

Ground Lesson: Airspace

Objectives:

1. for the student to exhibit knowledge relating to the National Airspace System

Justification:

1. As a pilot, one will fly in the airspace system continuously, thus it is necessary to understand it, including requirements, minimums, and procedures.
2. during the checkride, the student must show knowledge of the airspace system

Schedule:

Activity	Est. Time
Ground	1.5
Total	1.50

Recommended Readings:

PHAK	Chapter 14
AIM	Chapter 3
AOPA	http://flash.aopa.org/asf/kbyg

Elements Ground:

- Airspace Overview
- Controlled Airspace
- Uncontrolled Airspace
- Special Use Airspace

Completion Standards:

1. when the student exhibits knowledge relating to the National Airspace System

Presentation Ground:

Airspace Overview

1. National Airspace System :system of controlled and uncontrolled airspace overlying the United States, run by the FAA for the purposes of safe air travel.
2. Airspace is primarily for separation and control of traffic
3. controlled airspace
 - (1) classes A, B, C, D, E
 - (2) airspace where IFR traffic may exist
 - (3) you may not be controlled, but *someone* else might be
4. uncontrolled airspace
 - (1) class G
 - (2) any airspace that is not controlled.
 - (3) there is no IFR traffic
5. every airspace has vertical and horizontal dimensions, and certain requirements
 - (1) dimensions
 - (2) cloud clearances and visibility
 - (3) equipment requirements
 - (4) pilot requirements
 - (5) entry requirements

Controlled Airspace

1. dimensions defined below are all general case scenarios. All airspace is varied to accommodate surrounding airspace and terrain.
2. class D (AIM 3-2-5)
 - (1) location and dimensions (general case)
 - i. surrounds relatively small airports with control towers
 - ii. 5 mile radius around airport
 - iii. usually 2,500 feet tall or up to overlying airspace
 - (2) cloud clearances and visual minimums
 - i. 3 SM visibility
 - ii. 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
 - (3) equipment
 - i. 2-way radio
 - (4) pilot requirements
 - i. no specific requirements (minimum student certificate)
 - (5) entry requirements
 - i. 2-way radio communications prior to entry
 - (i) to have established two way radio communication, the controller *must* respond using your call sign
 - (6) on charts this is represented as dashed blue lines
 - (7) speed limit is 200 kts
3. class C (AIM 3-2-4)
 - (1) location and dimensions

- i. surround airports having an operational control tower, serviced by a radar approach control, and with a certain number of IFR operations or passenger operations
- ii. extends from the surface to 4000 ft above the airport elevation
- iii. volume dimensions:
 - (i) 5 NM radius extending from surface to 4000 feet above airport elevation
 - (ii) 10 NM radius 1200 to 4000 ft above airport elevation
 - (iii) 20 NM “outer area” which extends from the surface up to 4000 ft above the primary airport, and may include satellite airports

(2) cloud clearances and visual minimums

- i. 3 SM visibility
- ii. 500 ft below, 1000 ft above, 2000 ft horizontal

(3) equipment

- i. 2-way radio
- ii. mode-c transponder (with altitude encoding capabilities)

(4) pilot requirements

- i. no specific requirements (minimum student pilot certificate)

(5) entry requirements

- i. 2-way radio communication before entry

(6) speed limit is 250 kts above 2,500 AGL and outside 4 NM. 200 kts otherwise

4. **class B** (AIM 3-2-3)

(1) location and dimensions

- i. airspace from usually from the surface up to 10000 ft MSL surrounding the nation’s busiest airports
- ii. class B airspace is individually tailored to the needs of a particular area
- iii. consists of a surface area and two or more layers (may resemble upside down wedding cake)

(2) cloud clearance and visual minimums

- i. 3 SM visibility
- ii. clear of clouds since controlled is *required* to separate ALL traffic

(3) equipment

- i. 2-way radio
- ii. mode-c transponder (with altitude encoding capabilities)

(4) pilot requirements

- i. minimum of a private pilot certificate or student certificate with specific endorsement

(5) entry requirements

- i. ATC clearance
 - (i) “Cessna 12345, you are **cleared** through class bravo”

(6) 30 NM mode C veil

- i. every class B airspace has a 20 NM ring which extends from the surface to the ceiling of the airspace in which every aircraft flown must have a mode-c transponder
- ii. since PAO is within that veil, we must always have a mode c transponder

5. **class A** (AIM 3-2-2)

(1) location

- i. 18000 ft up to and including FL600

ii. includes airspace overlying the waters within 12 NM of the coast of the 48 contiguous states and Alaska

(2) cloud clearances and visual minimums

i. all operations in Class A is conducted under instrument flight rules, thus no cloud clearances or visual minimums

(3) equipment requirements

i. IFR equipped

ii. above 24000 ft MSL, DME required

(4) pilot requirements

i. instrument rating

(5) entry requirements

i. ATC clearance

6. class E (AIM 3-2-6)

(1) location and dimensions

i. Controlled airspace that is not designated A, B, C, or D

ii. in general 14,500 up to but not including 18,000 ft

(i) class E airspace then is lowered as appropriate to certain areas

a. this can be the surface, 700 ft, or 1200 ft

b. this lowering of the airspace is usually in the interest of safety, occurring in areas of high traffic

(2) cloud clearance and visual minimums

i. below 10,000 ft MSL:

(i) 3 SM visibility

(ii) 500 ft below, 1000 ft above, 2000 ft horizontally

ii. above 10,000 ft MSL:

(i) 5 SM visibility (faster planes)

(ii) 1000 ft below, 1000 ft above, 1 SM horizontally

(3) equipment requirements

i. no specific requirements

ii. above 10,000 ft, transponder required (Mode C?)

