Gleim Commercial Pilot Flight Maneuvers

Sixth Edition, First Printing
Updates
September 2019

NOTE: Sections with changes are indicated by a vertical bar in the left margin. 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!

The changes described and reproduced in this update are due to the release of the FAA's revised Commercial Pilot – Airplane Airman Certification Standards (FAA-S-ACS-7A, Change 1), effective June 2019.

To view the updated ACS, go to
https://www.faa.gov/training_testing/testing/acs/media/commercial_airplane_acs_change_1.pdf

The Task reproductions at the beginning of each Part II study unit as well as each Task element within each subunit have been updated to match the FAA ACS document above.

Part II/Study Unit 5 – Weather Information

Page 40, Subunit 5.1, New item 1.b.:

b. Flight Service Stations (FSSs) are FAA facilities that provide a variety of services to pilots, including pilot weather briefings.

1) An FSS provides preflight and in-flight briefings, transcribed weather briefings, and scheduled and unscheduled weather broadcasts, and it furnishes weather support to flights in its area.

2) Flight service specialists are certificated pilot weather briefers and are not authorized to make original forecasts.

a) They are trained to translate and interpret available forecasts and reports directly into terms of the weather conditions you may expect along your route of flight and at your destination.

3) To contact an FSS by telephone, dial 1-800-WX-BRIEF (1-800-992-7433).

a) Weather information is also available online at www.1800wxbrief.com.

4) The FSSs are here to serve you. You should not hesitate to discuss factors that you do not fully understand.

a) You have a complete briefing only when you have a clear picture of the weather to expect.

b) It is to your advantage to make a final weather check immediately before departure if at all possible.

~~b.~~c. The FAA and National Weather Service (NWS) collect weather observations.

Page 59, Subunit 5.1, New item 3.j.8):

8) **Mist** is a visible aggregate of minute water droplets or ice crystals suspended in the atmosphere that reduces visibility to less than 7 SM, but greater than, or equal to, 5/8 SM.

a) Mist forms a thin, grayish veil that covers the landscape. It is similar to fog but does not obstruct visibility to the same extent.

b) Mist may be considered an intermediate between fog and haze.

i) It has lower relative humidity (95-99%) than fog and does not obstruct visibility to the same extent.

ii) However, there is no distinct line between any of these categories.

Page 59, Subunit 5.1, New item 3.l.:

l. **Obstructions to visibility (e.g., smoke, haze, volcanic ash, etc.)**

1) **Haze** is a concentration of salt particles or other dry particles not readily classified as dust or other phenomena.

a) It occurs in stable air, is usually only a few thousand feet thick, but sometimes may extend as high as 15,000 ft.

b) Haze layers often have definite tops above which horizontal visibility is good.

i) However, downward visibility from above a haze layer is poor, especially on a slant.

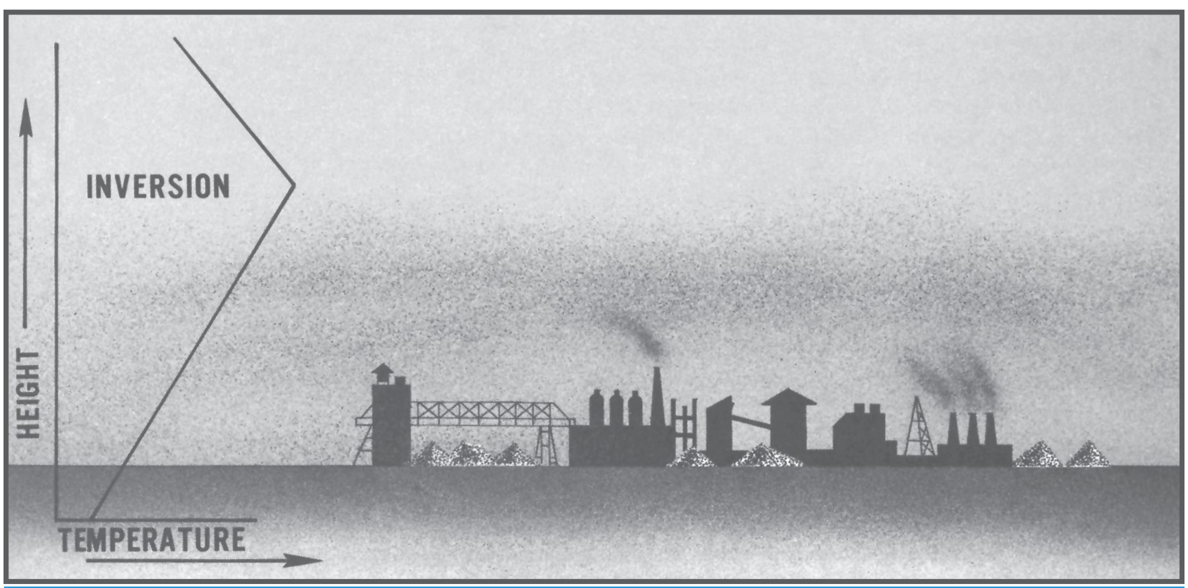
c) Visibility in haze varies greatly depending upon whether the pilot is facing the sun.

