Gleim Pilot Handbook

Eleventh Edition, First Printing
Updates
October 2022

NOTE: Text that should be deleted is displayed with a line through it. New text is shown with blue underlined font.

If you are tested on any content not represented in our materials or this update, please share this information with Gleim so we can continue to provide the most complete test preparation experience possible. You can submit feedback at www.GleimAviation.com/questions. Thank you in advance for your help!

These updates are due to industry changes and for clarity. Edits performed throughout the book, but not represented in this document, include changing “cockpit” to “flight deck” and updating “Notice to Airmen” to “Notice to Air Missions.”

Study Unit 1 – Airplanes and Aerodynamics

Page 21, Subunit 1.1, Item 2.e.:

e. **Center of pressure --** the point along the chord line of a wing at which all the aerodynamic forces (including lift) are considered to be concentrated. For this reason, it is also called the **center of lift** **(CoL)**. Lift acts perpendicular to the flight path through the CoL.

Page 34, Subunit 1.5, Item 2.c.:

c. **Wing flaps** are used on ~~most airplanes to increase~~ airfoils to change the camber, which alters both lift and drag.

Page 41, Subunit 1.6, New item 6.c.2)c):

c) Profile drag equals the total of the form drag and skin friction for a two dimensional airfoil section.

~~c~~d) **Interference drag** is caused by interference of the airflow between adjacent parts of the airplane, such as the intersections of wings and tail sections with the fuselage. This drag combines the effects of form and skin friction drag.

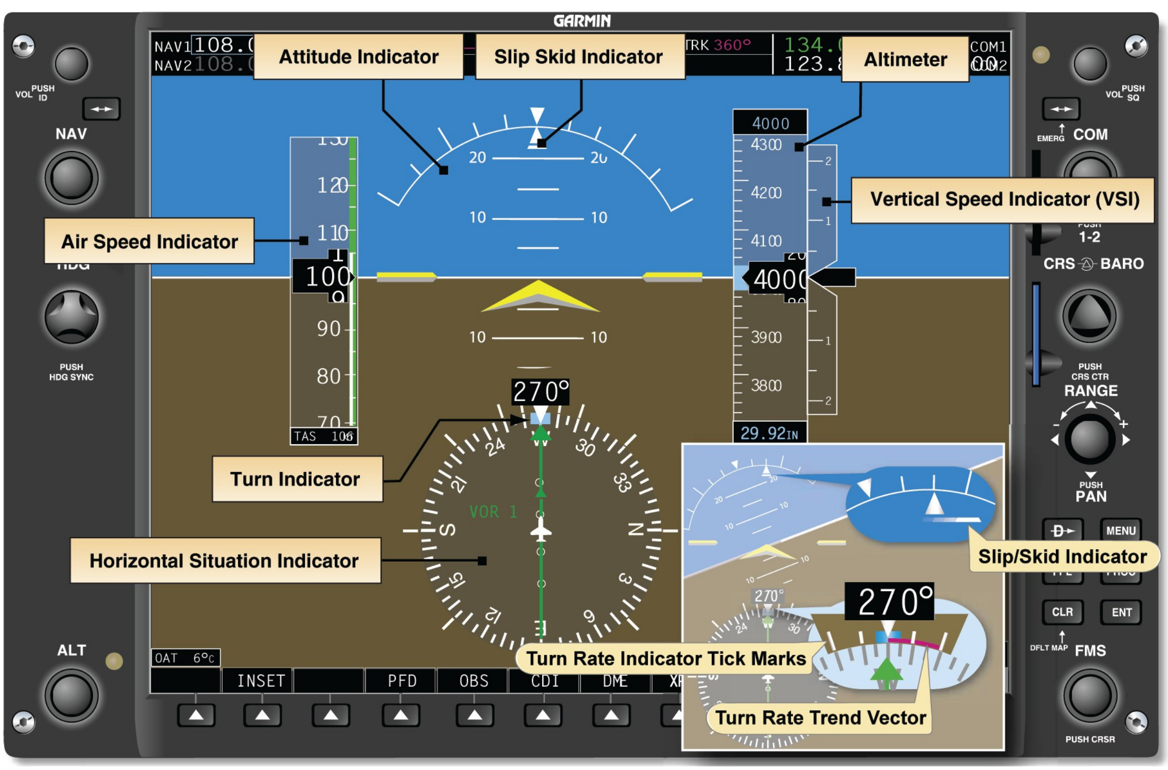
i) Fairings are used to streamline these intersections and decrease interference drag.

Study Unit 2 – Airplane Instruments, Engines, and Systems

Pages 97-99, Subunit 2.12: This subunit was replaced with new material on electronic flight instrumentation systems (EFIS), reproduced below without blue underlined font.

2.12 ELECTRONIC FLIGHT INSTRUMENTATION SYSTEMS (EFIS)

1. It is now very common for general aviation airplanes to have advanced flight and engine instrumentation.
   a. All major aircraft manufacturers provide electronic flight instrumentation systems as standard or optional equipment.
   b. This system of electronic flight displays (EFDs) and associated components displays information, such as
      1) Aircraft flight attitude and direction
      2) Location via a moving map
      3) Pertinent engine information
   c. **Integrated advanced avionics systems** increase EFIS functionality by incorporating communication/navigation radios, transponders, autopilots, weather and traffic display systems, and even cabin controls.
   d. These systems are designed to decrease pilot workload, enhance situational awareness, and increase the safety margin. EFIS require almost no maintenance compared to mechanical instrumentation systems.
2. While all EFIS are slightly different, they contain two central components.
   a. **Primary Flight Display (PFD)**
      1) The PFD shows the six basic flight instruments (seen in the figure below).
      2) Navigational instruction can also be displayed.
      3) Various insets of traffic, terrain, and moving map information can be selected.

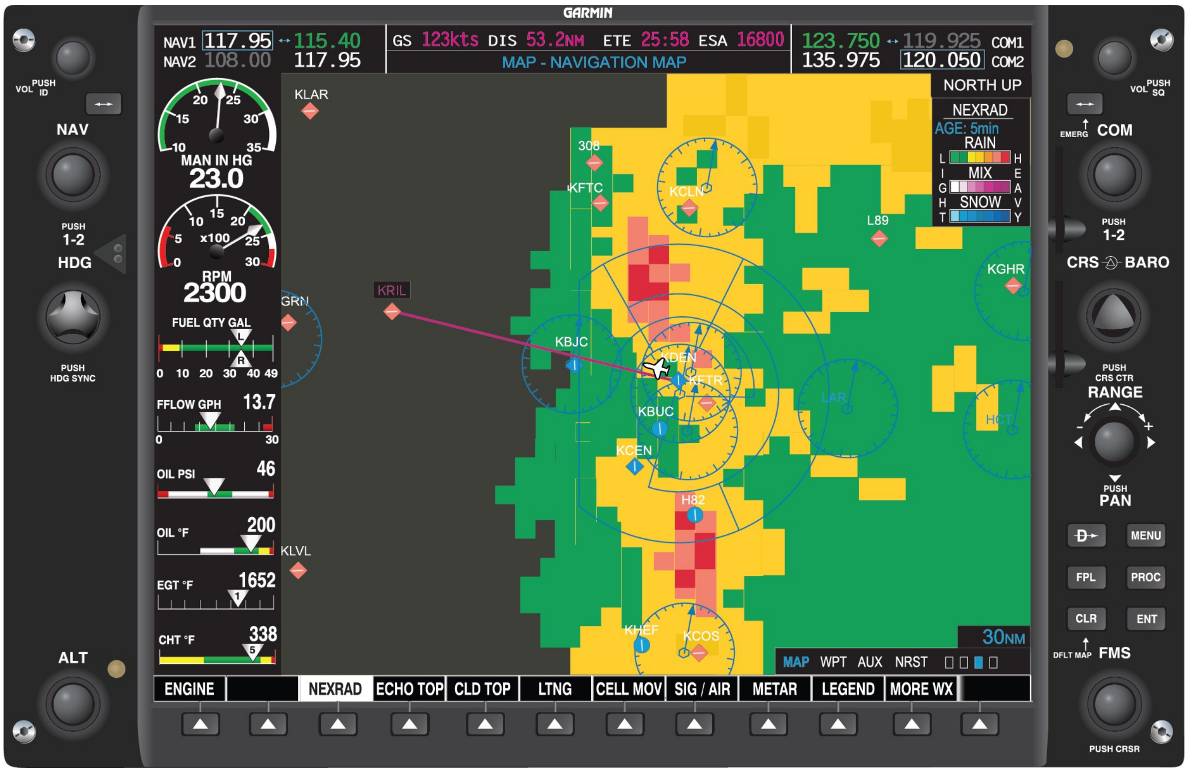


b. **Multi-Function Display (MFD)**

1) The MFD usually includes a large moving map (several map pages may be available) and engine instrumentation. With some installations, it is used as a backup for the PFD.

