WEATHER REPORTS

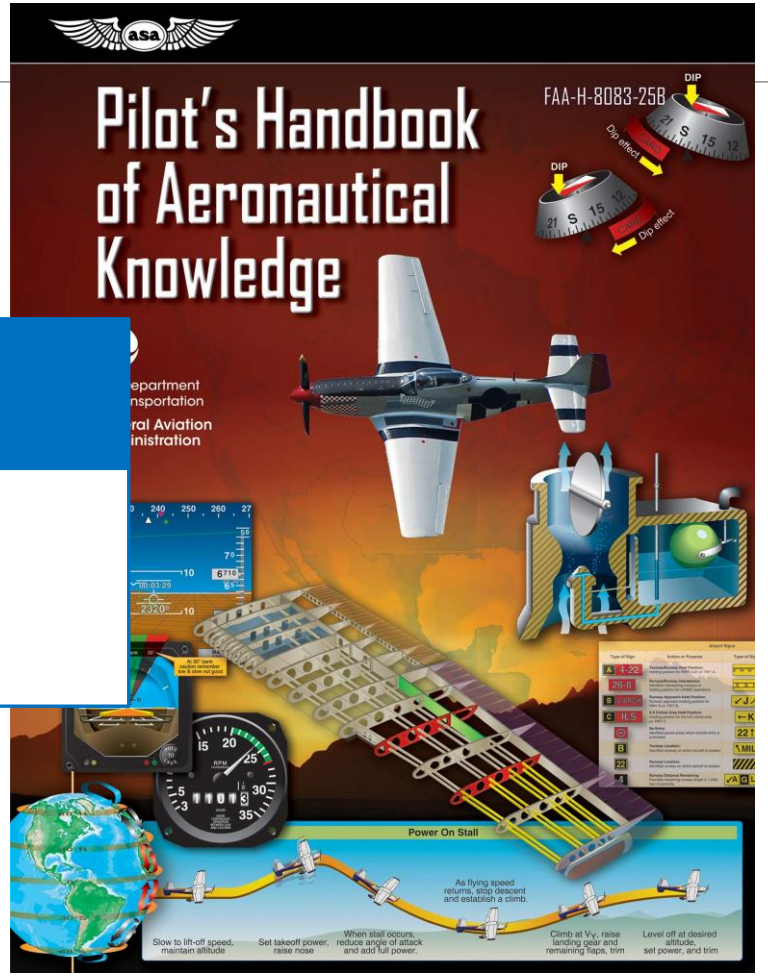
Lesson Outline

LESSON OBJECTIVE

To determine that the student exhibits proficient knowledge of the elements related to weather reports by describing the elements on the following slide.

LESSON SOURCE(S)

Pilot's Handbook of Aeronautical Knowledge
FAA-H-8083-25



Lesson Outline

LESSON ELEMENTS	TIMEFRAME	EQUIPMENT/TOOLS
Means of Obtaining Weather Information Use of Weather Reports In-Flight Weather Advisories Understanding Symbology and Definitions of Various Weather Reports	40 Minutes *approximately* Discuss Objectives Present and Review Material Student Questions Conclusion and Quiz	Lesson Presentation Whiteboard and Markers FAA Sources and References

Lesson Outline

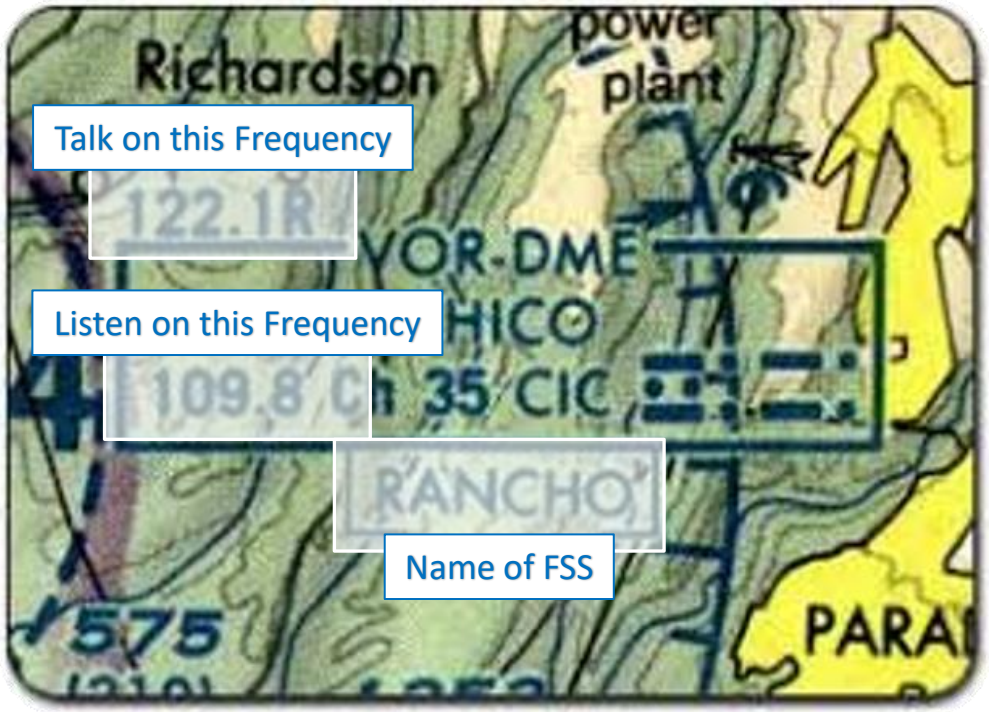
INSTRUCTOR ACTIONS	STUDENT ACTIONS	COMPLETION STANDARDS
Present Objectives and Standards Teach Lesson from Presentation Ask and Answer Student Questions Assign Homework Check Student's Post Lesson Quiz	Participate in Lesson Take Notes Ask and Respond to Questions Pass the Post Lesson Quiz	Student is able to understand and differentiate between the different lesson elements. Student is further able to apply this acquired knowledge in flight training/flight operation scenarios effectively and appropriately.