i) Landing an aircraft into the sun is often hazardous when haze is present.

2) **Smoke** concentrations form primarily in industrial areas when air is stable.

a) It is most prevalent at night or early morning under a temperature inversion, but it can persist throughout the day.

i) The figure below illustrates smoke trapped under a temperature inversion.



Smoke Trapped in Stagnant Air under an Inversion

3) When skies are clear above haze or smoke, visibility generally improves during the day; however, the improvement is slower than the clearing of fog.
   a) Fog evaporates, but haze or smoke must be dispersed by movement of air.
      i) Haze or smoke may be blown away, or heating during the day may cause convective mixing that spreads the smoke or haze to a higher altitude, decreasing the concentration near the surface.
   b) At night or in the early morning, radiation fog or stratus clouds often combine with haze or smoke.
      i) The fog and stratus may clear rather rapidly during the day, but the haze and smoke will linger.
      ii) A heavy cloud cover above haze or smoke may block sunlight, preventing dissipation; visibility will improve little, if any, during the day.
4) **Dust.** Strong wind lifts blowing dust in both stable and unstable air.
   a) When air is unstable, dust is lifted to great heights (as much as 15,000 ft.) and may be spread over wide areas by upper winds.
      i) Visibility is restricted both at the surface and aloft.
   b) When air is stable, dust does not extend to as great a height as in unstable air and usually is not as widespread.
   c) Dust, once airborne, may remain suspended and restrict visibility for several hours after the wind subsides.
   d) Aircraft operation in a dust storm can be very hazardous. Dust can
      i) Reduce visibility to zero in a matter of seconds.
      ii) Clog the air intake of engines and damage electro-optical systems.
      iii) Cause problems with human health.
5) **Blowing sand** is more local than blowing dust; the sand is seldom lifted above 50 ft. However, visibilities within it may be near zero.
   a) Blowing sand may occur in any dry area where loose sand is exposed to strong wind.
6) **Blowing snow** can cause visibility at ground level to be near zero, and the sky may become obscured when the particles are raised to great heights.
   a) Strong winds can keep snow suspended up to 50 ft. and reduce surface visibility to near-zero “whiteout” conditions.
7) **Volcanic ash** is made up of fine particles of rock powder that originate from a volcano and that may remain suspended in the atmosphere for long periods.
   a) Volcanic ash plumes may not be visible, especially at night or in instrument meteorological conditions (IMC).
      i) Even if visible, it is difficult to distinguish visually between an ash cloud and an ordinary cloud.
      ii) Ash cannot be detected by air traffic control (ATC) radar. However, it may be detected by weather radar, particularly during the early stages of a volcanic eruption when the ash is more concentrated.

b) Flying into a volcanic ash cloud can be exceedingly dangerous.

i) Volcanic ash is composed of silica (glass). When ash is ingested into a jet engine, it melts to produce a soft, sticky, molten product that adheres to the compressor turbine blades and fuel injectors/igniters.

ii) With no air going into the engine, the fuel cannot ignite, the engine comes to a slow spinning stop by spooling down, and a flameout occurs.