2) The MFD can usually interface with (display) weather radar, traffic avoidance systems, terrain warning systems, and various forms of navigational charts and/or instrument approach plates.

3) A typical MFD presentation is shown below.



3. These systems get their display information from electronic sources instead of traditional pitot-static and vacuum systems. This increases the internal, error-monitoring capability of the units while making them more reliable and reducing maintenance.

a. An **Attitude and Heading Reference System (AHRS)** provides information typically given by gyroscopic instruments, such as

1) Attitude (pitch/bank) information
2) Heading
3) Rate of turn
4) Turn coordination

b. An **Air Data Computer (ADC)** provides information typically given by pitot-static instruments, such as

1) Airspeed
2) Altitude
3) Vertical speed

c. These devices are typically referred to as **Line Replaceable Units (LRUs)** because of their stand-alone nature and the ease with which they can be replaced.

4. EFIS can reduce pilot workload and increase situational awareness.
    a. Complete system knowledge is essential to be able to use it effectively.
        1) Pilots with incomplete knowledge of advanced avionics systems will find that their workload is actually increased and their attention is shifted from flying the airplane. This is often described as "heads down" flying.
        2) This is fundamentally dangerous and must be avoided by thorough initial and recurrent systems training.
    b. The PFD presents all necessary flight information in one central location with trend displays, so the pilot is not only aware of what is happening with the airplane at any given time but also what will happen in the immediate future.
    c. The MFD provides the pilot with the "big picture," greatly increasing situational awareness.
        1) From the MFD you can monitor nearest airports, wind drift, terrain and landmarks, and weather and traffic information (if equipped).
5. EFIS increase safety through internal, automatic error-monitoring and alerting systems.
    a. A typical system will alert a pilot if any operational tolerance is exceeded in any system component.
    b. In the case of a PFD or MFD failure, information from both displays can be shown on a single screen, called **reversionary mode**.
    c. Troubleshooting a malfunctioning system on the ground is as easy as plugging a computer into the system and determining the error code.
        1) Failures in these systems are very rare.
        2) Time between errors is measured in thousands of hours rather than hundreds of hours for traditional instrumentation systems.

Study Unit 3 – Airports, Air Traffic Control, and Airspace

Page 187, Subunit 3.17, New item 4.a.:

4. You should copy the clearance; then read it back to the controller.
    a. Recall **C-R-A-F-T** for the components of a clearance:
        1) **C** - Clearance
        2) **R** - Route
        3) **A** - Altitude
        4) **F** - Frequency
        5) **T** - Transponder

Page 199, Subunit 3.26, Item 2.b.:

b. Two-way radio communication, appropriate navigational capability, ADS-B, and a Mode C transponder are required.

Pages 199-200; Subunit 3.27; Items 2.c., 3., and 4.b.:

c. Mode C transponder and ADS-B Out equipment is required within and above the lateral limits of Class B airspace and within 30 NM of the primary airport.

[. . .]

3. For IFR operations, an operable VOR or TACAN receiver or an operable and suitable RNAV system is required, in addition to a two-way radio, ADS-B Out, and a Mode C transponder.

4. **Mode C Veil**

   a. The Mode C veil is the airspace within 30 NM of a Class B primary airport, from the surface up to 10,000 ft. MSL.

   b. Unless otherwise authorized by ATC, aircraft (with some exceptions) operating within this airspace must be equipped with a Mode C transponder and operable ADS-B Out equipment.

Page 200, Subunit 3.28, Items 2.b.2)-3) and New item 2.b.4):

b. Minimum equipment needed to operate in Class C airspace:

   1) 4096 code transponder, with

   2) Mode C (altitude encoding) capability when within and above Class C airspace, ~~and~~

   3) Two-way communication capability~~.~~, and

   4) Operable ADS-B Out equipment.

Page 201; Subunit 3.30; Items 2., 2.a., and New item 3.:

2. There are no specific pilot certification ~~or equipment~~ requirements to operate ~~under VFR~~ in Class E airspace.

   a. ~~While generally no equipment is required to operate VFR in Class E airspace, t~~There are some airports with operational control towers within the surface area of Class E airspace. In these circumstances, you must establish and maintain two-way radio communication with the control tower if you plan to operate to, from, or through an area within 4 NM from the airport, from the surface up to and including 2,500 ft. AGL.

3. Equipment requirements unless otherwise authorized by ATC are as follows:

   a. Mode C altitude reporting transponder and ADS-B Out equipment above 10,000 ft. MSL within the 48 contiguous states and DC (excludes airspace at or below 2,500 ft. AGL).

   b. Operable ADS-B Out at and above 3,000 ft. MSL over the Gulf of Mexico from the United States coastline to 12 NM offshore.

~~3~~4. **Types of Class E Airspace**

Study Unit 4 – Federal Aviation Regulations

Page 226, Subunit 4.6, New Sec. 61.8:

61.8 Inapplicability of Unmanned Aircraft Operations

1. Actions conducted under Part 107, Small unmanned aircraft systems (sUAS), cannot be used to meet Part 61 requirements.

Page 227, Subunit 4.6, 61.18: Coverage of Sec. 61.18 was deleted.

Page 234; Subunit 4.6; 61.57; Item 2.a., Items 2.a.1)-3), and New items 2.a.4)-5):

2. Instrument rating recent flight experience
   a. To act as PIC of an airplane under IFR, you must have logged the following flight experience (actual or simulated) ~~within the previous 6 months:~~. Recall 6-6-H-I-T for experience requirements:
      1) ~~At least six instrument approaches~~ 6 - within the 6 calendar months preceding the month of the flight
      2) ~~Holding procedures~~ 6 - performed 6 instrument approaches
      3) ~~Intercepting and tracking courses through the use of navigation systems~~ H - holding procedures and tasks
      4) I - intercepting courses
      5) T - tracking courses through the use of navigational electronic systems

Page 260, Subunit 4.8, 91.109, Item 2.a.1):

2. To conduct simulated instrument flight, you must
   a. Have at least a private pilot with appropriate category and class ratings at the other set of controls, i.e., the safety pilot.
      ~~1) Since the safety pilot is required, (s)he is a required flight crewmember who must also have a valid medical certificate.~~

Page 263, Subunit 4.8, 91.130, Item 3.:

3. Unless otherwise authorized by the ATC facility having jurisdiction over the Class C airspace area, you must have a transponder with altitude encoding and the applicable ADS-B Out equipment while operating in the Class C airspace area and the airspace above the ceiling and within the lateral boundaries of the Class C airspace area.

Page 264, Subunit 4.8, 91.131, Item 5. and New item 5.a.:

5. The equipment aboard your aircraft must include operative two-way radio communications ~~and~~, a transponder with altitude encoding (Mode C), and the applicable ADS-B Out equipment.
   a. In addition to two-way communications, operation under IFR requires an operable VOR or TACAN receiver or an operable and suitable RNAV system.