Weather Reports

It is vital that pilots understand how to acquire and interpret various weather charts and briefings.

Flight Service Station (FSS)

The FSS is the primary source for preflight weather information. A preflight weather briefing from an FSS can be obtained 24 hours a day by calling 1-800-WX BRIEF from anywhere in the United States and Puerto Rico. Telephone numbers for FSS can be found in the Chart Supplement U.S. (formerly Airport/Facility Directory) or in the United States Government section of the telephone book. The FSS also provides in-flight weather briefing services and weather advisories to flights within the FSS area of responsibility.



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Weather Briefings

Pilots should always contact FSS to get a weather briefing prior to any flight (especially cross country flights). There are three different types of briefing a pilot can request.

Standard Briefing

This type of briefing contains the most complete weather picture and should be obtained prior to any flight. Contents of this briefing include: adverse conditions, VFR flight recommendation, synopsis, current conditions, en-route forecasts, destination forecasts, NOTAMS, winds and temps aloft, and more.

Abbreviated Briefing

This type of briefing is a shortened version of the Standard Briefing. It should be used to supplement a Standard Briefing after a delayed departure time.

Outlook Briefing

This type of briefing is a future forecast briefing. It does not give current weather conditions and should only be requested when the planned departure time is more that 6 hours in the future.

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METAR

METAR stands for “Aviation Routine Weather Report” and it is an observation of current surface weather reported in a standard international format. METARs are typically updated on an hourly basis but can be updated more frequently with changing weather conditions.

METAR Breakdown

KOGD	091753Z	VRB05KT	10SM	CLR	09/M02	A3032	RMK	AO2	SLP257	T00941022

- Station Identifier
- Time and Date of Report
- Wind Direction and Velocity
- Visibility
- Sky Condition/Cloud Coverage
- Temperature/Dewpoint
- Current Altimeter Setting
- Additional Remarks
- Type of Reporting Station
- Sea Level Pressure in Millibars
- Specific Temperature/Dewpoint

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METAR Descriptors

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

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Sky Conditions as Ceilings

Sky Cover	Contraction
Less than 1/8 (Clear)	SKC, CLR, FEW
1/8–2/8 (Few)	FEW
3/8–4/8 (Scattered)	SCT
5/8–7/8 (Broken)	BKN
8/8 (Overcast)	OVC

Do not count as Ceilings

Count as Ceilings

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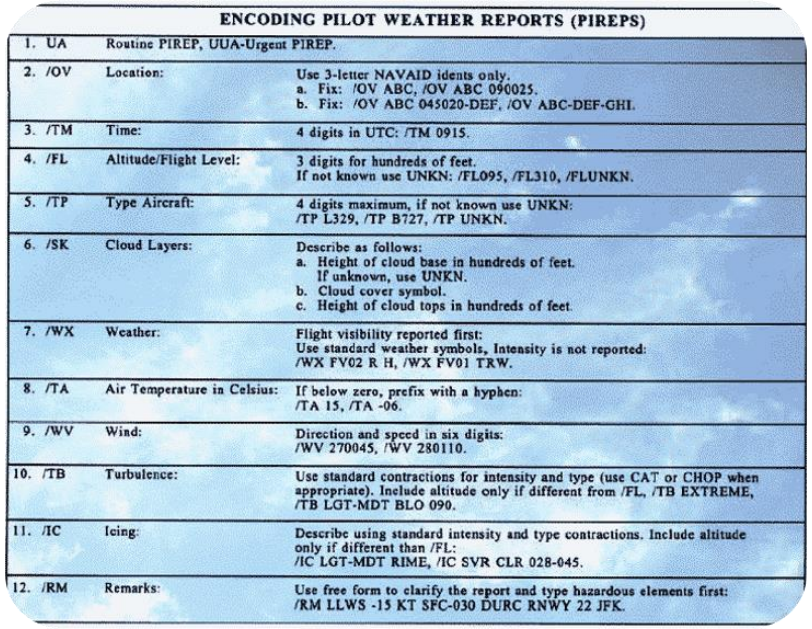
PIREP

PIREP stands for “Pilot Report” and provide valuable information regarding the conditions as they actually exist in the air, which cannot be gathered from any other source. Pilots can confirm the height of bases and tops of clouds, locations of wind shear and turbulence, and the location of inflight icing. If the ceiling is below 5,000 feet, or visibility is at or below five miles, ATC facilities are required to solicit PIREPs from pilots in the area.

PIREP Example

UA/OV GGG 090025/TM 1450/FL 060/TP C182/SK 080 OVC/WX FV04SM RA/TA 05/WV 270030KT/TB LGT/RM HVY RAIN



ENCODING PILOT WEATHER REPORTS (PIREPS)

1. UA	Routine PIREP, UUA-Urgent PIREP.	
2. /OV	Location:	Use 3-letter NAVAID idents only. a. Fix: /OV ABC, /OV ABC 090025. b. Fix: /OV ABC 045020-DEF, /OV ABC-DEF-GHI.
3. /TM	Time:	4 digits in UTC: /TM 0915.
4. /FL	Altitude/Flight Level:	3 digits for hundreds of feet. If not known use UNKN: /FL095, /FL310, /FLUNKN.
5. /TP	Type Aircraft:	4 digits maximum, if not known use UNKN: /TP L329, /TP B727, /TP UNKN.
6. /SK	Cloud Layers:	Describe as follows: a. Height of cloud base in hundreds of feet. If unknown, use UNKN. b. Cloud cover symbol. c. Height of cloud tops in hundreds of feet.
7. /WX	Weather:	Flight visibility reported first: Use standard weather symbols, Intensity is not reported: /WX FV02 R H, /WX FV01 TRW.
8. /TA	Air Temperature in Celsius:	If below zero, prefix with a hyphen: /TA 15, /TA -06.
9. /WV	Wind:	Direction and speed in six digits: /WV 270045, /WV 280110.
10. /TB	Turbulence:	Use standard contractions for intensity and type (use CAT or CHOP when appropriate). Include altitude only if different from /FL, /TB EXTREME, /TB LGT-MDT BLO 090.
11. /IC	Icing:	Describe using standard intensity and type contractions. Include altitude only if different than /FL: /IC LGT-MDT RIME, /IC SVR CLR 028-045.
12. /RM	Remarks:	Use free form to clarify the report and type hazardous elements first: /RM LLWS -15 KT SFC-030 DURC RNWY 22 JFK.

