Definitions

• Basic VFR
  — Visibility: Greater than 3 SM
  — Ceiling: Greater than 1000 ft AGL

• Ceiling
  — Lowest of:
    • BKN: Broken
    • OVC: Overcast
    • VV: Vertical Visibility

SCT and FEW layers do not count as a ceiling.

<table>
<thead>
<tr>
<th>Reportable Contractions</th>
<th>Meaning</th>
<th>Summation Amount of Sky Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV</td>
<td>Vertical Visibility</td>
<td>8/8</td>
</tr>
<tr>
<td>SKC</td>
<td>Sky Clear</td>
<td>0</td>
</tr>
<tr>
<td>FEW</td>
<td>FEW</td>
<td>less than 1/8 to 2/8</td>
</tr>
<tr>
<td>SCT</td>
<td>SCaTered</td>
<td>3/8 to 4/8</td>
</tr>
<tr>
<td>BKN</td>
<td>BroKeN</td>
<td>5/8 to less than 8/8</td>
</tr>
<tr>
<td>OVC</td>
<td>OVerCast</td>
<td>8/8</td>
</tr>
</tbody>
</table>
VFR Weather Minimums

Topics

- Text Weather
- Graphic Weather
- Getting the weather on the ground
- Getting the weather in the air
Don’t Despair, Use Software

• Most of what follows can be summarized.

• Example:
  WeatherSpork app/site ->

Symbols for VFR, MVFR, IFR, and LIFR (defined in AIM 7-1-7)
Plan.foreflight.com
Text Reports and Forecasts

Reports vs. Forecasts

- Report
  - CURRENT weather conditions that have been observed at a location
- Forecast
  - FUTURE weather that might exist at a location during a valid time
Aviation Routine Weather Report (METAR)

- Time-stamped surface weather
- Wind from True North
  - if you hear it: magnetic.
  - If you read it: true.
  - If you read it on the Internet: definitely true.
- “Ceiling” is lowest Broken or Overcast cloud layer
- VFR
  - 3 Statute Mile Visibility
  - 1000 foot ceiling

- Report Format
  - Type of Report (METAR or SPECI)
  - Station Designator
  - Time
  - Wind
  - Visibility
  - Weather and obstructions
  - Sky Condition
  - Temperature/Dew point
  - Altimeter Setting
  - Remarks

Abbreviations
- TS – Thunderstorms
- SH – Showers
- FZ – Freezing
- BL – Blowing
- RA – Rain
- DZ – Drizzle
- SN – Snow
- GR – Hail
- FG – Fog
- BR – Mist
- HZ – Haze
- SQ – Squall
- SKC – Sky Clear
- SCT – Scattered
- OVC – Overcast
- BKN - Broken

Other Modifiers etc
- - Light
- + Heavy
- Z – Zulu, UTC time
- G – gusting
- VRB – wind direction variable
- SM – Statute Miles
- VC – vicinity, 5 to 10 miles
- TCU – Towering Cumulus
- CB – Cumulonimbus
- M – Minus degrees
- A – Altimeter Setting
- B – Began
- E – Ended
- KT - Knots
Aviation Routine Weather Report
METAR

• KPDK 161653Z VRB04KT 10SM OVC060 14/07 A3015 RMK AO2 ...

• Location: Peachtree Dekalb Airport
• Date: 16th of the month
• Time: 16:53 Z
• Time: 12:53 PM EDT
• Wind Direction: Variable
• Wind Speed: 04 knots
• Visibility: 10 Statute Miles
• Clouds/Wx/Remarks: Overcast 6000
• Temperature: 14 C
• Dewpoint: 07C
• Altimeter Setting: 30.15 in Hg
• Remarks ...

AviationWeather.gov
Request METAR

Request METAR data

ID: KBED
Format: Raw
Time: most recent only
Include TAF

Get METAR data

Read METAR

METAR Data

Data at: 1451 UTC 23 Jan 2019

METAR for: KBED (Bedford/Hanscom Fld, MA, US)
Text: KBED 231356Z 21006KT 10SM BKN06S OVC110 MD04/M09 A3032 RMK AO2 SLP285 T10391094 PRO
Temperature: -3.0°C (25°F)
Dewpoint: -2.4°C (21°F) (RH = 66%)
Pressure (altimeter): 1013.2 inches Hg (1026.8 mb) [Sea level pressure: 1028.8 mb]
Winds: from the SSW (210 degrees) at 7 MPH (6 knots; 3.1 m/s)
Visibility: 10 miles or more (16+ km)
Ceiling: 6500 feet AGL
Clouds: broken clouds at 6500 feet AGL, overcast at 11000 feet AGL

TAF for: KBED (Bedford/Hanscom Fld, MA, US) issued at 1132 UTC 23 Jan 2019
Text: KBED 231333Z 2312/2412 10005KT P6SM OVC200
Forecast period: 1200 to 1900 UTC 23 January 2019
Forecast type: FROM: standard forecast or significant change
Winds: from the S (190 degrees) at 6 MPH (5 knots; 2.6 m/s)
Visibility: 6 or more sm (10+ km)
Ceiling: 30000 feet AGL
Pilot Weather Reports (PIREPS)

