UltimateSimGuide

Reading the METAR

Learn to decode aviation weather, step by step

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www.ultimatesimguide.com

A free companion to the upcoming book — The Ultimate Sim Guide: Airbus A320

Why the METAR matters

Before you program the A320's computers, you must understand what the atmosphere is doing outside. Airliners prefer to take off and land into the wind. They need to know if thunderstorms are nearby, if visibility is deteriorating, or if wind gusts could make the landing difficult.

At first glance, a METAR looks intimidating. In reality, it is a globally standardized weather snapshot written in a strict order. Once you learn the pattern, you can read the weather at any airport on Earth in seconds.

The order never changes

Every METAR speaks in the same sequence. Memorize this and you can never get lost:

1. Station (ICAO code)
2. Date & time (Zulu)
3. Wind
4. Visibility
5. Runway Visual Range (only when it's bad)
6. Present weather
7. Clouds
8. Temperature / dewpoint
9. Pressure (QNH or altimeter)
10. Trend & remarks

Where to find METARs

Electronic Flight Bag: shows both departure and destination METARs.

The SimBrief OFP: your flight plan includes the weather for departure, destination, and alternate.

ATIS: tune the published ATIS frequency for a continuous broadcast of the current report.

MCDU: MCDU MENU → ATSU → AOC MENU → WX REQUEST — enter the ICAO and press SEND.

Preferred method: use your D-ATIS or EFB METAR if available. Otherwise, default to your OFP.

Anatomy of a METAR

A realistic example, decoded piece by piece:

```
KSFO 021656Z 31006KT 10SM FEW030 13/06 A3013 RMK AO2 SLP203 T01330056
```

KSFO
Location — the four-letter ICAO airport code (San Francisco Intl).

021656Z
02 = day of the month; 1656Z = 16:56 Zulu time (UTC). All METARs use UTC.

31006KT
Wind — from 310° at 6 knots. Watch for variants: 31015G25KT adds gusts to 25 knots; 240V300 after the wind group means the direction is swinging between 240° and 300°; VRB03KT is light wind from no steady direction; 00000KT is dead calm.

10SM
Visibility 10 statute miles. In North American reporting, 10SM is the maximum reported — essentially "unlimited."

FEW030
Few clouds at 3,000 feet above ground level. Add two zeros to the number to get feet.

13/06
Temperature 13°C / dewpoint 6°C. When they're close together, humidity is high and fog risk increases. An M prefix means minus: M05/M06 is –5°C with a dewpoint of –6°C.

A3013
Altimeter — 30.13 inches of mercury (inHg). This is the number for your Baro window.

RMK AO2
Remarks: automated station with a precipitation discriminator (it can tell rain from snow).

SLP203
Sea-level pressure 1020.3 hPa.

T01330056
Exact temperature 13.3°C, exact dewpoint 5.6°C.

Also worth knowing: AUTO after the time means a fully automated report with no human observer — common with sim weather injection. SPECI instead of METAR marks a special, unscheduled report: the weather changed enough to warrant one.

Around the world: US reports use statute miles (10SM) and inches of mercury (A3013). Most of the rest of the world uses meters (9999 = 10 km or more) and hectopascals (Q1013).

The codes you must know

Weather appears as compact codes, built as: intensity + descriptor + phenomenon. So -SHRA is light rain showers; +TSRA is a heavy thunderstorm with rain.

Intensity	
`-`	Light
`(none)`	Moderate
`+`	Heavy
`VC`	In the vicinity

Descriptors	
`SH`	Showers
`TS`	Thunderstorm
`FZ`	Freezing
`BL`	Blowing
`MI`	Shallow
`PR`	Partial
`BC`	Patches
`DR`	Low drifting

Precipitation	
`RA`	Rain
`SN`	Snow
`DZ`	Drizzle
`PL`	Ice pellets
`GR`	Hail (>5 mm)
`GS`	Small hail
`IC`	Ice crystals

Obscurations	
`BR`	Mist (1,000–5,000 m visibility)
`FG`	Fog (<1,000 m visibility)
`HZ`	Haze
`FU`	Smoke
`DU`	Dust
`SA`	Sand
`VA`	Volcanic ash

Clouds & sky (coverage in eighths)	
`FEW`	Few (1–2/8)
`SCT`	Scattered (3–4/8)
`BKN`	Broken (5–7/8) — counts as a ceiling
`OVC`	Overcast (8/8) — counts as a ceiling
`CB`	Cumulonimbus — thunderstorm clouds
`TCU`	Towering cumulus — building convection
`VV002`	Sky obscured; vertical visibility 200 ft — acts as your ceiling
`NSC / NCD / CLR / SKC`	No significant cloud / none detected / clear

Trend indicators & special groups

TEMPO — temporary fluctuations expected for less than half of the stated period. TEMPO 0900/1100 TSRA means thunderstorms with rain expected intermittently between 09:00Z and 11:00Z.

