

Airspace

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Gleim sections 3.8-11, 4.6, ~4.7, 9.1-3, 9.6

Communications

- For the purposes of airspace, “two-way communications established” means that ATC has referred to you using your aircraft call sign

- Example of communication established:

You: “Sierra Approach, Cessna 12345”

ATC: “Cessna 12345, Sierra Approach, go ahead”

- Example of communication not established:

You: “Sierra Approach, Cessna 12345”

ATC: “Aircraft calling Approach, stand by”

- Once communication has been established, any ATC clearances must be obeyed, e.g.:

You: “Sierra Approach, Cessna 12345”

ATC: “Cessna 12345, Sierra Approach, remain clear of Class Charlie”

Transponder

- A transponder is a device that responds to ATC radar and returns a pilot-programmable 4-digit code and possibly the current pressure altitude
- Mode A refers to the 4-digit code only. Each digit can be 0-7 and thus there are 4,096 possible codes.
- Mode C refers to altitude reporting
- Mode S is a new digital transponder system used mainly by larger aircraft
- 4-digit codes (“squawks”) are assigned by ATC, but there are several standard codes:
 - **1200 – VFR and not assigned an ATC code (anonymous airplane)**
 - **7500 – Airplane hijacked**
 - **7600 – Airplane communications failure**
 - **7700 – Emergency**
 - **7777 – Military intercept (should never be used by civilian aircraft!)**
- Transponders are required to be used:
 - When one is installed and operational in any controlled airspace (excludes class G)
 - In class A, B, and C airspace
 - Within 30nm of a class B airport (technically within 30 nm of any airport listed in Part 91 Appendix D Section 1) up to 10,000 MSL
 - Within the lateral boundaries of class B and class C airspace from the ceiling up to 10,000 MSL (*not* below the floor of the airspace)
 - Within 10nm of any airport lists in Part 91 Appendix D Section 2 (currently only Billings, MT)
 - At and above 10,000 MSL but not at and below 2,500 AGL
- See [91.215] for further details, especially for aircraft not equipped with an electrical system

Classes of Airspace

- Airspace is *controlled* if ATC may or must have responsibility for separation of aircraft. Class A, B, C, D, and E airspace is controlled. Depending on the type of airspace, it may not be a requirement to be under ATC control, just an option.
- Airspace is *uncontrolled* if ATC is unable to take responsibility for separation of aircraft. Class G airspace is uncontrolled.
- See airspace table at back of notes for most details. Any special details not included on the chart are mentioned below. This table is derived from [91.155].
- In addition to normal cloud clearance and visibility requirements, which are required just to fly through the airspace at any altitude, in class B, C, D, and E surface airspace surrounding an airport a minimum ceiling of 1,000 AGL and visibility of 3 SM is required to be able to land or takeoff or fly under the ceiling under normal VFR.

Class A

- See [91.135, 71 Subpart A]
- Class A airspace is all airspace at and above 18,000 feet MSL (see Part 71 for exceptions in Alaska)
- Class A airspace has radar coverage
- Generally only airplanes on IFR flight plans are allowed (exceptions are sometimes made for gliders)
- Separation services available:
 - Separation between all aircraft
- Other services:
 - N/A

Class B

- See [91.131, 71 Subpart B]
- Class B airspace surrounds the busiest airports (SFO, LAX, DCA, DFW)
- Class B airspace has radar coverage
- Student operations are only permitted in some class B airspace, and then only with special training and a special endorsement
- Transponders are required within 30nm of a class B airport (the “mode C veil”)
- When taking off from a satellite airport within the class B, contact must be made with the control tower at the primary airport as soon as practicable after takeoff
- Separation services available:
 - Sequencing to the primary airport
 - Separation between all IFR and VFR aircraft
 - Runway
- Other services:
 - Basic radar services (vectoring, traffic advisories, and safety alerts)

Class C

- See [91.130, 71 Subpart C]
- Class C airspace surrounds busy commercial airports (SJC, OAK)
- Class C airspace has radar coverage
- Class C airspace has two levels
 - **The area directly surrounding the primary airport extends from the ground to 4,000 AGL and is 5 NM in radius**
 - **The outer shelf extends from 1,200 AGL to 4,000 AGL and is 10 NM in radius**

- **The “outer area” is 20 NM radius and consists of the area where radar service is provided. Aircraft should contact approach control within the outer area before entering the class C itself.**
- **When taking off from a satellite airport within the class C, contact must be made with the control tower at the primary airport as soon as practicable after takeoff**
- Separation services available:
 - Sequencing to the primary airport
 - Separation between IFR and special VFR aircraft (*not* normal VFR aircraft)
 - Runway
- Other services:
 - **Basic radar services (vectoring, traffic advisories, and safety alerts)**

