Section 2
AVIATION ROUTINE WEATHER REPORT (METAR)

The aviation routine weather report (METAR) is the weather observer's interpretation of the weather conditions at a given site and time. The METAR is used by the aviation community and the National Weather Service (NWS) to determine the flying category - visual fight rules (VFR), marginal VFR (MVFR), or instrument flight rules (IFR) - of the airport, as well as produce the Aviation Terminal Forecast (TAF). (See Section 4.)

Although the METAR code is being adopted worldwide, each country is allowed to make modifications or exceptions to the code for use in that particular country. The U.S.A. reports temperature and dew point in degrees Celsius and continues to use current units of measurement for the remainder of the report.

The elements in the body of a METAR report are separated with a space. The only exception is temperature and dew point that are separated with a solidus **(/)**. When an element does not occur, or cannot be observed, the preceding space and that element are omitted from that particular report. A METAR report contains the following elements in order as presented:

1. Type of report
2. ICAO station identifier
3. Date and time of report
4. Modifier (as required)
5. Wind
6. Visibility
7. Runway visual range (RVR) (as required)
8. Weather phenomena
9. Sky condition
10. Temperature/dew point group
11. Altimeter
12. Remarks (RMK) (as required)

The following paragraphs describe the elements in a METAR report. A sample report will accompany each element with the subject element highlighted.

TYPE OF REPORT

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

There are two types of reports: The METAR and the aviation selected special weather report (SPECI). The METAR is observed hourly between 45 minutes after the hour till the hour and transmitted between 50 minutes after the hour till the hour. It will be encoded as a METAR even if it meets SPECI criteria. The SPECI is a non-routine aviation weather report taken when any of the SPECI criteria have been observed. The criteria are listed in Table 2-1, "SPECI Criteria."

Table 2-1 SPECI Criteria

Report Element	Criteria
Wind	**Wind direction changes by 45 degrees or more in less than 15 minutes and the wind speed is 10 knots or more throughout the windshift.**
Visibility	**Surface visibility as reported in the body of the report decreases to less than, or if below, increases to equal or exceeds: 3,2, or 1mile or the lowest standard instrument approach procedure minimum as published in the National Ocean Service U.S Instrument Procedures. If none is published use ½ mile.**
RVR	**Changes to above or below 2,400 feet**
Tornado, Funnel Cloud, Waterspout	**When observed or when disappears from sight (ends)**
Thunderstorm	**Begins or ends**
Precipitation	**When freezing precipitation or ice pellets begin, end, or change intensity or hail begins or ends**
Squalls	**When they occur**
Ceilings	**The ceiling forms or dissipates below, decreases to less than, or if below, increases to equal or exceeds: 3,000, 1,500, 1,000, or 500 feet or the lowest standard instrument approach procedure minimum as published in the National Ocean Service U.S Instrument Procedures. If none is published use 200 feet.**
Sky Condition	**A layer of clouds or obscuring phenomenon aloft that forms below 1,000 feet**
Volcanic Eruption	**When an eruption is first noted**
Aircraft Mishap	**Upon notification of an aircraft mishap, unless there has been an intervening observation**
Miscellaneous	**Any other meteorological situation designated by the agency, or which, in the opinion of the observer, is critical**

ICAO STATION IDENTIFIER

METAR **KLAX** 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

The METAR code uses International Civil Aviation Organization (ICAO) four-letter station identifiers that follow the type of report. In the conterminous United States, the three-letter identifier is prefixed with K. For example SEA (Seattle) becomes KSEA. Elsewhere, the first one or two letters of the ICAO identifier indicate in which region of the world and country (or state) the station is located. Pacific locations such as Alaska, Hawaii, and the Mariana Islands start with P followed by an A, H, or G respectively. The last two letters reflect the specific reporting station identification. If the location's three-letter identification begins with an A, H, or G, the P is added to the beginning. If the location's three-letter identification does not begin with an A, H, or G, the last letter is dropped and the P is added to the beginning.

Examples:
ANC (Anchorage, AK) becomes PANC.
OME (Nome, AK) becomes PAOM.
HNL (Honolulu, HI) becomes PHNL.
KOA (Keahole Point, HI) becomes PHKO.
UAM (Anderson AFB, Guam) becomes PGUA.

Canadian station identifiers start with C.

Example:
Toronto, Canada, is CYYZ.

Mexican and western Caribbean station identifiers start with M.

Examples:
Mexico City, Mexico, is MMMX.
Guantanamo, Cuba, is MUGT.
Santo Domingo, Dominican Republic, is MDGM.
Nassau, Bahamas, is MYNN.

The identifier for the eastern Caribbean is T, followed by the individual country's letter.

Example:
San Juan, Puerto Rico, is TJSJ.

For a complete worldwide listing, see ICAO Document 7910, "Location Indicators."

DATE AND TIME OF REPORT

METAR KLAX **140651Z** AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

The date and time the observation is taken are transmitted as a six-digit date/time group appended with **Z** to denote Coordinated Universal Time (UTC). The first two digits are the date followed with two digits for hour and two digits for minutes. If a report is a correction to a previously disseminated erroneous report, the time entered on the corrected report shall be the same time used in the report being corrected.

MODIFIER (AS REQUIRED)

METAR KLAX 140651Z **AUTO** 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

The modifier element, if used, follows the date/time element. The modifier, **AUTO**, identifies a METAR/SPECI report as an automated weather report with no human intervention. If AUTO is shown in the body of the report, AO1 or AO2 will be encoded in the remarks section of the report to indicate the type of precipitation sensor used at the station. A remark of AO1 indicates a report from a station that does not have a precipitation discriminator, and an AO2 remark indicates a report from a station

which has a precipitation discriminator. The absence of AUTO indicates that the report was made manually or the automated report had human augmentation/backup.