- As the aircraft exits the ash cloud into colder temperatures, the cooled, hardened silica on the turbine blades becomes dislodged, allowing the fan blades to start rotating and for an engine relight as the air starts moving through the engine again.

iii) Piston-powered aircraft are less likely to lose power, but severe damage is almost certain to ensue after an encounter with a volcanic ash cloud that is only a few hours old.

c) Volcanic ash also causes abrasive damage to aircraft flying through it at hundreds of miles per hour.

i) Particles impacting the windshield can sandblast the surface into a frosted finish that obscures the pilot's view.

ii) The sandblasting can also remove paint and pit metal on the nose and leading edges of wings and navigation equipment.

iii) Ash contaminates aircraft ventilation, hydraulic, instrument, electronic, and air data systems.

d) Ash covering a runway can cover its markings and cause aircraft to lose traction during takeoffs and landings.

Page 67, Subunit 5.3: Item 1. was split into item 1. and new item 3. by moving items 1.d.-v. to new item 3. as items a.-s. This section was previously edited in a December 2018 update.

Part II/Study Unit 15 – Before Takeoff Check

Page 186, Subunit 15.2, New item 4.:

4. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing a powerplant failure during takeoff or other malfunction while considering operational factors such as airplane characteristics, runway/takeoff path length, surface conditions, environmental conditions, and obstructions.**

a. Prior to takeoff, the departure plan briefing should include a statement regarding the appropriate course of action to take if an engine failure or other malfunction occurs at various phases of takeoff.

b. An engine failure on takeoff is a critical situation that will not allow time for emergency checklists or a restart in most cases.

1) However, an engine failure at altitude will allow some time to attempt a restart and to go through the appropriate emergency checklists.

c. After you decide the appropriate course of action, immediately implement your decision.

1) If engine power is lost during the takeoff roll, pull the throttle to idle, apply the brakes, and slow the airplane to a stop.
2) If you are just lifting off the runway and you lose engine power, land the airplane straight ahead.
3) If an actual engine failure occurs immediately after takeoff and before a safe maneuvering altitude is attained (at least 500 ft. AGL), it is usually inadvisable to attempt turning back to the takeoff runway.

a) Turning back to the airport should only be attempted if you have sufficient altitude and airspeed.
b) There is a high risk of entering an unrecoverable low-altitude stall/spin situation.
c) With an instructor, this maneuver can be safely practiced at a higher altitude to determine the typical altitude loss and the conditions necessary to safely turn back.

d. Section IV Introduction, item 22.e., on page 245, has more information on engine failure during takeoff and climb.

Part II/Study Unit 18 – Normal Takeoff and Climb

Page 252, Subunit 18.3, New item 8.: Subsequent items have been renumbered accordingly.

8. **The applicant demonstrates the ability to avoid excessive water spray on the propeller(s) (ASES, AMES).**

a. This is a seaplane task item, and it is not covered in this text.

Part II/Study Unit 19 – Normal Approach and Landing

Page 261, Subunit 19.2, Item 6.:

6. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing distractions, loss of situational awareness, ~~and~~/incorrect airport surface approach and landing, or improper task management.**

a. Study Unit 10, Subunit 2, item 3., beginning on page 133, has information on distractions, situational awareness, and task management.
b. Section IV Introduction, item 7., on page 228, has information on runway surface for approach and landing.

Part II/Study Unit 32 – Navigation Systems and Radar Services

Page 433, Subunit 32.1, New item 4.e.:

e. **ADS-B**

1) ADS-B is a precise satellite-based surveillance system. The use of satellites allows ATC to control areas that were not previously covered by line-of-sight radar facilities.
2) ADS-B technology will replace ATC's dependency on ground-based radar tracking and control systems.