Weather Reports

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TAF

TAF stands for “Terminal Aerodrome Forecast.” These reports give a forecast of expected weather for a 5SM radius around an airport and are typically valid for 24 or 30 hour time periods. They are issued 4 times daily at: 0000Z, 0600Z, 1200Z, and 1800Z.

TAF Example

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN050

- Station Identifier
- Time and Date of Report
- Validity Times and Dates
- Temporary Conditions
- Tempo Dates and Times
- Tempo Visibility
- FROM Time
- Wind Direction and Velocity
- Visibility Value
- Cloud Types and Layers

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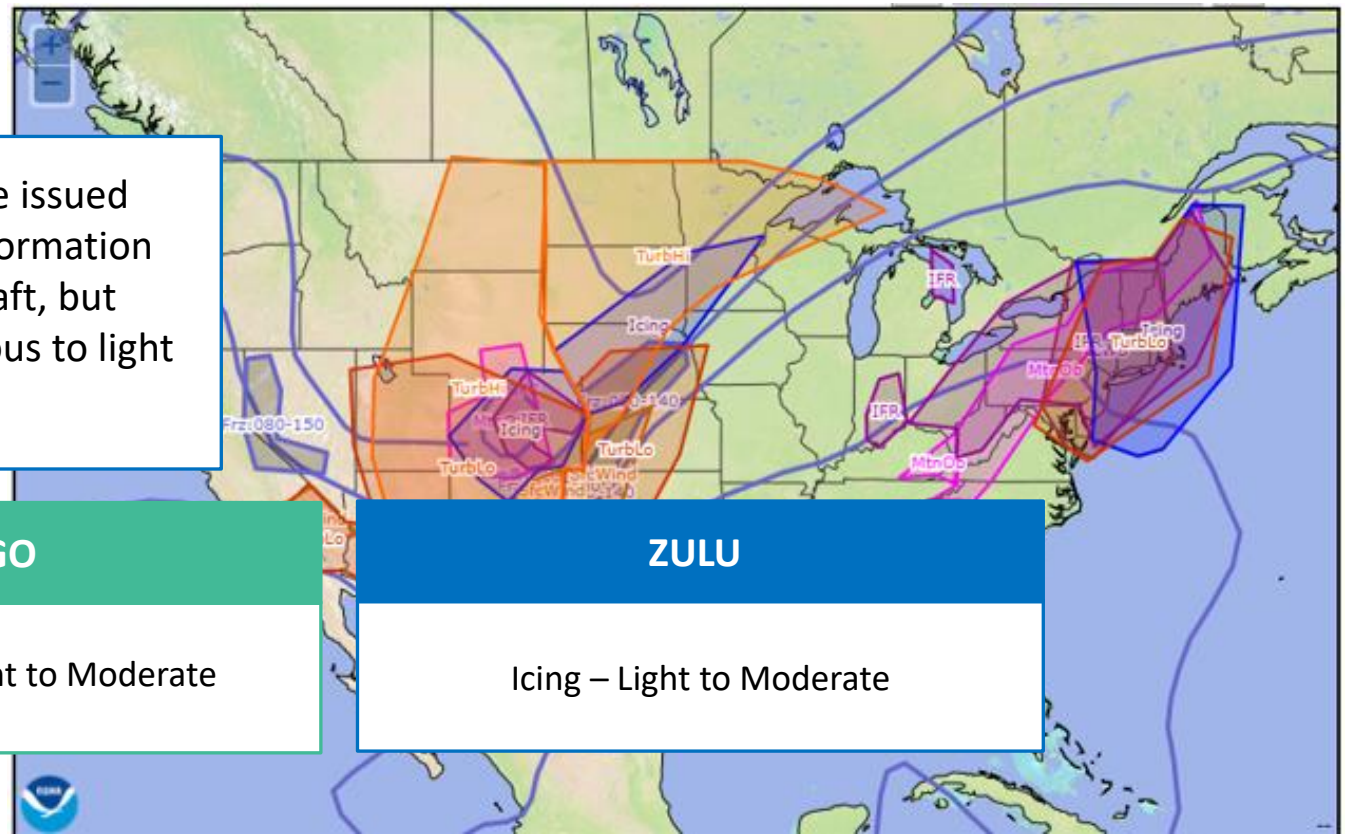
AIRMET

AIRMETs are examples of inflight weather advisories that are issued every 6 hours with intermediate updates as needed. The information contained in an AIRMET is of operational interest to all aircraft, but the weather phenomena are considered potentially hazardous to light aircraft with limited operational capabilities.