BECMG — becoming: a gradual, lasting change.

NOSIG — no significant change expected in the next two hours.

CAVOK

Ceiling And Visibility OK — common in Europe and Asia. It means: visibility 10 km or more, no clouds below 5,000 ft, and no significant weather. The best word in aviation.

Runway Visual Range (RVR)

Reported only when visibility is poor, right after the visibility group. R20C/0600 means Runway 20 Center has 600 meters of visibility down the runway; US reports use feet with an FT suffix, e.g. R04L/1200FT. This is critical for ILS approaches in low visibility.

Practice METARs

Decode each one on your own — out loud, like a briefing — before turning the page to check your answers. They get harder as you go.

Practice #1

```
EGLL 121350Z 27018G28KT 240V300 4000 -RA SCT012 BKN020 12/09 Q0995 TEMPO 3000 SHRA
```

Practice #2

```
KJFK 051451Z 18012KT 2SM R04L/1200FT BR OVC004 08/07 A2982
```

Practice #3

```
RJTT 220600Z 02005KT CAVOK 25/18 Q1018 NOSIG
```

Practice #4

```
WSSS 010900Z 04010G20KT 350V080 9999 +SHRA FEW018 BKN140CB 31/24 Q1012 NOSIG
```

Practice #5

```
LOWI 171820Z AUTO 00000KT 0400 R08/0450 FZFG VV001 M06/M07 Q1028
```

Hint: work strictly through the ten-step order from page 2 — station, time, wind, visibility, RVR, weather, clouds, temperature/dewpoint, pressure, trend. It never changes.

Solutions

#1 — London Heathrow (EGLL)

12th day of the month, 13:50 Zulu. Wind from 270° at 18 knots, gusting 28, direction swinging between 240° and 300°. Visibility 4,000 meters in light rain, scattered clouds at 1,200 ft and a broken layer at 2,000 ft (your ceiling). Temperature 12°C, dewpoint 9°C, QNH 995 hPa. Temporarily expect visibility down to 3,000 meters in rain showers.

#2 — New York JFK (KJFK)

5th day, 14:51 Zulu. Wind from 180° at 12 knots. Visibility 2 statute miles, and because it's poor, an RVR follows: runway 04 Left has 1,200 feet of visibility down the runway (the FT marks a US report — without it, RVR is in meters). Mist, overcast at just 400 ft — a very low ceiling. Temperature 8°C, dewpoint 7°C (that 1° spread is why there's mist). Altimeter 29.82 inHg. An ILS kind of morning.

#3 — Tokyo Haneda (RJTT)

22nd day, 06:00 Zulu. Wind from 020° at 5 knots, CAVOK — visibility 10 km or more, no clouds below 5,000 ft, no significant weather. Temperature 25°C, dewpoint 18°C, QNH 1018 hPa, and no significant change expected. Enjoy the view.

#4 — Singapore Changi (WSSS)

1st day, 09:00 Zulu. Wind from 040° at 10 knots gusting 20, swinging between 350° and 080°. Visibility 10 km or more, but heavy rain showers, a few clouds at 1,800 ft and a broken layer of cumulonimbus at 14,000 ft — thunderstorm territory. Temperature 31°C, dewpoint 24°C (tropical humidity), QNH 1012 hPa, no significant change expected. Expect a bumpy, wet approach.

#5 — Innsbruck (LOWI)

17th day, 18:20 Zulu, automated report. Wind dead calm — and that's the problem: nothing to stir the air in an Alpine valley. Visibility 400 meters, RVR on runway 08 is 450 meters, in freezing fog. No cloud layers reported — instead VV001: the sky is obscured and vertical visibility is 100 ft, which acts as your ceiling. Temperature –6°C, dewpoint –7°C — saturated, subzero air, so the fog deposits ice. QNH 1028 (high pressure trapping the valley air). This is Low IFR at one of the sim world's trickiest airports: for most of us, tonight is a diversion — or a very good autoland story.

Note: unlike the US format's statute miles (2SM), most of the world reports visibility in meters (4000) — and 9999 means 10 km or more.

Keep practicing

If you can confidently decode these, you're ready to integrate weather into your flight planning. For instant checking, paste any METAR into the live decoder at ultimatesimguide.com — it explains every token and gives a VFR/IFR verdict. Found a code we should add? ultimatesimguide.com/feedback.