

CHAPTER 6 • REFERENCE DEPTH

Meteorological Codes & the Pre-Flight Briefing Service

Weather is the single biggest variable in aviation, and the industry built a compact, coded language to describe it — terse strings that pack an entire weather picture into one line. This chapter teaches you to read those codes fluently and shows how the pre-flight briefing service puts that weather, and the NOTAMs, in your hands before you fly.

SYLLABUS MAP

Part I (ix) Meteorological codes, Pre-Flight briefing service and their usages

🎯 Learning objectives — by the end of this chapter you will be able to...

- Explain why aviation weather is coded and read a METAR/SPECI field by field.
- Interpret a TAF, its validity and change groups, and the TREND group.
- Identify SIGMET, AIRMET, PIREP and GAMET, and the ATIS/VOLMET broadcasts.

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- State the CAVOK criteria and decode the cloud, weather and RVR groups.
- Describe the pre-flight briefing service and the pilot's information sequence to a go/no-go decision.

6.1 Why weather is coded

6.2 METAR & SPECI — field by field

6.3 Cloud, weather & RVR groups

6.4 TAF — the aerodrome forecast

6.5 TREND, SIGMET, AIRMET, PIREP

6.6 ATIS & VOLMET

6.7 CAVOK

6.8 The pre-flight briefing service



Understanding coded weather accurately is critical for safe decision-making in the flight deck.

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6.1 Why weather is coded

FIRST PRINCIPLES — LANGUAGE-PROOF, TRANSMISSION-PROOF WEATHER

Weather decisions are made by crews of every nationality, and the information often crosses a noisy radio or telex link. A free-text English forecast would be slow, ambiguous and easy to garble. So the world adopted a **fixed-order, internationally standardised code**: every report follows the same sequence of groups, so a pilot in Mumbai or Madrid reads it identically and a single transposed letter is obvious. Master the **order of the slots** and any report decodes itself.

THE TWO FAMILIES

Reports describe weather that *is* happening: **METAR** (routine, observed) and **SPECI** (special, off-schedule observation).

Forecasts describe weather that *will* happen: **TAF** (aerodrome forecast) and the appended **TREND** (a 2-hour landing forecast).

6.2 METAR & SPECI — field by field

IN PLAIN TERMS

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A METAR is the routine observed weather at an aerodrome, issued at fixed intervals (commonly every 30 or 60 minutes). A SPECI uses the same format but is issued *off-schedule* when something changes significantly. Both follow the same fixed order.

Example METAR Breakdown

VABB 241230Z 27008KT 8000 -RA FEW020 SCT025 BKN090 32/26 Q1008 NOSIG

VABB	Mumbai — station (ICAO indicator)
241230Z	24th day of month, 1230 UTC (Zulu)
27008KT	wind 270° (TRUE) at 8 knots
8000	visibility 8000 metres
-RA	light rain (– light, + heavy)
FEW020	few cloud at 2000 ft;
SCT025	scattered 2500 ft;
BKN090	broken 9000 ft
32/26	temperature 32 °C / dewpoint 26 °C
Q1008	QNH 1008 hPa (an "A2992" would be inches of mercury)
NOSIG	trend: no significant change expected

💡 MNEMONIC — READ A METAR IN ORDER

"**Station, Time, Wind, Visibility, Weather, Cloud, Temp/Dewpoint, Pressure, Trend.**"

Always the same slots — once you know them, any METAR decodes itself.

⚠️ EXAM TRAP — WIND REFERENCE

Wind in a METAR/TAF is in **degrees TRUE and knots**; the surface wind **passed by ATC on the radio** is in **degrees MAGNETIC**. Same wind, different reference — a favourite catch. A gust is shown as e.g. 27015G27KT; a variable direction as VRB.

🔧 WORKED EXAMPLE — EXTRACT THE OPERATIONAL PICTURE

From the METAR above: lowest **broken** (operational ceiling) is BKN090 = 9000 ft; visibility 8000 m; light rain; temp/dewpoint **32/26** — a 6 °C spread, so humid but not yet fog.

