UAS Standards, Reg, Law & Exam

FAA Regulations: Part 107

Lesson 3a – Aviation Weather Information Sources

Objectives of Weather

- To determine that the applicant is knowledgeable in sources of weather information
- To determine that the applicant is knowledgeable of the effects of weather on performance

Sources of Weather Information

- Internet weather briefing and sources of weather available for flight planning purposes
- Aviation routine weather reports (METAR)
- Terminal aerodrome forecasts (TAF)
- Weather charts
- Automated surface observing systems (ASOS) and automated weather observing systems (AWOS)

Internet Weather Sources

- They are sources recommended by the FAA for UAS pilot
- Lockheed Martin Flight Service (https://www.1800wxbrief.com/Website/#!/)
- Aviation Weather Center (AWC) (https://aviationweather.gov/)
  - Aviation Routine Weather Report (METAR)
  - Terminal Aerodrome Forecast (TAF)

Weather Briefings

- **Standard briefing** – should be obtained before every flight
- **Outlook briefing** – provided when it is six (6) or more hours before proposed take-off
- **Abbreviated briefing** – will be provided when the pilot requests information to
  - Supplement mass disseminated data
  - Update a previous briefing
  - When the pilot is limited to specific information
  - "Time stamp" a request for updated TFRs which may affect the flight

Aviation Routine Weather Reports (METAR)

- Current surface weather
- There are likely to be questions referring to this specific Figure on the Exam

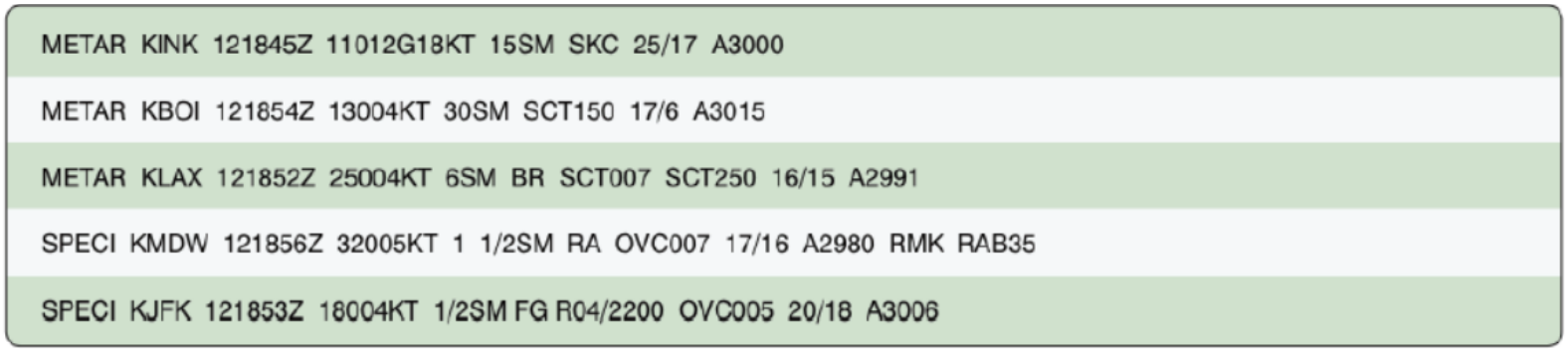
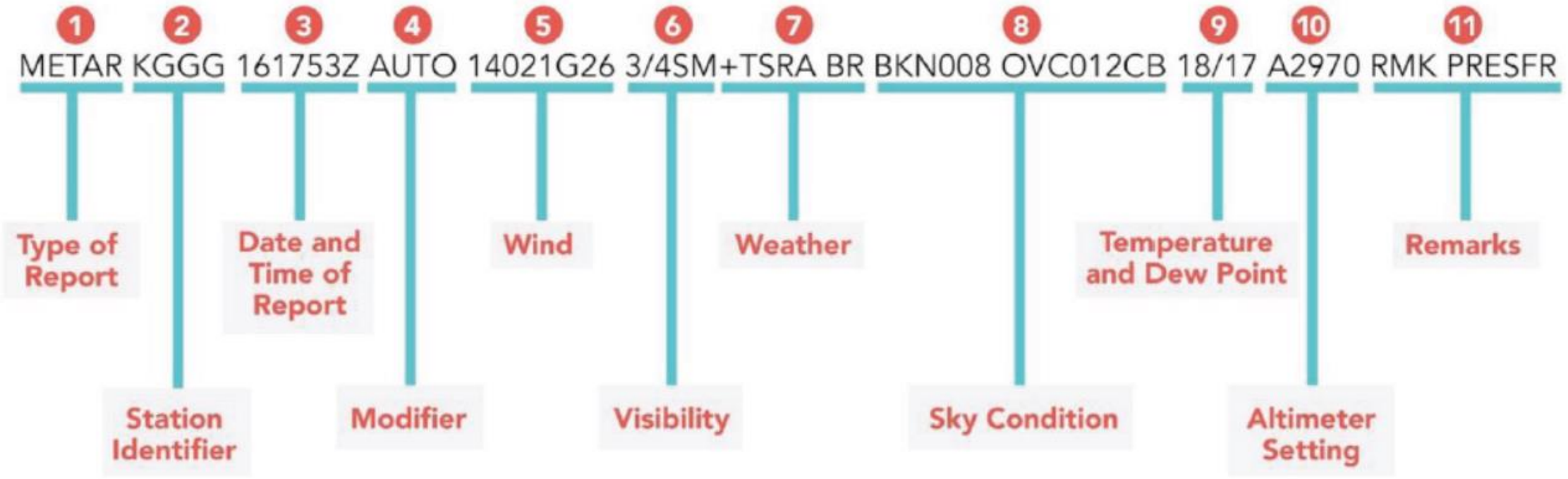


FIGURE 12.—Aviation Routine Weather Reports (METAR).