(4) pilot requirements

i. no specific requirements

(5) entry requirements

i. none for VFR

7. Special VFR (SVFR)

(1) reduced cloud clearance and visibility for the purposes of arriving and departing in marginal VFR conditions

(2) cloud clearance and visual minimums

i. 1-3 SM visibility

ii. clear of clouds

(3) pilot requirements

i. minimum of a private pilot certificate

ii. at night, IFR rating AND IFR equipped aircraft is required

- (4) SVFR is only available in airspace that goes down to the surface and is controlled by a tower.
- (5) not all class C and class B airspace allow SVFR

Uncontrolled Airspace

1. class G (AIM 3-3)

(1) overview

- i. uncontrolled airspace, which is any airspace not designated as A, B, C, D, or E
- ii. extends from the surface up to the base of the overlying class E airspace
- iii. ATC does not have any authority or responsibility to control air traffic, but there are still VFR minimums

(2) cloud clearances and visual minimums

i. 1200 ft AGL or less (regardless of MSL altitude)

(i) day

- a. 1 SM visibility
- b. clear of clouds

(a) since there should be no IFR traffic

(ii) night

- a. 3 SM visibility
- b. 500 ft below, 1000 ft above, 2000 ft horizontal
- c. note: if less than ½ NM from an airport, then day minimums apply

ii. more than 1200 ft AGL but less than 10,000 ft MSL

(i) day

- a. 1 SM visibility
- b. 500 ft below, 1000 ft above, 2000 ft horizontal

(ii) night

- a. 3 SM visibility
- b. 500 ft below, 1000 ft above, 2000 ft horizontal

iii. more than 1200 ft AGL, and at or above 10,000 MSL

(i) 1000 ft below, 1000 ft above, 1 SM horizontally

(ii) 5 SM visibility

(3) no specific requirements for equipment, pilot rating, or entry

Special Use Airspace (SUA's)

1. prohibited areas (AIM 3-4-2)

- (1) strictly forbidden to all aircraft, usually for reasons of national security (ex, White House)

2. restricted areas (AIM 3-4-3)

- (1) usually a weapons testing of firing range
- (2) may be flown through at certain times and at certain altitudes as shown on aeronautical charts, *or* with prior permission from the controlling agency
- (3) failure to obtain permission to enter is a violation of FAR's

3. warning areas (AIM 3-4-4)

- (1) areas are over international or domestic territories and may or may not contain similar hazards as restricted areas
- (2) they are only warning areas because FAA does not have international jurisdiction, and thus no authority to restrict your movement through these areas

- (3) exercise extreme caution through these areas
- 4. Military Operations Areas (MOAs) (AIM 3-4-5)
 - (1) areas used by the military services for high-volume or high-speed flights, or unusual aircrew training missions (such as aerobatics or abrupt combat tactics)
 - (2) no permission required to enter, but extra vigilance is required while in the airspace
 - i. main purpose is to separate IFR from military traffic
 - (3) FSS can advise of current status of activities in the area
- 5. alert area (AIM 3-5-6)
 - (1) may contain extensive pilot-training activity or other unusual (but regularly conducted) aerial operations
 - (2) permission is not required to enter, but extra vigilance is recommended
 - (3) FSS can advise of current status
- 6. controlled firing area (AIM 3-4-7)
 - (1) contain activities which may be hazardous to non participating aircraft
 - (2) difference in this area is that there may be spotters on the ground and air which will suspend activity if aircrafts are spotted
- 7. Military Training Routes (MTRs) (AIM 3-5-2)
 - (1) routes defined by the FAA and military for military aircraft conducting low-altitude, high-speed training such as low level combat tactics
 - (2) generally, aircraft are flying at speeds greater than 250 kts, below 10,000 ft.
 - (3) VR (visual route) = VFR operations
 - (4) IR (instrument route) = IFR operations
 - (5) if route has no segment above 1500 ft, there will be 4 numbers, otherwise 3
 - (6) FSS can provide information
- 8. Air Defense Identification Zone (ADIZ) and Distant Early Warning Identification Zone (DEWIZ)
 - (1) all aircraft approaching domestic US airspace must be properly identified prior to entry
 - (2) ADIZ (and DEWIZ in Alaska) represent established areas along the boundaries of US and international airspace for this purpose
 - (3) approximately 12 NM off the coast
 - (4) You must be on an IFR or DVFR flight plan
- 9. other airspace
 - (1) National Wildlife refuge
 - i. pilots are requested to stay above 2000 ft AGL
 - (2) Airport Advisory Area (AIM 3-5-1)
 - i. within 10SM of an FSS at an airport
 - (3) temporary flight restrictions (TFRs) (AIM 3-5-3)
 - i. *temporary restrictions established for many reasons including high volume events, protect president, wildfires, disaster areas, etc*
 - ii. information available through an FDC NOTAM including location, time period, area definition and altitudes effected.
 - (4) Parachute jump operations (AIM 3-5-4)
 - (5) published VFR routes (AIM 3-5-5)
 - i. *published VFR routes for transitioning around, under, and through complex airspace.*