Why temp/dewpoint matters: when the dewpoint closes on the temperature, the air is near saturation and **fog/low cloud** becomes likely. A 1–2 °C spread on a cooling evening is a warning sign for the destination.

| 6.3 Cloud, weather & RVR groups

☁️ CLOUD AMOUNT (OKTAS OF SKY COVERED)

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FEW 1–2 oktas · **SCT** (scattered) 3–4 · **BKN** (broken) 5–7 · **OVC** (overcast) 8. Heights are in **hundreds of feet above aerodrome** (020 = 2000 ft). **NSC** = nil significant cloud; **SKC/NCD** = sky clear / no cloud detected.

Weather Groups

Group	Meaning	Group	Meaning
RA / SN	Rain / Snow	FG / BR	Fog / Mist
TS / SH	Thunderstorm / Shower	DZ / GR	Drizzle / Hail
CB / TCU	Cumulonimbus / Towering cumulus	HZ / FU	Haze / Smoke
+ / –	Heavy / Light prefix	VC	In the vicinity

RVR IN A METAR

When visibility is low, an **RVR** group appears, e.g. **R27/0600** = runway 27, RVR 600 m. **Runway Visual Range** is the distance over which a pilot on the centreline can see the runway markings or lights — measured by transmissometers, and the governing visibility for low-visibility approaches (full RT detail in Chapter 21).

6.4 TAF — the aerodrome forecast

IN PLAIN TERMS

A TAF is the forecast for an aerodrome over a **validity period**, written in the same vocabulary as a METAR but with **change groups** that say "and then it will become...". A TAF begins with its issue time and the validity period (e.g. 2412/2512 = from the 24th 1200Z to the 25th 1200Z).

TAF Change Groups	
Group	Meaning
FM (FROM)	A rapid, permanent change from the stated time onward
BECMG	A gradual (becoming) change over the stated period
TEMPO	Temporary fluctuations, each lasting under an hour, totalling less than half the period
PROB30 / PROB40	30% / 40% probability of the stated conditions

6.5 TREND, SIGMET, AIRMET & PIREP

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Other Met Bulletins

Code	What it is
TREND	A 2-hour landing forecast appended to a METAR (NOSIG / BECMG / TEMPO)
SIGMET	Warning of weather significant to all aircraft — thunderstorms, severe turbulence/icing, volcanic ash, tropical cyclones, dust/sandstorms
AIRMET	Warning of weather significant to low-level / lighter aircraft operations
PIREP	A pilot report of conditions actually encountered in flight
GAMET	An area forecast for low-level flights

💡 MNEMONIC

SIGMET = SIGnificant to all; **AIRMET = lighter AIR**craft. Both are warnings; PIREP is what a pilot actually saw.

6.6 ATIS & VOLMET

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"I" ATIS VS VOLMET

ATIS — Automatic Terminal Information Service: a continuous broadcast of **one aerodrome's** weather, runway-in-use and operational information, identified by a letter (Information "Alpha", "Bravo"...), so the frequency isn't tied up reading it to every aircraft.

VOLMET — a scheduled broadcast of **en-route** meteorological information (METARs/TAFs/SIGMETs) for **several aerodromes**, for aircraft in flight, on HF and/or VHF.

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✈ COCKPIT REALITY

You listen to ATIS before first contact and read back the letter ("...with Information Charlie") so the controller knows you have the current weather and runway. It saves a congested frequency from reading the same numbers a hundred times an hour — and confirms you and ATC share the same picture.

| 6.7 CAVOK

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📖 DEFINITION — CAVOK ("CEILING AND VISIBILITY OK")

Used when **all** of these hold simultaneously: visibility **10 km or more**; **no cloud below 5000 ft** (or below the highest minimum sector altitude, whichever is greater) and **no CB or TCU** at any level; and **no significant weather** at or near the aerodrome. When

CAVOK applies, the visibility, cloud and weather groups are replaced by the single word.

⚠ EXAM TRAP

CAVOK is not just "nice weather" — it has the three defined criteria above. A common wrong answer is "visibility 8 km"; the threshold is **10 km**. And a single CB, even with great visibility, **disqualifies** CAVOK.

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| 6.8 The pre-flight briefing service

i FIRST PRINCIPLES — FLYING THE PAPERWORK BEFORE THE AIRCRAFT

Before a flight a pilot must gather the **weather** and the **NOTAMs**, study the procedures, and **file a flight plan**. The service that makes this possible is the **pre-flight briefing service**, run by the Aeronautical Information Service at the aerodrome, increasingly through self-briefing terminals and online portals.