- Normal PIREP designated UA (“Upper Air”)
- Urgent PIREP designated UUA
- PIREPS are current weather reports by pilots to Air Traffic Controllers or Flight Service Stations

PIREP FORM
- UA or UUA
- /OV – location
- /TM – Time
- /FL – Altitude/Flight level
- /TP – Type of Aircraft
- /SK – Cloud Layers
- /WX – Weather
- /TA – Air Temperature
- /WV – Wind
- /TB – Turbulence
- /IC – Icing
- /RM - Remarks
Printed Weather Forecasts

- Forecasts indicate FUTURE weather conditions
  - Terminal Aerodrome Forecast (TAF)
  - Aviation Area Forecast (FA)
  - Winds and Temperature Aloft Forecast (FD)

Terminal Aerodrome Forecast (TAF)

- Forecast weather
- For specific airport vicinity
- Only issued for certain airports (towered)
- Issued 4 times a day
- Valid for 24 hours
Terminal Aerodrome Forecast (TAF)

- Report Format
  - Type
  - Location
  - Issuance Time
  - Valid Time
  - Forecast
    - Wind
    - Visibility
    - Weather
    - Cloud Coverage
    - Cloud Height

- Abbreviations
  - Same as in METAR
  - FM (HH) – From
  - BECMG (HHhh) – becoming from/to
  - TEMPO (HHhh) – Temporarily from/to

MOS forecast for non-TAF airports

- nws.noaa.gov (description)
- usairnet.com
- ForeFlight
- Garmin Pilot
- WeatherSpork
Aviation Area Forecast (FA)

- Forecast weather for a broad area, e.g., all of Hawaii or Caribbean
- Use for airports without TAF
- Contains section for clouds and visibility (including forecast tops)
- Section for other hazards (icing, turbulence)
- Since 2016, not available for the Lower 48

See https://www.aviationweather.gov/areafcst

Aviation Area Forecast (FA)

- Report Format
  - Communications/Header
  - Precautionary Statements
  - Synopsis
  - VFR Clouds/Weather
Winds Aloft Forecast (FD)

- Forecast winds from above the surface to high altitude
- Used to determine ground speed and time enroute
- Includes
  - Wind direction in relation to True North
  - Wind speed in Knots
  - Temperature

Figure 17. Winds and temperatures aloft forecast.
Severe Weather Reports

• AIRMET - WA
  – Warning of weather hazardous to aircraft
• SIGMET - WS
  – Warning of significant weather hazardous to all aircraft
• Convective SIGMET - WST
  – Warning of hazardous convective (thunderstorm) activity

AIRMET - WA

• Warning of weather hazardous to aircraft
• Includes
  – Moderate Icing - Zulu
  – Moderate Turbulence - Tango
  – Surface winds sustained over 30 knots - Tango
  – Mountain Obscuration – Sierra
  – Widespread instrument conditions - Sierra
AIRMET - WA

**AIRMET Zulu** (icing and freezing level)
NAZVYA 171345
AIRMET ZULU UPDT 2 FOR ICE AND FRZLVL VAUD UNTIL 1720Z
AIRMET ICE, NC SIG 6A FL 304 AG VT MA RI CT NY LO NJ PA OH LE WV MD DC DE VA AND CISTL WTRIS
FROM AIRE ICE TO 40K TO ISSUE 13Z TO 05Z TO LOC TO 09G TO HNV TO BWY TO AIR TO 255NY CLE TO 30W MS TO 40ENE 19Z
OCNL MOD FINE/NEIG K5W0 RGN FRZLVL AND FL200 FRZLVL 08B-140 N applicants excluding 00W 20W ON MET CNDL/CSTS OVLF END OVR RMRD ME AND CISTL WTRIS ELSRY/COND MOV EVD AND CNDL EVD 202 THR 02Z.
FRZLVL NR 140 NE/NW AND CISTL WTRIS
NR 160 0A FL AND CISTL WTRIS

SIGMET - WS

- **Warning of weather hazardous to ALL aircraft**
- **Includes**
  - Severe Icing
  - Severe or Extreme Turbulence or CAT
  - Dust or Sandstorms or Volcanic Ash with visibility less than 3 SM
  - Volcanic Eruption
SIGMET Example

SIGMET issued for the Boston Area Forecast region on the 5th day of the month at 0600 UTC.
This is the second (2nd) issuance of SIGMET series Romeo and is valid until the 5th day of the month at 1000 UTC. The affected states are Maine (ME), New Hampshire (NH) and Vermont (VT). Within an area bounded from Millinocket, Maine; to St. Johns, New Brunswick; to Concord, New Hampshire; to Montpelier, Vermont; to Millinocket, Maine. Occasional severe turbulence below 8,000 feet due to strong northwesterly flow. Conditions are expected to continue beyond 1000 UTC.