Aviation Routine Weather Reports (METAR)

METAR Format



METAR Section 1 – Type of Report

- The content in this section indicates the type of the report
- METAR – routine report that is transmitted every hour
- SPECI – special report that can be given at any time to update the METAR for rapidly changing weather conditions, aircraft mishaps, or other critical information

METAR Section 2 – Station Identifier

- A four-letter code as established by the International Civil Aviation Organization (ICAO)
- In the contiguous United States, a unique three-letter identifier is preceded by the letter "K", e.g., KABQ
- For the rest of the world, including Alaska and Hawaii, the first two letters of the four-letter ICAO identifier indicate the region, country, or state; specifically, the first letter indicates the region (e.g., E refers to northern Europe), the second letter indicates the country in this region, and the remaining two letters are a two-letter abbreviation for the airport
- In this case, KGGG indicates the East Texas Regional Airport, located in Longview, Texas

METAR Section 3 – Date and Time of Report

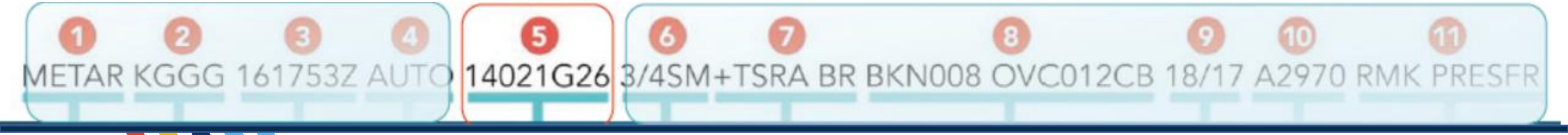
- Depicted in a six-digit group (e.g., 161753Z)
- The first two digits are the date, the 16th of the month
- The last four digits are the time of the METAR, which is always given in coordinated universal time (UTC)
- A "Z" is appended to the end of the time to denote that the time is given in Zulu time (UTC) as opposed to local time

METAR Section 4 – Modifier

- Denotes that the METAR came from an automated source or that the report was corrected
- "AUTO" indicates the report came from an automated source
- "COR" indicates the METAR is a corrected report sent out to replace an earlier report that contained an error (e.g., METAR KGGG 161753Z COR)

METAR Section 5 – Wind

- Wind speed reported as five digits (e.g., 14021) unless the speed is greater than 99 knots, in which case the wind is reported using six digits
- The first three digits indicate the direction of the wind is blowing in tens of degrees in relation to TRUE North
- The last two digits indicate the speed of the wind in knots unless the wind is greater than 99 knots, in which case it is indicated by three digits
- If the wind is variable:
  - "V" will be used when the wind direction is variable over a range of directions, but the wind speed is greater than 6 knots; it specifies a range of directions between which the wind is fluctuating; for example, if the wind is blowing from 180 degrees at 10 knots but is varying between 150 and 210 degrees, it would be written as 18010KT 150V210
  - "VRB" is used when the wind speed is 6 knots or less and the direction is variable; it indicates that the wind direction is not steady and can come from any direction within a certain speed limit; for example, if the wind speed is 4 knots and its direction is variable, it would be written as VRB04KT
- If the winds are gusting, the letter "G" follows the wind speed, the numbers following the G indicate the highest expected wind gusts (e.g., G26)



METAR Section 6 – Visibility

- This section shows the prevailing visibility
- Reported in statute miles as denoted by the letters "SM"
- It is reported in both miles and fractions of miles
- In this case, ¾ of a statute mile
- At times, runway visual range (RVR) is reported following the prevailing visibility; RVR is the distance a pilot can see down the runway in a moving aircraft; when RVR is reported, it is shown with an R, then the runway number followed by a slant, then the visual range in feet; for example, when the RVR is reported as R17L/1400FT, it translates to a visual range of 1,400 feet on runway 17 left

METAR Section 7 – Weather

- Weather is broken down into two categories
  - Qualifiers
  - Weather phenomenon
- First, the qualifiers of intensity, proximity, and the descriptor of the weather are given, and they may be light (-), moderate (), or heavy (+)
- Proximity only depicts weather phenomena that are in the airport vicinity; the notation of "VC" indicates a specific phenomenon is in the vicinity of five to ten miles from the airport
- Descriptors are used to describe certain types of precipitation and obscurations; weather phenomena may be reported as being precipitation, obscurations, and other phenomena, such as squalls or funnel clouds
- Descriptors of weather phenomena as they begin or end and hailstone size are also listed in the "Remarks" sections of the report

METAR Section 7 – Weather

- + TSRA BR
- + TSRA means heavy thunderstorm and rains
- BR indicates mist

Qualifier		Weather Phenomena		
Intensity or Proximity 1	Descriptor 2	Precipitation 3	Obscuration 4	Other 5
– Light	**MI** Shallow	**DZ** Drizzle	**BR** Mist	**PO** Dust/sand whirls
Moderate (no qualifier)	**BC** Patches	**RA** Rain	**FG** Fog	**SQ** Squalls
+ Heavy	**DR** Low drifting	**SN** Snow	**FU** Smoke	**FC** Funnel cloud
VC in the vicinity	**BL** Blowing	**SG** Snow grains	**DU** Dust	**+FC** Tornado or waterspout
	SH Showers	**IC** Ice crystals (diamond dust)	**SA** Sand	**SS** Sandstorm
	TS Thunderstorms	**PL** Ice pellets	**HZ** Haze	**DS** Dust storm
	FZ Freezing	**GR** Hail	**PY** Spray	
	PR Partial	**GS** Small hail or snow pellets	**VA** Volcanic ash	
		UP *Unknown precipitation		

The weather groups are constructed by considering columns 1–5 in this table in sequence:
intensity, followed by descriptor, followed by weather phenomena (e.g., heavy rain showers(s) is coded as +SHRA).
* Automated stations only

1 METAR | 2 KGGG | 3 161753Z | 4 AUTO | 5 14021G26 | 6 3/4SM | 7 +TSRA BR | 8 BKN008 OVC012CB | 9 18/17 | 10 A2970 | 11 RMK PRESFR

METAR Section 8 – Sky Condition

- Always reported in the sequence of amount, height, and type or indefinite ceiling / height (vertical visibility)
  - E.g., BKN008 OVC012CB, VV003
  - Broken cloud layer at 800 feet and an overcast cumulonimbus cloud layer at 1,200 feet above ground level, vertical visibility of 300 feet
- The height of the cloud bases are reported with a three-digit number in hundreds of feet AGL
- Clouds above 12,000 feet are not detected or reported by an automated station
- The types of clouds, specifically towering cumulus (TCU) or cumulonimbus (CB) clouds, are reported with their height
- Contractions are used to describe the amount of cloud coverage and obscuring phenomena
- The amount of sky coverage is reported in eights of the sky from the horizon to horizon

