



UNITED VIRTUAL AIRLINES TRAINING DEPARTMENT

PILOT'S GUIDE

METARs and TAFs

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METARs AND TAFs

1.- INTRODUCTION

Coded meteorological information is provided for thousands of airports worldwide. The international codes used ensure that all the important meteorological elements are provided in a logical and easily understandable form, even if local/regional variations do exist.

The meteorological observation (meteo bulletin) is known as **METAR (METeorological Aviation Report)**, while the forecast is known as **TAF (Terminal Aerodrome Forecast)**.

The METAR coding was introduced in 1968 and has been modified several times since.

METARs are issued hourly or semi-hourly, but a new METAR may be issued at any time if weather conditions change. Usually, a METAR issued outside the scheduled time interval is labelled a SPECI (Special report).

2.- METAR

The METAR must include:

- Station identifier (4 letter ICAO code) / METAR or SPECI
- Time of issuance in 4 digits, Zulu time
- Report modifier (AUTO if fully automated or COR, if corrected from a previous issuance)
- Wind direction (degrees true) and velocity (kts, km/h, meters per second)
- Surface visibility (statute miles, meters or kilometers); RVR if necessary
- Present weather
- Sky condition (cloud coverage and cloud base height; type of cloud required only for Cb and TCU; or vertical visibility if sky is obscured)
- Temperature and Dew Point (degrees Celsius)
- Air pressure ("reduced" to sea level; inHg, hPa, mb, mmHg)

It may include several coded and non-coded remarks and the "trend-forecast".

Dominant **wind direction** is given in degrees true and is the direction from which the wind blows, in tens of degrees (3 digits). Average **wind velocity** is given in knots (suffix "KT") or kilometers per hour (suffix "KMH") or meters per second (suffix "MPS"), usually in 2 digits, but may be 3 digits if above 100. To obtain velocity in knots from a velocity stated in km/h, roughly divide by 2 and roughly double the value if given in mps. A gusting wind will be reported as "xxGyy" where "xx" is the minimum average velocity and "yy" is the maximum gust velocity. A calm wind will be reported as "00000". A light wind, usually below 3 knots, is reported as "VRB02", even if sometimes wind velocities of just 1 knot are reported along the average direction. If the wind direction is variable 60 degrees or more, the two delimitations will be reported as "abcVxyz" after the average wind.

Examples:

VRB02KT = wind variable, 2 knots

33012MPS = wind from 330 degrees, 12 meters per second (roughly 24 knots)

26007KMH = wind from 260 degrees, 7 kilometers per hour (roughly 4 knots)

04012G25KT = wind from 040 degrees, 12 gusting 25 knots

02006KT 330V060 = wind from 020 degrees, 6 knots, variable between 330 and 060 degrees

Surface prevailing visibility is reported in statute miles (whole or fractional, suffix "SM"), meters (no suffix) or whole kilometers (suffix "KM"). The minimum visibility should be reported first. Visibility of less than the measurable value are reported either as zero ("0SM" or "0000") or less than a threshold ("M1/4SM" or "M0050"). In international METARs, if visibility is not the same in all sectors, it may be reported in two values, the lowest first, each followed by the direction over which the visibility is observed, in 8 compass points ("0500NE 5000S"). In automated stations outside North America, when no sector visibility capability is available, "NDV" is appended after the visibility value (i.e. "9999NDV"). Visibility in statute miles may be

reported up to 7SM, 10SM or higher; in meters, any visibility greater than 10 km, is reported as "9999". Usually, visibility greater than 4SM or 5000 meters are reported in whole values ("5SM", "7000"). Low visibility values in statute miles are expressed in fractions (quarters, eighths and sixteenths, depending of the station sensor), down to 1/16SM, while in meters, steps of 50 m may be reported when under 500 m ("0250"). A variable visibility may be reported in the remarks section of the METAR.

Examples:

1 1/4SM = visibility 1 and ¼ statute miles
3/8SM = visibility 3/8 statute miles
4SM = visibility 4 statute miles
10SM = visibility 10 statute miles or greater
1500 = visibility 1500 meters
0100 = visibility 100 meters
9999 = visibility more than 10 km
4000 = visibility 4000 meters
25KM = visibility 25 km

Runway Visual range (RVR) is reported if visibility falls below a threshold value (usually 1SM or 1500 or 2000 meters). Average (usually, for the 10 minutes preceding the METAR issuance time) RVR is reported in feet (suffix "FT") or meters (no suffix). Format for reporting RVR is "Rxxx/yyyy" where "R" stands for RVR, "xxx" is the runway (3 digits for parallel runways only), "yyyy" is the RVR value (always 4 digits). When RVR is below the measurable value an "M" will precede the RVR digits ("M0600"); when it's above the measurable range, a "P" will precede the RVR digits ("P6000"). CATIII certified runway will have RVR sensors capable of very low values (if in meters, down to 50 meters). Very low RVR values in meters are reported in 25 or 50 increments (in the US/Canada, 100 ft increments up to 1000 ft, 200 ft from 1000 to 3000 ft, 500 ft from 3000 to 6000 ft). A variable RVR will have a "V" between the extremes ("0200V0450"). A "trend" indication, if available, may be added after the RVR ("N"= no change; "U"=increasing; "D"=decreasing). North American METARs include RVR for one runway only, while international METARs may include several runways.