The modifier, **COR**, identifies a corrected report that is sent out to replace an earlier report with an error.

Example:
METAR KLAX 140651Z **COR**…

WIND

METAR KLAX 140651Z AUTO **00000KT** 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

The wind element is reported as a five-digit group (six digits if speed is over 99 knots). The first three digits are the direction from which the wind is blowing in tens of degrees referenced to true north. Directions less than 100 degrees are preceded with a zero. The next two digits are the average speed in knots, measured or estimated, or if over 99 knots, the next three digits.

Example:
340105KT

If the wind speed is less than 3 knots, the wind is reported as calm, 00000KT. If the wind is gusty, 10 knots or more between peaks and lulls, **G** denoting gust is reported after the speed followed by the highest gust reported. The abbreviation **KT** is appended to denote the use of knots for wind speed. Other countries may use kilometers per hour or meters per second.

If the wind direction is variable by 60 degrees or more and the speed is greater than 6 knots, a variable group consisting of the extremes of the wind directions separated by **V** will follow the wind group.

Example:
08012G25KT 040V120

The wind direction may also be considered variable if the wind speed is 6 knots or less and is varying in direction (60-degree rule does not apply). This is indicated with the contraction **VRB**.

Example:
VRB04KT

WIND REMARKS

At facilities that have a wind recorder or at automated weather reporting systems, whenever the peak wind exceeds 25 knots, **PK WND** will be included in the Remarks element in the next report. The peak wind remark includes three digits for direction and two or three digits for speed followed by the time in hours and minutes of occurrence. If the hour can be inferred from the report time, only the minutes are reported.

Example:
PK WND 28045/15

When a windshift occurs, **WSHFT** will be included in the Remarks element followed by the time the windshift began (with only minutes reported, if the hour can be inferred from the time of observation). A windshift is indicated by a change in wind direction of 45 degrees or more in less than 15 minutes with sustained winds of 10 knots or more throughout the windshift. The contraction, **FROPA**, may be entered following the time if the windshift is the result of a frontal passage.

Example:
WSHFT 30 FROPA

VISIBILITY

METAR KLAX 140651Z AUTO 00000KT **1SM** R35L/4500V6000FT -RA BR BKN030 10/10 A2990 RMK AO2

Prevailing visibility is reported in statute miles followed by a space, fractions of statute miles, as needed, and the letters **SM**. Other countries may use meters or kilometers. Prevailing visibility is considered representative of the visibility conditions at the observing site. Prevailing visibility is the greatest visibility equaled or exceeded throughout at least half the horizon circle, which need not be continuous. When visibilities are less than 7 miles, the restriction to visibility will be shown in the weather element. The only exception to this rule is that if volcanic ash, low drifting dust, sand, or snow is observed, it is reported, even if it does not restrict visibility to less than 7 miles.

VISIBILITY REMARKS

If tower or surface visibility is less than 4 statute miles, the lesser of the two will be reported in the body of the report; the greater will be reported in the Remarks element.

Example:
TWR VIS 1 1/2 or SFC VIS 1 1/2

Automated reporting stations will show visibility less than 1/4 statute mile as **M1/4SM** and visibility 10 or greater than 10 statute miles as **10SM**.

For automated reporting stations having more than one visibility sensor, site-specific visibility (which is lower than the visibility shown in the body) will be shown in the Remarks element.

Example:
VIS 2 1/2 RWY 11

When the prevailing visibility rapidly increases or decreases by 1/2 statute mile or more during the observation, and the average prevailing visibility is less than 3 statute miles, the visibility is variable. Variable visibility is shown in the Remarks element with the minimum and maximum visibility values separated by a V.

Example:
VIS 1/2V2

Sector visibility is shown in the Remarks element when it differs from the prevailing visibility and either the prevailing or sector visibility is less than 3 miles.

Example:
VIS NE 2 1/2

RUNWAY VISUAL RANGE (RVR) (AS REQUIRED)

METAR KLAX 140651Z AUTO 00000KT 1SM **R35L/4500V6000FT** -RA BR BKN030 10/10 A2990 RMK AO2

Runway visual range (RVR) follows the visibility element. RVR, when reported, is in the following format: **R** identifies the group; followed by the runway heading and, if needed, the parallel runway designator; next is a solidus (**/**); last is the visual range in feet (meters in other countries) indicated by "**FT**." RVR is shown in a METAR/SPECI if the airport has RVR equipment and whenever the prevailing visibility is 1 statute mile or less and/or the RVR value is 6,000 feet or less. When the RVR varies by more than one reportable value, the lowest and highest values are shown with **V** between them.

Example:
R35L/4500V6000FT

When the observed RVR is above the maximum value which can be determined by the system, it should be reported as P6000 where 6,000 is the maximum value for this system. When the observed RVR is below the minimum value which can be determined by the system, it should be reported as M0600 where 600 is the minimum value for this system.

Example:
R27/P6000FT and R12C/M0600FT

WEATHER PHENOMENA

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT **-RA BR** BKN030 10/10 A2990 RMK AO2

Weather phenomena is broken into two categories: qualifiers and weather phenomena.

QUALIFIERS

Intensity

Intensity may be shown with most precipitation types.

A "-"denotes a light intensity level, no symbol denotes a moderate intensity level, and a "+" denotes a heavy intensity level. When more than one type of precipitation is present, the intensity refers to the first precipitation type (most predominant). (See Table 2-2.)