METAR Section 8 – Sky Condition

- Different cloud types can be found at different altitudes, thus the need for multiple descriptors
- SKC indicates Sky Clear
- CLR indicates Clear
- SKC shall be used at automated stations when no layers at or below 12,000 feet are reported; CLR shall be used at manual stations when on layers are reported
- Any layer amount less than 1/8 is reported as FEW

Sky Cover	Contraction
Less than ⅛ (Clear)	SKC, CLR, FEW
⅛–⅔ (Few)	FEW
⅜–⅝ (Scattered)	SCT
⅝–⅞ (Broken)	BKN
⅞ or (Overcast)	OVC

METAR Section 9 – Air Temperature and Dew Point

- Air temperatures and dew point temperatures are always given in whole degree Celsius (°C) and separated by a forward slash (/)
- Temperatures below 0°C are preceded by the letter "M" to indicate minus
- Example 18/17 (air temperature = 18°C and due point temperature = 17°C)

METAR Section 10 – Altimeter Setting

- Reported as inches of mercury (Hg) in a four-digit number group (A2970)
- It is always preceded by the letter "A"
- A2970 indicates that the altimeter setting is 29.70 inch of Hg
- Rapidly rising or falling pressure may also be denoted in the "Remarks" section as "PRESRR" or "PRESFR", respectively

METAR Example for Exam Supplement (FAA-CT-8080-2H)

METAR KINK 121845Z 11012G18KT 15SM SKC 25/17 A3000
METAR KBOI 121854Z 13004KT 30SM SCT150 17/6 A3015
METAR KLAX 121852Z 25004KT 6SM BR SCT007 SCT250 16/15 A2991
SPECI KMDW 121856Z 32005KT 1 1/2SM RA OVC007 17/16 A2980 RMK RAB35
SPECI KJFK 121853Z 18004KT 1/2SM FG R04/2200 OVC005 20/18 A3006

Figure 12. Aviation Routine Weather Reports (METAR).

There are likely to be questions referring to this specific Figure on the Exam.

Terminal Aerodrome Forecasts (TAF)

- Weather report established for the five statute mile radius around an airport
- Usually for larger airports
- Usually valid for a 24-hour or 30-hour time period; validity may vary but is always reported in TAF
- TAFs are updated 4 times a day
  - 0000Z, 0600Z, 1200Z, and 1800Z
- TAF reports use the same descriptors and abbreviations used in the METAR report
- TAF reports can be beneficial to the remote pilot for flight planning purposes

Terminal Aerodrome Forecasts (TAF) – Field Sequence

- **Type of report** – a TAF can be either a routine forecast (TAF) or an amended forecast (TAF AMD)
- **ICAO station identifier** – the station identifier is the same as that used in a METAR
- **Date and time of origin** – date and time of TAF origination is given in the six-digit code with the first two being the date and the last four being the time; time is always given in UTC as denoted by the Z following the number group
- **Valid period date and time** – the valid forecast time period is given by an eight-digit number group; the first four digits indicate the date followed by the two-digit beginning time for the valid period, and the last four digits represent the ending date and time of the valid period
- **Forecast meteorological conditions** (the body of the forecast) – wind, visibility, weather, and sky condition; cumulonimbus clouds (CB) are the only cloud type that is forecast in a TAF

TAF Example from Exam Supplement (FAA-CT-8080-2H)

TAF
KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 1220/1222 1SM TSRA OVC008CB FM122200 33015G20KT P6SM BKN015 OVC025 PROB40 1220/1222 3SM SHRA FM120200 35012KT OVC008 PROB40 1202/1205 2SM-RASN BECMG 1306/1308 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=
KOKC 051130Z 0512/0618 14008KT 5SM BR BKN030 TEMPO 0513/0516 1 1/2SM BR FM051600 18010KT P6SM SKC BECMG 0522/0524 20013G20KT 4SM SHRA OVC020 PROB40 0600/0606 2SM TSRA OVC008CB BECMG 0606/0608 21015KT P6SM SCT040=

Figure 15. Terminal Aerodrome Forecasts (TAF).

There are likely to be questions referring to this specific Figure on the Exam.

TAF Example from Exam Supplement (FAA-CT-8080-2H)

TAF
KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 1220/1222 1SM TSRA OVC008CB FM122200 33015G20KT P6SM BKN015 OVC025 PROB40 1220/1222 3SM SHRA FM120200 35012KT OVC008 PROB40 1202/1205 2SM-RASN BECMG 1306/1308 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=

- TAF is a routine forecast
- KMEM is Memphis International Airport, Memphis, TN
- TN121720Z means the forecast was prepared on the 12th day of the month at 1720UTC
- 1218/1324 means the forecast is valid for 30 hours from 1800UTC on the 12th to 2400UTC on the 13th

TAF Example from Exam Supplement (FAA-CT-8080-2H)

TAF
KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 1220/1222 1SM TSRA OVC008CB FM122200 33015G20KT P6SM BKN015 OVC025 PROB40 1220/1222 3SM SHRA FM120200 35012KT OVC008 PROB40 1202/1205 2SM-RASN BECMG 1306/1308 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=

- 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA OVC008CB is wind 200 degrees from TRUE North at 12knots, visibility 5 SM with haze, broken clouds at 3,000 feet; between 2000Z and 2200Z, there is a 40% probability of visibility 1 SM, thunderstorm with rain, clouds overcast at 800 feet with cumulonimbus clouds.

