ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL THREE

INSTRUCTIONAL GUIDE

SECTION 5

EO C336.01 – READ AN AVIATION ROUTINE WEATHER REPORT (METAR)

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-803/PG-001, 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.

Gather sample METARs from the NavCanada aviation weather website.

Create a slide of Annex R.

Photocopy Annex S for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 to introduce the cadets to a METAR.

An in-class activity was chosen for TP 3 as an interactive way for the cadets to practice reading a METAR.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have read a METAR.

IMPORTANCE

It is important for cadets to read a METAR as it will enable them to determine weather conditions for flying in the local area.

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Teaching point 1 **Describe a METAR**

Time: 10 min Method: Interactive Lecture

Weather is a major factor in aviation. Pilots must constantly watch the weather around them as weather will effect the way an aircraft operates. In particular, pilots must review the weather prior to going flying to decide whether it is safe to fly.



Show the slide of examples located at Annex R.

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

Normally, METAR observations are taken and disseminated on an hourly basis. METARs are only valid for the time that they are issued, not for the hour in between reports. METARS are normally issued every hour, on the hour as weather does not normally change much in an hour.

SPECIAL WEATHER REPORTS (SPECI)

There are times when the weather may change drastically in a short period of time. When this happens a SPECI is issued. SPECIs can be issued at any time. They will normally follow the last METAR issued and in sequence from oldest to newest as more SPECIs are issued. SPECIs use the same code as a METAR, but will start with SPECI.

WHERE METARS ARE AVAILABLE

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

- NavCanada’s aviation weather website,
- a Flight Services Station (FSS),
- a Flight Information Centre (normally accessed by phone).

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What does a METAR describe?

Q2. How often is a METAR observation normally issued?

Q3. Why is a SPECI issued?

ANTICIPATED ANSWERS

A1. The existing weather conditions at a specific time and location.

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

A3. When the weather may change drastically in a short period of time.

Teaching point 2 **Review Terminology Used in METARs**

Time: 25 min Method: Interactive Lecture

TERMINOLOGY USED IN METARS



Indicate on the slide of Annex R 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 showing in the same order.

Report Type

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

Station Indicator

Each weather reporting station in Canada is assigned a four letter identifier, starting with the letter C. The remaining three letters are an abbreviation of the reporting station, where the first letter identifies what type of station it is.

An example would be CYOW for 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 in a six-digit grouping, based on universal coordinated time (UTC). 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 hrs 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 hrs UTC.

Report Modifier

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

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Wind

This group reports the two-minute average wind direction and speed. Direction is always three digits, given 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 00000 kt indicates calm winds.

For example, 35016 will read as: winds are 350 degrees true (rounded off) at 16 kts.

If gust conditions exist, the direction and speed will be followed by a G and the maximum gust strength. A gust must be 5 knots stronger than the 10-minute average wind speed.

For example, 35016G25 will read as: winds are 350 degrees true at 16 kts gusting to 25 kts.

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.

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.

For example, R06L/1000V2400FT/U will read as: the minimum runway visual range for runway 06 left is 1 000 feet and the maximum is 2 400 feet with an upward trend.

Present Weather

This section indicates the current weather phenomena at the reporting station. This may include precipitation, obscuration, or other phenomena. This section will include all phenomena that exist, varying the length of the section between reports.

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.



Distribute the handout located at Annex S.

For example, VCFZRABLSN+SNVA would translate to: 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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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 (eighth of the sky) and the height of the clouds in hundreds of feet above ground level (AGL). The sky cover is represented by an abbreviation related to how many oktas of the sky are covered.

- 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 would translate to: 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 (M). A (/) will separate the two values.

Altimeter Setting

This group reports the altimeter setting at the reporting station in inches of mercury. The group starts with (A), which will be 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 would translate to: altimeter setting is 30.06 inches of mercury.

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. The sea level pressure will always be the last entry in a METAR, prefaced by SLP. Sea level pressure is translated by 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, SLP 123 would translate to: sea level pressure is 1012.3 hPa.

For example, SLP 998 would translate to: sea level pressure is 999.8 hPa.



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

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

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

Q2. What does the present weather section indicate?

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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 **Demonstrate and Have the Cadets Read a METAR**

Time: 15 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadets to read a METAR.

RESOURCES

Five or six examples of METARs.

ACTIVITY LAYOUT

Arrange the classroom to enable both individual and small-group work.

ACTIVITY INSTRUCTIONS

1. Project a sample METAR and demonstrate reading it.
2. Distribute examples of METARs.
3. Have the cadets work in pairs to decipher a METAR in three minutes.
4. Correct the cadets' work.
5. Have the cadets work in pairs to decipher a second METAR in two minutes.
6. Correct the cadets' work.
7. Repeat Steps 5. and 6. as often as possible until examples are exhausted.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

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

END OF LESSON CONFIRMATION

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

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CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Reading a METAR is a skill which can be transferred to many other outdoor activities. The code used may also be found in aviation forecasts, which cover larger areas. This can be used for camping trips, trip planning and checking to see if your flight the next morning will be delayed.

INSTRUCTOR NOTES/REMARKS

Recent METARs can be found at http://www.flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Langue=anglais &NoSession=NS_Inconnu?Page=forecast-observation&TypeDoc=html. Click on the METAR/TAF icon and then enter the airport name or identifier.

REFERENCES

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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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