Examples:

R35L/2400FT = RVR Runway 35L, 2400 feet
R06/0700V1200FT = RVR Runway 06, variable between 700 and 2400 feet
R12/2600FT/U = RVR Runway 12, 2600 feet, increasing
R22L/M0600FT = RVR Runway 22L, less than 600 feet
R19C/P6000FT = RVR Runway 19C, more than 6000 feet
R34L/1200N = RVR Runway 34L, 1200 meters, no change
R36/0125 = RVR Runway 36. 125 meters
R15R/M0050 = RVR Runway 15R, less than 50 meters
R18/P1500 = RVR Runway 18, more than 1500 meters
R24/1000VP1500 = RVR Runway 24, variable between 1000 and more than 1500 meters

Present weather is the observed actual weather and is reported using a coded format.

Several weather elements may be included in the same report (i.e.: "SN FG", for snow and fog, or "DZ BR" for drizzle and mist). Precipitation associated with thunderstorms should always be reported as "TSxx", where "xx" is the code for the associated precipitation (i.e.: "TSRA" for thunderstorm with rain, "TSSN" for thunderstorm with snow).

Intensity of precipitation may be included for "light" (a "-" preceding the code) or "heavy" (a "+" preceding the code): "-SN" for light snow or "+RA" for heavy rain. No intensity modifier will mean "moderate" intensity. In mixed codes, the modifier applies to the first element only (i.e.: "+TSRA" is heavy thunderstorm with rain).

Freezing (supercooled) conditions are reported with the prefix "FZ" before the code: "FZBR" for freezing mist, "FZFG" for freezing fog, "FZDZ" for freezing drizzle and "FZRA" for freezing rain. Precipitation or thunderstorm or fog not occurring at the station, but within 5NM or 8 km, is reported with the prefix "VC": "VCTS" for thunderstorm in the vicinity or "VCFG" for fog in the vicinity.

Low drifting snow/sand or dust (raised by the wind not above about 6 feet from the ground) is reported as "DRSN", "DRSA" or "DRDU", while blowing snow/sand or dust is reported as "BLSN", "BLSA", "BLDU".

Code	Weather	Remarks
Obscuration		
BR	Mist	<i>visibility is less than 7SM or 5000 m but more than 5/8SM/1000 m</i>
FG	Fog	<i>visibility is less than 5/8SM / 1000 m</i>
MIFG	Shallow Fog	<i>Low lying fog, also in patches; prevailing vis may be >7SM, up to 6 ft in depth</i>
BCFG	Fog Patches	<i>Prevailing vis may be >7SM</i>
PRFG	Partial Fog	<i>fog extending not in all directions around the station and of little vertical extent (not above 20 ft)</i>
FU	Smoke	
HZ	Haze	
VA	Volcanic Ash	
SA	Sand	
DU	Widespread Dust	
PY	Spray	<i>Shall be coded only as BLPY; carried by air from water bodies</i>
Precipitation		
DZ	Drizzle	<i>May be mixed with snow grains (DZSG) or rain (DZRA); diameter of droplets less than 0.02 in (0.5 mm), very close together</i>
RA	Rain	<i>May be mixed with snow (RASN) or drizzle (RADZ); droplets widely separated (may be less than 0.02 in diameter)</i>
PL	Ice Pellets	<i>Hard grain of ice or snow grains encased in ice</i>
SG	Snow Grains	<i>May be mixed with drizzle (SGDZ)</i>
SN	Snow	<i>May be mixed with rain (SNRA)</i>
GS	Small Hail	<i>Or snow pellets, diameter less than 0.2 in (5 mm)</i>
GR	Hail	
IC	Ice Crystals	<i>Also known as Diamond Dust, unbranched ice crystals</i>
SH	Shower	<i>May be also reported as SHRA or SHSN</i>
UP	Unknown precip	<i>In automated station</i>
Other		
TS	Thunderstorm	<i>May be associated with precipitation</i>
SS	Sandstorm	
DU	Dust-storm	
FC	Funnel Cloud	<i>Funnel cloud (not touching the ground) or waterspout; Tornadoes (touching the ground) are always coded as +FC</i>
PO	Sand/dust whirls	
SQ	Squall	<i>Strong wind of sudden onset, with wind speed increase of at least 16 kts and sustained at 22 kts or more for at least 1 minute</i>

Examples:

FG = fog

SN = snow

-RASN = light rain and snow (rain prevailing over snow)

+SGDZ = heavy snow grains and drizzle (snow grains prevailing over drizzle)

TSRA = thunderstorm with rain

TSRAGS = thunderstorm with rain and small hail

VCSH = showers in the vicinity

Intensity of rain may be based on rain-rate: light from zero to 0.10 in/hr (0 to 2.5 mm/hr), moderate from 0.11 to 0.30 in/hr (2.7 to 7.6 mm/hr), heavy more than 0.31 in/hr (7.7 mm/hr). It may also be based on visual effects (such as visibility of individual drops) or

changes in visibility. Snow and drizzle intensity is based on the effects on visibility: light if visibility is above about ½ SM (800 m), moderate if between ¼ and ½ SM (400 to 800 m), heavy if below about ¼ SM (400 m).