Page 270, Subunit 4.8, 91.167, Item 2.:

~~2. An alternate airport is not required if, for 1 hr. before and 1 hr. after the proposed ETA, the ceiling is forecast to be at least 2,000 feet above the airport elevation, and the visibility 3 SM.~~

Page 270, Subunit 4.8, 91.169, Item 1.:

1. ~~An alternate airport is required to be listed on an IFR flight plan except when~~ Recall **always/unless** and the **1-2-3** rule for forecast weather.
   a. ~~The first airport of intended landing has a prescribed instrument approach procedure, and~~ An alternate airport is **always** required, **unless** the first airport of intended landing has a standard instrument approach procedure (SIAP) and weather reports or forecasts indicate that
      1) 1 - For at least 1 hr. before and for 1 hr. after the ETA
      2) 2 - Ceiling will be at least 2,000 ft. above the airport elevation
      3) 3 - Visibility will be at least 3 SM
   ~~b. At least 1 hr. before and 1 hr. after the ETA, the weather reports or forecasts indicate~~
      ~~1) Ceiling of at least 2,000 ft. above the airport elevation and~~
      ~~2) Visibility of at least 3 SM.~~

Study Unit 5 – Airplane Performance and Weight and Balance

Page 305, Subunit 5.5, Item 3.b.6)a):

TAKE-OFF DATA

TAKE-OFF DISTANCE FROM HARD SURFACE RUNWAY WITH FLAPS UP

GROSS WEIGHT POUNDS	IAS AT 50 ~~MPH~~ FT.	HEADWIND KNOTS	AT SEA LEVEL & 59°F		AT 2500 FT. & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TOTAL TO CLEAR 50 FT. OBS	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS
2300	68	0	865	1525	1040	1910	1255	2480	1565	3855
		10	615	1170	750	1485	920	1955	1160	3110
		20	405	850	505	1100	630	1480	810	2425
2000	63	0	630	1095	755	1325	905	1625	1120	2155
		10	435	820	530	1005	645	1250	810	1685
		20	275	580	340	720	425	910	595	1255
1700	58	0	435	780	520	920	625	1095	765	1370
		10	290	570	335	680	430	820	535	1040
		20	175	385	215	470	270	575	345	745

NOTES: 1. Increase distance 10% for each 25°F above standard temperature for particular altitude.
2. For operation on a dry, grass runway, increase distances (both “ground run” and “total to clear 50 ft. obstacle”) by 7% of the “total to clear 50 ft. obstacle” figure.

Study Unit 6 – Aeromedical Factors and Aeronautical Decision Making (ADM)

Page 331, Subunit 6.2, Items 2.b. and 2.b.2)-3):

b. **~~Hypemic~~Anemic hypoxia** occurs when the blood is not able to take up and transport a sufficient amount of oxygen to the cells in the body.

1) This type of hypoxia is a result of oxygen deficiency in the blood, rather than a lack of inhaled oxygen, and can be caused by a variety of factors, such as

a) Reduced blood volume (due to severe bleeding)

b) Certain blood diseases (e.g., anemia)

c) Hemoglobin, which transports oxygen, is chemically unable to bind oxygen molecules

2) The most common form of ~~hypemic~~anemic hypoxia is carbon monoxide (CO) poisoning. This is explained in greater detail in Subunit 6.5.

3) ~~Hypemic~~Anemic hypoxia can also be caused by the loss of blood due to blood donation. Blood can require several weeks to return to normal following a donation.

a) Although the effects of the blood loss are slight at ground level, there are risks when flying during this time.

Page 332, Subunit 6.3, Items 2.a.2)-3):

a. Heat exhaustion often accompanies dehydration. Below are the three stages of heat exhaustion, along with accompanying signs and symptoms.

1) Heat stress (body temp., 99.5°-100° F) – reduces performance, decision-making ability, alertness, and visual capabilities.

2) Heat exhaustion (body temp., 101°-~~105°~~104° F) – fatigue, nausea/vomiting, cramps, rapid breathing, and fainting.

3) Heat stroke (body temp., >~~105°~~104° F) – body's heat control mechanism stops working, mental confusion, disorientation, and coma.

Page 333, Subunit 6.5, Item 2.:

2. When carbon monoxide is taken into the lungs, it combines with hemoglobin, the oxygen-carrying agent in the blood. The affinity of the hemoglobin for carbon monoxide is greater than for oxygen; consequently, ~~hypemic (~~anemic~~)~~ hypoxia occurs.

Page 347, Subunit 6.12, Item 4.d.:

	1	2	3	4	5	Rating
Pilot						
Experience	>1500 hours	500-1500 hours	300-500 hours	100-300 hours	<100 hours	
Recency (last 90 days)	>20 hours	15-20 hours	10-14 hours	5-9 hours	<5 hours	
Currency	VFR and IFR		VFR not IFR		Not VFR or IFR	
Emotional Condition	Excellent	Good	Average	Poor	Unacceptable	
Aircraft						
Fuel Reserves	Exceeds requirement		Meets requirement		None	
Time in Type	>400 hours	300-400 hours	200-300 hours	100-200 hours	<100 hours	
Performance	Well within limits		At limits		Outside limits	
Equipment	GPS, weather display	Hand-held GPS	VOR, NDB	Minimum required	Does not meet 14 CFR 91.205	
enVironment						
Airport	Adequate, familiar		Barely adequate		Unfamiliar, inadequate	
Weather (IFR/VFR)	VFR		MVFR	IFR	LIFR	
Runways	Dry, hard, long	Dry, hard, short	Dry, soft, short	Wet, hard, short	Wet, soft, short	
Lighting (Day VFR=1)	Runway, taxiway		Runway only		None	
Terrain	Flat, ~~populated~~ dry	Flat, swampy	Flat, ~~unpopulated~~ dense forests	Hilly	Mountainous	
External pressures						
Delays/Diversions	No pressure exists		Inconvenient		Not possible	
Alternate Plans	No pressure exists		Inconvenient		Not possible	
Personal Equipment	Emergency kit		Cell phone only		None available	
Additional Factors						
					Total Risk Rating →	
Risk within normal parameters. Flying is inherently risky. Do not take any unnecessary risks and examine your personal minimums to ensure compliance.						16-33
Elevated risk. Plan for extra time for flight planning. Review your personal minimums to ensure that all your self-determined standards are being met. Carefully analyze any risks near or on the boundaries of your personal minimums. Delay any flight that exceeds your personal minimums until conditions improve.						34-55 Or a 5 in any row
High risk. Plan for extra time for flight planning and consider requesting assistance from a more experienced pilot, if one is available. Carefully examine your personal minimums to ensure none are being violated. Examine methods of reducing the risk to the extent possible. Consider delaying or canceling the flight if risks cannot be reduced to an acceptable level.						56-80 Or a 5 in any two rows

Study Unit 7 – Aviation Weather

Page 376, Subunit 7.9:

7.9 TURBULENCE, WIND SHEAR, AND WIND SHEAR AVOIDANCE

Page 379, Subunit 7.9, New item 5:

5. Wind Shear Avoidance
   a. Understanding how to avoid wind shear is just as important as understanding how it is formed.
      1) Accident reports have shown that experiencing wind shear even within the performance capability of an airplane has caused tragic accidents.
      2) Though training to recover from wind shear is recommended, emphasis should be placed on avoidance.
         a) Pilots should understand that the success rate of recovering from a wind shear incident is not high.
   b. If a microburst has been detected in the vicinity of an airport, avoidance involves delaying your departure or approach for 10 to 20 min.
      1) This is the average time required for microbursts to dissipate.
   c. Although there is no assured detection and warning system in operation that can measure wind shear intensity along a specific flight path, referring to available weather reports such as METARs and PIREPs can provide insight and may be helpful in avoiding wind shear.
   d. The table below, from AC 00-54, *Pilot Windshear Guide*, provides a subjective evaluation of various observational clues to aid in making appropriate real-time wind shear avoidance decisions.

TABLE 1

MICROBURST WINDSHEAR PROBABILITY GUIDELINES

OBSERVATION	PROBABILITY OF WINDSHEAR
PRESENCE OF CONVECTIVE WEATHER NEAR INTENDED FLIGHT PATH:	
- With localized strong winds (Tower reports or observed blowing dust, rings of dust, tornado-like features, etc.)	HIGH
- With heavy precipitation (Observed or radar indications of contour, red or attenuation shadow)	HIGH
- With rainshower	MEDIUM
- With lightning	MEDIUM
- With virga	MEDIUM
- With moderate or greater turbulence (reported or radar indications)	MEDIUM
- With temperature/dew point spread between 30 and 50 degrees fahrenheit	MEDIUM
ONBOARD WINDSHEAR DETECTION SYSTEM ALERT (Reported or observed)	HIGH
PIREP OF AIRSPEED LOSS OR GAIN:	
- 15 knots or greater	HIGH
- Less than 15 knots	MEDIUM
LLWAS ALERT/WIND VELOCITY CHANGE	
- 20 knots or greater	HIGH
- Less than 20 knots	MEDIUM
FORECAST OF CONVECTIVE WEATHER	LOW

NOTE: These guidelines apply to operations in the airport vicinity (within 3 miles of the point of takeoff or landing along the intended flight path and below 1000 feet AGL). The clues should be considered cumulative. If more than one is observed the probability weighting should be increased. The hazard increases with proximity to the convective weather. Weather assessment should be made continuously.