TAF Example from Exam Supplement (FAA-CT-8080-2H)

TAF
KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 1220/1222 1SM TSRA OVC008CB FM122200 33015G20KT P6SM BKN015 OVC025 PROB40 1220/1222 3SM SHRA FM120200 35012KT OVC008 PROB40 1202/1205 2SM-RASN BECMG 1306/1308 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=

- 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA OVC008CB
- Wind 200 degrees from TRUE North at 12knots, visibility 5 SM with haze, broken clouds at 3,000 feet; between 2000Z and 2200Z, there is a 40% probability of visibility 1 SM, thunderstorm with rain, clouds overcast at 800 feet with cumulonimbus clouds

TAF Example from Exam Supplement (FAA-CT-8080-2H)

TAF
KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 1220/1222 1SM TSRA OVC008CB FM122200 33015G20KT P6SM BKN015 OVC025 PROB40 1220/1222 3SM SHRA FM120200 35012KT OVC008 PROB40 1202/1205 2SM-RASN BECMG 1306/1308 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=

- FM2200 33015G20KT P6SM BKN015 OVC025 PROB40 2202 3SM SHRA FM0200 35012KT OVC008 PROB40 0205 2SM-RASN BECMG 0608 02008KT BKN012 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG FM131600 VRB06KT P6SM SKC=
- Validity from 2200Z, winds 330° at 15 knots, gusting to 20 knots, visibility greater than 6 SM, clouds broken at 1,500 feet and overcast at 2,500 feet; between 2200Z and 0200Z, there is a 40% probability of visibility 3 SM and rain showers; from 0200Z, winds 350° at 12 knots, clouds overcast at 800 feet. Between 0200Z and 0500Z, there is a 40% probability of visibility 2 SM, rain and snow becoming between 0600Z and 0800Z, wind 20° at 8 knots, broken clouds at 1,200 feet becoming between 1000Z and 1200Z on the 13th, winds 0° at 0 knots, visibility 3 SM, mist with clear skies; temporarily on the 12th between 1200Z and 1400Z, visibility 1/2 SM with fog; from 1600Z on the 13th, variable wind direction at 6 knots, visibility greater than 6 SM, clear skies...end of report (=)

Aviation Area Forecast Report (FA)

- Report weather conditions over a large regional area
- Issued three (3) times daily
- Valid for 18 hours (12-hour forecast, plus 6-hour categorical outlook)
- Cover an area the size of several states
- Visibility is always stated in statute miles (SM)
- Times are issued in coordinated universal time (UTC)

Sections of an FA

- Four sections
- Section 1 – a communication and header section
  - Time of forecast
  - Valid times of the synopsis and the visual flight rules (VFR) CLOUDS/WX (Weather) forecast and outlook sections
  - Area of coverage
- Section 2 – a precautionary statement section
  - Warns users to check the AIRMET (Airman's Meteorological Information) section for Instrument Flight Rules (IFR) and/or mountain obscuration
  - Describes the hazards associated with all thunderstorm
  - Reminds users that all altitudes are given in MSL, unless noted as AGL or CIG (cloud ceiling in 100s feet)

Sections of an FA

- Four sections
- Section 3 – a synopsis section
  - Brief summary of the location and movement of fronts, pressure systems, and circulation patterns for an 18-hour period
  - References to low ceilings, reduced visibility and/or strong winds may be included
- Section 4 – a VFR CLOUDS/WX section
  - Contains a 12-hour specific forecast, followed by a 6-hour categorical outlook
  - Broken down into geographical areas, and/or states
  - Describes cloud and weather affecting VFR flight operations, including precipitation, thunderstorms, and sustained surface winds 20 knots (KTs) or greater; also includes visibility when the forecast to visibility is between 3 and 6 SM and/or obstructions to visibility