Sky condition is reported as cloud cover and height (vertical distance from the station) of the cloud base. Cloud type – “genus”- (which follows the amount/height) is reported only for cumulonimbus (“CB”) or towering cumulus (“TCU”). If the sky is clear (no clouds) or no clouds are detected below a certain height (usually 12000 ft), the sky condition format may show either “SKC” (sky clear) or “CLR” (no clouds below 12000 ft) or “NSC” (no significant cloud). The code SKC is gradually being replaced by NSC, especially in international METAR. The group “CAVOK” (Ceiling And Visibility OK) replaces visibility/RVR and sky conditions in international METARS when visibility is 10 km or more, no precipitation or obscuration occurs and no significant clouds are present below a certain height (usually 5000 ft or below the highest MSA).

Cloud base height (above the station) is coded in hundreds of feet in 3 digits: “001” means 100 ft, “010” means 1000 ft, “100” means 10000 ft. Usually, height is rounded to the nearest 100 ft up to 5000 ft, to the nearest 500 ft between 500 and 10000 ft and to the nearest 1000 ft above 10000 ft. Maximum measurable height may be 12000 ft or around 25000 ft or 30000 ft, depending on station sensors capability. Minimum height is 100 ft, with any base below that reported as “000”. Pilots must remind that cloud base is a “height”: for example, if ceiling is 500 ft over an airport whose elevation is 1000 ft, they may expect to break from clouds at an altitude around 1500 ft as indicated by their altimeter.

If cloud base and/or vertical visibility is not measurable, “///” will follow the cloud amount or VV group (i.e. “SCT///” or “VV///”).

Amount of sky cover is reported according to the following table:

Reported amount	Meaning	Oktas
SKC or CLR	<i>Sky clear or clear</i>	0/8 or no significant amount
FEW	<i>Few</i>	1 or less but not zero or 2/8
SCT	<i>Scattered</i>	3 or 4 /8
BKN	<i>Broken</i>	5 to 7/8 or more but not 8/8
OVC	<i>Overcast</i>	8/8
VV	<i>Vertical Visibility</i>	Sky obscured

Usually, layers are reported in increasing amounts (i.e.: first FEW, then SCT, then BKN, then OVC), but any amount of CB and/or TCU may be reported in any sequence.

Usual maximum amount of reported layers is four.

Examples:

SCT003 BKN012 = scattered at 300 ft, broken at 1200 ft

FEW210 = few at 21000 ft

SCT010 FEW020CB BKN050 = scattered at 1000 ft, few cumulonimbus at 2000 ft, broken at 5000 ft

VV003 = sky obscured, vertical visibility is 300 ft

Temperature and dew point are reported in whole degrees Celsius, separated by a slash. A negative temperature value is preceded by “M”.

Examples:

21/19 = temperature 21 °C, dewpoint 19 °C

M00/M03 = temperature minus 0 °C (less than zero but not -1), dewpoint -3 °C

12/M06 = temperature 12 °C, dewpoint -6 °C

Pressure (“reduced” to sea-level) is reported in whole millibars/hectoPascals, preceded by “Q” (which stands for QNH), in inches of mercury (2 decimal digits), preceded by “A” (which stands for “altimeter setting”) or millimeters of mercury (very rare).

Examples:

Q1016 = pressure 1016 hPa/mb

A2968 = pressure 29.68 inHg

In the **remarks section**, which may or may not be preceded by "RMK", several items may be appended, some coded and some in plain (or abridged) language.

Remarks may be:

- *Trend forecast* (only for some stations): the weather trend for the next hour or half-hour (if semi-hourly bulletins are issued); if no significant changes are expected, "NOSIG" will be coded
- *Type of automated station* (only in North American METARs): AO1 if the station is not equipped with a precipitation discriminator, AO2 if it is so equipped
- *Recent weather*: preceded by "RE", the recent (since the last METAR) significant weather is reported (i.e.: "RERA" for recent rain)
- *SNOWTAM* (only for some international destination): runway conditions if necessary (see below for coding)
- *Potential meteorological hazards information*: usually in abridged plain language. Typical info is regarding windshear (i.e.: "WS ALL RWYS" for windshear alert on all runways), or CB/TCU location ("DSTN CB SE" for distant CB to the south-east), or ice/turbulence ("SEV ICE BLW 6000FT" for severe ice below 6000 ft or "MOD TURB BELOW FL120" for moderate turbulence below FL120)
- *Additional meteorological information* (in some countries only): may be type of cloud and amount in oktas (i.e.: "SC6" for 6 oktas of stratocumulus), sea-level pressure in hectopascals (i.e.: "SLP282" for a sea level pressure of 1028.2 hPa), QFE setting in mmHg (i.e. "QFE732" for a QFE setting of 732 mmHg) or similar
- *Additional meteorological information of operational significance* (items may vary in each country):

- Peak wind and/or windshift: coded as "PK_WND_dddff/mm" where "ddd" is direction, "ff" is velocity, "mm" the time at which peak wind was recorded (in minutes since the last METAR); "WSHFT_mm", where "mm" is the time in minutes when the windshift was recorded.