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✓ WHAT THE BRIEFING SERVICE PROVIDES

At the AIS/briefing office (or via self-briefing terminals / the online flight-planning portal) a pilot obtains: the relevant **METARs and TAFs**; **SIGMET/AIRMET/GAMET** warnings;

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the route **NOTAMs** packaged as a **PIB (Pre-flight Information Bulletin)**; charts and AIP data; and the means to **file the ATS flight plan**.

✓ A PILOT'S PRE-FLIGHT INFORMATION SEQUENCE

1. Obtain the **weather** — METAR/TAF for departure, destination and alternates; SIGMETs en route.
2. Obtain the **PIB** — NOTAMs affecting the route and aerodromes.
3. Study the **AIP/charts** for procedures, facilities and frequencies.
4. **File the flight plan** with ATS.
5. Make the **go / no-go** decision against the operating minima and fuel.

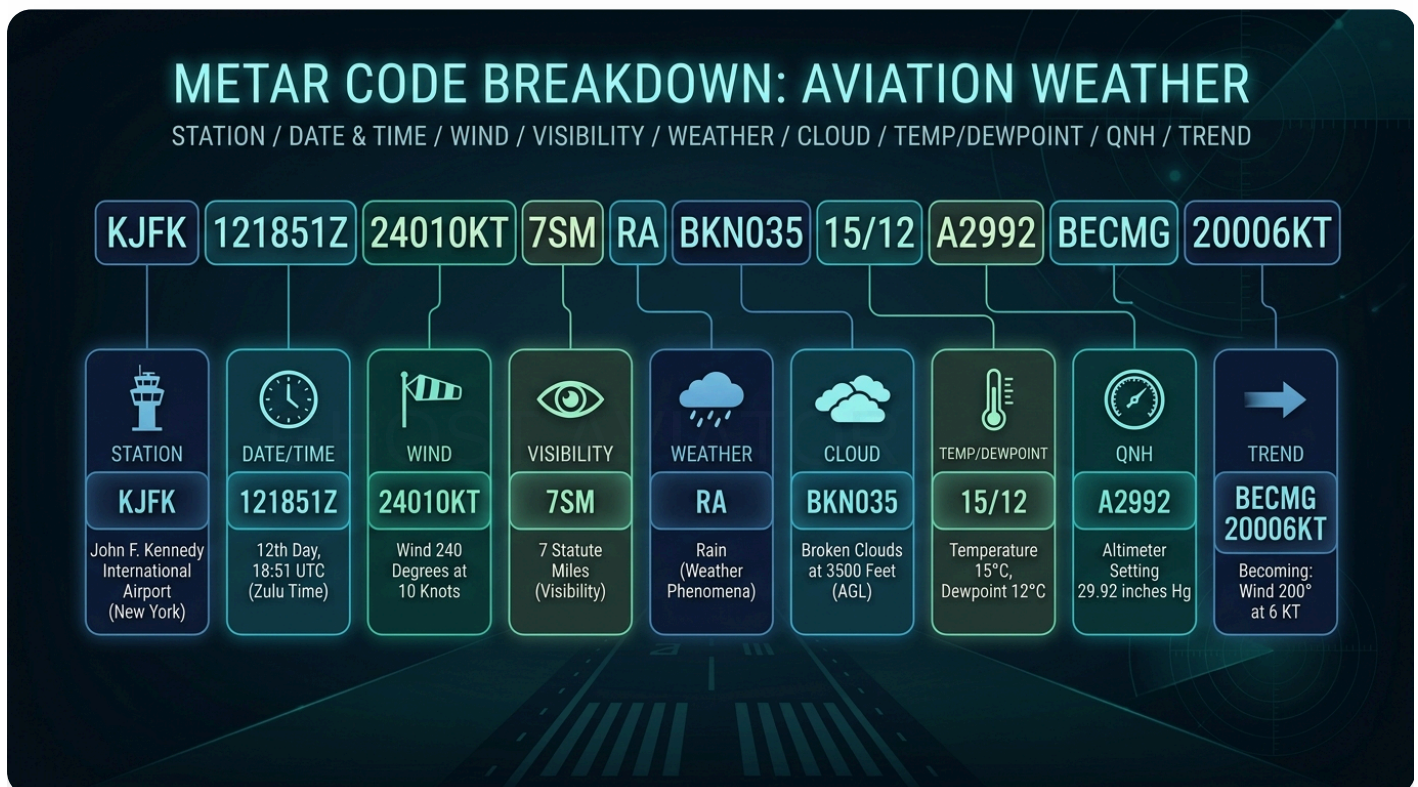


Figure 6.1 — Decoding a METAR — the slots in order.