SIERRA

IFR Conditions and Mountain Obscuration

TANGO

Turbulence – Light to Moderate

ZULU

Icing – Light to Moderate

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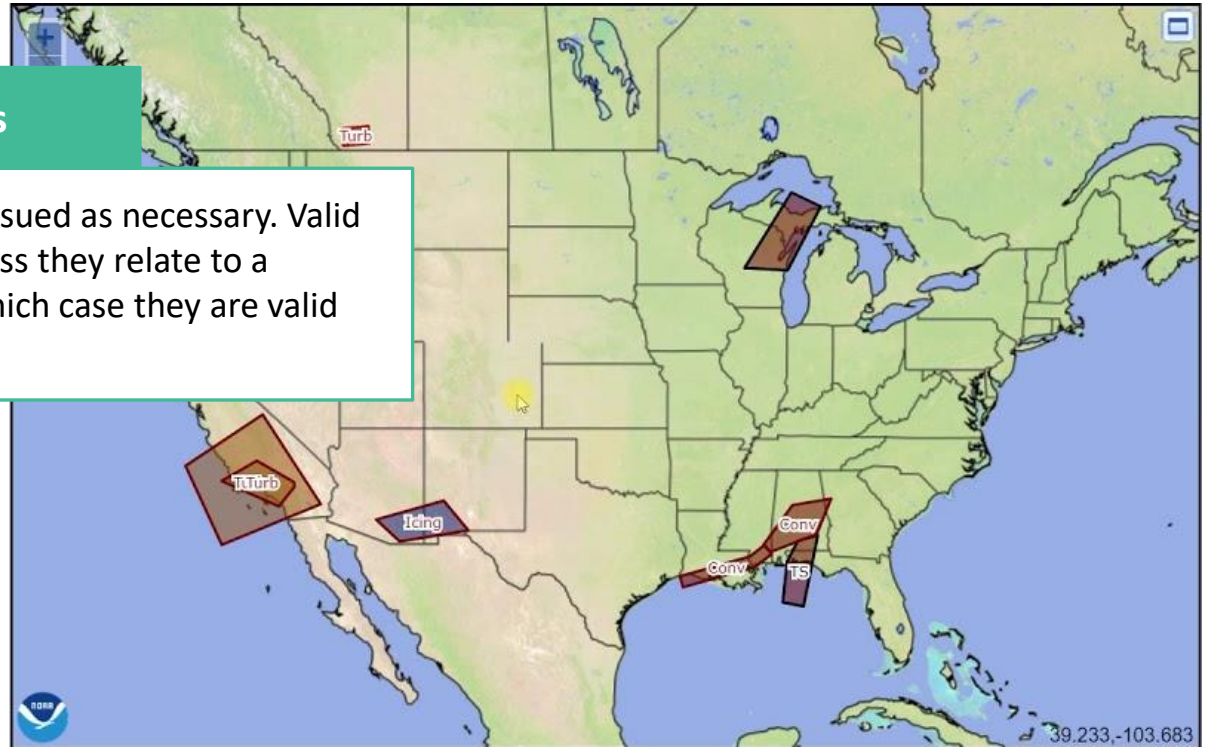
SIGMET

SIGMETs (WSs) are inflight advisories concerning non-convective weather that is potentially hazardous to all aircraft. They report weather forecasts that include:

- Severe icing not associated with thunderstorms
- Severe or extreme turbulence or clear air turbulence (CAT) not associated with thunderstorms
- Dust storms or sandstorms that lower surface or in-flight visibilities to below three miles,
- Volcanic ash.

Validity Times

Unscheduled, issued as necessary. Valid for 4 hours unless they relate to a hurricane, in which case they are valid for 6 hours.



Weather Reports

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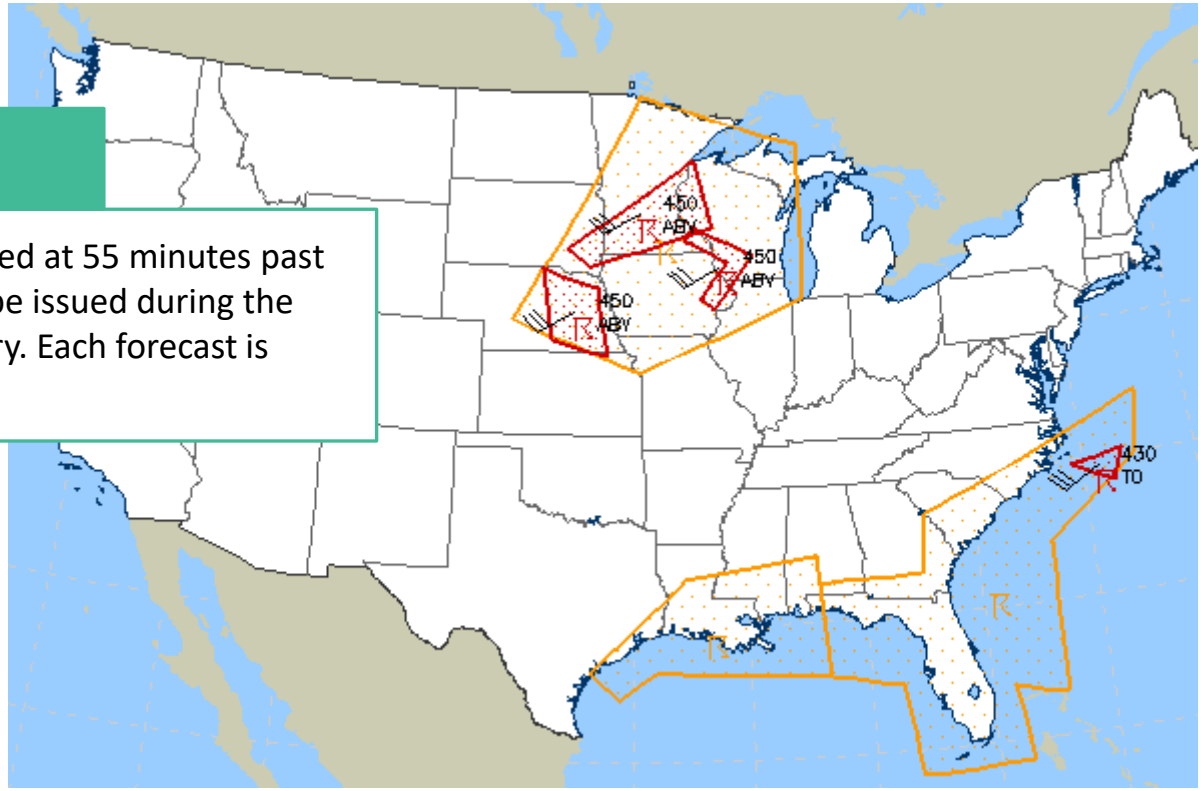
Convective SIGMET

A Convective SIGMET (WST) is an inflight weather advisory issued for hazardous convective weather that affects the safety of every flight. They are essentially SIGMETs that are associated with Thunderstorms. Convective SIGMETs are issued for severe thunderstorms with:

- Surface winds greater than 50 knots
- Hail at the surface greater than or equal to ¾ inch in diameter
- Tornadoes

Validity Times

Each report is issued at 55 minutes past the hour but can be issued during the interim if necessary. Each forecast is valid for 2 hours.