Examples:

PK WND 33027/24 = peakwind was 330 deg, 27 kts, recorded at 24 min past the hour

WSHFT 11 = windshift occurred at 11 minutes past the hour

- Tower or surface or variable visibility: coded as "TWR_VIS_vvvv" or "SFC_VIS_vvvv" or "VISvvvvVvvvv", if necessary. Sector visibility may be reported here in North American bulletins. In international METARs, variable visibility may be reported as "VIS FLUCT" for visibility fluctuating.

Examples:

TWR VIS 1 = tower visibility is 1SM

SFC VIS 1/4 = surface visibility is 1/4SM

VIS 1/2V2 = visibility is variable between ½ and 2 SM

VIS NE 1 ¼ = visibility in the northeast sector is 1 ¼ SM

- Lightning: usually reported only in US bulletins, coded as "Frequency_LTG (type)_location". Frequency is "OCNL" (occasional, less than 1 flash/min), "FRQ" (frequent, up to 6 flashes/min), "CONT" (continuous, more than 6 flashes/min). Type of lightning is "CG" (cloud-ground), "IC" (in cloud, within the cloud), "CC" (cloud-cloud, between clouds), "CA" (cloud-air, not reaching the ground). If lightning occurs over 10NM from the station it will be reported as "DSNT".

Examples:

OCNL LTGIC OVH = occasional lightning in clouds overhead the station

CONT LTGCGCC NE = continuous lightning cloud-ground and cloud-cloud northeast

LTG DSNT = lightning distant

- Beginning and ending of precipitation/thunderstorm: time of beginning ("B") or ending ("E") of precipitation or thunderstorm is reported

Examples:

RAB06 = rain began at 06 minutes past the hour

TSE36 = thunderstorm ended at 36 minutes past the hour

TSB04GRB16E21RAB21E28 = thunderstorm began at 04 minutes past the hour, hail started at 16 and ended at 21, rain began at 28 minutes

- Thunderstorm or virga location: location of thunderstorm or virga, if necessary

Examples:

TS S MOV NE = thunderstorm south moving to northeast

VIRGA SW = virga located southwest of the station

- Hailstone size: in US METARs only, hail size in ¼ inch increments preceded by "GR" (i.e.: "GR 1 ¼" for hailstone size of 1 and ¼ inch)
- Variable ceiling height: coded as "CIG_xxxVyyy", if necessary (i.e.: "CIG 005V009" for ceiling variable between 500 and 900 ft)
- Variable sky condition: if necessary, using standard coding (i.e. "SCT010 V BKN" for scattered at 1200 ft, variable to broken at same height or "BKN012 V OVC009" for broken at 1200 ft, variable to overcast at 900 ft)
- Obscuration: if necessary, obscuration (occurring at surface or aloft) may be reported, using standard coding.

Examples:

FG SCT000 = fog is 3 or 4 octas below 100 ft

FU BKN010 = smoke is 5 to 7 octas at 1000 ft

- Significant cloud types: if necessary, significant cloud types (if not already in the body of the report for CB/TCU) along with position and direction of movement, if any. Cloud types may be CB or CB_MAMM (CB mammatus), TCU, ACC (altocumulus castellanus), SL (standing lenticular, typical of mountain waves conditions) or ROTOR (rotor clouds).

Examples:

ACC SE = altocumulus castellanus to the southeast

CCSL N = cirrocumulus standing lenticular to the north

ROTOR E = rotor to the east

ACSL NW = altocumulus standing lenticular to the northwest

- Pressure trend: if pressure is rising rapidly (PRESRR) or falling rapidly (PRESFR)
- Snow increasing rapidly: in selected stations, snow depth on the ground increasing rapidly may be reported as "SNINCR in hr/in gnd", where "in hr" is inches per hour of snow amount and "in gnd" is total snow on the ground in inches (i.e. "SNINCR 1/06" for snow increasing at a rate of 1 inch per hour and total amount is 6 inches)
- Volcanic eruptions: this item is reported in plain language, with name of volcano, latitude/longitude, date and time of eruption, size and location of volcanic clouds and all other pertinent info
- Aircraft mishap: in case the met bulletin is issued after an accident, this must be noted as "ACFT MSHP"

- *Additional information* (items may vary in each country): many additional items may be added.

- Precipitation: in liquid equivalent, "Pxxxx" is hourly precipitation (in hundredths of inches, P0000 if traces); "6xxxx" is the 3 or 6-hour precipitation (in tens, units, tenths and hundredths of inches, 60000 if traces; 6//// if not measurable); "7xxxx" is the 24-hour precipitation in the 1200Z bulletin (in tens, units, tenths and hundredths of inches, 7//// if not measurable); "4sss" is snow depth on the ground in 00, 06, 12 and 18Z bulletins (in whole inches); "933xxx" is water equivalent of snow on the ground (in tens, units and tenths of inches, if snow or frozen precip is more than 2 inches); in several countries, precipitation is reported as "RR" (recent rain) in millimeters