☆ Numbers to memorise

Essential Facts for Chapter 6

Fact	Value
METAR / SPECI	Routine / special observed aerodrome report
METAR order	Station · Time(Z) · Wind · Vis · Weather · Cloud · Temp/Dew · QNH · Trend
Wind reference	METAR = degrees TRUE; ATC surface wind = degrees MAGNETIC
Cloud amounts	FEW 1–2 · SCT 3–4 · BKN 5–7 · OVC 8 oktas (hundreds of ft)
TAF change groups	FM · BECMG · TEMPO · PROB30/40
CAVOK	Vis ≥ 10 km · no cloud < 5000 ft / no CB·TCU · no significant wx
SIGMET / AIRMET	Hazard to all aircraft / to low-level light aircraft
ATIS / VOLMET	One-aerodrome broadcast / en-route multi-aerodrome broadcast
PIB	Pre-flight Information Bulletin (route NOTAM digest)

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Question bank

Part A — MCQs (click an option to check)

1. A METAR is a:

Routine observed aerodrome weather report

Aerodrome forecast

Pilot report

NOTAM

Answer: Routine observed aerodrome weather report.

METAR = routine observation; the forecast is the TAF; a special observation is a SPECI.

2. In a METAR, the wind is given in:

Degrees magnetic, km/h

Degrees true, knots

Degrees magnetic, knots

Degrees true, m/s

Answer: Degrees true, knots.

METAR/TAF winds are degrees TRUE and knots; ATC passes surface wind in degrees magnetic.

3. "BKN" means cloud cover of:

1–2 oktas

3–4 oktas

5–7 oktas

8 oktas

Answer: 5–7 oktas.

BKN (broken) = 5–7 oktas. OVC = 8, SCT = 3–4, FEW = 1–2.

4. "FEW020" indicates few cloud at:

20 ft

200 ft

2000 ft

20,000 ft

Answer: 2000 ft.

Cloud heights are in hundreds of feet above aerodrome — 020 = 2000 ft.

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5. "Q1008" in a METAR is the:

Temperature

QNH in hectopascals

Visibility

Cloud base

Answer: QNH in hectopascals.

Q1008 = QNH 1008 hPa. An "A" prefix gives inches of mercury.

6. "R27/0600" in a report means:

Runway 27 closed at 0600

Runway 27 RVR 600 metres

Wind 270° 6 kt

QNH 600

Answer: Runway 27 RVR 600 metres.

It is the Runway Visual Range group: runway 27, RVR 600 m.

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7. When temperature and dewpoint are close, you should expect an increased risk of:

High pressure

Fog or low cloud (air near saturation)

Strong winds

Clear skies

Answer: Fog or low cloud (air near saturation).

A small temp/dewpoint spread means the air is near saturation, favouring fog/low cloud.

8. In a TAF, "TEMPO" indicates:

A permanent change from a time

Temporary fluctuations, each under an hour

A 40% probability

The validity period

Answer: Temporary fluctuations, each under an hour.

TEMPO = temporary fluctuations each lasting under an hour; FM = permanent change; BECMG = gradual change.

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9. A SIGMET warns of weather significant to:

Only light aircraft

All aircraft (e.g. thunderstorms, severe turbulence, volcanic ash)

Ground vehicles

Only IFR traffic at night

Answer: All aircraft (e.g. thunderstorms, severe turbulence, volcanic ash).

SIGMET = significant to all aircraft; AIRMET is for low-level/lighter aircraft.

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10. A report of conditions actually encountered in flight is a:

TAF

SIGMET

PIREP

ATIS

Answer: PIREP.

A PIREP is a pilot report of actual conditions met in flight.

11. ATIS broadcasts information for:

Several aerodromes en route

One aerodrome (its weather and operational info)

Only military fields

The whole FIR

Answer: One aerodrome (its weather and operational info).

ATIS = one aerodrome; VOLMET = several aerodromes for aircraft in flight.

12. CAVOK requires a visibility of at least:

5 km

8 km

10 km

1500 m

Answer: 10 km.

CAVOK needs visibility ≥ 10 km, no cloud below 5000 ft / no CB·TCU, and no significant weather.

