PART D – SUPPLEMENTARY CODES

CHAPTER 14

PILOT'S REPORTS

14.1 GENERAL. Pilot Reports (PIREPS) are reports of weather conditions encountered by aircraft during flight. This information is extremely useful to other pilots, aircraft operators, and forecasters for supplementing the information received from meteorological observing stations. Pilots are encouraged to file brief reports of weather conditions when giving position reports. Also any important atmospheric phenomenon encountered between reporting points should be reported, either immediately or appended to the position report given over the next reporting point. Pilot reports received at flight service stations are relayed on meteorological communications circuits to weather offices and other flight service stations.

14.2 AIRCRAFT WEATHER OBSERVATIONS. In order to provide standard methods of observing and reporting meteorological phenomena encountered during flight, the following descriptions and criteria should be used for pilot reports. The order in which the data are discussed is the same as the order in which the data appear on the encoded PIREP.

14.2.1 Location shall be reported in one of two ways:

1. as a direction from a navigation radio aid (navaid) or a weather station, followed by the distance therefrom, or

2. as a route segment (e.g., navaid–navaid).

14.2.1.1 Navaids which may be used shall have 3–letter identifiers. Form 0062–9420 is a map depicting location identifiers valid for use in PIREPS; these 3–letter identifiers are also listed in section C, Radio Navigation Aids and Communications, of the IFR Supplement. Three–letter identifiers for navaids and weather stations are also published in Canadian Location Identifiers.

14.2.1.2 Direction of the aircraft from the navaid, or weather station, is reported in whole degrees magnetic (3 digits)in Southern Domestic Airspace and whole degrees true in Northern Domestic Airspace, and the distance from the navaid is in nautical miles (3 digits). If the aircraft is overhead the navaid, direction and distance are omitted from the report. See para. 14.3.5, example 1.

14.2.1.3 Time of occurrence of the element being reported is given in hours and minutes Coordinated Universal Time (4 digits).

14.2.1.4 Flight level, or altitude, reports are based on readings taken from aircraft altimeters set in accordance with Air Navigation Order, Series V, No. 16. Generally, flights below 18 000 feet in the altimeter setting region defined in the above Air Navigation Order use the current altimeter setting of the nearest station, while other flights use a standard altimeter setting of 29.92 inches. In both cases, the true altitude will be above or below the indicated flight level depending on the actual atmospheric conditions prevailing. Flight level, or altitude, in hundreds of feet, is included as part of the location information and is always encoded using three digits.

14.2.2 Aircraft Type is decoded or encoded in accordance with the list of designators contained in the Transport Canada handbook, "Air Traffic Designators".

14.2.3 Sky Cover data are reported in terms of layer amount and altitude of bases and/or tops. The altitude of the base of a layer precedes the layer amount, and the altitude of the tops follows layer amount. Reports may comprise one or more layers.

14.2.3.1 The symbols, CLR, SCT, BKN, and OVC are used to report layer amount, and altitudes are encoded in hundreds of feet, using three digits. The cloud heights, above mean sea level, are based on aircraft altimeter measurement as in para. 14.2.1.4.

14.2.3.2 Aircraft Ceiling. A pilot report of the ceiling which may be classified as "Aircraft" may be disseminated as part of a regular Hourly or Special weather report. Specifications for this ceiling classification are given in para. 10.2.8.9.5.

14.2.4 Temperature. The ambient air temperature is normally reported in whole degrees Celsius and is always coded using two digits. Negative temperatures are preceded by a minus (–) sign.

14.2.4.1 Thermometers used in aircraft require correction for (1) air–speed and (2) altitude. This is normally done by the pilot, using graphs or correction tables supplied by the operating agency. If a pilot is reporting uncorrected temperatures, he should make this known to the person receiving the report and he should also indicate the corrections to be applied.

14.2.5 Winds Aloft. The wind direction shall be reported in whole degrees true and the wind speed in knots, using three digits for each of direction and speed. Some pilots may report winds in degrees magnetic and it is the responsibility of the person encoding the PIREP to determine whether the reported wind is in degrees true or magnetic and to convert, where necessary, to degrees true before relaying. The conversion may be made as follows:

If the magnetic variation or declination is West:

True direction = Magnetic Direction minus Declination

If the magnetic variation or declination is East:

True Direction = Magnetic Direction plus Declination

14.2.5.1 The value to be used for the declination varies slowly with time and place. Values to be used may be found in the Canada Air Pilot, the VFR Supplement, the Northern Supplement, or on a recent aeronautical chart.