- Cloud types: in some station, according to WMO (not aviation) codes, cloud types, as "8/ccc" where "ccc" are low, middle and high cloud type codes.
- Duration of sunshine: "98mmm", where "mmm" is the total duration of sunshine in minutes, reported in some station at 08Z
- Hourly temperature and dewpoint: "Tsxxxxsxxx", to the tenth of degree Celsius. If below zero, a "1" will precede the figures (i.e.: if temperature is 1.2 °C and dew point is -1.9 °C, in the body of the report this will show as 01/M02, while in the remarks it will show as T0012/10019)
- Temperature extremes: "1sxxx" is the 6-hourly maximum temperature (in tenths of degree Celsius, "s" is "1" if below zero); "2sxxx" is the six-hourly minimum temperature; "4sxxxxsxxx" is the 24-hour maximum and minimum temperature
- 3-hourly Pressure tendency: reported as "5appp" where "a" is the tendency code and "ppp" is the actual change of pressure in tenths of hectopascals, according to a code.
- Sensor status indicator: in US stations, if a sensor is not operating, the following codes will be shown:
RVRNO = RVR is not available, even if it should be reported
PWINO = in automated stations, present weather sensor is inoperative
PNO = in automated stations, precipitation gauge is inoperative
FZRANO = in automated stations, freezing precip sensor is inoperative
TSNO = in automated stations, thunderstorm sensor is inoperative
VISNO_LOC = in automated stations with a second visibility sensor, one (specified location) is inoperative
CHINO_LOC = in automated stations with a second ceiling sensor, one (specified location) is inoperative
- Maintenance indicator: in automated station, "\$" is reported when the diagnostic system detects that maintenance is required
- Other plain language info

SNOWTAM (SNOW noTAM) is reported when necessary in some international destination.

The **format** is as follows:

RRTEDDBB

where:

RR = runway designator
T = type of deposit
E = extent of contamination
DD = depth of deposit
BB = braking conditions

For RR (runway) the following code applies:

25 = runway designator (e.g. Rwy 25 or 25L, see below)
75 = runway designator for R runway- 50 is added to R Rwy designator (e.g. Rwy 25R)
88 = all runways
99 = a previous Rwy report is repeated

NOTE: some airports are now using RRR/ designators (e.g. 25R/ or 16L/, see examples below)

For T (type of deposit) the following code applies:

0 = Clear and Dry
1 = Damp
2 = Wet or Water Patches
3 = Rime or Frost < 1mm (< 0.04 in)
4 = Dry Snow
5 = Wet Snow

6 = Slush
7 = Ice
8 = Compacted or Rolled Snow
9 = Frozen Ruts or Ridges
/ = Not Reported (e.g. due to Rwy clearance in progress)

For E (extent of contamination) the following code applies:

1 = 10% or less of RWY covered
2 = 11% to 25% of RWY covered
5 = 26% to 50% of RWY covered
9 = 51% to 100% of RWY covered
/ = Not Reported (e.g. due to RWY clearance in progress)

For DD (depth of deposit) the following code applies:

00 = Less than 1 mm (< 0.04 in)
01 to 90 = Depth in mm (from 0.04 to 3.5 in)
92 = 100 mm (3.9 in)
93 = 150 mm (5.9 in)
94 = 200 mm (7.9 in)
95 = 250 mm (9.8 in)
96 = 300 mm (11.8 in)
97 = 350 mm (13.8 in)
98 = 400 mm (15.7 in)
99 = RWY not operational due to contamination or clearance in progress
// = Depth not significant (e.g. ice) or not measurable (e.g. wet)

For BB (braking conditions) the following code applies:

01 to 90 = Friction Coefficient (e.g. 34 = 0.34; see below for table)
91 = BA Poor
92 = BA Medium-Poor
93 = BA Medium
94 = BA Medium-Good

These special codes also apply:

///// = Report not updated
CLRD = Contamination has disappeared (e.g. Rwy has been cleared)
SNOCLO = Airport closed due to snow

This **table** applies for friction coefficients ($\mu \times 100$):

Code 91 means BA POOR μ coeff: 0-25
Code 92 means BA MEDIUM/POOR μ coeff: 26-29
Code 93 means BA MEDIUM μ coeff: 30-35
Code 94 means BA MEDIUM/GOOD μ coeff: 36-39
Code 95 means BA GOOD μ coeff: over 40

Examples:

Rovaniemi (Finland) EFRO (Nov 26, 0950Z METAR)
260950 14008KT 110V180 9999 -SG FEW005 BKN008 BKN011 M03/M03 Q0986 21790321
SNOWTAM decoding: Rwy 21, covered with ice, for over 51 %, for a depth of 3 mm, braking coefficient is 0.21 (BA Poor)

Prague (Czech Republic) LKPR (Nov 26, 1000Z METAR)
261000Z 26010KT 9999 BKN046 01/M02 Q1022 R24/19//95 R31/09//95
SNOWTAM decoding: Rwy 24, damp, for over 51 %, depth not measurable, braking action good;
Rwy 31, clear and dry, for over 51 %, depth not measurable, braking action good.

Zurich (Switzerland) LSZH (Nov 26, 0950Z METAR)
260950Z VRB02KT 4000 BR FEW003 M02/M02 Q1026 8819//99
SNOWTAM decoding: all rwys, damp, for over 51%, depth not significant, braking action not measurable

Helsinki Vantaa (Finland) EFHK (Nov 27, 0850Z METAR)
270850Z VRB02KT 9999 -RASN OVC023 01/00 Q0993 0429//95 5429//95
1529//95 TEMPO 6000 BKN012
SNOWTAM decoding: Rwy 04L, wet or water patches, for over 51 %, depth not measurable, braking action good
Rwy 04R: the same as Rwy 04L
Rwy 15: the same as Rwy 04L (in fact they could have put the "88" code)

Torino (Italy) LIMF (Nov 28, 0850Z METAR)
280850Z 26003KT 0800 R36/1500 SN FG BKN004 OVC012 01/00 Q1013 36590294
SNOWTAM decoding: Rwy 36, wet snow, for over 51 %,depth 2 mm, braking action medium-good.