CAUTION: CURRENTLY NO QUANTITATIVE MEANS EXISTS FOR DETERMINING THE PRESENCE OR INTENSITY OF MICROBURST WINDSHEAR. PILOTS ARE URGED TO EXERCISE CAUTION IN DETERMINING A COURSE OF ACTION.

e. The observation weighting is categorized according to the following scale:

1) High Probability

a) **Critical attention needed.** A decision to avoid by diverting or delaying is appropriate.

2) Medium Probability

a) **Consideration should be given to avoiding.** Pilots should take careful precautions.

3) Low Probability

a) **Consideration should be given to this observation.** However, a decision to avoid is not generally required.

f. The guidelines in the table on the previous page apply to operations in the airport vicinity, which is defined as within 3 mi. of takeoff or landing along the intended flight path below 1,000 ft. AGL. The use of this table should not replace sound judgment in making wind shear avoidance decisions.

1) If more than one wind shear clue is observed, the total probability rating should be increased and pilots should strongly consider delaying or diverting the flight.

g. Remember, when it comes to wind shear, avoidance is the safest answer.

Page 380, Subunit 7.10, Items 3. and 3.a. and New items 3.d.-g.:

3. ~~Three types of ice can form on an airplane:~~ There are many forms of in-flight icing.

a. **Clear or glaze ice** forms when water droplets that touch the airplane flow across the surface before freezing. Clear ice will accumulate as a smooth sheet. This type of ice forms when the water droplets are large, such as in rain or cumuliform clouds.

[. . .]

d. **Residual ice** is any ice remaining on a protected surface after the actuation of a deicing system.

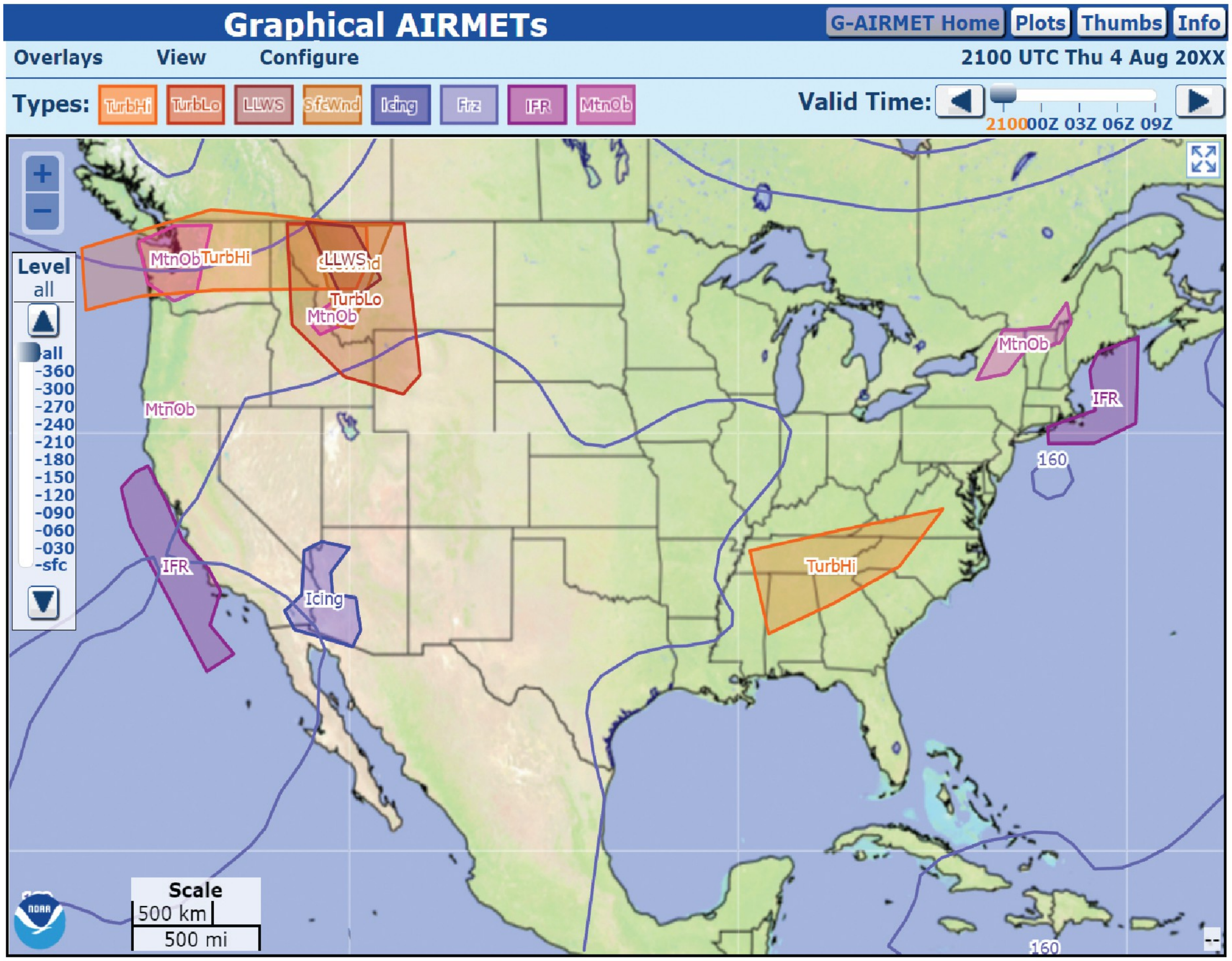
e. **Intercycle ice** is the ice that accumulates on a protected surface between deicing actuation cycles.

f. **Known or observed or detected ice** is any actual ice accretion that is identified by onboard sensors or visually observed by the flight crew.

g. **Runback ice** is ice formed by water leaving protected surfaces, freezing or refreezing as it runs back onto unprotected surfaces, and likely refreezing there as clear ice.

Study Unit 8 – Aviation Weather Services

Page 399, Subunit 8.5, Item 1.: Subunit 8.5 was previously replaced in a May 2020 update. The figure was updated to the image below.