Example:
+SHRASN indicates heavy rainshowers and snow.

Table 2-2 Intensity Qualifiers

Intensity Qualifiers	
-	**Light**
	Moderate
+	**Heavy**

Proximity

Proximity is applied to and reported only for weather phenomena occurring in the vicinity of the airport. Vicinity of the airport is defined to be between 5 and 10 miles of the usual point of observation for obscuration and just beyond to point of observation to 10 miles for precipitation. It is denoted by **VC**. Intensity and VC will never be shown in the same group.

Examples:
VCSH indicates showers in the vicinity of the airport.
VCFG indicates fog in the vicinity of the airport.

Descriptor

The eight descriptors shown in Table 2-3 further identify weather phenomena and are used with certain types of precipitation and obscurations. Although **TS** and **SH** are used with precipitation and may be preceded with an intensity symbol, the intensity still applies to the precipitation and not the descriptor.

Example:
+TSRA is a thunderstorm with heavy rain and not a heavy thunderstorm with rain.

Table 2-3 Descriptor Qualifiers

Descriptor	
MI[1]	**Shallow**
BC[2]	**Patches**
DR[3]	**Low drifting**
BL[4]	**Blowing**
SH	**Showers**
TS	**Thunderstorm**
FZ	**Freezing**
PR	**Partial**

[1]MI shall be used only to further describe fog that has little vertical extent (less than 6 feet).
[2]BC shall be used only to further describe fog that has little vertical extent and reduces horizontal visibility.
[3]DR shall be used when dust, sand, or snow is raised by the wind to less than 6 feet.
[4]BL shall be used when dust, sand, snow, and/or spray is raised by the wind to a height of 6 feet or more.

WEATHER PHENOMENA

If more than one significant weather phenomenon is observed, entries will be listed in the following order: Tornadic activity, thunderstorms, and weather phenomena in order of decreasing predominance (i.e., the most dominant type is reported first).

If more than one significant weather phenomenon is observed, except precipitation, separate weather groups will be shown in the report. No more than three weather groups will be used to report weather phenomena at or in the vicinity of the station. If more than one type of precipitation is observed, the appropriate contractions are combined into a single group with the predominant type being reported first. In such a group, any intensity will refer to the first type of precipitation in the group.
Refer to Table 2-4 while reading the rest of this section.

Examples:
TSRA indicates thunderstorm with moderate rain.
+SHRA indicates heavy rainshowers.
-FZRA indicates light freezing rain.

Precipitation

The types of precipitation in the METAR code are shown in Table 2-4. Precipitation is any form of water particle, whether liquid or solid, that falls from the atmosphere and reaches the ground.

Examples:
GR is used to indicate hail ¼ inch in diameter or larger.
GS is used to indicate hail less than ¼ inch in diameter.
UP is unknown precipitation and is used only at automated sites. This occurs when light precipitation is falling but the precipitation discriminator cannot determine the precipitation type. This situation usually occurs when rain and snow are falling at the same time.

Obscurations

The types of obscuration phenomena in the METAR code are shown in Table 2-4. They are any phenomena in the atmosphere, other than precipitation, that reduce horizontal visibility.

Examples:
BR is used to indicate mist restricting visibility and is used only when the visibility is from 5/8 mile to 6 miles.
FG is used to indicate fog restricting visibility and is used only when visibility is less than 5/8 mile.

Other

The other weather phenomena, shown in the table, are reported when they occur.

Examples:
SQ is a sudden increase in wind speed of at least 16 knots, the speed rising to 22 knots or more, and lasting at least 1 minute.
+FC is used to denote a tornado or waterspout.
FC is used to denote a funnel cloud.

Table 2-4 Weather Phenomena

Precipitation	Obscuration	Other
DZ Drizzle	**BR Mist**	**PO Dust/Sand whirls**
RA Rain	**FG Fog**	**SQ Squalls**
SN Snow	**DU Dust**	**FC Funnel cloud**
SG Snow grains	**SA Sand**	**+FC Tornado or Waterspout**
IC Ice crystals	**HZ Haze**	**SS Sandstorm**
PL Ice pellets	**PY Spray**	**DS Dust storm**
GR Hail	**VA Volcanic ash**	
GS Small hail or Snow pellets	**FU Smoke**	
UP Unknown precipitation		

Weather Begins/Ends

When weather begins or ends, the Remarks element will show the beginning and ending times of any type of precipitation or thunderstorms. Types of precipitation may be combined if beginning or ending times are the same.

Example:
RAB05E30SNB30E45 This means that rain began at 5 minutes past the hour and ended at 30 minutes past the hour, snow began at 30 minutes past the hour and ended at 45 minutes past the hour.

Example:
TSB05E45 This means a thunderstorm began at 5 minutes past the hour and ended at 45 minutes past the hour.

Hailstone Size

When hailstones, **GR**, are shown in the body of a report, the largest hailstone size is shown in the Remarks element in 1/4-inch increments and identified with the contraction GR. Hailstones less than 1/4 inch are shown in the body of a report as **GS** and no remarks are entered indicating hailstone size.

Example:
GR 1 ¾

SKY CONDITION

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR **BKN030** 10/10 A2990 RMK AO2

Sky condition is reported in the following format:

Amount/Height/Type (as required) or Indefinite Ceiling/Height (Vertical Visibility)

AMOUNT

A clear sky, a layer of clouds, or an obscuring phenomenon is reported by one of the six sky cover contractions. (See Table 2-5.) When more than one layer is reported, they are reported in ascending order of height. For each layer above a lower layer or layers, the sky cover for that higher layer will be the total sky cover that includes that higher layer and all lower layers. In other words, the summation of the cloud layers from below and at that higher level determines what sky cover is reported. This summation includes both clouds and obscuration. The amount of sky cover is reported in eighths of the sky, using the contractions in Table 2-5.

