Understanding Aviation Wheater

Mastering METARs, TAFs, and Weather Planning for VFR/IFR

1. Introduction

Weather is one of the most decisive factors in flight safety and realism—both in the real world and on VATSIM. Understanding how to interpret aviation weather reports allows you to make informed go/no-go decisions, anticipate in-flight conditions, and plan your route effectively.

This bulletin reviews the essential weather products used in aviation: METAR, TAF, and SIGWX charts. You'll also learn how to plan a flight based on forecast conditions, whether flying VFR or IFR in the complex and mountainous Swiss environment.

2. METAR – Understanding Current Conditions

A METAR is a coded aviation weather observation, typically updated every 30 or 60 minutes. It provides an instantaneous snapshot of the current meteorological conditions observed at an aerodrome.

Example:

LSZH 101320Z 23008KT 9999 FEW030 SCT080 14/08 Q1015 NOSIG

Decoded:

- **LSZH** – Zurich Airport
- **101320Z** – Observation made on the 10th at 13:20 UTC
- **23008KT** – Wind from 230° at 8 knots
- **9999** – Visibility 10 km or more
- **FEW030 SCT080** – Few clouds at 3000 ft AGL, scattered clouds at 8000 ft AGL
- **14/08** – Temperature 14°C, dew point 8°C
- **Q1015** – QNH 1015 hPa
- **NOSIG** – No significant change expected within the next 2 hours

Tips for pilots:

- **VFR:** Pay close attention to visibility and cloud base in relation to VMC minima and terrain.
- **IFR:** Monitor wind, QNH, runway visual range (RVR), ceiling, and any precipitation that may affect approach minima.

3. TAF – Forecasting the Future

A TAF (Terminal Aerodrome Forecast) provides a forecast of expected meteorological conditions for a specific aerodrome, usually covering a period of up to 24 or 30 hours.

Example:

TAF LSZH 101100Z 1012/1118 22008KT 9999 SCT040 BECMG 1018/1020 6000 SHRA BKN025 TEMPO 1100/1106 4000 TSRA

Interpretation:

- Valid from the 10th at 12:00 UTC to 11th at 18:00 UTC
- Initially: 8 kt wind from 220°, good visibility, scattered clouds at 4000 ft
- BECMG 1018/1020 – Between 18:00 and 20:00 UTC, weather becoming: showers and broken clouds at 2500 ft
- TEMPO 1100/1106 – Temporarily between 00:00–06:00 UTC, thunderstorms with rain and 4000 m visibility

Good practice:

- **VFR:** Ensure forecast visibility and cloud base remain above VMC minima for the entire route and time window.
- **IFR:** Closely monitor **TEMPO** and **PROB** groups:
- **TEMPO** indicates temporary fluctuations expected to last less than one hour at a time.
- **PROB30 / PROB40** indicates a 30% or 40% probability of occurrence of the specified weather phenomenon.
- Always evaluate whether forecast conditions require the planning of a suitable alternate aerodrome.

4. SIGWX Charts – Seeing the Big Picture

SIGWX (Significant Weather) charts provide a synoptic overview of significant meteorological phenomena such as turbulence, icing, frontal systems, jet streams, and cloud tops.

While primarily intended for **IFR and high-altitude planning**, SIGWX charts are also valuable for **VFR pilots** to understand large-scale weather developments that may impact visibility, wind, and cloud evolution—especially in mountainous terrain.

What to look for:

- Fronts (cold, warm, occluded) – indicate zones of cloud and precipitation
- Turbulence – marked with "TURB" and altitude ranges
- Icing – zones where temperature and moisture make ice formation likely
- Jet Streams – arrows with wind speeds in knots, useful for flight time estimation

Tip:

Even VFR pilots benefit from looking at the SIGWX chart—it helps anticipate widespread weather systems that can impact visibility or wind patterns in valleys.

5. Weather Planning for VFR and IFR Flights

5. A. VFR Weather Planning

Before a VFR flight:

- Review **METARs and TAFs** along the route and at alternates.
- Consult **ground pressure maps**, **LLSWC**, **GAFOR**, and local Swiss aviation weather products.
- Review **winds aloft** to anticipate drift, turbulence, and groundspeed.
- Evaluate cloud coverage in relation to terrain: maintain at least **1000 ft vertical** and **1500 m horizontal** separation from clouds.
- Avoid routes close to mountain ridges when surface or ridge-level winds exceed **20 kt**, as lee-side turbulence and downdrafts are likely.
- In marginal conditions, always plan a **safe escape or diversion route**.

5. B. IFR Weather Planning

For IFR flights:

- Crosscheck TAFs for destination and alternate aerodromes, paying particular attention to **TEMPO** and **PROB30/40** groups.
- Use **upper wind and temperature charts** to select optimal flight levels and calculate realistic fuel consumption.
- Anticipate **icing** and **turbulence** using SIGWX charts and freezing level information.
- Calculate alternate fuel requirements conservatively, accounting for weather-related delays or holding.

6. Practical Scenario

Flight: LSZH (Zurich) → LSZB (Bern) → LSGG (Geneva)

Morning briefing (08:00Z):

- METAR LSZH: 101000Z 25010KT 9999 SCT030 12/07 Q1013
- TAF LSZH: 100600Z 1006/1112 24010KT 9999 SCT030 TEMPO 1008/1012 4000 -RA BKN020

Decision-making:

- Depart Zurich before the forecasted rain window (08:00–12:00Z).
- Plan alternate LSZG (Grenchen) in case ceiling drops below 2000 ft AGL near Bern.

- Monitor SIGWX chart showing a cold front approaching from France—expect deteriorating weather in western Switzerland by midday.

7. Summary

Understanding and using weather information is as important as mastering navigation or radio communication. Whether you're flying a short VFR hop across the Alps or an IFR approach into Geneva in challenging conditions, reading METARs, TAFs, and SIGWX charts confidently is key to safe and enjoyable virtual flying.

- **SIGWX charts:** https://aviationweather.gov/sigwx/
- **Metar & Taf:** https://metar-taf.com/?c=460367.113379.6
- **Swiss Weather:** https://www.meteoswiss.admin.ch/#tab=forecast-map

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