FA Example

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BOSC  FA  241845
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 251300
CLDS/WX VALID UNTIL 250700...OTLK VALID 250700-251300
ME NH VT MA RI CT NY LO NJ PA OH LE WV MD DC DE VA AND CSTL WTRS
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.
.
SYNOPSIS...19Z CDFNT ALG A 16NE ACK-ENE LN...CONTG AS A QSTNRY
FNT ALG AN END-50SW MSS LN. BY 13Z...CDFNT ALG A 140ESE ACK-HTO
LN...CONTG AS A QSTNRY FNT ALG A HTO-SYR-YYZ LN. TROF ACRS CNTRL
PA INTO NRN VA. ...REYNOLDS...
.
OH LE
NRN HLF OH LE...SCT-BKN025 OVC045. CLDS LYRD 150. SCT SHRA. WDLY
      SCT TSRA. CB TOPS FL350. 23-01Z OVC020-030. VIS 3SM BR. OCNL-
      RA. OTLK...IFR CIG BR FG.
SWRN QTR OH...BKN050-060 TOPS 100. OTLK...MVFR BR.
SERN QTR OH...SCT-BKN040 BKN070 TOPS 120. WDLY SCT-TSRA. 00Z
      SCT-BKN030 OVC050. WDLY SCT-TSRA. CB TOPS FL350. OTLK...VFR
      SHRA.
.
```

There are likely to be questions referring to this specific Figure on the Exam.

FA Example – Interpretation

- BOSC FA 241845 – Boston Center Area Forecast issued 24th day of month at 1845Z
- SYNOPSIS AND VFR CLDS/WX SYNOPSIS VALID UNTIL 251300 – synopsis valid until 25th day of month at 1300Z
- CLDS/WX VALID UNTIL 250700 – clouds and weather valid until 25th day of month at 0700Z
- OTLK VALID 250700-251300 – outlook valid from 25th day of month at 0700Z until 25th day of month at 1300Z
- ME NH VT MA RI CT NY... – the geographical area covered are ME, NH, VT, etc.
- TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS – thunderstorm simply severe or greater turbulence severe icing low level wind shear and IFR conditions
- NON MSL HGTS DENOTED BY AGL OR CIG – non MSL heights are denoted by AGL or CIG

Winds and Temperatures Aloft (FB)

- Winds and temperatures aloft (FBs) are computer-prepared forecasts for specific locations in the contiguous U.S.
- Issued 4 times a day
- Useful in:
  - Determining the most favorable altitude based on winds and direction of flight
  - Identifying areas of possible aircraft icing, by noting air temperature of +2°Cto -20°C, and temperature inversions
  - Predicting turbulence by observing abrupt changes in wind direction and speed at different altitudes

FB Example (FAA-CT-8080-2H)

FB WBC 151745
DATA BASED ON 151200Z
VALID 1600Z FOR USE 1800-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ALS			2420	2635-08	2535-18	2444-30	245945	246755	246862
AMA		2714	2725+00	2625-04	2531-15	2542-27	265842	256352	256762
DEN			2321-04	2532-08	2434-19	2441-31	235347	236056	236262
HLC		1707-01	2113-03	2219-07	2330-17	2435-30	244145	244854	245561
MKC	0507	2006+03	2215-01	2322-06	2338-17	2348-29	236143	237252	238160
STL	2113	2325+07	2332+02	2339-04	2356-16	2373-27	239440	730649	731960

Figure 17. Winds and Temperatures Aloft Forecast.