Table 2-5 Reportable Contractions for Sky Cover

Reportable Contractions	Meaning	Summation Amount
***SKC or CLR**	**Clear**	**0 or 0 below 12,000**
FEW	**Few**	**>0 but ≤ 2/8**
SCT	**Scattered**	**3/8-4/8**
BKN	**Broken**	**5/8-7/8**
OVC	**Overcast**	**8/8**
VV	**Vertical Visibility (indefinite ceiling)**	**8/8**

***SKC** will be reported at manual stations. The abbreviation **CLR** shall be used at automated stations when no clouds below 12,000 feet are detected.

Note: For aviation purposes, the ceiling is defined as the height (AGL) of the lowest broken or overcast layer aloft or vertical visibility into an obscuration.

HEIGHT

Cloud bases are reported with three digits in hundreds of feet above ground level.

Example:
SCT020

Clouds above 12,000 feet cannot be detected by automated reporting systems. At reporting stations located in the mountains, if the cloud layer is below the station level, the height of the layer will be shown as three solidi (**///**).

Example:
SCT///

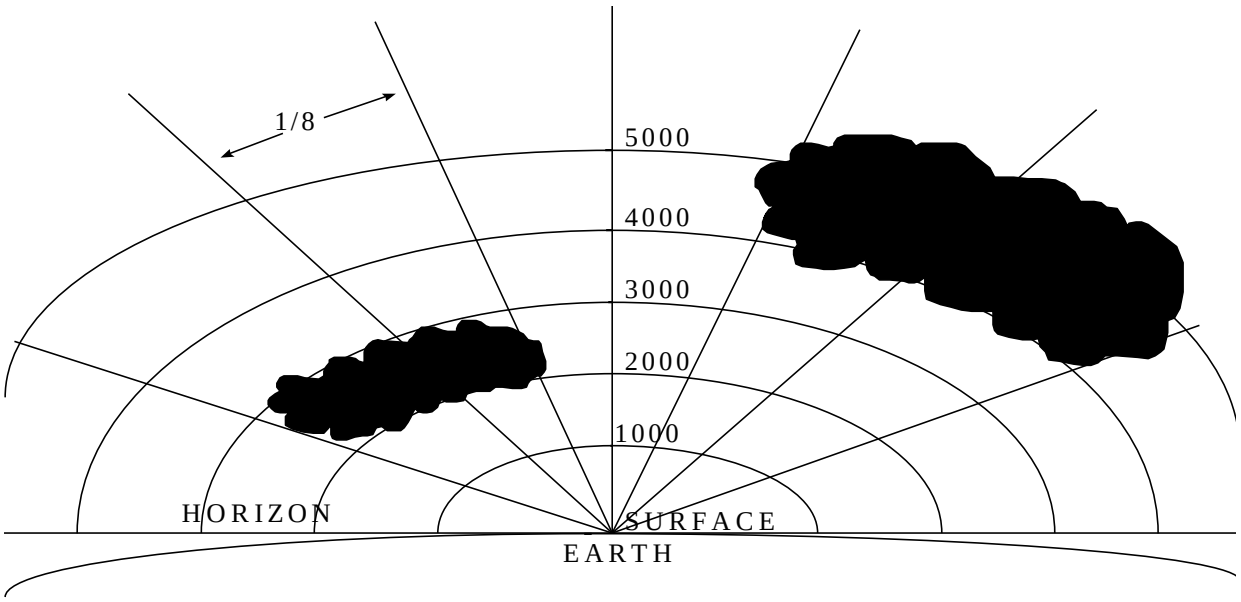

Figure 2-1. Few sky cover at 2,000 feet (2/8) and scattered sky cover at 4,000 feet (4/8). The summation of sky cover would be coded as FEW020 SCT040.