3) ADS-B Mandate

a) ADS-B Out uses GPS technology to determine an aircraft's location, airspeed, and other data and broadcasts that information to a network of ground stations. The ground stations then relay the data at least once per second to air traffic control displays and to nearby aircraft equipped to receive the data via ADS-B In.

b) All aircraft (with few exceptions) operating in designated ADS-B airspace must be equipped with a certified ADS-B Out avionics unit by January 1, 2020.

c) ADS-B Out will be required in the following airspaces:

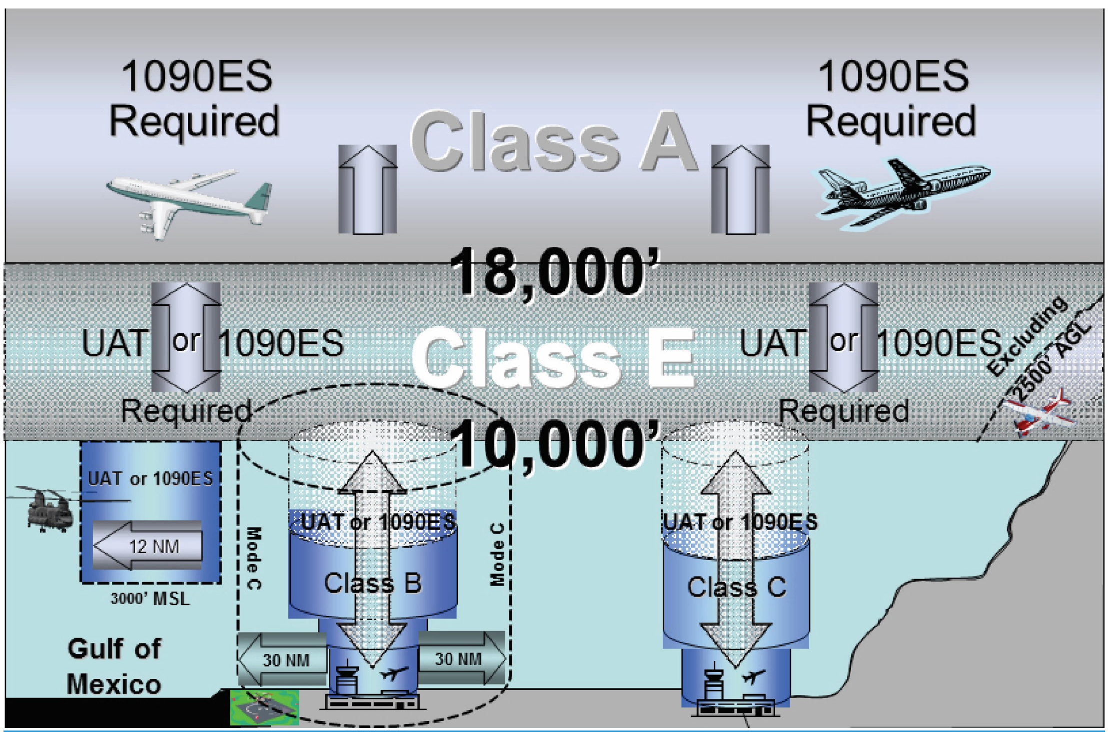
i) Class A, B, and C airspace

ii) Class E airspace areas at or above 10,000 ft. MSL over the 48 states and D.C., excluding airspace at and below 2,500 ft. AGL

iii) Airspace within 30 NM of certain busy airports from the surface up to 10,000 ft. MSL; airports listed in Appendix D to Part 91

iv) Above the ceiling and within the lateral boundaries of a Class B or C airspace area up to 10,000 ft. MSL

v) Class E airspace over the Gulf of Mexico at and above 3,000 ft. MSL within 12 NM of the coastline of the United States