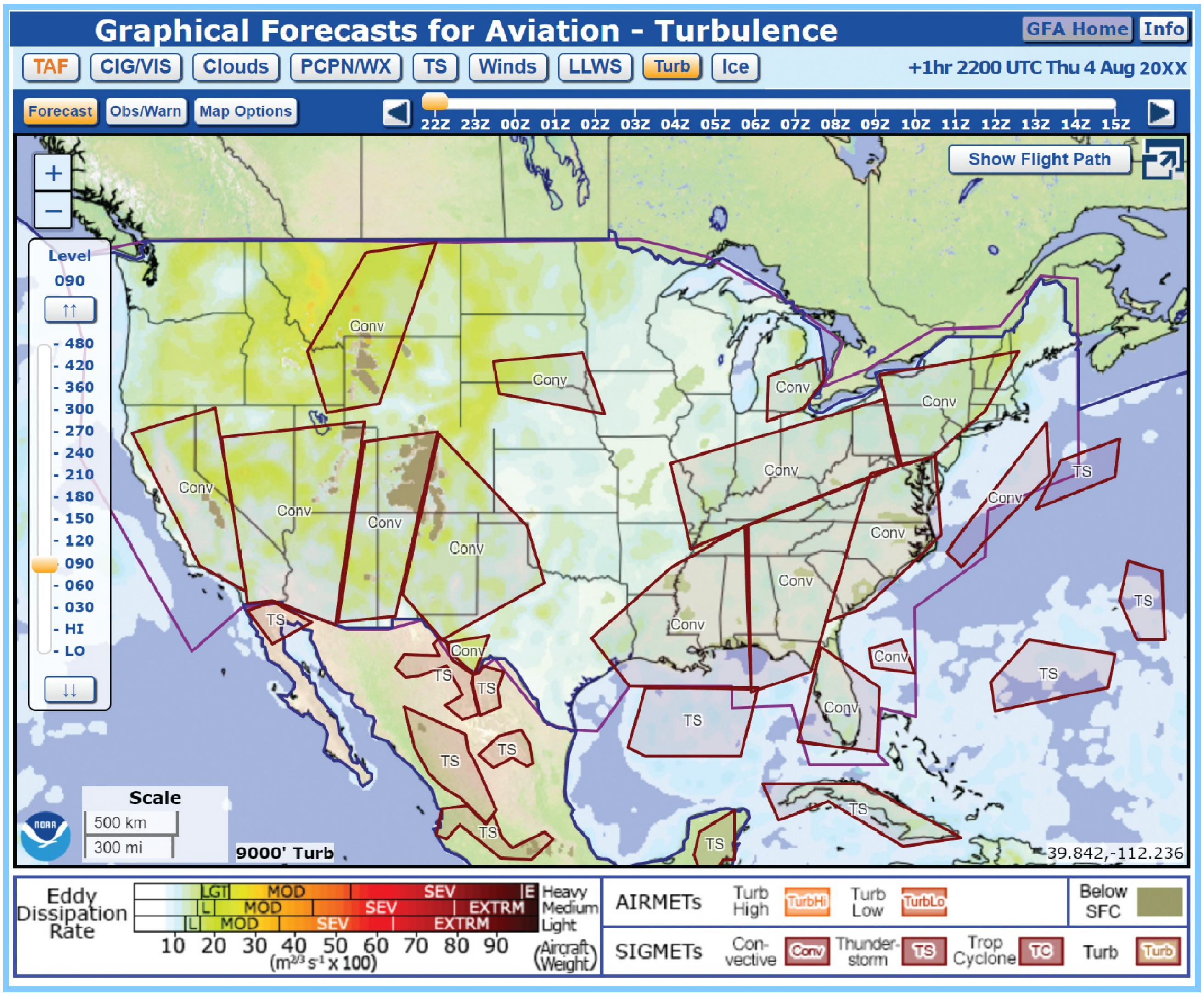


Page 402, Subunit 8.6, Items 2.a. and 3.: Subunit 8.6 was previously added in a December 2017 update.

a. The GFA web page includes observational data, forecasts, and warnings that can be viewed from 14 hr. in the past to ~~15~~18 hr. in the future, including thunderstorms, clouds, flight category, precipitation, icing, turbulence, and wind.

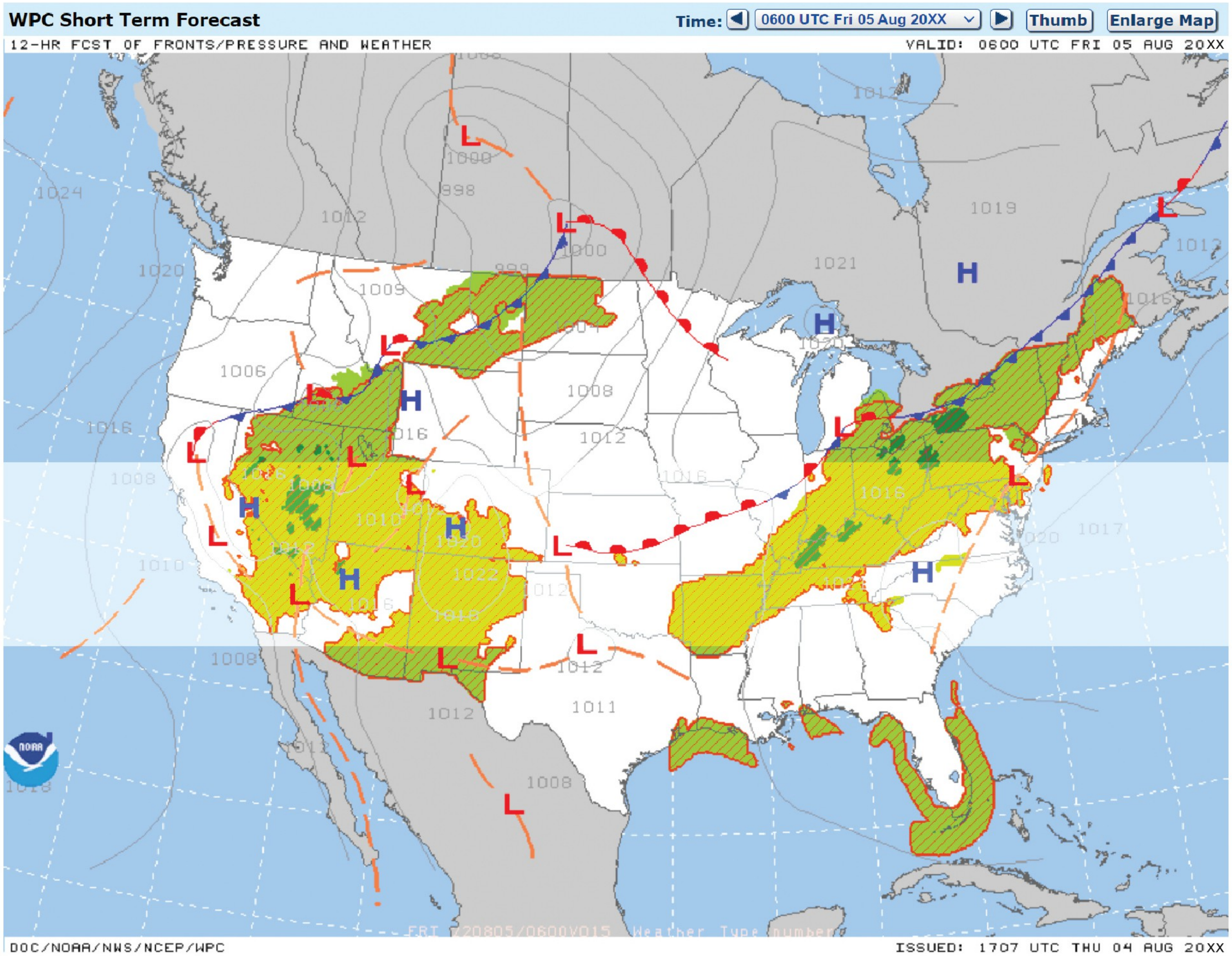
[. . .]