3.- METAR EXAMPLES

Below some examples of real world METARs:

KJAC 290735Z AUTO 36005KT 10SM CLR M19/M20 A3018 RMK AO1
Jackson Hole day 29/0735Z wx: automated report, wind 360 degrees at 5 kts, visibility 10 SM, sky clear below 12000 ft, temperature -19C, dew point -20C, altimeter 30.18 inHg, remarks: automated station not equipped with precip discriminator

KORD 290551Z 36004KT 10SM FEW150 M14/M21 A3051 RMK AO2 SLP346 4/001 T11391211
11122 21139 410831139 56002
Chicago O'Hare day 29/0551Z wx: wind 360 degrees at 4 kts, visibility 10 SM, few clouds at 15000 ft, temperature -14C, dewpoint -21C, altimeter 30.51 inHg, remarks: automated station equipped with precip discriminator, sea-level pressure 1034.6 hPa, snow on the ground 1 inch, temperature -13.9C, dew point -21.1C, maximum 6-hr temp -12.2C, minimum 6-hr temp -13.9C, maximum 24-hr temp -8.3C, minimum 24-hr temp -13.9C, pressure tendency: decreasing then increasing with pressure currently lower than 3 hrs ago, difference 0.2 hPa

KDEN 291553Z 25004KT 1/8SM R35L/0500V0700FT FZFG VV001 M04/M05 A3006 RMK AO2 TWR
VIS 1/4 SLP203 T10391050
Denver International day 29/1553Z wx: wind 250 degrees at 4 kts, visibility 1/8 SM, RVR Rwy 35L variable between 500 and 700 ft, present weather: freezing fog, vertical visibility 100 ft, temperature -4C, dew point -5C, altimeter 30.05 inHg, remarks: automated station equipped with precip discriminator, tower visibility ¼ SM, sea-level pressure 1020.3 hPa, temperature -3.9C, dewpoint -5.0C

PHNL 300053Z 23008KT 10SM FEW018 SCT038TCU BKN075 26/21 A2988 RMK AO2 SLP118 TCU
OMTNS NE-E T02610206
Honolulu day 30/0053Z wx: wind 230 degrees at 8 kts, visibility 10 SM, few clouds at 1800 ft, scattered towering cumulus at 3800 ft, broken clouds at 7500 ft, temperature 26C, dewpoint 21C, remarks: automated station equipped with precip discriminator, sea-level pressure 1011.8 hPa, towering cumulus over mountains NE to E, temperature 26.1C, dewpoint 20.6C

KHEY 300453Z AUTO 10008KT 1 3/4SM +TSRA BR OVC002 13/13 A2978 RMK AO2 TSB12
PRESFR SLP068 P0044 T01330128 \$
Henchey Heliport day 30/0453Z wx: automated report, wind 100 degrees at 8 kts, visibility 1 ¾ SM, present weather heavy thunderstorm with rain, overcast at 200 ft, temperature 13C, dewpoint 13C, altimeter 29.78 inHg, remarks: automated station equipped with precip discriminator, thunderstorm began at 0012Z, pressure falling rapidly, sea-level pressure 1006.8 hPa, precipitation since last report 44/100th of inch, temperature 13.3C, dewpoint 12.8C, maintenance

required. Note: this automated sensor cannot discriminate cloud types and no CBS are reported even if a thunderstorm is the present weather

EDDM 282150Z 25020KT 1200 R26R/0700V1100U R26L/1000VP2000U SHSN VV/// M02/M02 Q1001 RESN NOSIG

Munich day 28/2150Z wx: wind 250 degrees at 20 kts, visibility 1200 m, RVR Rwy 26R variable between 700 and 1100 m, increasing, Rwy 26L variable between 1000 and more than 2000m, increasing, present weather shower of snow, sky obscured, vertical visibility not measurable, temperature -2C, dewpoint -2C, QNH 1001 hPa, recent wx snow, trend forecast no significant change

LIMF 300820Z 29003KT 3500 BR NSC M02/M04 Q0991

Torino day 30/0820Z wx: wind 230 degrees at 3 kts, visibility 3500 m, present weather mist, no significant cloud, temperature -2C, dewpoint -4C, QNH 991 hPa

LFMV 291030Z AUTO 32012KT 9999NDV NSC 07/M01 Q1001

Avignon day 29/1030Z wx: automated report, wind 320 degrees at 12 kts, visibility more than 10 km and no sector visibility capability, no significant cloud, temperature 7C, dewpoint -1C, QNH1001

UUEE 291030Z 13005MPS 1600 -SN SCT015 OVC100 M14/M16 Q1003 TEMPO 1000 SN RMK 07450337 57450337

Moscow Sheremetyevo day 29/1030Z wx: wind 130 degrees at 5 mps, visibility 1600 m, present weather light snow, scattered clouds at 1500 ft, overcast at 10000 ft, temperature -14C, dew point -16C, QNH 1003, trend forecast temporary change to visibility 1000 m, remarks: SNOWTAM Rwy 07L, dry snow, for 26 to 50%, 3 mm depth, friction coefficient 0.37; Rwy 07R, dry snow, for 26 to 50%, 3 mm depth, friction coefficient 0.37,

