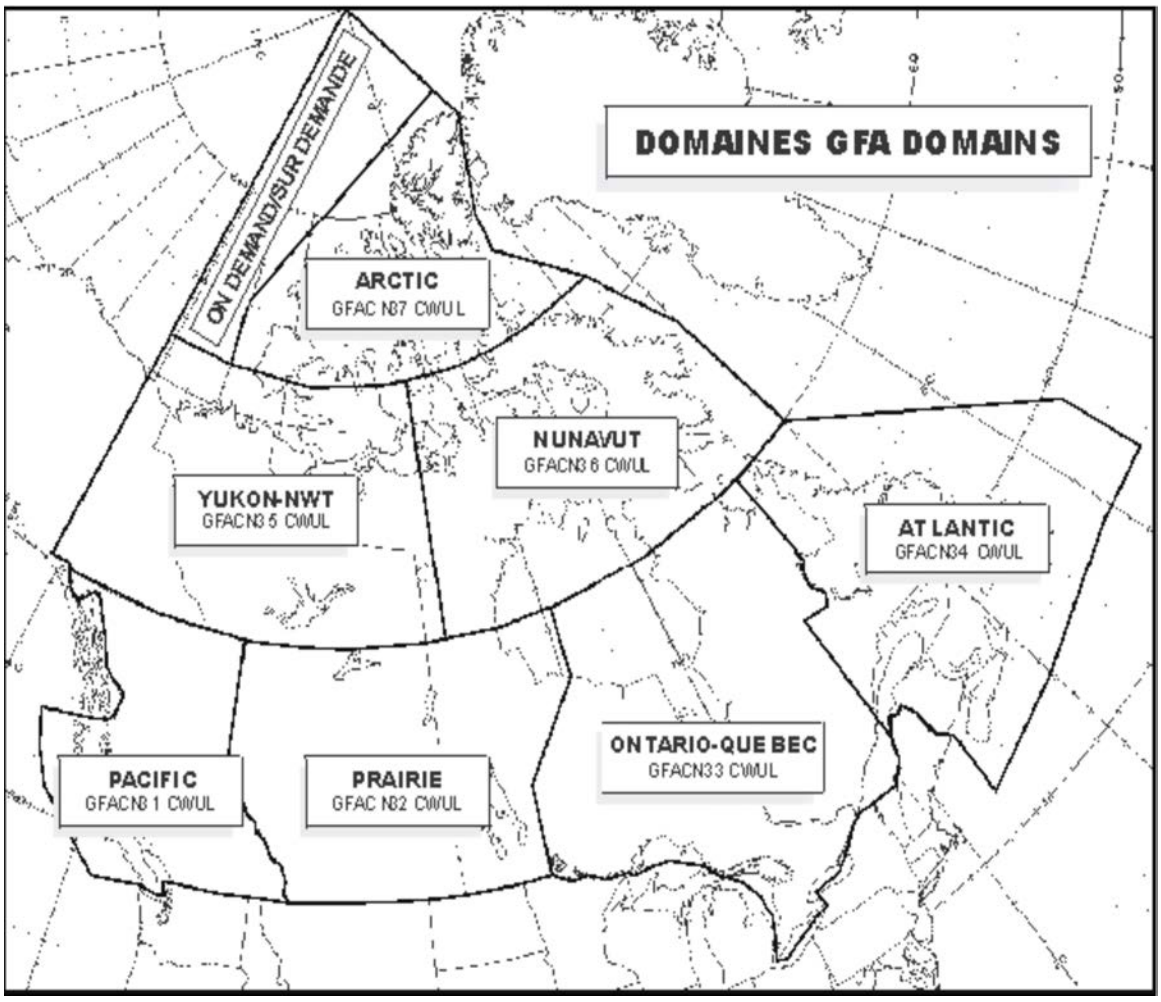


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*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure G-1 GFA Domains



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### 3.6 Abbreviations – Aviation Forecasts