Weather Reports

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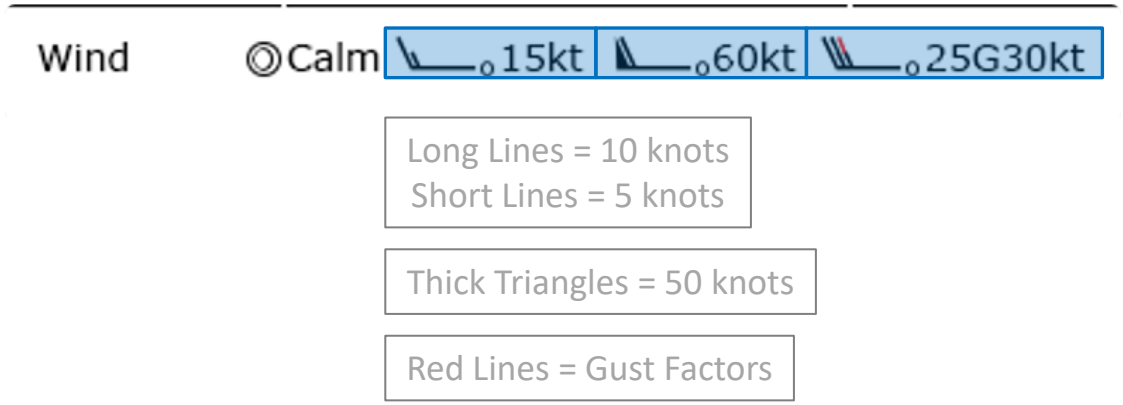
Winds and Temps Aloft

Winds and temperatures aloft forecasts (FB) provide wind and temperature forecasts for specific locations throughout the United States.The forecasts are made twice a day based on the radiosonde upper air observations taken at 0000Z and 1200Z.

Wind Symbols



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Example #1

```
FD KWBC 151640

BASED ON 151200Z DATA

VALID 151800Z FOR  USE 1700-2100Z TEMPS NEG ABV 24000

FT  3000    6000     9000   12000    18000    24000    30000   34000   39000

ALA                  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
```

The Wind Direction, Velocity, and Temperature For Denver at 12,000’ MSL = 250@32 Knots, -8C

Weather Reports

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Winds and Temps Aloft

Winds and temperatures aloft forecasts (FB) provide wind and temperature forecasts for specific locations throughout the United States.The forecasts are made twice a day based on the radiosonde upper air observations taken at 0000Z and 1200Z.

Example #2

```
FD KWBC 151640

BASED ON 151200Z DATA

VALID 151800Z FOR  USE 1700-2100Z TEMPS NEG ABV 24000

FT  3000   6000    9000  12000   18000   24000   30000  34000  39000

ALA                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
```

The Wind Direction, Velocity, and Temperature
For St. Louis at 39,000’ MSL = 230@119 Knots, -60C

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Surface Analysis Charts

Surface analysis charts show the general locations of pressure systems and fronts for the surface around the country. Isobars (the light gray lines) are lines of equal pressure. When these lines are closer together it can indicate areas of high wind. Troughs (the orange dashed lines) are elongated areas of low pressure). Additionally, some pressure readings are bold and underlined while others are grayed out. The ones that are bold and underlined are the highest or lowest pressure readings in the area and generally correlate to the High and Low Pressures seen.