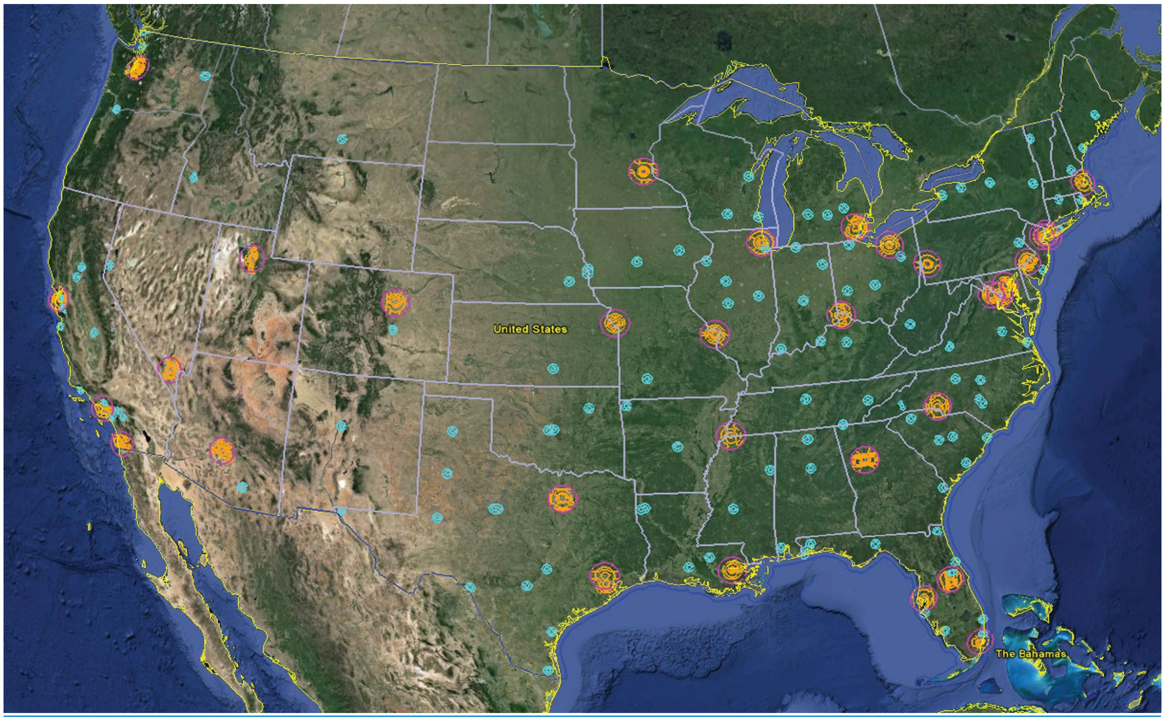


d) The mandate does not mean that aircraft without ADS-B will be grounded after January 1, 2020.

i) Rather, they will only be prohibited from flying in the designated airspace, which is very similar to the current Mode C transponder requirements.

ii) Aircraft that are not operated above 10,000 ft. MSL or near Class B or C airspace, may be able to continue operating without equipping.

iii) The image on the next page indicates areas where ADS-B Out is required below 10,000 ft. MSL.



e) For more information, refer to 14 CFR 91.225 and 91.227.

f) Aircraft operations above 18,000 ft. (FL180) or internationally require a Mode S transponder operating on 1090 MHz with Extended Squitter (1090ES).

i) A 1090 MHz receiver is needed to process Traffic Information Service Broadcast (TIS-B) information.

ii) Flight Information Services Broadcast (FIS-B) is not available with 1090ES.

g) Aircraft operating within U.S. airspace below FL180 can use either a 1090ES or a Universal Access Transceiver (UAT) operating on 978 MHz.

i) UAT is the data link that enables ADS-B for general aviation by broadcasting both position and performance information, while also receiving in-flight weather and traffic data.

h) ADS-B In is not part of the mandate.

4) Operators of aircraft equipped with ADS-B In can receive weather and traffic position information directly to the flight deck via FIS-B.

a) On most systems, the traffic is displayed on the GPS moving map or MFD with altitude and velocity information.

b) The cost to equip general aviation airplanes with ADS-B In starts around $2,000.

c) Portable ADS-B In devices are available starting at around $200 to display weather and traffic information to a portable electronic device. These devices cannot be certified to meet the ADS-B Out mandate.

5) In addition to traffic, ADS-B In offers the following services to pilots:

a) Weather information including radar, METARs, and TAFs

b) Terrain awareness information displayed on the GPS or MFD

c) TFR and NOTAM data

i) There is a 30-day limitation for NOTAMs on the FIS-B feed. After 30 days, the NOTAM, although still active, will be removed.

ii) NOTAMs should be checked from additional sources, not solely from the FIS-B option.