3. A GFA forecast for turbulence intensity at the 9,000-ft. level at ~~2100Z~~2000Z is shown below.

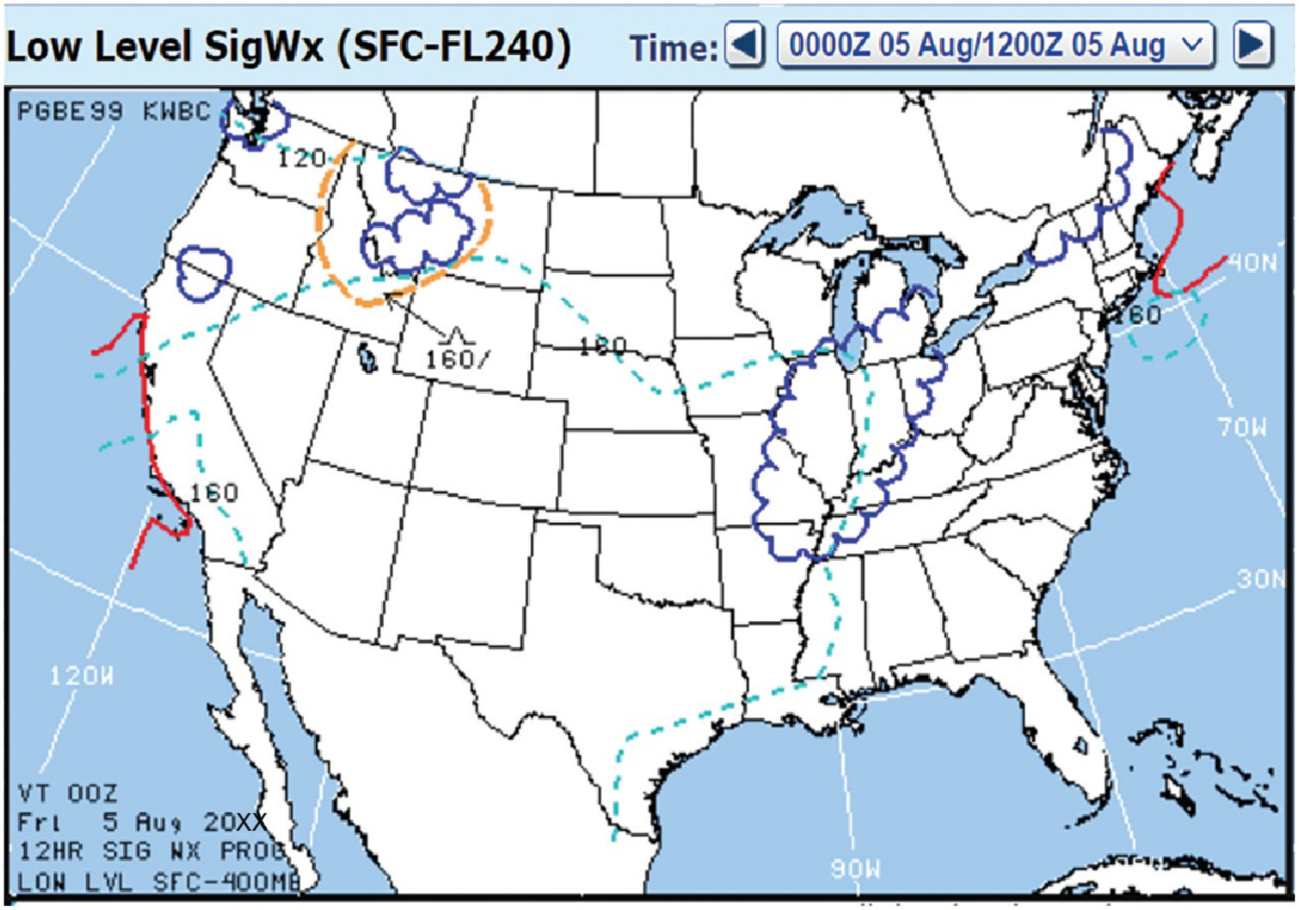


Pages 410, Subunit 8.10: This subunit covering CVA was added in a December 2017 update and has now been removed.

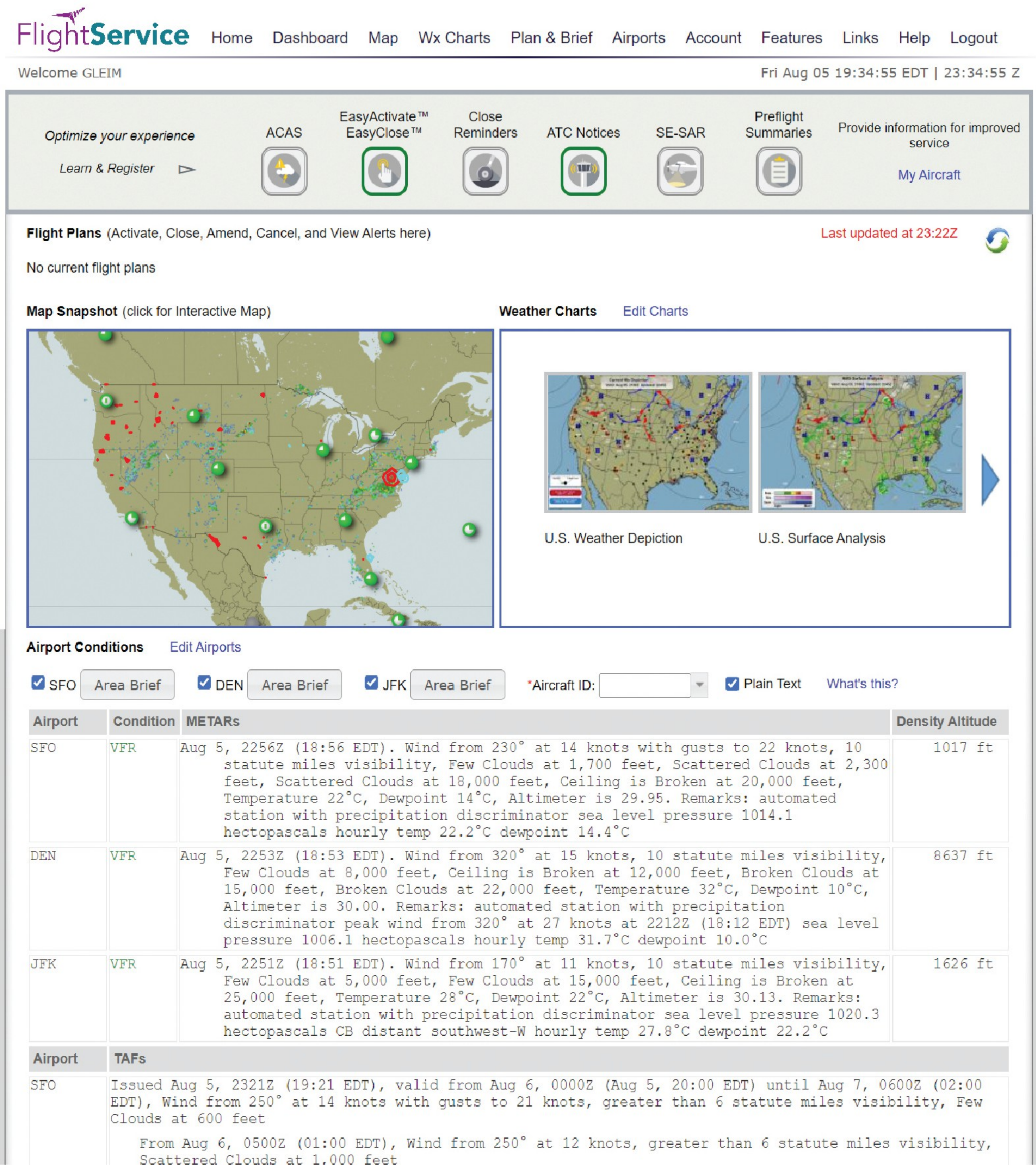
Page 412, Subunit 8.11, Item 2.c.: The figure was updated to the image below.



Page 414, Subunit 8.12, Item 3.: The figure was updated to the image below.



Page 422, Subunit 8.14, Item 4.a.: The figure was updated to the image below.



FlightService Home Dashboard Map Wx Charts Plan & Brief Airports Account Features Links Help Logout

Welcome GLEIM Fri Aug 05 19:34:55 EDT | 23:34:55 Z

Optimize your experience

Learn & Register

ACAS | EasyActivate™ EasyClose™ | Close Reminders | ATC Notices | SE-SAR | Preflight Summaries

Provide information for improved service

My Aircraft

Flight Plans (Activate, Close, Amend, Cancel, and View Alerts here) Last updated at 23:22Z

No current flight plans

Map Snapshot (click for Interactive Map)

Weather Charts Edit Charts

U.S. Weather Depiction U.S. Surface Analysis

Airport Conditions Edit Airports

SFO Area Brief DEN Area Brief JFK Area Brief *Aircraft ID: Plain Text What's this?