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| ABV | above |
| ACCAS | altocumulus castellanus |
| ACRS | across |
| ACSL | standing lenticular altocumulus |
| ACT | active |
| AFT | after |
| AFL | above freezing layer |
| AHD | ahead |
| ALF | aloft |
| ALG | along |
| ALT | altitude |
| AIRMS | air mass |
| APCH | approach |
| APCHG | approaching |
| ASL | above sea level |
| AWOS | Automated Weather Observation System |
| BECMG | becoming |
| BFR | before |
| BGN | begin |
| BGNG | beginning |
| BHND | behind |
| BKN | broken |
| BL | blowing |
| BLDG | building |
| BLO | below |
| BLZD | blizzard |
| BDRY | boundary |
| BR | mist |
| BRF | brief |
| BRFLY | briefly |
| BRKS | breaks |
| BTN | between |
| CAT | clear air turbulence |
| CAVOK | ceiling and visibility OK |
| CB | cumulonimbus |
| CIG | ceiling |
| CLD | cloud |
| CLR | clear |
| CLRG | clearing |
| CNTR | centre |
| CNTRD | centred |
| CONDS | conditions |
| COTRAILS | condensation trails |
| CONTUS | continuous |
| CONTG | continuing |
| CST | coast |
| CU | cumulus |
| DCRG | decreasing |
| DEG | degree |
| DFUS | diffuse |
| DIST | distant |
| DNS | dense |
| DNSLP | downslope |
| DP | deep |
| DPNG | deepening |
| DRFTG | drifting |
| DURG | during |
| DVLPG | developing |
| DZ | drizzle |
| E | east |
| ELSW | elsewhere |
| ELY | easterly |
| EMBD | embed |
| ENDG | ending |
| ENTR | entire |
| FCST | forecast |
| FEW | few clouds |
| FG | fog |
| FILG | filling |
| FLWD | followed |
| FLWG | following |
| FM | from |
| FNT | front |
| FRQ | frequent |
| FZLVL | freezing level |
| FROIN | frost on indicator |
| FROPA | frontal passage |
| FRQ | frequent |

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure H-1 Abbreviations



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Verify against the official publication.

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| FT | feet, foot |
| FU | smoke |
| FZ | freezing |
| GND | ground |
| GRAD | gradient |
| GRDLY | gradually |
| HGT | height |
| HI | high |
| HLTP | hilltop |
| HND | hundred |
| HR | hour |
| HVY | heavy |
| ICG | icing |
| ICGIC | icing in cloud |
| ICGIP | icing in precipitation |
| IMDTLY | immediately |
| INCRG | increasing |
| INDEF | indefinite |
| INSTBY | instability |
| INTMT | intermittent |
| INTS | intense |
| INTSFY | intensify |
| ISLD | island |
| ISOL | isolate(d) |
| KT | knot(s) |
| LCL | local |
| LFTG | lifting |
| LGT | light |
| LIFR | low IFR |
| LK | lake |
| LLJ | low level jet stream |
| LLWS | low level wind shear |
| LN | line |
| LO | low |
| LTL | little |
| LVL | level |
| LWIS | limited weather information system |
| LWR | lower |
| LWRG | lowering |
| LYR | layer |

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| MDFYD | modified |
| MDT | moderate |
| MI | shallow |
| MID | middle |
| MOVG | moving |
| MPH | miles per hour |
| MRNG | morning |
| MRTM | maritime |
| MSTR | moisture |
| MTS | mountains |
| MVFR | marginal VFR |
| MXD | mixed |
| MXG | mixing |
| N | north |
| NE | northeast |
| NELY | northeasterly |
| NGT | night |
| NLY | northerly |
| NM | nautical mile(s) |
| NMRS | numerous |
| NR | near |
| NRLY | nearly |
| NSW | no significant weather |
| NW | northwest |
| NWLY | northwesterly |
| OBSC | obscure(d) |
| OCLD | occlude |
| OCLDG | occluding |
| OCLN | occlusion |
| OCNL | occasional |
| OCNLY | occasionally |
| OFSHR | offshore |
| ONSHR | onshore |
| ORGPHC | orographic |
| OTLK | outlook |
| OTWZ | otherwise |
| OVC | overcast |
| OVR | over |
| OVRNG | overrunning |
| PCPN | precipitation |

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure H-2 Abbreviations



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Verify against the official publication.