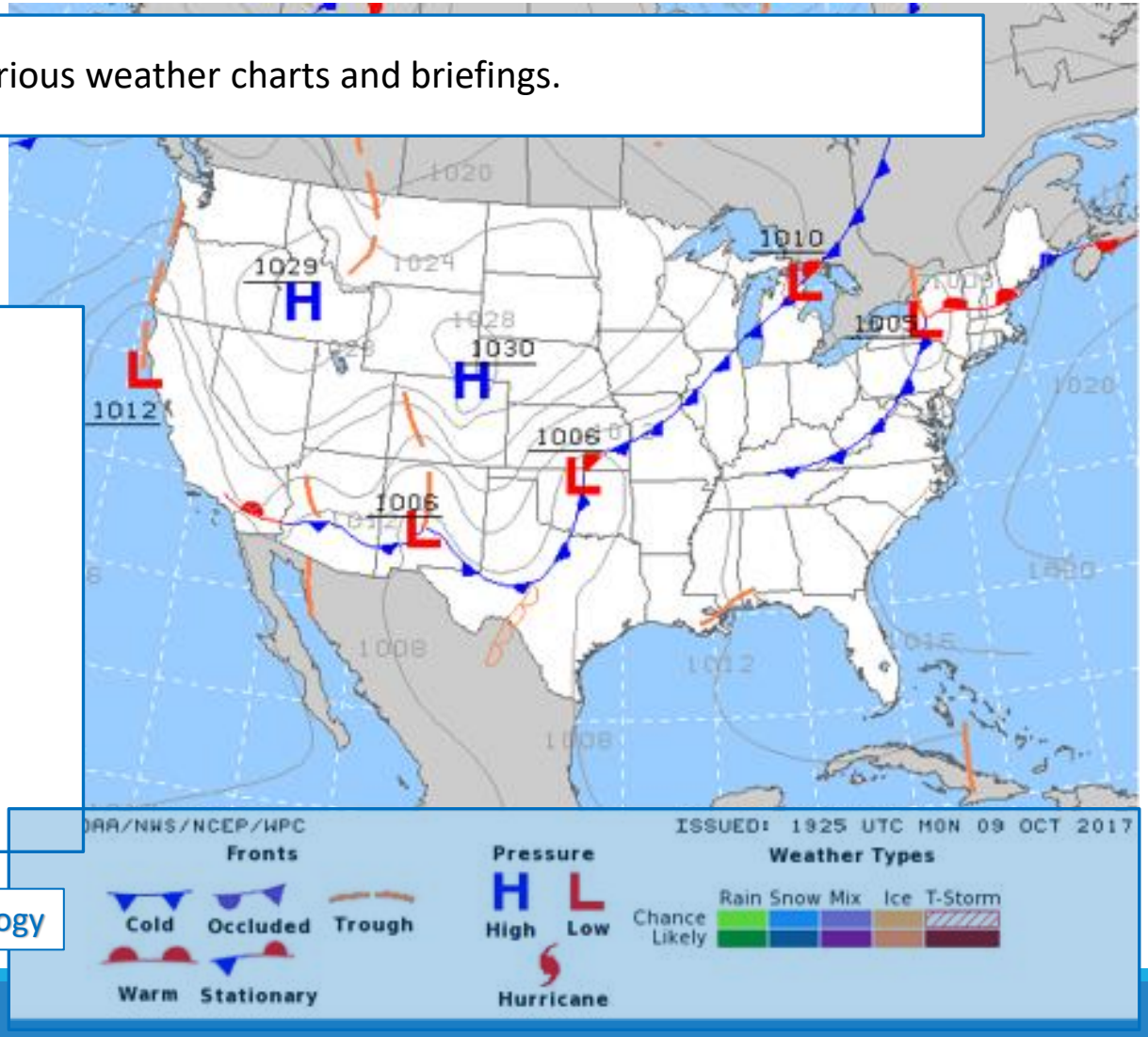

Chart Symbology

Weather Reports

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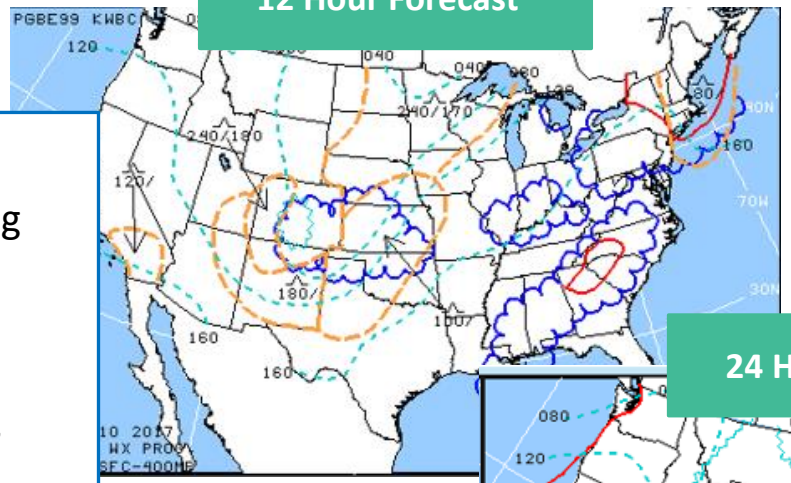
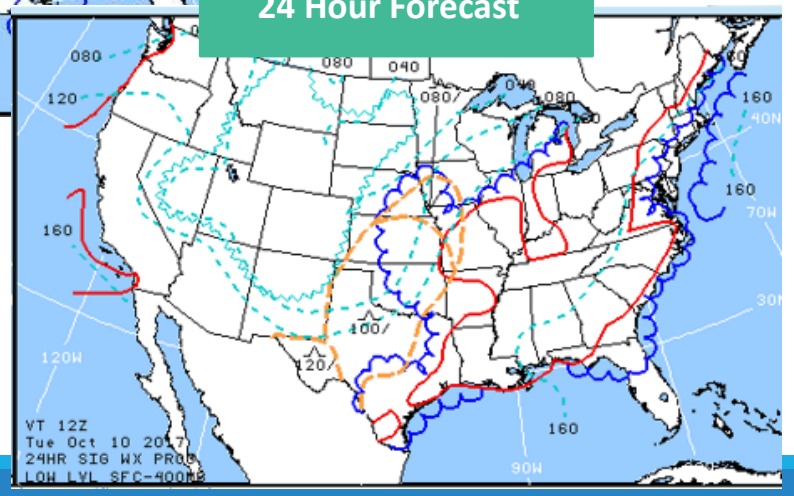
Low Level Prognostic Charts

The low-level chart is is a forecast of aviation weather hazards, primarily intended to be used as a guidance product for briefing the VFR pilot. The forecast domain covers the 48 contiguous states, southern Canada and the coastal waters for altitudes below 24,000 ft. Low altitude Significant Weather charts are issued four times daily and are valid at fixed times: 0000, 0600, 1200, and 1800 UTC. Each chart is divided on the left and right into 12 and 24 hour forecast intervals.