There are likely to be questions referring to this specific Figure on the Exam.

FB Example – Interpretation

- Header
  - DATA BASED ON 151200Z – Data is based on the 15th day of the month, 1200Z
  - FOR USE: 1800-0300Z – Data is valid between 1800Z and 0300Z
  - TEMPS NEG ABOVE 24000 – This is a standard line, and simply means that since temperatures above 24,000 feet are always negative, the minus sign is omitted in the report
- Body
  - The rows are **locations**, and the columns are **altitudes**
  - A four-digit number group shows wind direction in tens of degrees (first two digits), and then wind speed in knots (second two digits)
    - Example: 2714 = 270° at 14 knots
  - When there are 6 digits showing, the last two numbers indicate forecast temperatures in degrees Celsius
    - Example: 1707-01 = 170° at 07 knots, minus 1°C

Pilot Report – PIREP

- Reports filed by pilots during flight
- Information relayed by radio or electronic submission to the nearest ground station, where it is encoded and relayed to other offices and sources of information

PIREP Example (FAA-CT-8080-2H)

UA/OV KOKC-KTUL/TM 1800/FL120/TP BE90/SK BKN018-TOP055/OVC072-
TOP089/CLR ABV/TA M7/WV 08021/TB LGT 055-072/IC LGT-MOD RIME 072-089

Figure 14. Pilot Weather Report.

There are likely to be questions referring to this specific Figure on the Exam.

PIREP Example – Interpretation

- This is a (UA) PIREP from an aircraft (/OV KOKC-KTUL) between Oklahoma City and Tulsa at (/TM 1800) 1800 UTC, altitude (/FL 120) 12,000 feet MSL, type of aircraft (/TP BE90) is a Beech 90
- The aircraft reports (/SK BKN018-TOP055/OVC072-TOP089/CLR ABV) bases of broken clouds at 1,800 feet MSL with tops of that layer at 5,500 feet MSL, base of a second layer of clouds which are overcast is at 7,200 feet MSL, tops at 8,900 feet MSL, clear above. The temperature is (/TA M7) minus 7°C, and the wind is (/WV 08021) 080° at 21 knots
- This aircraft reported (/TB LGT 055-072) light turbulence existed between 5,500 feet MSL and 7,200 feet MSL along with (/IC LGT-MOD RIME 072-089) light to moderate rime icing between 7,200 feet MSL and 8,900 feet MSL

Weather Terms

- **SIGMET**: Significant Meteorological Information, and it's a weather advisory that contains information about significant weather events like thunderstorms and severe turbulence
- **AIRMET**: Airmen's Meteorological Information, and it's a weather advisory that contains information about weather events that are potentially unsafe; AIRMETs cover less severe weather: things like moderate turbulence and icing, sustained surface winds of 30 knots or more, or widespread restricted visibility