Convective SIGMET - WST

- Warning of weather hazardous to ALL aircraft
- Includes
  - Severe Thunderstorms
  - Embedded Thunderstorms
  - Line of Thunderstorms
  - Very large area of Thunderstorms (>3000 mi^2)
  - Tornadoes
  - Hail ¾-inch or greater in diameter
Convective SIGMET - WST

WSUB31 KKG1174805 SIG WKSCE WST 1174805 CONVECTIVE SIGMET DE VALD UNTIL 2050Z FL D A LA AND FL AL WS LA CSTL WTRP FROM 60000 FL AT 60000 C EJW TO 35 40 FLA OR W FROM 29500 UT TOPS ABV FL450.
OUTLOOK VALID 170050-180050 FROM 400 FLO-450 QRO-1500 TRE-4000 EJS-4400 EJL
WST ISSUANCES EXPECT REFER TO MOST RECENT AUSHE OR KIWX FROM STORM PREDICTION CENTER FOR SYNOPSIS AND METEOROLOGICAL DETAILS.
JAB

Graphic Weather Products
Weather Depiction Chart

- Purpose: determining general weather conditions on which to base flight planning
- Shaded areas are “IFR” (instrument conditions)
- Contours without shading is “marginal VFR”
- = sign indicates fog
- Circles indicate percent cloud cover
  - ¼ filled: few clouds (FEW)
  - ½ filled: scattered clouds (SCT)
  - ¾ filled: broken layer (BKN)
  - All filled: overcast layer (OVC)
- Ceiling indicated in hundreds of feet AGL under circle
Significant Weather Prognostic Chart

- Forecast of future conditions
- Red lines enclose areas of IFR
- Light blue scalloped lines enclose areas of MVFR
- Blue zigzag and green dashed lines represent freezing levels at different altitudes
- Hat symbols and yellow dashed lines indicate turbulence
Significant Weather Prognostic Chart

- Symbols indicate precipitation type
- Areas enclosed by solid green lines indicate location and intensity of large areas of precipitation

Source: Public Domain
The following are useful, but not on the knowledge test.
Surface Analysis Chart

• Depicts location of fronts, High and Low pressure areas, and Isobars
• Warm Front – red line with semi circles
• Cold Front – blue line with triangles
• Stationary Front – combination of warm and cold symbols

Surface Analysis

Source: Public Domain
Surface Analysis + Satellite Overlay

Radar
Radar

Winds Aloft
Preflight Weather Sources

Call 1-800-WX-BRIEF

- Started life as Flight Service Stations (FSS) run by FAA
- Trained briefers answer the phone
- Access with a tail number
- Accept and close flight plans
- Except for Alaska, outsourced to Lockheed Martin in 2005 and now “Leidos”
- They also have a web site.
- Pay attention: “VFR Flight Not Recommended”
KBED 210256Z 31018G25KT 10SM CLR
M11/M19 A2947 RMK AO2 PKWND 31031/0225

Jan 21, 0256Z. Wind from 310° at 18 knots with gusts to 25 knots, 10 statute miles visibility, Clear Skies, Temperature -11°C, Dewpoint -19°C, Altimeter is 29.47. Remarks: automated station with precipitation discriminator peak wind from 310° at 31 knots at 0225Z

Private web sites

- fltplan.com (free; example briefing)
- plan.foreflight.com (example briefing)
Mobile Apps

- ForeFlight (iOS-only)
- Garmin Pilot
- NavMonster
- WeatherSpork

New apps every day!
In Flight Weather Sources

Transcribed Weather Broadcast
TWEB

• Weather briefing for a route continuously broadcast on navigation radio frequency (e.g., VOR) along route
• Older service, mostly phased out
Hazardous Inflight Weather Advisory Service

HIWAS

- Weather briefing for a route continuously broadcast on navigation radio frequency along route
- Indicated as available on sectional charts (selected NDB or VOR frequencies)

FSS Enroute

- flight plans
- weather
- NOTAMS
- call your mom
- accept PIREP

Frequencies printed in Chart Supplement and on charts.

“Nearest FSS” is a function of many GPS/COM boxes such as Garmin 430 or 650/750.
NEXRAD via XM Subscription

Also text such as METAR and TAF.

Shows TFRs, lightning, etc.

Free NEXRAD via ADS-B IN

FIS-B is only available to aircraft who can receive data over 978 MHz (UAT). FIS-B automatically transmits a wide range of weather products with national and regional focus to all equipped aircraft. [includes NEXRAD, METAR, TAF, Lightning, etc.]
DIY ADS-B Receiver!

- [https://www.aviationgeek.com/how-to/build-the-stratux-ads-b-receiver/](https://www.aviationgeek.com/how-to/build-the-stratux-ads-b-receiver/)

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VFR Weather Minimums

Brandon Abel Private Pilot Ground School 70

Source: Public Domain