14.2.6 Turbulence. The occurrence and intensity of turbulence should be reported using the following criteria which are based on the aircraft and occupants' reactions.

14.2.6.1 Light Turbulence momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw).

14.2.6.1.1 Turbulence that causes slight, rapid and somewhat rhythmic bumpiness without appreciable changes in altitude or attitude is known as Light Chop.

14.2.6.2 Moderate Turbulence is similar to Light Turbulence but of greater intensity. Changes in altitudes and/or attitude occur but the aircraft remains in positive control at all times. It usually causes variations in indicated airspeed.

14.2.6.2.1 Turbulence that is similar to Light Chop but of greater intensity which causes rapid bumps or jolts without appreciable changes in aircraft altitude or attitude is known as Moderate Chop.

14.2.6.3 Severe Turbulence causes large abrupt changes in altitude and/or attitude. It usually causes large variations in indicated airspeed and aircraft may be momentarily out of control.

14.2.6.4 Extreme Turbulence tosses the aircraft violently about, making it practically impossible to control. Extreme turbulence may cause structural damage.

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14.2.6.5 Turbulence is reported by giving first the intensity, or variation of intensity, (followed in the case of clear air turbulence only by the type, i.e. CAT). Turbulence intensities are coded as follows:

Light, or light chop	– LGT
moderate, or moderate chop	– MDT
severe	– SVR
extreme	– XTRM

14.2.6.5.1 The altitude, or layer, of turbulence, if different from the flight level of the location data, is reported by the use of one or two three digit groups. The symbols, BLO and ABV may be used in conjunction with a flight level when the base or top of a layer is undefined, e.g. ABV–290.

14.2.7 Air Frame Icing. Air frame icing should be reported according to type and intensity or rate of accretion. The intensity is determined with reference to de–icing equipment and, to some extent, the characteristics of the ai rcraft.

14.2.7.1 Types of Ice.

14.2.7.1.1 Rime. Rime is ice (other than frost) which is rough, milky and opaque in appearance and is formed by the instantaneous freezing of small super–cooled water droplets. It will usually form only on the leading edges of airfoils and tends to build forward into the air–stream, forming fingers and ridges. If it is impossible to determine from the cockpit of an aircraft whether the structure of an ice formation is granular, any ice accretion which is confined to the leading edges should be reported as rime. Because of the low adhesive properties of rime, it is generally readily removed by de–icing equipment.

14.2.7.1.2 Clear Ice. This type of ice has high adhesive and cohesive properties. Unlike rime, it can spread from the leading edges, and in severe cases may cover the whole surface of the aircraft. Its physical appearance can vary all the way from a transparent, glass–like structure to a very tough opaque surface. Clear ice is formed when large, super–cooled water droplets collide with the air frame and freeze slowly after impact, the free water flowing back over the surface as it freezes at temperatures not far below freezing. Clear ice builds back from leading edges as well as forward and may develop large irregular protuberances into the air stream.

If it is impossible to determine from the cockpit the exact structure of the ice, any ice which spreads back from the leading edges should be reported as clear ice.

14.2.7.2 Rate of Ice Accretion. The intensity or rate of ice accretion is reported as trace, light, moderate or severe. As there is no satisfactory instrument installed on commercial aircraft for measuring directly the rate of ice accretion on an airframe, these terms must be interpreted qualitatively and measured by the effect of the ice formation on the flying characteristics of the aircraft.

14.2.7.2.1 Trace. Ice becomes perceptible. Rate of accretion is slightly greater than rate of sublimation. It is not hazardous even though deicing/anti–icing equipment is not utilized, unless encountered for an extended period of time (over 1 hour).

14.2.7.2.2 Light. The rate of accretion may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti–icing equipment removes/prevents accretion. It does not present a problem if the deicing/anti–icing equipment is used.

14.2.7.2.3 Moderate. The rate of accretion is such that even short encounters become potentially hazardous and use of deicing/anti–icing equipment, or diversion, is necessary.

14.2.7.2.4 Severe. The rate of accretion is such that deicing/anti–icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.

14.2.7.3 Icing is reported using the same format as turbulence, so the sequence is intensity, type, and altitude or layer.

14.2.7.3.1 Symbols used for intensity of icing are TR, LGT, MDT, and SVR. Variation in intensity may be reported, e.g. LGT–MDT.