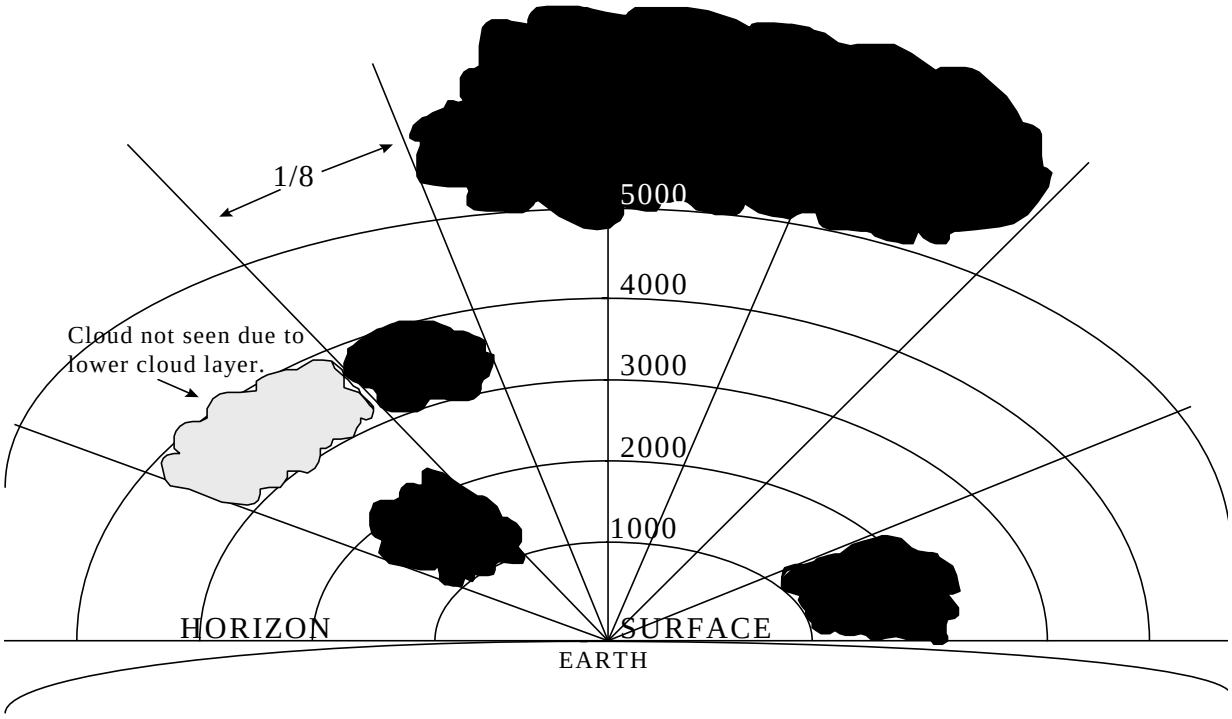

Figure 2-2. The sky cover consists of few clouds at 1,000 feet (2/8), scattered clouds at 3,000 feet (3/8), and broken clouds at 5,000 feet (6/8). This is coded as FEW010 SCT030 BKN050.

TYPE (AS REQUIRED)

If towering cumulus clouds, **TCU**, or cumulonimbus clouds, **CB**, are present, they are reported after the height that represents their base.

Example:
BKN025CB or SCT040TCU

Figure 2-3. Towering Cumulus (TCU). The significance of this cloud is that it indicates the atmosphere in the lower altitudes is unstable and conducive to turbulence. (Photo courtesy of National Severe Storms Laboratory/University of Oklahoma.)

Figure 2-4. Cumulonimbus (CB). The anvil portion of a CB is composed of ice crystals. The CB or thunderstorm cloud contains most types of aviation weather hazards, particularly turbulence, icing, hail, and low-level wind shear (LLWS). (Photo courtesy of Doug Streu.)

INDEFINITE CEILING/HEIGHTS (VERTICAL VISIBILITY)

The height into an indefinite ceiling is preceded with VV followed by three digits indicating the vertical visibility in hundreds of feet above ground level. The layer is spoken as “indefinite ceiling” and indicates total obscuration.

Example:
VV002

Partial Obscurations

The amount of obscuration is reported in the body of the METAR when the sky is partially obscured by a surface-based phenomenon by indicating the amount of obscuration as **FEW**, **SCT**, or **BKN** followed with three zeros **(000)**. The type of obscuring phenomenon is stated in the Remarks element and precedes the amount of obscuration and three zeros. For example, if fog is hiding >1/8 to 2/8 of the sky, it will be coded in the body of the METAR as “FEW000.” Because the fog is partially obscuring the sky, a remark is required. (See Figure 2-5.)

Example of Remark:
FG FEW000.

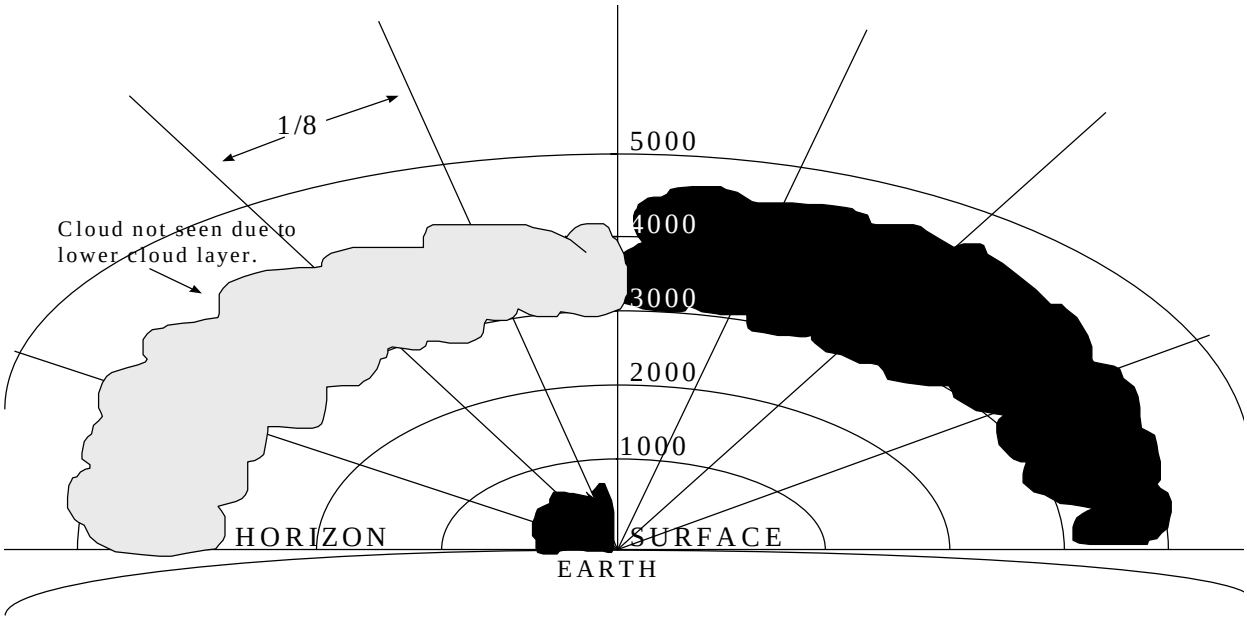

Figure 2-5. The sky cover consists of surface-based obscuration and an overcast layer at 3,000 feet. This is coded as SCT000 OVC030 with FG SCT000 in remarks.