Airport	Condition	METARs	Density Altitude
SFO	VFR	Aug 5, 2256Z (18:56 EDT). Wind from 230° at 14 knots with gusts to 22 knots, 10 statute miles visibility, Few Clouds at 1,700 feet, Scattered Clouds at 2,300 feet, Scattered Clouds at 18,000 feet, Ceiling is Broken at 20,000 feet, Temperature 22°C, Dewpoint 14°C, Altimeter is 29.95. Remarks: automated station with precipitation discriminator sea level pressure 1014.1 hectopascals hourly temp 22.2°C dewpoint 14.4°C	1017 ft
DEN	VFR	Aug 5, 2253Z (18:53 EDT). Wind from 320° at 15 knots, 10 statute miles visibility, Few Clouds at 8,000 feet, Ceiling is Broken at 12,000 feet, Broken Clouds at 15,000 feet, Broken Clouds at 22,000 feet, Temperature 32°C, Dewpoint 10°C, Altimeter is 30.00. Remarks: automated station with precipitation discriminator peak wind from 320° at 27 knots at 2212Z (18:12 EDT) sea level pressure 1006.1 hectopascals hourly temp 31.7°C dewpoint 10.0°C	8637 ft
JFK	VFR	Aug 5, 2251Z (18:51 EDT). Wind from 170° at 11 knots, 10 statute miles visibility, Few Clouds at 5,000 feet, Few Clouds at 15,000 feet, Ceiling is Broken at 25,000 feet, Temperature 28°C, Dewpoint 22°C, Altimeter is 30.13. Remarks: automated station with precipitation discriminator sea level pressure 1020.3 hectopascals CB distant southwest-W hourly temp 27.8°C dewpoint 22.2°C	1626 ft

Airport	TAFs
SFO	Issued Aug 5, 2321Z (19:21 EDT), valid from Aug 6, 0000Z (Aug 5, 20:00 EDT) until Aug 7, 0600Z (02:00 EDT), Wind from 250° at 14 knots with gusts to 21 knots, greater than 6 statute miles visibility, Few Clouds at 600 feet From Aug 6, 0500Z (01:00 EDT), Wind from 250° at 12 knots, greater than 6 statute miles visibility, Scattered Clouds at 1,000 feet

Page 423, Subunit 8.14, Items 4.d.1)-9) and New items 4.d.10)-11): These edits update the list of detailed airport information available in Flight Services Online and remove the image that previously followed this list.

d. The **Airports** section provides detailed airport information including

1) ~~Communications frequencies~~ Location information
2) ~~Geographical information~~ Operational data
3) ~~Services available~~ Airport communications
4) ~~Operations~~ Nearby navigation aids
5) ~~NAVAIDs (Weather services and station type if available)~~ Runways
6) ~~Runways~~ Services available
7) ~~Airport remarks~~ Ownership information
8) ~~Airport satellite view~~ Remarks
9) Airport charts and publications

   ~~a) Airport diagram~~
   ~~b) IFR approach plates~~
   ~~c) Chart legends~~

10) Instrument approach procedure (IAP) charts
11) Chart legends

Pages 425-426, Subunit 8.15, Items 2.c.1)a) and 2.c.2)a): These edits update information available through Gleim Aviation Weather and the Aviation Weather Center as well as remove the image after 2.c.1)a) and replace the image after 2.c.2)a) with an updated version. This item was previously edited in a December 2017 update.

c. The following sites are popular weather resources for pilots.

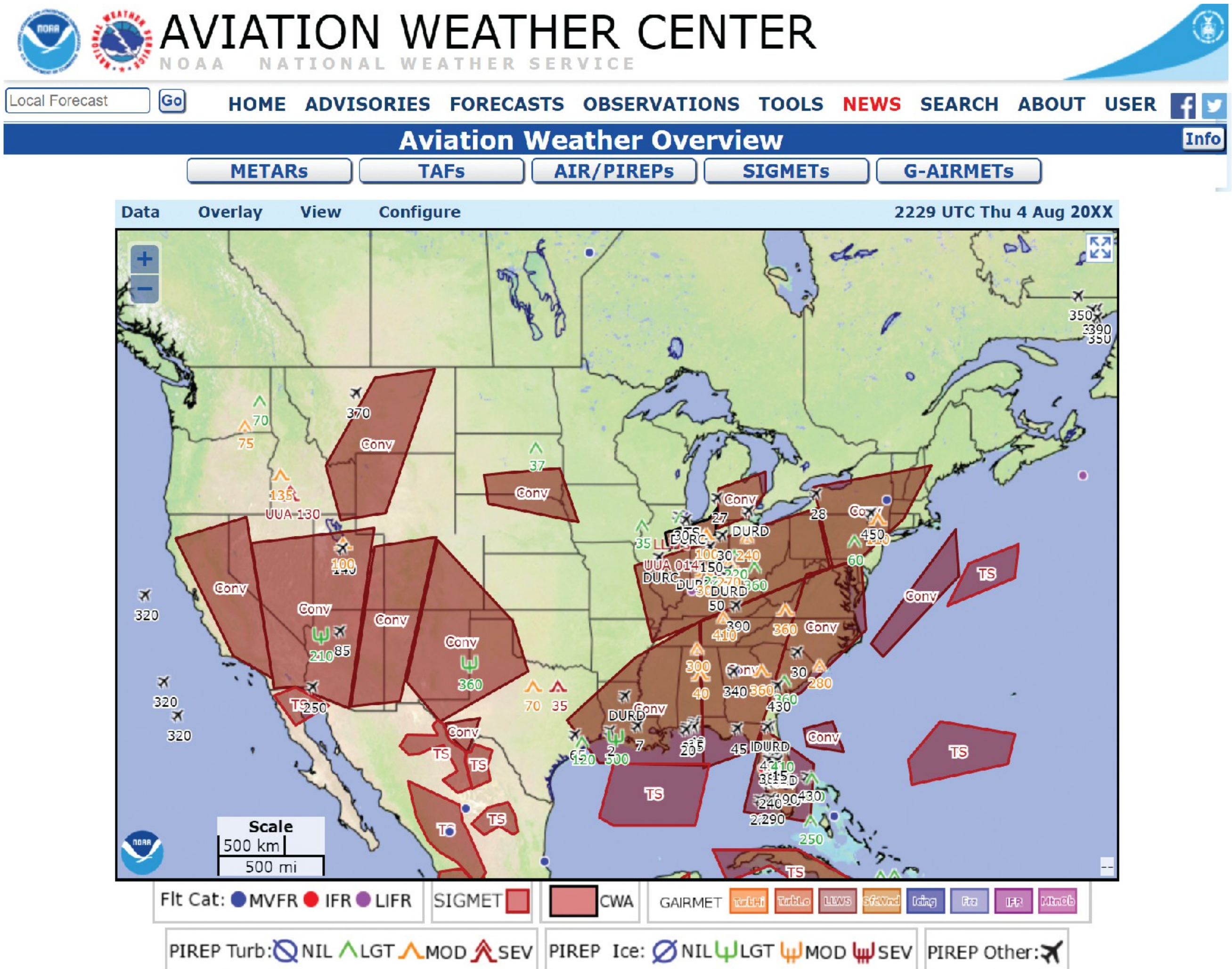
1) Gleim Aviation Weather: www.GleimAviation.com/resources/weather

   a) Links to National Weather Service radar images as well as METAR/TAF reports by airport, winds aloft, and ~~area forecast reports~~ the latest surface analysis. An easy onestop aviation weather information resource.

2) Aviation Weather Center: www.aviationweather.gov

   a) Official products, such as SIGMETs, AIRMETs, weather depiction, surface analysis, PROG Charts, METARs, TAFs, winds aloft forecasts, ~~area forecasts,~~ PIREPs, and ~~excellent~~ ~~National Radar~~radar with tops and satellite imagery, etc., are available on this official government website.

   NOTE: Accessing this information does NOT constitute an official weather briefing.


AVIATION WEATHER CENTER
NOAA NATIONAL WEATHER SERVICE
Local Forecast
Go
HOME ADVISORIES FORECASTS OBSERVATIONS TOOLS NEWS SEARCH ABOUT USER
Aviation Weather Overview
Info
METARs
TAFs
AIR/PIREPs
SIGMETs
G-AIRMETs
Data Overlay View Configure
2229 UTC Thu 4 Aug 20XX
Scale
500 km
500 mi
Flt Cat: MVFR IFR LIFR
SIGMET
CWA
GAIRMET
PIREP Turb: NIL LGT MOD SEV
PIREP Ice: NIL LGT MOD SEV
PIREP Other:

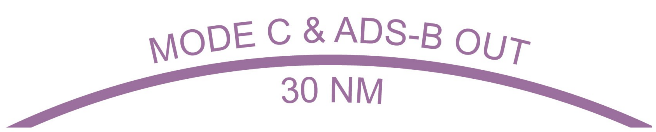
Study Unit 9 – Navigation: Charts, Publications, Flight Computers

Page 427, Subunit 9.1, Items 1. and 1.b.2): Item 1. was previously edited in a December 2017 update.