14.2.7.3.2 Symbols used for type of icing are CLR and MXD. RIME is also used, rather than a symbol or contraction.

14.2.7.3.3 The altitude, or layer, at which icing is encountered is also reported, if different from the flight level given in the location data, using one or two three–digit groups, including the terms ABV and BLO.

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14.2.8 Remarks are used to report weather conditions not previously reported in the PIREP, or to clarify information reported in one of the previous elements. Wording may be a combination of plain language and abbreviations found in "Manual of Word Abbreviations (MANAB)". Remarks reported in the PIREP may consist of, without being limited to, information of the following types.

14.2.8.1 Icing in Precipitation. When icing is experienced in precipitation, this fact should be reported because of its operational and meteorological significance. Icing in precipitation includes at one extreme that formed in freezing rain, which is the most dangerous type of icing condition, and, at the other extreme, that formed in slightly wet snow which has just sufficient adhesion to cling for a short time to the leading edges, dislodging automatically at short intervals when it has accreted to appreciable proportions.

The intensity or rate of accretion of icing in precipitation is reported in the Remarks section of the PIREP as the appropriate rate of accretion of rime or clear ice resulting from the precipitation.

14.2.8.2 Thunderstorms. Reports of thunderstorm activity will consist of reports of the occurrence of lightning only, as a pilot is most unlikely to hear thunder. The direction in which the lightning was observed should be reported as well as the type of lightning, e.g., 'cloud to ground', 'cloud to cloud', 'within cloud' or 'below horizon'.

14.2.8.3 St. Elmo's Fire. Pilots will occasionally report a 'brush discharge' commonly known as "St. Elmo's Fire". When this is reported, it will be recorded and transmitted in Remarks so that other pilots may be warned of conditions favourable for such discharges.

14.2.8.4 Frontal Conditions. Pilots are encouraged to report geographical location, phenomena encountered, and time of passage through fronts. This information will be recorded and reported in Remarks in the PIREP.

14.2.8.5 Although no specific format must be followed in Remarks, when weather elements such as tornadoes, thunderstorms, other forms of severe weather and explanatory information are reported in Remarks, they shall be reported in descending order of importance.

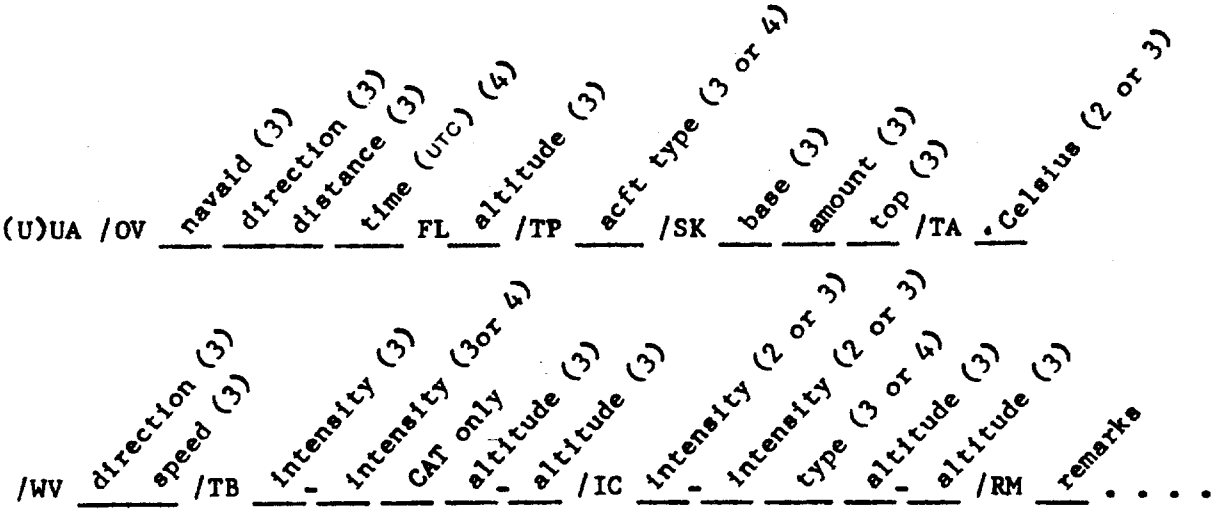
14.2.8.6 The final Remark in a PIREP, if there is a regional requirement, is the identification of the station which encodes the PIREP for distribution on the communications circuits. When this identification is made, it shall be in the form of the 3–letter station identifier, preceded by the word 'via'. For example, if Cranbrook, B. C. is identified as the originating or encoding station, the final Remark should be 'via YXC'.