12 Hour Forecast



24 Hour Forecast



Symbology

Weather Reports

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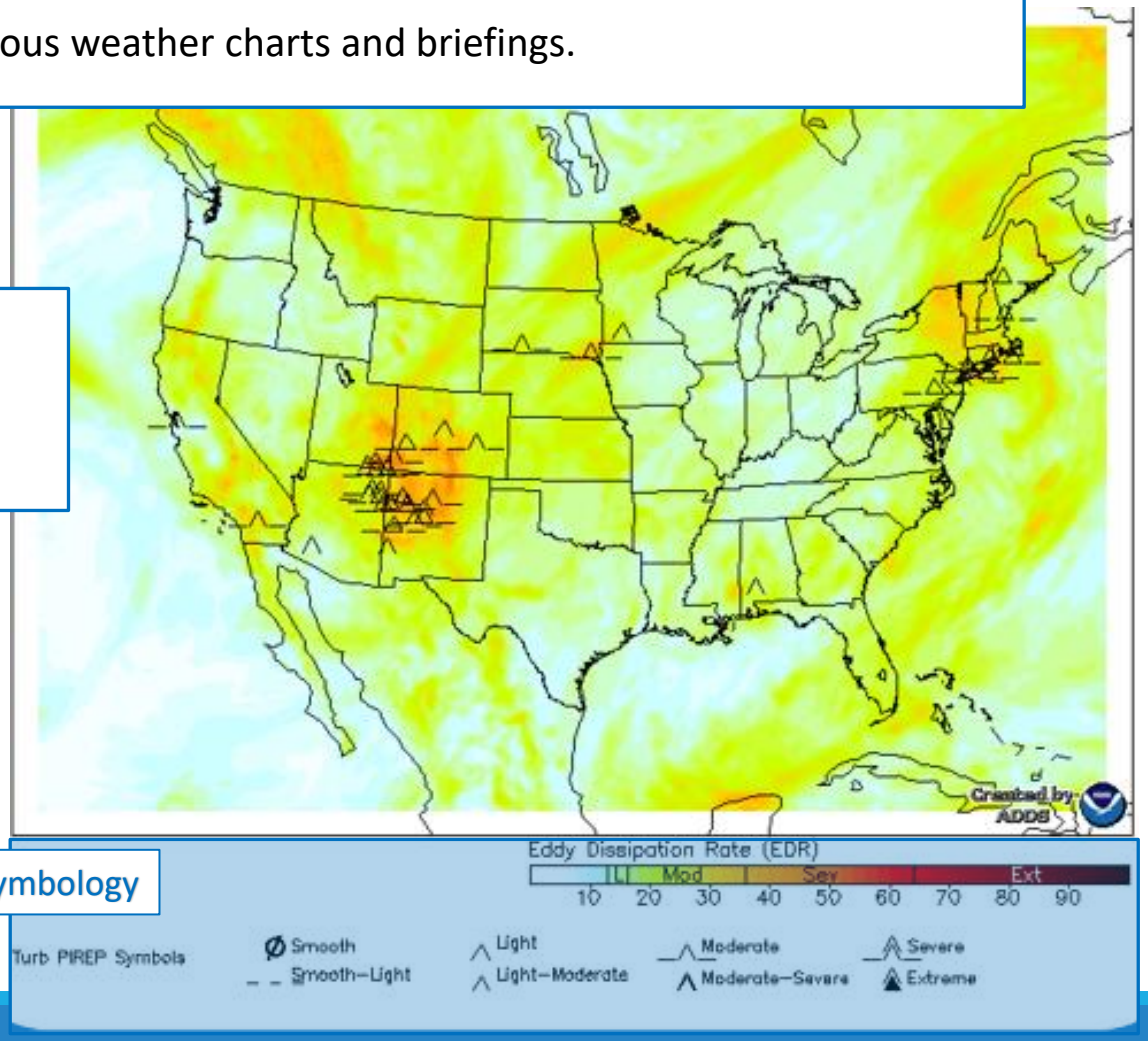
Turbulence Chart

Turbulence charts show the location and intensity of turbulence in a given area. The symbols and color coding are found at the bottom of the chart.



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Icing Chart

Icing charts show the location and intensity of icing in a given area. The symbols and color coding are found at the bottom of the chart. SLD = Supercooled Liquid Drops and represent intense possibilities and hazards of icing in their indicated areas.