- **VFR**: Visual Flight Rules; VFR is the most common mode of operation for smaller aircraft. The normal daytime minimums needed for VFR in many of the various airspaces is 3 statute miles of flight visibility and a distance from clouds of 500 feet below, 1,000 feet above, and 2,000 feet horizontally; these distances are relative to the aircraft's position in relation to the clouds; in other words, the aircraft must maintain a distance of at least 500' below clouds, 1000 feet above the clouds, and 2,000 feet horizontally from the clouds

Weather Terms

- **IFR**: Instrument Flight Rules; when operation of an aircraft under VFR is not safe or legal, because the visual cues outside the aircraft are obscured by weather or darkness, instrument flight rules must be used instead; basic IFR is defined at an airport having less than a 1,000 feet ceiling and/or less than 3 statute miles of visibility
- **Ceiling**: in aviation there are 5 defined types of cloud cover, based upon the amount of the obscuration of the visible sky; only 2 of these are considered "ceilings" for legal purposes
  - CLEAR – No cloud cover
  - FEW – Up to 1/8 of cloud cover
  - SCATTERED – up to 4/8 (1/2) of cloud cover
  - BROKEN – up to 7/8 of cloud cover
  - OVERCAST – up to 8/8 (full) of cloud cover
  - Only BROKEN and OVERCAST are considered "ceilings" in aviation

Weather Charts

- Interpretation of many weather charts requires a rudimentary knowledge of U.S. geography and can be obtained from either of the two FAA-recommended sources above
- Typically, weather charts show the movement of major weather systems and fronts
  - Weather depiction charts
  - Radar summary charts
  - Significant weather prognostic charts

Weather Depiction Chart

- Weather depiction charts details surface conditions as derived from METAR and other surface observations
- The weather depiction chart is prepared and transmitted by computer every 3 hours beginning at 0100Z time, and is valid at the time of the plotted data
- It is designed to be used for flight planning by giving an overall picture of the weather across the U.S.
- Weather depiction charts typically display major fronts or areas of high and low pressure
- The shaded regions represent Instrument Flight Rules (IFR) with a ceiling of less than 1000 feet and/or visibility is less than 3 statute miles
- The height of clouds is expressed in hundreds of feet AGL; so 140 means 14,000 feet AGL; and the visibility is indicated in a number next to the circle; so a 4 means 4 statute miles visibility
- Reporting stations are marked with a small circle, and weather is indicated with special icons

Weather Depiction Chart Example (FAA-CT-8080-2H)

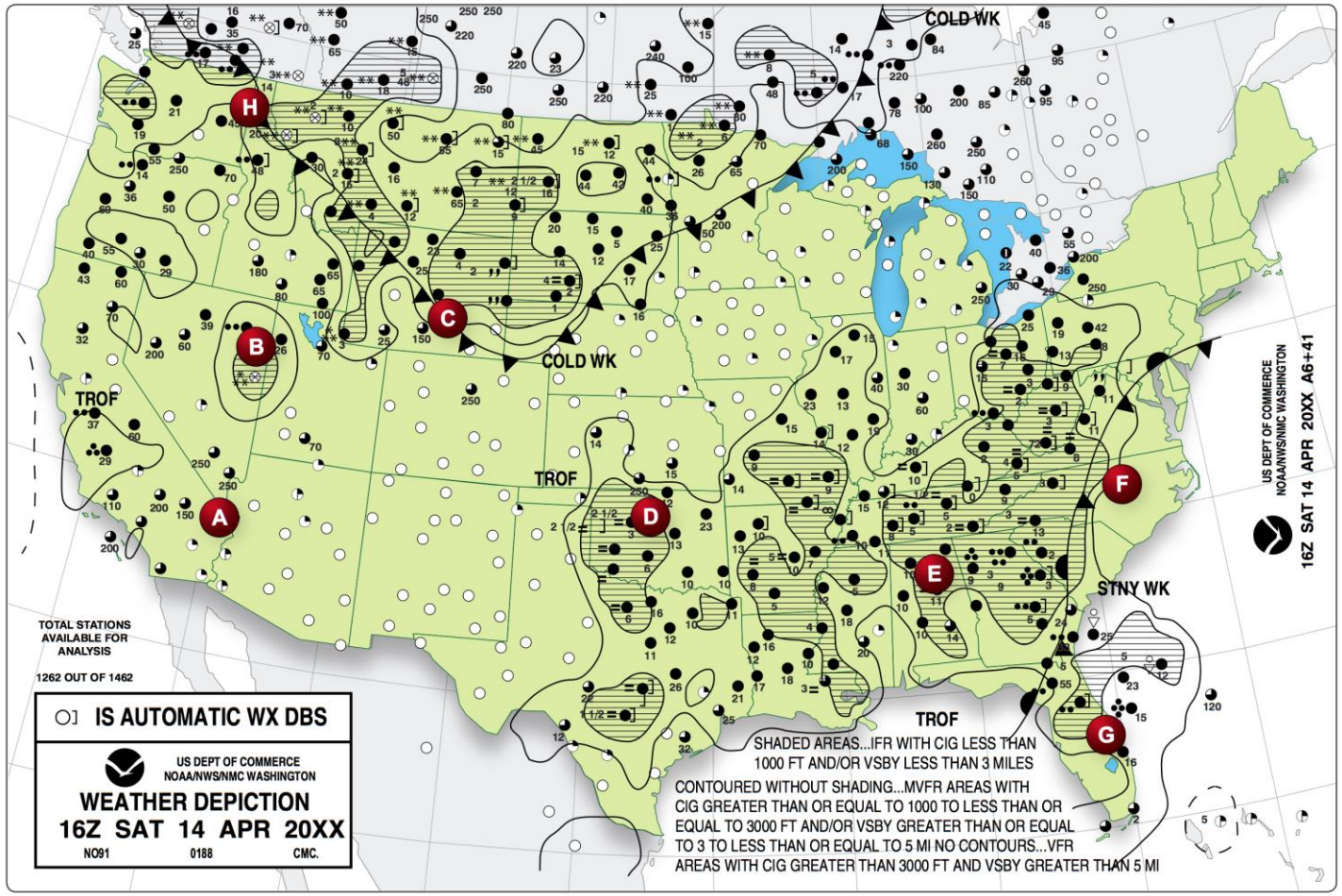
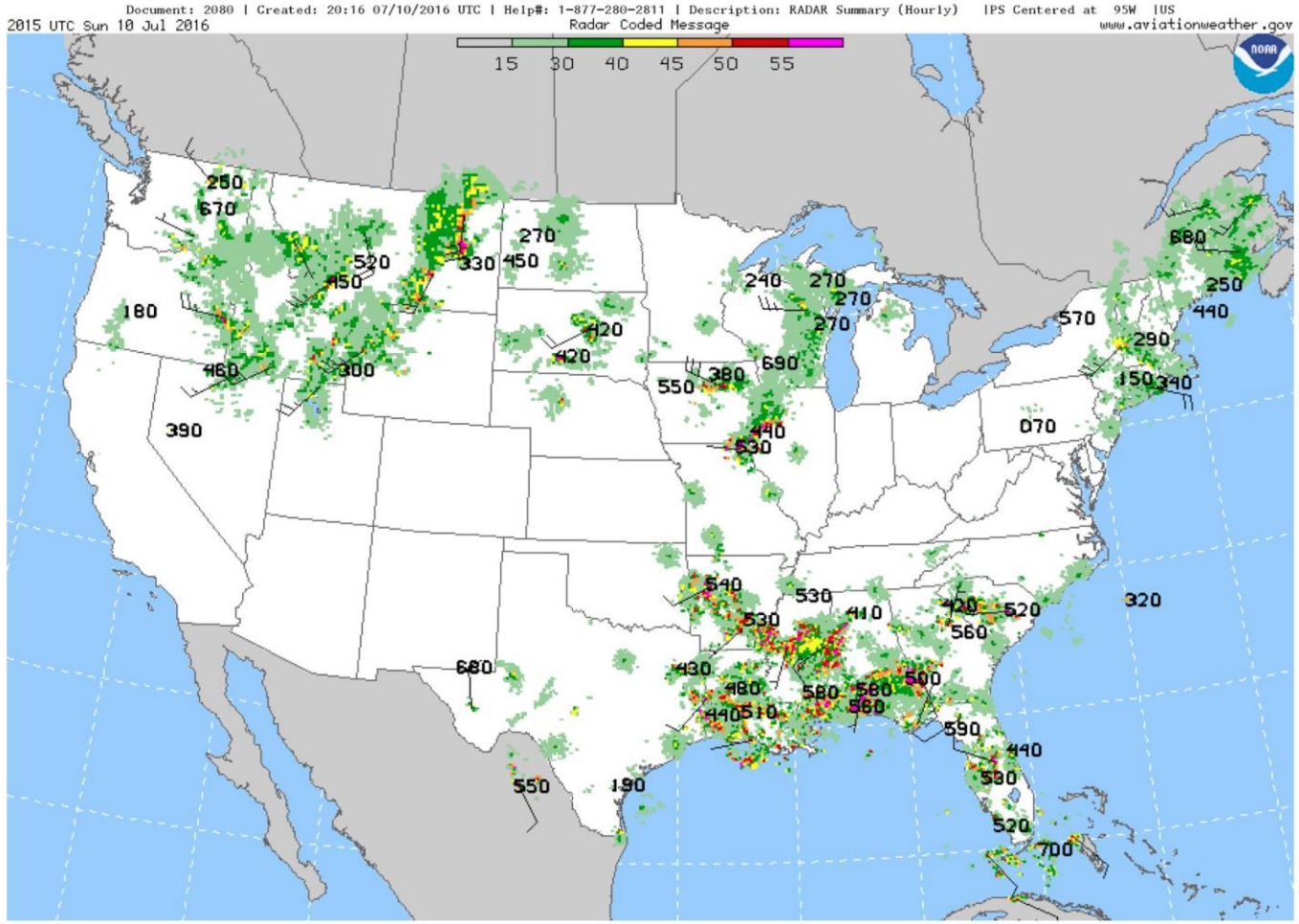


FIGURE 18.—Weather Depiction Chart.

Radar Summary Chart

- A radar summary chart is a graphical representation of radar weather reports; radar summary charts are published hourly at 35 minutes past the hour and display areas of precipitation, as well as information regarding the characteristics of the precipitation