14.3 ENCODING THE PIREP

14.3.1 Format. The encoded PIREP consists of meteorological elements as described in para. 14.2 and each element must be preceded by a specific indicator. The message may be of variable length, due to the omission of some elements, but because of the inclusion of the message heading and element indicators, the message can be processed and manipulated by computer.

14.3.1.1 A minimal PIREP consists of the message header, aircraft location information, aircraft type, and at least one other element. A complete report consists of the message header, location, flight level, aircraft type, sky condition, temperature, wind velocity, turbulence, icing, and remarks.

14.3.1.2 The general PIREP format, including element indicators, spacing, interpretation, and number of characters required for each element is as follows:



Notes: 1)Elements for which no data are reported are omitted from the message.

2) All element indicators, except FL (flight level), are always preceded by a space and a solidus, then followed by a space.

3) FL is always preceded by a space only, then followed immediately by the 3–digit flight level or altitude.

4) If turbulence and/or icing is reported at the same altitude as given in the location data, then no altitude is coded following /TB and/or /IC. A single altitude may be reported, or a layer may be defined by encoding both top and bottom altitudes.

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14.3.1.2.1 The indicators used in the message are as follows.

UA	–	identifies the message as a PIREP.
UUA	–	identifies the message as an urgent PIREP and also alerts the computer to increase the priority given to distribution of the message.
(FIR)	–	identifies the Flight Information Region for the PIREP.
/OV	–	location data to follow.
FL	–	flight level or altitude. Units used by pilots in North America are feet. If the flight level is unknown, it may be encoded UNK.
/TP	–	aircraft type. If type is unknown, it may be encoded UNK.
/SK	–	sky cover. Multiple layers may be reported and will be separated by a solidus.
/TA	–	ambient temperature
/WV	–	wind velocity
/TB	–	turbulence
/IC	–	icing
/RM	–	remarks

14.3.1.2.2 Hyphens are used to show variation in intensity, lower and upper limits of a layer, or between the two ends of a route segment. A hyphen is also used to indicate negative temperatures.

14.3.1.2.3 Zeros are inserted in reported values when the number of digits is less than the number required by the format. For example, an aircraft location report of "45 miles from the London VOR on the 005 radial at 0030 UTC at 5000 feet" would be encoded:

/OV YXU 005045 0030 FL050

14.3.2 Message Header. Each message or group of PIREPS distributed on the meteorological communications circuits must have a message type identifier, four letter issuing station identifier, and a six digit date/time group (the last four digits of which represent Coordinated Universal Time).

Note: AES sites will not directly input PIREPS to the communication system. All PIREPS shall be phoned or facsimiled to the nearest FSS (Flight Service Station).

14.3.2.1 Pilot reports transmitted on the AES National Communications System are input using either the UA data entry or free format screens.

14.3.2.2 The message type identifier is normally UACN10. However, an urgent PIREP is transmitted with the identifier UACN01.

Examples of message headers for PIREP messages:

1. Normal PIREP – UACN10 CYUL 020922
2. Urgent PIREP – UACN01 CYYZ 232037

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14.3.3 Urgent PIREPS

14.3.3.1 An urgent PIREP should be transmitted when conditions hazardous or potentially hazardous to flight are reported by a pilot.

14.3.3.2 Any of the following reported weather conditions would be reason to transmit an urgent PIREP:

(a) tornado, funnel cloud, waterspout

(b) severe or extreme turbulence

(c) severe icing

(d) hail

(e) low level wind shear (within 2000 feet of the surface)

14.3.4 Flight Information Region (FIR)

14.3.4.1 The 2–letter identifier for the Flight Information Region (FIR) shall be inserted on the second line of the PIREP, immediately below the bulletin header.

14.3.4.2 The FIR Identifiers are:

QX – Gander	QM – Moncton
UL – Montreal	YZ – Toronto
WG – Winnipeg	EG – Edmonton
VR – Vancouver	

14.3.5 Examples of PIREP Messages.

1. ENCODE:

UACN10 CYYZ 131348

YZ

UA /OV VQC 045043 1342 FL090 /TP BE80 /SK OVC 075 /TA –18 /IC

LGT RIME BLO–075 /RM WIND COMP HEAD 010 MH 065 TAS 210

DECODE:

location– Stirling VORTAC 045 degree radial, 43 nm at 1342 UTC at 9000 feet; type– Beech Queen Air; sky condition– overcast, tops 7500 feet; air temperature– minus 18 degrees Celsius; icing– light rime below 7500 feet; remarks– headwind component 10 knots, magnetic heading 065 degrees, true airspeed 210 knots.