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| PD | period |
| PL | ice pellets |
| PRECDD | preceded |
| PRECDS | precedes |
| PRES | pressure |
| PROG | prognostic, prognosis |
| PRSTG | persisting |
| PSG | passage, passing |
| PSN | position |
| PTCHY | patchy |
| PTLY | partly |
| RA | rain |
| RDG | ridge |
| RFRMG | reforming |
| RGN | region |
| RMNG | remaining |
| RPDLY | rapidly |
| RPRT | report |
| RSG | rising |
| RUF | rough |
| RVR | river |
| S | south |
| SCT | scattered |
| SCTR | sector |
| SE | southeast |
| SELY | southeasterly |
| SFC | surface |
| SH | shower |
| SHFT | shift |
| SHFTG | shifting |
| SHLW | shallow |
| SKC | sky clear |
| SLO | slow |
| SLOLY | slowly |
| SLY | southerly |
| SM | statute mile(s) |
| SML | small |
| SN | snow |
| SNRS | sunrise |
| SNST | sunset |

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| SPECI | special |
| SPRDG | spreading |
| SQ | squall |
| STBL | stable |
| STG | strong |
| STGTN | strengthen |
| STNRY | stationary |
| SEV | severe |
| SVRL | several |
| SW | southwest |
| SWLY | southwesterly |
| SXN | section |
| SYS | system |
| T | temperature |
| TCU | towering cumulus |
| TEMPO | temporary |
| THK | thick |
| THKNG | thickening |
| THN | thin |
| THNC | thence |
| THNG | thinning |
| THRU | through |
| THRUT | throughout |
| THSD | thousand |
| TILL | until |
| TRML | terminal |
| TROF | trough |
| TROWAL | trough of warm air aloft |
| TRRN | terrain |
| TS | thunderstorm |
| TURB | turbulence |
| TWD | toward |
| UNSTBL | unstable |
| UPR | upper |
| UPSLP | upslope |
| UTC | co-ordinated universal time |
| VC | vicinity |
| VLY | valley |
| VRB | variable |
| VIS | visibility |

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure H-3 Abbreviations



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Verify against the official publication.

| CONTRACTION | PLAIN LANGUAGE |
|---|---|
| VV | vertical visibility |
| W | west |
| WDLY | widely |
| WK | weak |
| WLY | westerly |
| WND | wind |
| WRM | warm |
| WS | wind shear |
| WV | wave |
| WX | weather |
| XCP | except |
| XT | extend |
| XTDG | extending |
| XTRM | extreme |
| XTSV | extensive |
| Z | ZULU (or UTC) |

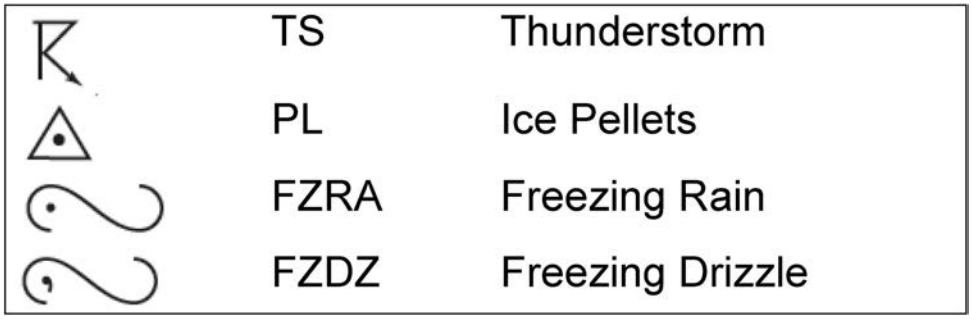
*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.pdf*

Figure H-4 Abbreviations



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Verify against the official publication.

**GFA WEATHER SYMBOLS**




*Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.*

Figure I-1 Weather Symbols

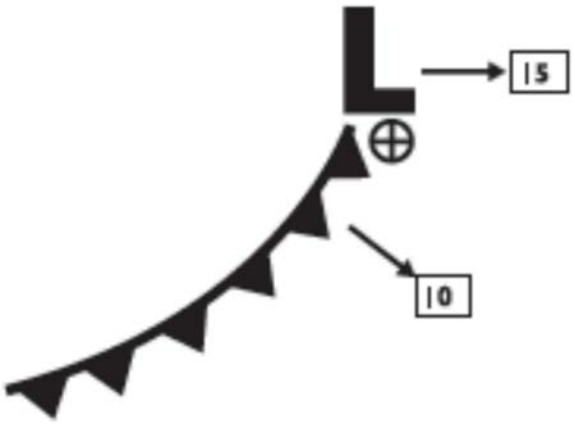


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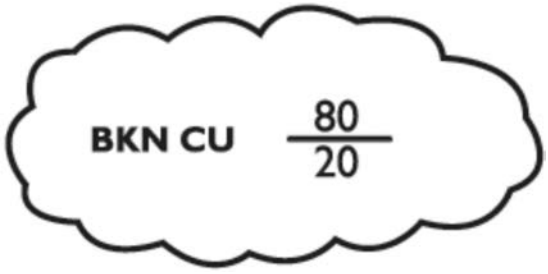