The sky cover and ceiling, as determined from the ground, represent as nearly as possible what the pilot should experience in flight. In other words, a pilot flying at or above a reported ceiling layer (BKN-OVC) should see less than half the surface below. A pilot descending through a surface-based total obscuration should first see the ground directly below from the height reported as vertical visibility into the obscuration. However, due to the differing viewing points of the pilot and the observer, the observed values and what the pilot sees do not always exactly agree. Figure 2-6 illustrates the effect of an obscured sky on the vision from a descending aircraft.

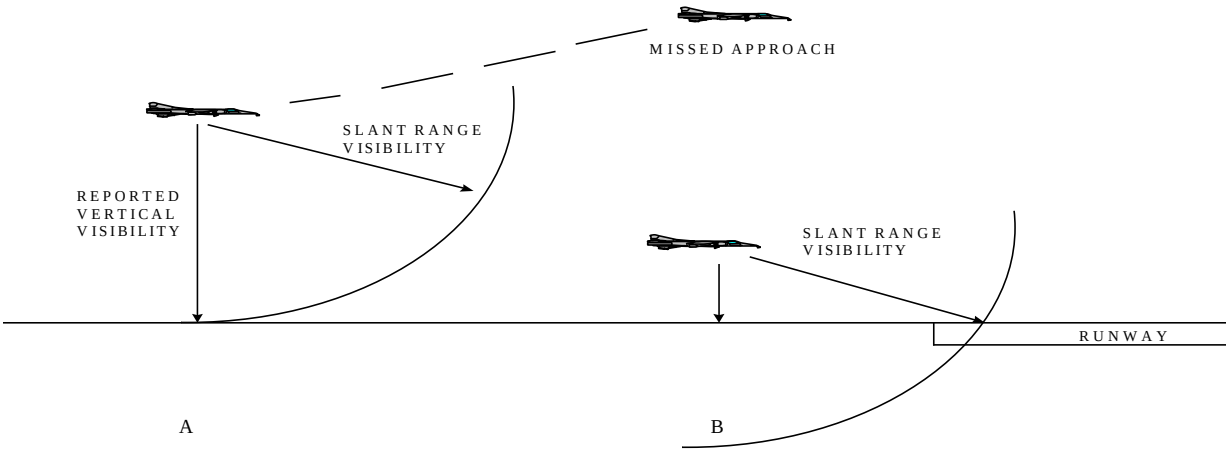

Figure 2-6. The obscuration limits runway acquisition due to slant range effects (A). This pilot would be able to see the ground but not the runway. The pilot will not be able to see the runway until position B, which is at a much lower altitude. If position A represented approach minimums, the approach could not be continued and a missed approach must be executed.

ADDITIONAL SKY CONDITION REMARKS

Whenever the ceiling is below 3,000 feet and is variable, the remark **CIG** will be shown in the Remarks element followed with the lowest and highest ceiling heights separated with a **V**.

Example:
CIG 005V010

When an automated station uses meteorological discontinuity sensors, site-specific sky conditions that differ from the ceiling height in the body of the report will be shown in the Remarks element.

Example:
CIG 002 RWY 11

When a layer is varying in sky cover, the variability range will be shown in the Remarks element. If there is more than one cloud layer of the same coverage, the variable layer will be identified by including the layer height.

Example:
BKN014 V OVC

When significant clouds are observed, they are shown in the Remarks element. The following cloud types are shown:

Towering cumulus, **TCU**, and direction from the station.

Example:
TCU W

Cumulonimbus, **CB**; or cumulonimbus mammatus, **CBMAM;** direction from the station; and direction of movement (if known). If the clouds are beyond 10 miles from the airport, **DSNT** will indicate that they are distant. (See Figure 2-7.)

Examples:
CB DSNT E or CBMAM E MOV NE
(For TCU and CB see Figures 2-3 and 2-4.)

Figure 2-7. Cumulonimbus Mammatus (CBMAM). This characteristic cloud can result from violent up- and downdrafts. This cloud type indicates possible severe or greater turbulence.
(Photo courtesy of Grant Goodge taken at Asheville, NC on 4/15/87.)

Altocumulus castellanus, **ACC**; standing lenticular (stratocumulus, **SCSL**; altocumulus, **ACSL**; or cirrocumulus, **CCSL**); or rotor clouds, **ROTOR CLD,** will show a remark describing the clouds (if needed) and the direction from the station.

Examples:
ACC NW or ACSL SW
(Figure 2-8 for ACC; see Figure 2-9 for standing lenticular clouds.)

Figure 2-8. Altocumulus Castellanus (ACC). ACC indicates unstable conditions aloft, but not necessarily below the base of the cloud. (Photo courtesy of National Severe Storms Laboratory/University of Oklahoma.)

Figure 2-9. Standing Lenticular Altocumulus (ACSL). These clouds are characteristic of the standing or mountain wave. Similar clouds are rotor clouds and standing lenticular cirrocumulus (CCSL). The rotor clouds are usually at a lower altitude than the ACSL. CCSL are whiter and at a higher altitude. All three cloud types are indicative of possible severe or greater turbulence. (Photo courtesy of Grant Goodge taken at Concord, CA in 1970.)

TEMPERATURE/DEW POINT GROUP

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 **10/10** A2990 RMK AO2

Temperature/dew point are reported in a two-digit form in whole degrees Celsius separated by a solidus (**/**). Temperatures below zero are prefixed with **M**. If the temperature is available but the dew point is missing, the temperature is shown followed by a solidus. If the temperature is missing, the group is omitted from the report.