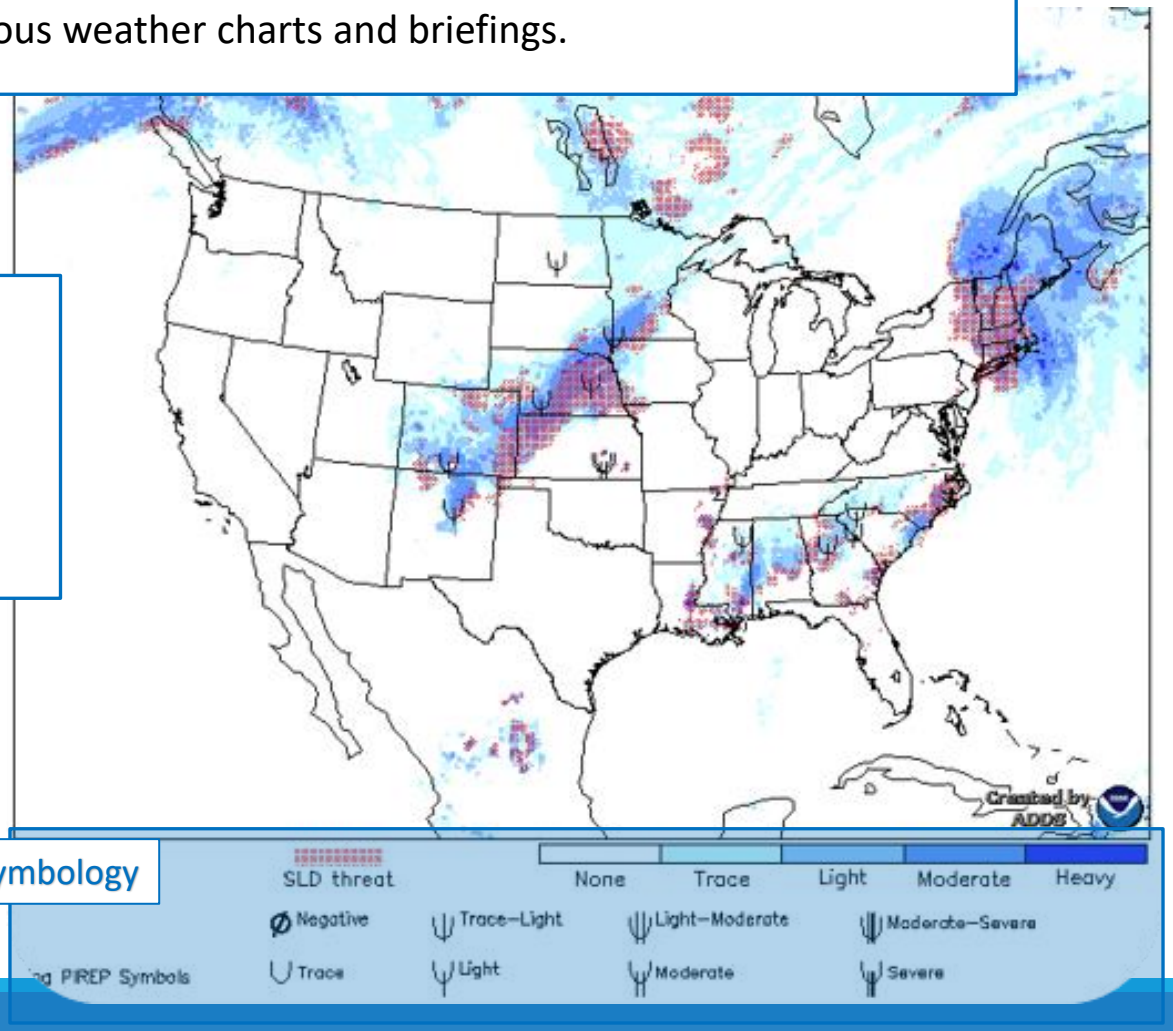

Chart Symbology

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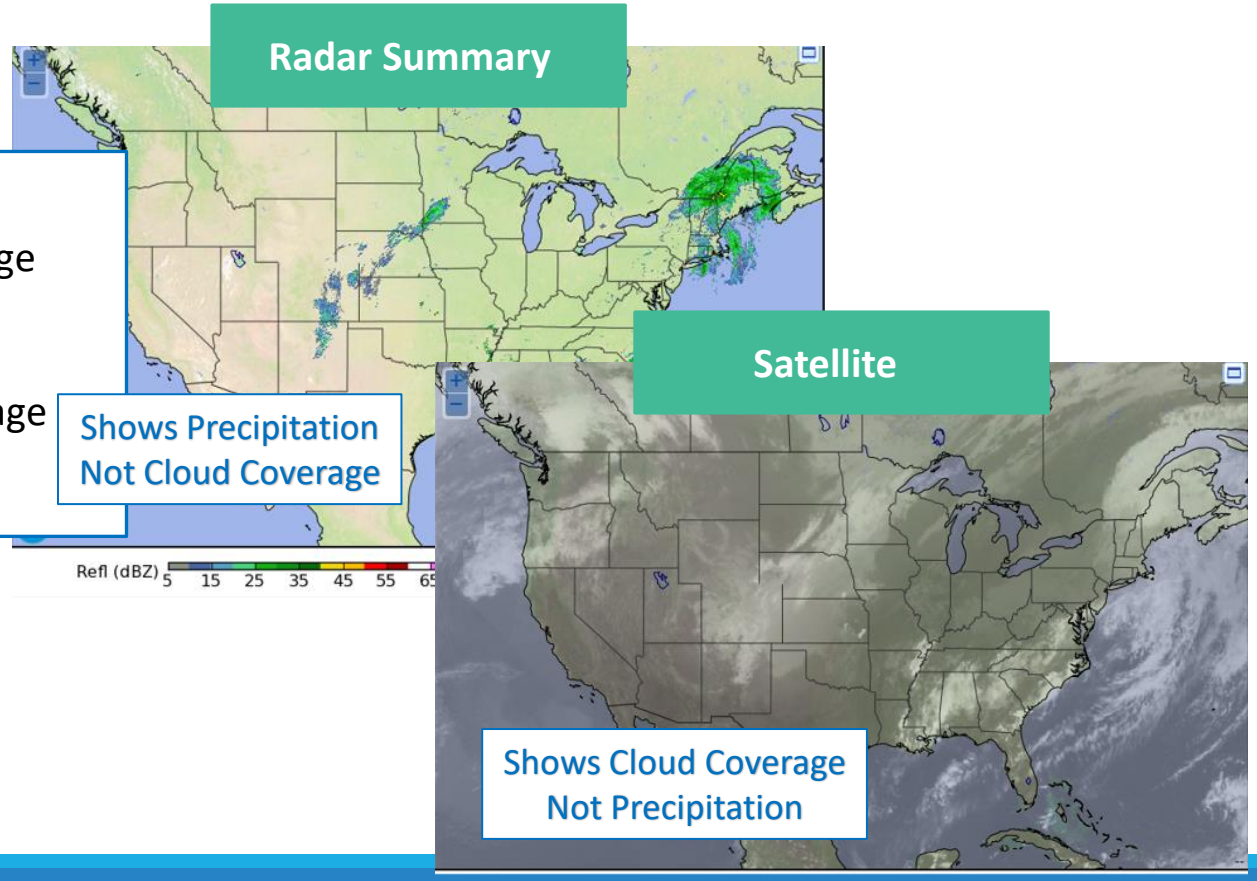
Radar Summary and Satellite Charts

Radar Summary Charts show areas of precipitation and the intensity of the precipitation. They do not show cloud coverage in the area.

Satellite Charts are just the opposite. They show cloud coverage for an area but do not show precipitation.



Lesson Summary

In this lesson we discussed various weather reports, how to decode those reports, and the information they give to pilots. All of this information is vital in making the “go/no-go” decision and the importance of thorough preflight weather briefings cannot be emphasized enough.