Note: If the pilot is unable to accurately determine wind direction or speed, wind components on a specific leg of a flight may be reported in Remarks. In this case, wind component is coded WIND COMP and then followed by a space and the qualifier HEAD or TAIL.

2. ENCODE:

UACN10 CYEG 070122

EG.

UA /OV YNY–YRM 0116 FL270 /TP DC8 /SK 180 BKN 230 /TA –36 /WV

280045 /TB LGT CAT ABV–250

DECODE:

location– Enderby to Rocky Mtn House, 0116 UTC at flight level 270; type– DC8; sky condition–cloud base 18 000 feet broken, tops 23 000 feet; air temperature– minus 36 degrees Celsius; wind velocity– 280 degrees at 45 knots; turbulence – light CAT above flight level 250.

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3. ENCODE:

UACN01 CYXU 072137

YZ

UUA /OV YXU 099015 2133 FLO40 /TP CV64 /SK 045 OVC /TB MDT–SVR ABV–050 /RM TORNADO TOUCHING SURFACE 8N

DECODE: (URGENT PIREP)

location– London VORTAC 099 degree radial, 15 nm at 2133 UTC at 4000 feet; type– Convair 640; sky condition– cloud base 4500 feet overcast; turbulence– moderate to severe above 5000 feet; remarks – tornado touching surface 8 nm N.

14.3.6 Examples of Coding Elements of the PIREP.

1. Location, including time and flight level.
   /OV YQT 115055 0040 FL090
   /OV YEG–YYC 2125 FL230
   /OV VLN 2030 FL035

2. Aircraft types
   /TP DH6 DeHavilland Twin Otter
   /TP L101 Lockheed Tri–Star (1011)

3. Sky condition
   /SK 045 SCT
   decode: scattered layer based at 4500 feet.

   /SK BKN 074
   decode: broken layer, tops at 7400 feet.

   /SK 160 OVC 240
   decode: overcast layer based at 16 000 feet, tops at 24 000 feet.

   When multiple layers are reported, each layer is separated from the next by a solidus.

   /SK 120 SCT 140/180 BKN 210

4. Air temperature (corrected)
   /TA 04 Temperature is 4°C
   /TA –35 Temperature is minus 35°C.

5. Wind velocity
/WV 005110 Wind is from 5° true at 110 knots.
/WV 310010 Wind is from 310° true at 10 knots.

6. Turbulence
/TB MDT
decode: moderate turbulence at flight level in the location data.

/TB LGT–MDT BLO–050
decode: light to moderate turbulence below 5000 feet.

/TB LGT–MDT CAT 230–270
decode: light to moderate clear air turbulence between flight levels 230 and 270.

Note: A hyphen is used, without spaces, to separate intensity symbols when describing variations in intensity. Similarly, in describing a layer, the hyphen is inserted between the two flight levels representing the top and bottom of the layer.

7. Icing
/IC TR RIME BLO–040/MDT CLR 100–140
decode: trace of rime icing below 4000 feet; moderate clear icing between 10 000 and 14 000 feet.
Note the use of the solidus to separate multiple icing layers.

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14.3.7 A Sample PIREP Encoding Form

PIREP FORM

UACN

BULLETIN HEADER UACN01 FOR URGENT UACN10 FOR NORMAL – ISSUING STATION DATE TIME GROUP (Z)

FLIGHT INFORMATION REGION (FIR) QX,QM,UL,YZ,WG,EG,VR

(U) UA→/OV→ FL

MSG TYPE LOCATION OF PHENOMENA 3–LTR IDENT RADIAL DIST TIME(Z) FLT LEVEL

/TP → /SK →

TYPE OF AIRCRAFT SKY CONDITION BASE AMOUNT TOP

/TA → /WV →

TEMPERATURE CELSIUS WIND – DIRECTION SPEED

/TB → /IC →

TURBULENCE – INTENSITY TYPE* ALTITUDE** ICING – INTENSITY TYPE ALTITUDE

/RM →

REMARKS (MOST HAZARDOUS ELEMENT REPORTED FIRST)

LEGEND: → =SPACE SYMBOL *=CAT ONLY **=ONLY IF DIFFERENT FROM FL