ALTIMETER

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 **A2990** RMK AO2

The altimeter element follows the temperature/dew point group and is the last element in the body of a METAR or SPECI report. It is reported in a four-digit format representing tens, units, tenths, and hundredths of inches of mercury prefixed with **A**. The decimal point is not reported or stated.

ALTIMETER REMARKS

When the pressure is rising or falling rapidly at the time of observation, Remarks element will show **PRESRR** or **PRESFR** respectively.

Some stations also include the sea-level pressure (which is different from altimeter). It is shown in the Remarks element as **SLP** being the remark identifier followed by the sea-level pressure in hectopascals (h/Pa), a unit of measurement equivalent to millibar (mb).

Example:
SLP982

REMARKS (RMK) (AS REQUIRED)

METAR KLAX 140651Z AUTO 00000KT 1SM R35L/4500V6000FT -RA BR BKN030 10/10 A2990
RMK AO2

Remarks will be included in all observations, when appropriate, in the order as presented in Table 2-6. The contraction **RMK** follows the altimeter in the body and precedes the actual remarks. Time entries will be shown as minutes past the hour if the time reported occurs during the same hour the observation is taken. If the hour is different, hours and minutes will be shown. Location of phenomena within 5 statute miles of the point of observation will be reported as at the station. Phenomena between 5 and 10 statute miles will be reported as in the vicinity, **VC**. Phenomena beyond 10 statute miles will be shown as distant, **DSNT**. Direction of phenomena will be indicated with the eight points of the compass (i.e., N, NE, E, SE, S, SW, W, NW). Distance remarks are in statute miles except for automated lightning remarks that are in nautical miles. Movement of clouds or weather will be indicated by the direction toward which the phenomenon is moving.

There are two categories of remarks: automated, manual, and plain language; and additive and automated maintenance data.

AUTOMATED, MANUAL, AND PLAIN LANGUAGE REMARKS CATEGORY

This group of remarks may be generated from either manual or automated weather reporting stations and generally elaborate on parameters reported in the body of the report. (See Table 2-6.)

Table 2-6 Automated, Manual, and Plain Language Remarks

Remarks	Examples of Remarks
1. Volcanic Eruptions	MT. AUGUSTINE VOLCANO 70 MILES SW ERUPTED 231505 LARGE ASH CLOUD EXTENDING TO APRX 30000 FEET MOVING NE
2. Tornado, Funnel Cloud, or Waterspout	TORNADO B13 6 NE
3. Automated Station Type	AO1 or AO2
4. Peak Wind	PK WND 28045/15
5. Windshift	WSHFT 30 FROPA
6. Tower Visibility or Surface Visibility	TWR VIS 1 ½ or SFC VIS 1 ½
7. Variable Prevailing Visibility	VIS 1/2V2
8. Sector Visibility	VIS NE 2 ½
9. Visibility at Second Site	VIS 2 ½ RWY 11
10. Lightning	OCNL LTGICCG OHD or FRQ LTGICCCCG W
11. Beginning and Ending of Precipitation	RAB05E30SNB20E55
12. Beginning and Ending of Thunderstorm	TSB05E30
13. Thunderstorm Locations	TS SE MOV NE
14. Hailstone Size	GR 1 ¾
15. Virga	VIRGA NE (See Figure 2-10.)
16. Variable Ceiling Height	CIG 005V010
17. Obscurations	FU BKN000
18. Variable Sky Condition	BKN014 V OVC
19. Significant Cloud Types	CB W MOV E or CBMAM S MOV E or TCU W or ACC NW or ACSL SW-W
20. Ceiling Height at Second Location	CIG 002 RWY 11
21. Pressure Rising or Falling Rapidly	PRESRR or PRESFR
22. Sea-Level Pressure	SLP982
23. Aircraft Mishap	(ACFT MSHP)
24. No SPECI Report Taken	NOSPECI
25. Snow Increasing Rapidly	SNINCR 2/10
26. Other Significant Information	Any other information that will impact aviation operations

FIGURE 2-10. Virga. Virga is precipitation falling from a cloud but evaporating before reaching the ground. Virga results when air below the cloud is very dry and is common in the western part of the country. Virga associated with showers suggests strong downdrafts with possible moderate or greater turbulence. (Photo courtesy of Grant Goodge.)

ADDITIVE AND AUTOMATED MAINTENANCE DATA REMARKS CATEGORY

Additive data groups are reported only at designated stations. The maintenance data groups are reported only from automated weather reporting stations. The additive data and maintenance groups are not used by the aviation community

EXAMPLES OF METAR REPORTS AND EXPLANATIONS:

METAR KMKL 021250Z 33018KT 290V360 1/2SM R31/2600FT SN BLSN FG VV008 00/M03 A2991 RMK RAESNB42 SLPNO T00111032

METAR	aviation routine weather report
KMKL	Jackson, TN
021250Z	date 02, time 1250 UTC
33018KT	wind 330 at 18 knots
290V360	wind direction variable between 290 and 360 degrees
1/2SM	visibility one-half statute mile
R31/2600FT	runway 31, RVR 2600
SN	moderate snow
BLSN FG	blowing snow and fog
VV008	indefinite ceiling 800
00/M03	temperature 0°C, dew point -3°C
A2991	altimeter 2991
RMK	remarks
RAESNB42	rain ended at four two, snow began at four two
SLPNO	sea-level pressure not available
T00111032	temperature 1.1°C, dew point -3.2°C

The following is an example of the phraseology used to relay this report to a pilot. Optional phrases or words are shown in parentheses.