1. FAA-Approved Print Providers publish and distribute aeronautical charts of the United States and foreign areas. Digital versions of VFR charts are provided by the FAA at www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr. These charts are used by pilots to aid in pilotage and dead reckoning. Pilots can also obtain a wealth of information from these charts, such as the navigation systems available, elevation of the terrain, and Flight Service Station (FSS) frequencies. The types of charts most commonly used by pilots flying VFR include
   a. Sectional charts. The scale is 1:500,000 (1 in. = 6.86 NM).
      1) This chart is normally used for VFR navigation.
   b. VFR terminal area charts. The scale is 1:250,000 (1 in. = 3.43 NM).
      1) VFR terminal area charts depict Class B airspace and adjacent areas around very busy airports. Class B airspace, with its many irregular sectors and various altitude floors, is somewhat complex. The pilot can see these details much more easily on a terminal area chart than on a sectional chart because of the difference in scale.
      2) Most of the sectional and VFR terminal area charts are ~~revised semiannually~~updated every 56 days.

Page 436, Subunit 9.3, Item 2.b.2):

2) The 30-NM veil, within which an altitude-reporting transponder (Mode C) ~~is~~and ADS-B Out are required regardless of aircraft altitude, is depicted by a thin magenta circle.



Page 441, Subunit 9.5, Item 2.:

CHAPTER 7. SAFETY OF FLIGHT

Section 1. Meteorology
Section 2. ~~Altimeter Setting Procedures~~Barometric Altimeter Errors and Setting Procedures
Section 3. Cold Temperature Barometric Altimeter Errors, Setting Procedures and Cold Temperature Airports (CTA)
Section ~~3.~~4. Wake Turbulence
Section ~~4.~~5. Bird Hazards and Flight over National Refuges, Parks, and Forests
Section ~~5.~~6. Potential Flight Hazards
Section ~~6.~~7. Safety, Accident, and Hazard Reports

[. . .]

APPENDICES

Appendix 1. Bird/Other Wildlife Strike Report
Appendix 2. Volcanic Activity Reporting Form (VAR)
Appendix 3. Abbreviations/Acronyms
Appendix 4. FAA Form 7233-4 -- International Flight Plan
Appendix 5. FAA Form 7233-1 -- Flight Plan

Page 443, Subunit 9.6, New item 3.a.:

a. Generally, each chart issuance is organized as follows:

GENERAL INFORMATION	SECTION 4: ASSOCIATED DATA
City/Military Airport Cross Reference	FAA Telephone Numbers and National Weather Service
Seaplane Landing Areas	NWS Upper Air Observing Stations
Abbreviations	Air Route Traffic Control Centers
SECTION 1: AIRPORT/FACILITY DIRECTORY LEGEND	Flight Service Station Communication Frequencies
	~~Flight Standards District Offices~~
SECTION 2: AIRPORT/FACILITY DIRECTORY	VOR Receiver Checkpoints and VOR Test Facilities
	Parachute Jumping Areas
SECTION 3: NOTICES	Supplemental Communication Reference
~~Aeronautical Chart Bulletins~~	Preferred IFR Routes
Special Notices	~~Q-Routes~~
Regulatory Notices	~~High Altitude Redesign (HAR) Phase 1 RNAV Routing~~ Minimum Operational Network (MON) Airport Listing
	SECTION 5: AIRPORT DIAGRAMS
	Airport Diagrams Legend
	Airport Hot Spots
	Airport Diagrams
	~~National Weather Service (NWS) Upper Air Observing Stations~~
	~~Enroute Flight Advisory Service (EFAS)~~ PIREP Form

Study Unit 10 – Navigation Systems

Page 500, Subunit 10.5:

10.6 ~~AREA NAVIGATION (RNAV)~~ PERFORMANCE-BASED NAVIGATION (PBN)

1. Under performance-based navigation (PBN), there are two main categories of navigation specifications: area navigation (RNAV) and required navigation performance (RNP).

   a. RNP is a PBN system that includes onboard performance monitoring and alerting. Receiver Autonomous Integrity Monitoring (RAIM) is an example, covered further in Subunit 10.8.

   ~~1.~~b. ~~Area navigation (~~RNAV~~)~~ allows a pilot to fly a selected course to a predetermined point without the need to overfly ground-based navigation facilities. The most common types of RNAV equipment used by small general aviation aircraft are

      ~~a.~~1) VORTAC-based
      ~~b.~~2) GPS (Global Positioning System)

   ~~2.~~c. RNAV allows you to fly directly from your departure airport to your destination airport, or from waypoint to waypoint.

      ~~a.~~1) A **waypoint** is a geographical position that is determined by a radial and distance from a VORTAC station or by using latitude/longitude coordinates.

      ~~b.~~2) Flying direct saves time and fuel and lowers operating expenses.

2. To meet PBN requirements, RNAV or RNP accuracy must be met 95% of the flight time.

   a. Aircraft navigating by IFR-approved GPS are considered to be PBN aircraft.

Study Unit 11 – Cross-Country Flight Planning

Pages 509-510, Subunit 11.1, New items 1.b.1) and 1.d.1)a): Subunit 11.1, item 1.b., was previously edited in a May 2020 update.

b. Obtain the appropriate charts and other navigation publications (e.g., Chart Supplement) that you will need for your cross-country flight.

1) Examine the runway lengths, pavement classification numbers, runway lighting systems, and obstructions from the appropriate charts. Check this information against the required takeoff and landing distances in your aircraft's POH/AFM to determine if you are able to safely land at the selected airport.

~~1~~2) You can obtain all required NOTAMs from https://notams.aim.faa.gov/notamSearch/nsapp.html#/ or by specifically requesting any "published NOTAMs" from an FSS specialist during your weather briefing.

~~2~~3) Be sure that you use only current charts and publications. Revisions to aeronautical information occur constantly.

a) These revisions may include changes in radio frequencies, new obstructions, temporary or permanent closing of runways and airports, and other temporary or permanent hazards to flight.

[. . .]

d. Once you have your course line(s) drawn, survey where your flight will be taking you.

1) Look for available alternate airports en route.

a) Prior to selecting an alternate airport, ensure your aircraft is capable of landing at the alternate. You may do so by referring to the alternate airport's Chart Supplement to determine runway lengths and lighting limitations. Also refer to the alternate airport's NOTAMs to identify runway and NAVAID closures during your planned flight.

Page 512, Subunit 11.1, New items 2.a.-b.:

2. On the day of your flight, you should obtain a weather briefing that, among many other important items, will include forecast winds and temperatures aloft. You will use this information to complete your flight planning log.

a. If the weather information obtained prevents you from departing at the planned time, consider delaying the flight by a few hours. When opting to do so, ensure that you make the necessary changes to your flight planning log to reflect the change in conditions.

b. If the weather does not begin to subside, consider flying a different day, which is often a safer option than flying in marginal weather. Utilize your aeronautical decision making skills and risk management checklists to help with your decision.

Page 516, Subunit 11.2, Item 1.d.: Subunit 11.2 was previously replaced in a September 2019 update.

d. For additional guidance, refer to the *Aeronautical Information Manual (AIM)* ~~paragraph 5-1-9~~, Appendix 4.

Page 519, Subunit 11.2, Item 3.: Subunit 11.2 was previously replaced in a September 2019 update.

3. For a more in-depth description of each item, FAA guidance is available in the *AIM* as "Appendix ~~A~~ 4: FAA Form 7233-4 – International Flight Plan."

Page 521, Subunit 11.5, New item 1.a.5):

1. Among the aeronautical skills that you must develop is the ability to plot courses in flight to alternate destinations when continuation of the flight to the original destination is impracticable.
    a. Reasons include
        1) Low fuel
        2) Bad weather
        3) Pilot or passenger fatigue, illness, etc.
        4) Airplane system or equipment malfunction
        5) Delays at the original point of destination
        ~~5~~6) Any other reason that causes you to decide to divert to an alternate airport