SAEZ 282000Z 05009KT 340V070 CAVOK 33/15 Q1006

Buenos Aires Ezeiza day 28/2000Z wx: wind 50 degrees at 9 kts, variable between 340 and 70 degrees, CAVOK, temperature 33C, dewpoint 16C, QNH 1006 hPa

MMUN 300348Z 00000KT 7SM FEW015 SCT300 24/21 A2991 RMK 8/508 HZY

Cancun day 30/0348Z wx: wind calm, visibility 7SM or more, few clouds at 1500ft, scattered clouds at 30000 ft, temperature 24C, dewpoint 21C, altimeter 29.91 inHg, remarks: cloud types low level stratocumulus, mid level none, high level cirrostratus, hazy

VIDP 291700Z 00000KT 0800 R28/P2000 R29/P2000 FU NSC 18/13 Q1017 NOSIG

New Delhi International day 29/1700Z wx: wind calm, visibility 800 m, RVR Rwy 28 more than 2000 m, Rwy 29 more than 2000 m, present weather smoke, no significant cloud, temperature 18C, dewpoint 13C, QNH 1017, trend forecast no significant change

YSSY 282230Z 19008KT 9999 FEW020 24/20 Q1008 FM2230 18010KT 9999 SCT015

Sydney Kingsford Smith day 28/2230Z wx: wind 190 degrees at 8 kts, visibility more than 10 km, few clouds at 2000 ft, temperature 24C, dewpoint 20C, QNH 1008 hPa, trend forecast from 2230Z wind 180 degrees at 10 kts, visibility 10 km or more. Scattered clouds at 1500 ft

NFFN 291000Z 15006KT 40KM FEW030 SCT300 26/24 Q1005 NOSIG RMK RR NIL

Nadi day 29/1000Z wx: wind 150 degrees at 6 kts, visibility 40 km, few clouds at 3000 ft, scattered at 30000 ft, temperature 26C, dewpoint 24C, QNH 1005 hPa, trend forecast no significant change, remarks: recent rain nil

NZAA 300700Z 16003KT 9999 SCT040 22/19 Q1012 NOSIG RMK SHRA TO W

Auckland International day 30/0700Z wx: wind 160 degrees at 3 kts, visibility more than 10 km, scattered clouds at 4000 ft, temperature 22C, dewpoint at 19C, QNH 1012 hPa, trend forecast no significant change, remarks: rain shower to W

RPLL 291000Z 07007KT 9999 FEW025 BKN300 28/21 Q1013 NOSIG RMK A2992

Manila International day 29/1000Z wx: wind 070 degrees at 7 kts, visibility more than 10 km, few clouds at 2500 ft, broken clouds at 30000 ft, temperature 28C, dewpoint at 21C, QNH 1013 hPa, trend forecast no significant change, remarks: altimeter 29.92 inHg

4.- TAF

TAFs use most of the METAR codes, plus some additional items typical of “dynamic” conditions (such as “BECMG” and the like).

The TAF must include:

- Station identifier (4 letter ICAO code) / TAF
- Time of issuance in 4 digits, Zulu time
- Report modifier (COR, if corrected from a previous issuance; AMD if amended; RTD if retarded)
- Validity period (usually 12 or 24 hours, international and some US TAFs are transitioning to a 36 hr validity)
- Wind direction (degrees true) and velocity (kts, km/h, meters per second)
- Surface visibility (statute miles, meters or kilometers)
- Forecast weather
- Sky condition (cloud coverage and cloud base height; type of cloud required only for CB and TCU; or vertical visibility if sky is obscured)
- Any significant change in the wind/visibility/weather /sky conditions during the TAF validity, including the forecast time of change and, if needed, probability of change

Some additional items may also be included.

Wind, weather and sky conditions are coded as in METARs. The only new code is “NSW”, “no significant weather”. Weather forecast must have at least a 50 percent probability to happen, if probability is less, it will be preceded by “PROBxx”, where “xx” is the probability percent (20, 30 or 40). Visibility greater than 6SM is coded as “P6SM”.

Changes are reported using the following codes:

FM = from, followed by time

TL = till, followed by time

BECMG = becoming, followed by the time interval in which changes are expected to take place

INTER = intermittently, followed by the time interval in which changes are expected to take place

Additional items may include forecast windshear (i.e.: “WS015/30045KT”, expected windshear at 1500 ft, wind 300 degrees at 45 kts) and forecast maximum and minimum temperatures (i.e. “TNM04/07Z TX01/14Z”, forecast minimum temperature -4 Celsius at 07Z, forecast maximum temperature + 1 Celsius at 14Z). Next forecast issuance time may also be reported (“RMK NXT FCST BY141800Z”, remark: next forecast will be issued by 18Z/day 14).