13. A single CB present with 15 km visibility:

Still allows CAVOK

Disqualifies CAVOK

Requires a SPECI only

Has no effect

Answer: Disqualifies CAVOK.

Any CB or TCU disqualifies CAVOK, regardless of visibility.

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14. The route NOTAM digest provided at briefing is the:

TAF

ATIS

PIB (Pre-flight Information Bulletin)

AIC

Answer: PIB (Pre-flight Information Bulletin).

The PIB gathers the relevant NOTAMs for the route and aerodromes.

15. "-RA" in a METAR means:

Recent rain

Light rain

Heavy rain

Radar

Answer: Light rain.

"-" = light, "+" = heavy; so -RA is light rain.

16. "NOSIG" appended to a METAR means:

No signal

No significant change expected (trend)

Aerodrome closed

Nil cloud

Answer: No significant change expected (trend).

NOSIG is the trend forecast: no significant change in the next two hours.

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17. The correct order of the first groups in a METAR is:

Wind, station, time, visibility

Station, time, wind, visibility

Time, wind, station, cloud

Pressure, temp, wind, station

Answer: Station, time, wind, visibility.

Station → Time(Z) → Wind → Visibility → Weather → Cloud → Temp/Dewpoint → QNH → Trend.

18. The final step of the pre-flight information sequence is to:

File the flight plan

Read the ATIS

Make the go/no-go decision against minima and fuel

Request start-up

Answer: Make the go/no-go decision against minima and fuel.

After weather, PIB, charts and filing the flight plan, the pilot makes the go/no-go decision.

Part B — Oral / viva (tap to reveal model answers)

▼ ? What is the difference between a METAR, a SPECI and a TAF?

Model Answer:

A METAR is a routine report of observed weather at an aerodrome; a SPECI is a special, off-schedule observation in the same format issued when conditions change significantly; a TAF is a forecast of expected weather at an aerodrome over a validity period.

▼ ? Read out the order of the groups in a METAR.

Model Answer:

Station, time in UTC, wind, visibility, present weather, cloud, temperature and dewpoint, QNH,

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and the trend.

▼ ? In which reference are METAR winds and ATC surface winds given?

Model Answer:

METAR/TAF winds are in degrees true and knots; the surface wind passed by ATC on the radio is in degrees magnetic.

▼ ? State the CAVOK criteria.

Model Answer:

Visibility 10 km or more; no cloud below 5000 ft (or the highest minimum sector altitude, whichever is greater) and no CB or TCU; and no significant weather.

▼ ? What is the difference between SIGMET and AIRMET?

Model Answer:

A SIGMET warns of weather significant to all aircraft — thunderstorms, severe turbulence/icing, volcanic ash, tropical cyclones; an AIRMET warns of weather significant to low-level and lighter-aircraft operations.

▼ ? What is the difference between ATIS and VOLMET?

Model Answer:

ATIS is a continuous broadcast of one aerodrome's weather and operational information, identified by a letter; VOLMET is a scheduled broadcast of en-route meteorological information for several aerodromes, for aircraft in flight, on HF/VHF.

▼ ? What does the pre-flight briefing service provide and in what sequence is it used?

Model Answer:

Through the AIS briefing office or self-briefing terminals: the relevant METARs and TAFs, SIGMET/AIRMET, the route NOTAMs as a PIB, charts and AIP data, and the facility to file the flight plan. The pilot obtains weather, then the PIB, studies charts, files the flight plan, and makes the go/no-go decision against minima and fuel.

⚡ 60-SECOND REVISION CARD

METAR observed, **SPECI** special, **TAF** forecast (FM/BECMG/TEMPO/PROB). Order: Station·Time·Wind·Vis·Wx·Cloud·T/Dew·QNH·Trend.

Wind: METAR **TRUE**/kt vs ATC **MAGNETIC**. Cloud **FEW 1–2** · **SCT 3–4** · **BKN 5–7** · **OVC 8**.

CAVOK = vis ≥10 km, no cloud <5000 ft / no CB·TCU, no significant wx (one CB disqualifies).

SIGMET all aircraft · **AIRMET** light · **PIREP** pilot-seen · **ATIS** one field · **VOLMET** en-route.

Briefing = weather + **PIB** (NOTAMs) + charts + **file flight plan** → **go/no-go**.