- Useful for preflight planning but limited in that they only provide a depiction of current precipitation along with type, intensity, and cell movement of precipitation
- They do not show clouds, fog in areas with no appreciable precipitation; nor do they depict the height of the tops and bases of the clouds

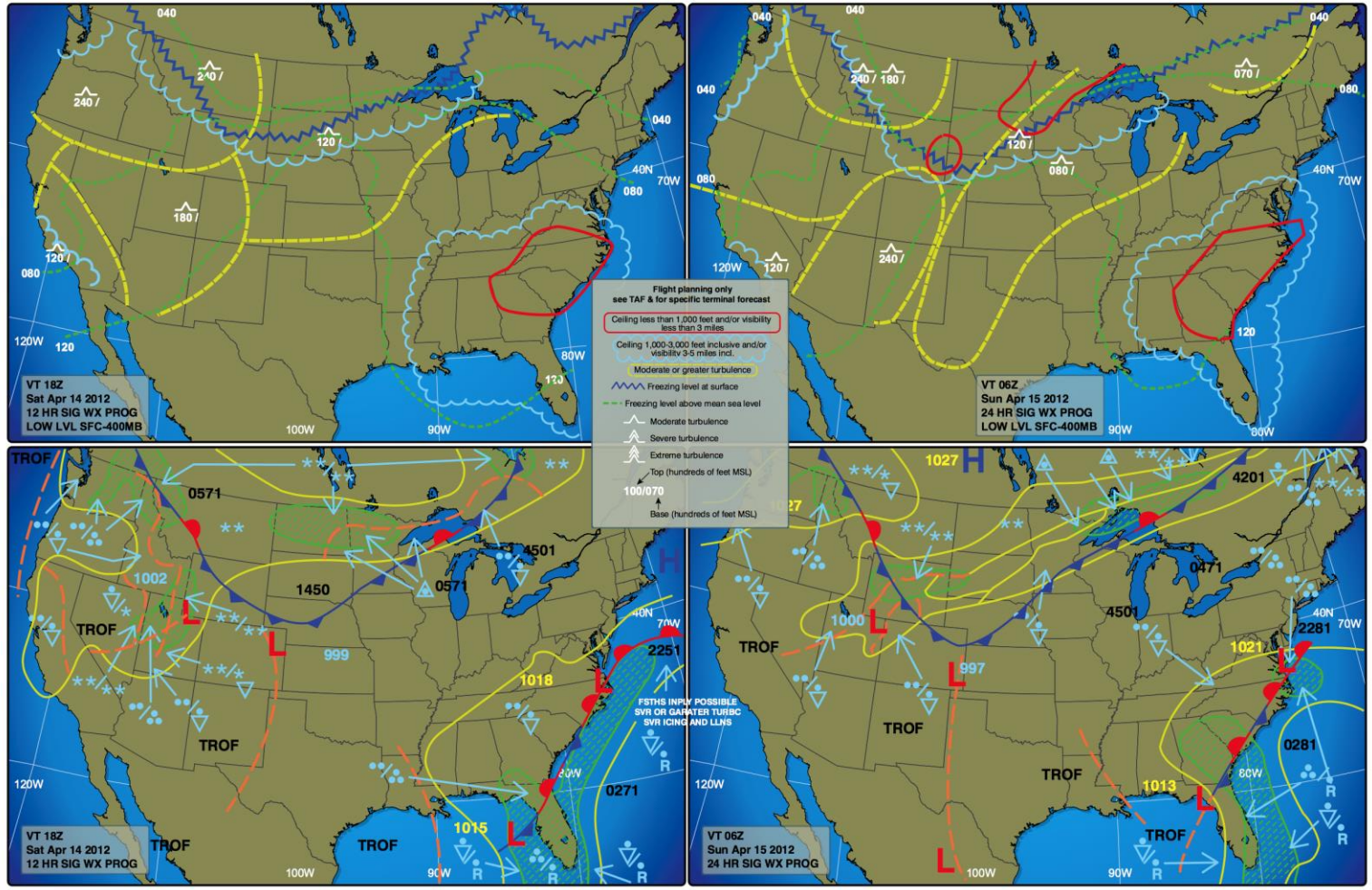
Radar Summary Chart Example



Source: http://aviationweather.gov

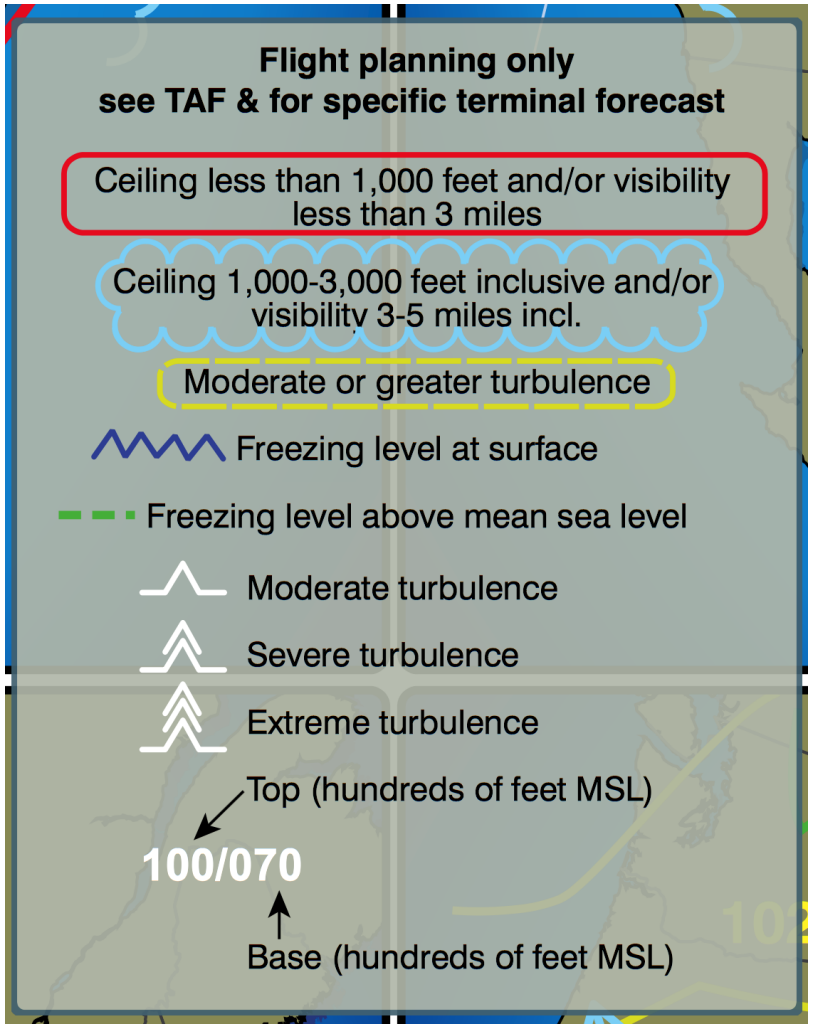
Significant Weather Prognostic Charts (SIGWX)

- Used for flight planning and identifying areas to avoid due to freezing and turbulence



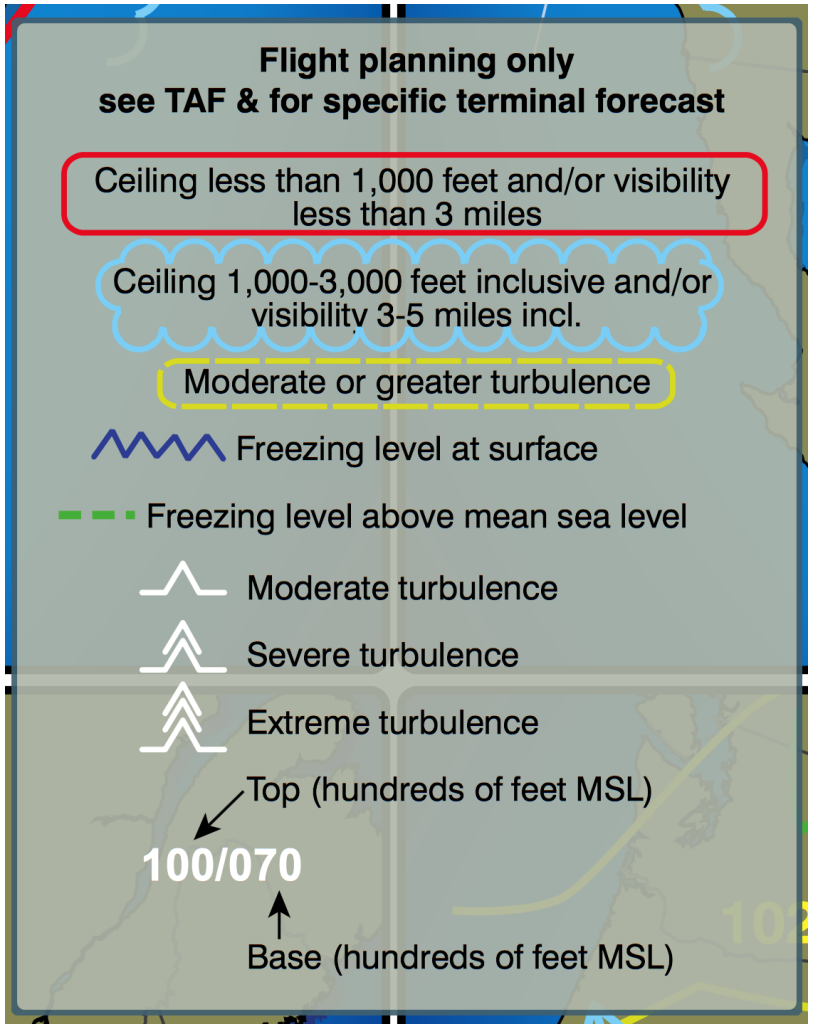
SIGWX – Interpretation

- In the Top Panels, altitudes are depicted; as an example, 140 means from the surface to 14,000 feet
  - A solid line around an area indicates ceilings less than 1,000 feet and/or visibility of less than 3 statute miles (SM)
  - A scalloped line around the area indicates ceilings 1,000 to 3,000 feet and/or visibility 3 to 5 SM.
  - A broken line around the area indicates moderate or greater turbulence; a peaked hat indicates modern turbulence
  - A dashed line indicates freezing levels, and the number next to the line indicates the height of the freezing level



SIGWX – Interpretation

- In the bottom panels, you'll see highs, lows, fronts, and other areas of significant weather; here are some things you will want to know about the bottom panels
  - Unshaded outlined areas indicate precipitation covering half or less of the area
  - Shaded outlined areas indicate precipitation covering more than half of the area
  - Precipitation and intensity is reported with standard symbols



ASOS and AWOS

- The Automated Surface Observing System (ASOS) is a weather reporting system that provides surface observations up to the minute via digitized voice broadcasts and printed reports
- ASOS is the primary surface weather observing system of the U.S; the program to install and operate these systems throughout the U.S. is a joint effort of the NWS, the FAA and the Department of Defense; AWSS is a follow−on program that provides identical data as ASOS; together, these programs are designed to support aviation operations and weather forecast activities by providing continuous, minute-by-minute observations and by performing the basic observing functions necessary to generate an aviation routine weather report (METAR) and other aviation weather information; those METAR reports we looked at earlier wouldn't be possible without the ASOS
- The Automated Weather Observing System (AWOS) is a weather reporting system that consists of various sensors, a processor, a computer-generated voice subsystem, and a transmitter to broadcast weather data, also on a minute-by-minute basis