5.- TAF EXAMPLES

Below some examples of real world TAFs:

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KIAD 021120Z 0212/0318 31003KT P6SM SCT100 OVC200 FM021400 00000KT P6SM OVC100
FM021600 12003KT P6SM SCT035 OVC050 FM021900 12003KT P6SM OVC020 FM022200
11003KT 5SM -SN OVC012 FM030200 00000KT 2SM -SN OVC005 FM031000 00000KT 5SM BR
OVC005 FM031300 31003KT P6SM OVC025
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Washington Dulles TAF issued on day 02 at 1120Z, valid from day 02 at 12Z to day 03 at 18Z (36 hrs): wind 310 degrees at 3 kts, visibility greater than 6SM, scattered at 10000ft, overcast at 20000 ft; from 14Z/day 02 wind calm, visibility greater than 6SM, overcast at 10000 ft; from 16Z/day 02 wind 120 degrees at 3 kts, visibility greater than 6SM, scattered at 3500 ft, overcast at 5000 ft; from 19Z/day 02, wind 120 degrees at 3 kts, visibility greater than 6SM, overcast at 2000 ft; from 22Z/day 02, wind 110 degrees at 3 kts, visibility 2SM, light snow, overcast at 1200 ft; from 02Z/day 03 wind calm, visibility 2SM, light snow, overcast at 500 ft; from 10Z/day 03 wind calm, visibility 5SM, mist,

overcast at 500 ft; from 13Z/day 03 wind 310 degrees at 3 kts, visibility greater than 6SM, overcast at 2500 ft

CYYZ 021438Z 0215/0318 VRB03KT P6SM BKN080 FM021600 22005KT P6SM SCT025 OVC060
TEMPO 0216/0220 5SM -SN BKN025 OVC060 FM022000 18005KT P6SM SCT020 OVC040 TEMPO
0220/0223 3SM -SN OVC020 FM022300 06006KT 5SM -SHSN OVC020 FM030800 32005KT P6SM
-SHSN OVC040 FM031400 27012G22KT P6SM BKN040

Toronto Pearson TAF issued on day 02 at 1438Z, valid from day 02 at 15Z to day 03 at 18Z (27 hrs): wind variable at 3 kts, visibility greater than 6SM, broken at 8000 ft; from 16Z/day 02 wind 220 degrees at 5 kts, visibility greater than 6SM, scattered at 2500 ft, overcast at 6000 ft; temporary change between 16Z and 20Z/day 02 to visibility 5SM, light snow, broken at 2500 ft, overcast at 6000 ft; from 20Z/day 02, wind 180 degrees at 5 kts, visibility greater than 6SM, scattered at 2000 ft, overcast at 4000 ft: temporary change between 20Z and 23Z/day 02 to visibility 3SM, light snow, overcast at 2000 ft; from 23Z/day 02, wind 60 degrees at 6 kts, visibility 5SM, light snow showers, overcast at 2000 ft; from 08z/day 03, wind 320 degrees at 5 kts, visibility greater than 6SM, light snow showers, overcast at 4000 ft; from 14Z/day 03, wind 270 degrees at 12 kts gusting to 22 kts, visibility greater than 6SM, broken at 4000 ft

EDDM 021100Z 0212/0318 24012KT 9999 FEW025 BECMG 0219/0223 25015G25KT 2000 SN
BKN009 TEMPO 0223/0309 26025G35KT TEMPO 0223/0304 0900 +SN +BLSN BKN004 BECMG
0304/0308 4000 SNRA BKN012 PROB30 TEMPO 0308/0318 1200 SN BKN008

Munich TAF issued on day 02 at 1100Z, valid from day 02 at 12Z to day 03 at 18Z (36 hrs): wind 240 degrees at 12 kts, visibility more than 10 km, few at 2500 ft; becoming between 19Z and 23Z/day 02 wind 250 degrees 15 kts gusting to 25 kts, visibility 2000 m, snow, broken at 900 ft; temporary change between 23Z/day 02 and 09Z/day 03 to wind 260 degrees at 25 kts gusting to 35 kts; temporary change between 23Z/day 02 to 04Z/day 03 to visibility 900 m, heavy snow, heavy blowing snow, broken at 400 ft; becoming between 04Z and 08z/day 03 visibility 4000 m, snow and rain, broken at 1200 ft; probability 30 percent of a temporary change between 08Z and 18Z/day 03 to visibility 1200 m, snow, broken at 800 ft

SBGR 021530Z 0218/0400 33005KT 9999 SCT030 TN19/0308Z TX32/0317Z PROB30 TEMPO
0218/0222 15010KT 6000 TSRA BKN030 FEW040CB BECMG 0222/0224 00000KT 8000 NSC
BECMG 0303/0305 06005KT

Sao Paulo Guarulhos TAF issued on day 02 at 1530Z, valid from day 02 at 18Z to day 04 at 00Z: wind 330 degrees at 5 kts, visibility more than 10 km, scattered at 3000 ft; minimum temperature 19 C at 08Z/day 03; maximum temperature 32 C at 17Z/day 03; probability 30 percent of a temporary change between 18Z and 22Z/day 02 to wind 150 degrees at 10 kts, visibility 6 km, thunderstorm with rain, broken at 3000 ft, few cumulonimbus at 4000 ft; becoming between 22Z and 24Z/day 02 wind calm, visibility 8 km, no significant cloud; becoming between 03Z and 05Z/day 03 wind 60 degrees at 5 kts