"Jackson (Tennessee), (one two five zero observation), wind three three zero at one eight, wind variable between two niner zero and three six zero, visibility one-half, runway three one RVR, two thousand six hundred, heavy snow, blowing snow, fog, indefinite ceiling eight hundred, temperature zero, dew point minus three, altimeter two niner niner one."

METAR KSFO 031453Z VRB02KT 7SM MIFG SKC 15/14 A3012 RMK SLP993 6//// T01500139 56012

METAR	aviation routine weather report
KSFO	San Francisco, CA
031453Z	date 03, time 1453 UTC
VRB02KT	wind variable at 2 knots
7SM	visibility 7 statute miles
MIFG	shallow fog
SKC	clear
15/14	temperature 15°C, dew point 14°C
A3012	altimeter 3012
RMK	remarks
SLP993	sea-level pressure 999.3 hectopascals
6////	an indeterminable amount of precipitation has occurred over the last 3 hours
T01500139	temperature 15.0°C, dew point 13.9°C
56012	atmospheric pressure lower since previous 3 hours ago

The following is an example of the phraseology used to relay this report to a pilot. Optional phrases or words are shown in parentheses.

"San Francisco (one four five three observation), wind variable at two, visibility seven, shallow fog, clear, temperature one five, dew point one four, altimeter three zero one two."

SPECI KCVG 312228Z 28024G36KT 3/4SM +TSRA SQ BKN008 OVC020CB 28/23 A3000 RMK TSB24 TS OHD MOV E

SPECI	aviation selected special weather report
KCVG	Covington, KY
312228Z	date 31, time 2228 UTC
28024G36KT	wind 280 at 24, gusts 36 knots
3/4SM	visibility three-quarters statute mile
+TSRA SQ	thunderstorm with heavy rain and squalls
BKN008 OVC020CB	ceiling 800 broken, 2,000 overcast, cumulonimbus
28/23	temperature 28°C, dew point 23°C
A3000	altimeter 3000
RMK	remarks
TSB24	thunderstorm began at two four
TS OHD MOV E	thunderstorm overhead moving east

The following is an example of the phraseology used to relay this report to a pilot. Optional phrases or words are shown in parentheses.

"Covington (Kentucky), special report, two eight observation, wind two eight zero at two four, gusts three six, visibility three-quarters, thunderstorm, heavy rain, squall, ceiling eight hundred broken, two thousand overcast, cumulonimbus, temperature two eight, dew point two three, altimeter three zero zero zero, thunderstorm began two four, thunderstorm overhead, moving east."
More examples without phraseology:

METAR KLAX 140651Z AUTO 00000KT 10SM -RA SCT080 12/05 A2990 RMK AO2

METAR	aviation routine weather report
KLAX	Los Angeles, CA
140651Z	date 14, time 0651 UTC
AUTO	automated site
00000KT	calm winds
10SM	visibility 10 statute miles
-RA	light rain
SCT080	8,000 scattered
12/05	temperature 12°C, dew point 5°C
A2990	altimeter 2990
RMK	remarks
AO2	automated observation with precipitation discriminator

SPECI KDEN 241310Z 09014G35KT 1/4SM +SN FG VV002 01/01 A2975 RMK AO2 TWR VIS ½ RAE08SNB08

SPECI	aviation selected special weather report
KDEN	Denver, CO
241310Z	date 24, time 1310 UTC
09014G35KT	wind 090 at 14, gusts to 35 knots
1/4SM	visibility one-quarter statute mile
+SN FG	heavy snow and fog
VV002	indefinite ceiling 200
01/01	temperature 1°C, dew point 1°C
A2975	altimeter 2975
RMK	remarks
AO2	automated observation with precipitation discriminator
TWR VIS 1/2	tower visibility one-half
RAE08SNB08	rain ended and snow began at 08 minutes after the hour

METAR KSPS 301656Z 06014KT 020V090 3SM -TSRA FEW040 BKN060CB 12/ A2982 RMK OCNL LTGICCG NE TSB17 TS E MOV NE PRESRR SLP093

METAR	aviation routine weather report
KSPS	Wichita Falls, TX
301656Z	date 30, time 1656 UTC
06014KT 020V090	wind 060 at 14 knots varying between 020 and 090 degrees
3SM	visibility 3 statute miles
-TSRA	thunderstorm with light rain
FEW040 BKN060CB	few clouds at 4,000, ceiling 6,000 broken, cumulonimbus
12/	temperature 12°C (dew point is missing)
A2982	altimeter 2982
RMK	remarks
OCNL LTGICCG NE	occasional lightning in cloud, cloud-to-ground northeast
TSB17	thunderstorm began 17
TS E MOV NE	**t**hunderstorm east moving northeast
PRESRR	pressure rising rapidly
SLP093	sea-level pressure 1009.3 hectopascals

SPECI KBOS 051237Z VRB02KT 3/4SM R15R/4000FT BR OVC004 05/05 A2998 RMK AO2 CIG 002V006

SPECI	aviation selected special weather report
KBOS	Boston, MA
051237Z	date 5, time 1237 UTC
VRB02KT	variable wind at 2 knots
3/4SM	visibility three-quarters statute mile
R15R/4000FT	runway visual range on runway 15R 4,000 feet
BR	mist
OVC004	ceiling 400 overcast
05/05	temperature 5°C, dew point 5°C
A2998	altimeter 2998
RMK	remarks
AO2	automated observation with precipitation discriminator
CIG 002V006	ceiling variable 200 to 600