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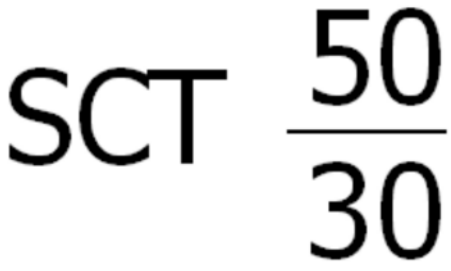

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure J-1 Synoptic Features




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure J-2 Broken Cumulus Clouds

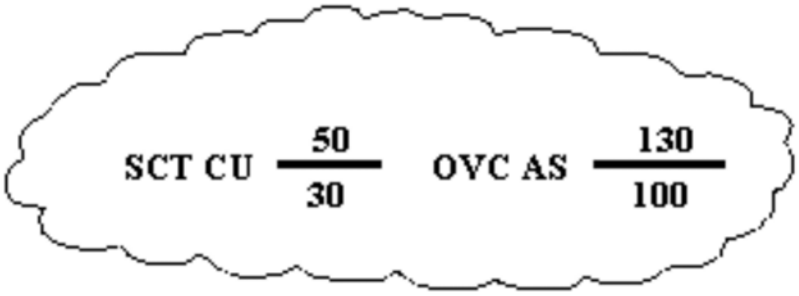



*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure J-3 Scattered Clouds

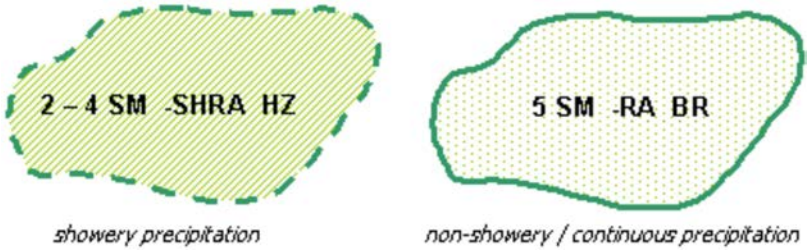


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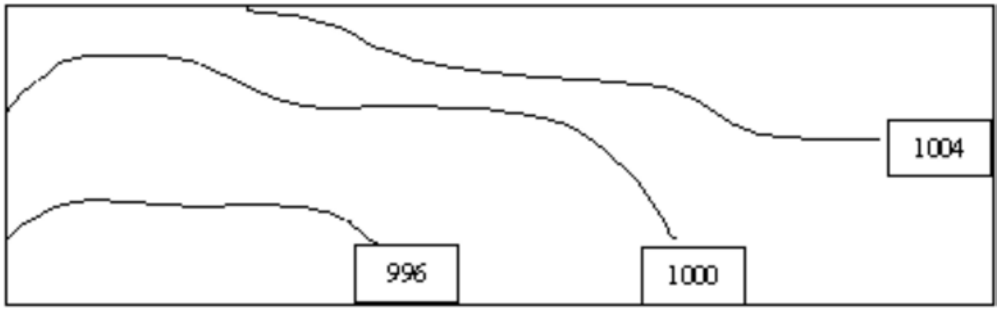

*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure J-4 Multiple Cloud Layers




*Note. From Nav Canada, 2007, Aviation Weather Website. Retrieved October 28, 2008, from http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Page=info-gfa&NoSession=NS_Inconnu&TypeDoc=gfa&Langue=anglais#abbr_symb*

Figure J-5 Weather and Obstructions to Vision




*Note. From Nav Canada, 2007, Aviation Weather Website. Retrieved October 28, 2008, from http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Page=info-gfa&NoSession=NS_Inconnu&TypeDoc=gfa&Langue=anglais#abbr_symb*

Figure J-6 Isobars




*Note. From Aeronautical Information Manual. by Transport Canada, 2008, Retrieved October 27, 2008, from http://www.tc.gc.ca/publications/EN/TP14371/PDF/HR/TP14371E.PDF*

Figure J-7 Surface Winds



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