Class D

- See [91.129, 71 Subpart D]
- **Class D airspace surrounds smaller tower-controlled fields (PAO, SQL, RHV) when the tower is in operation**
- **Class D airspace can be any shape, but is usually 2,500 feet tall and 4 NM in radius. The shape is related to the instrument procedures for the airport.**
- When the tower is not operating the airspace becomes class E if weather reporting service is available, or class G otherwise
- Class D airports do not necessarily have radar coverage
- **When taking off from a satellite airport within the class D, contact must be made with the control tower at the primary airport as soon as practicable after takeoff**
- Separation services available:
 - IFR and special VFR (*not* normal VFR aircraft)
 - Runway
- Other services:
 - Basic radar services if radar available, workload permitting (vectoring, traffic advisories, and safety alerts)

Class E

- See [91.127, 71 Subpart E]
- Class E airspace exists in most places above 1,200 AGL, and in all places above 14,500 MSL (if also above 1,200 AGL). It can also exist down to 700 AGL or to ground level when surrounding an airport.
 - On a sectional or terminal area chart, check the legend for information on the floor of class E. In most areas class E will automatically start at 1,200 AGL unless otherwise marked.
 - If class E has a floor of 700 AGL around an airport, it will be marked by a magenta vignette
 - If class E has a floor of 1,200 AGL around an airport, and class E doesn't start by default at 1,200 AGL, it will be marked by a blue vignette
- The top of class E is the bottom of class A (18,000 MSL)
- Class E airspace does not necessarily have radar coverage
- If a control tower is in operation at an airport, communication must be established at least 4 NM out below 2,500 feet
- Separation services available:
 - IFR and special VFR
- Other services:
 - Workload permitting (vectoring, traffic advisories)

Class G

- See [91.126]
- Class G airspace exists anywhere that class A, B, C, D, or E airspace doesn't exist

- Class G airspace does not necessarily have radar coverage
- **Exception to class G clearance requirements: An airplane may be operated clear of clouds in class G airspace at night below 1,200 feet AGL when the visibility is less than 3SM but more than 1SM in an airport traffic pattern and within ½ NM of the runway**
- If a control tower is in operation at an airport, communication must be established at least 4 NM out below 2,500 feet
- Separation services available:
 - None
- Other services:
 - Workload permitting (vectoring, traffic advisories)

Special VFR

- See [91.157]
- Special VFR is a special clearance that allows an aircraft to operate below normal weather minimums in controlled airspace around an airport
- Special VFR must be specifically requested by the pilot. It can not be offered by ATC.
- The new limits are 1 SM visibility and clear of clouds
- Some class B airports do not permit special VFR operations. They are marked NO SVFR on charts.

Speed Limits

- The speed limit is 200 KIAS:
 - Under the shelf of class B airspace
 - At or below 2,500 AGL within 4 NM of the primary airport of class C or class D
- The speed limit is 250 KIAS:
 - Below 10,000 MSL
 - Within class B airspace
- There is no speed limit (except the speed of sound):
 - At and above 10,000 MSL

Other Types of Airspace

Airways

- See [71.75]
- An airway is a standard navigational route that extends from one navigation aid to another in sequence
- Airways are called “Victor airways” because they are based on VORs
- There are old color-coded airways, so called because they were based on lighted beacons, but these only exist in extremely rare cases today
- **An airway extends to 4 NM on each side of the airway centerline**
- **Unless otherwise specified, airways start at 1,200 AGL and go up to, but not including, 18,000 MSL**
- An airway within lower class E airspace takes the floor of that airspace
- Aerobatics are prohibited on or within 4 NM of the centerline of an airway

Terminal Radar Service Area (TRSA)

- A TRSA is an obsolete and rarely used type of airspace that is used when a class D airport sequences traffic in cooperation with an approach control
- Separation services available:

- o Sequencing to the primary airport
- o **IFR and VFR separation**
- Participation in the TRSA services is voluntary, but recommended
- It's very hard to find a TRSA – the only one on the west coast in at Palm Springs, CA

Airport Advisory Area

- An airport advisory area is a non-towered airport with a Flight Service Station (FSS) on the field
- Airport advisory areas are not marked on charts
- The FSS provides advisories about traffic around and on the airport
- **Pilots are requested to contact the FSS for advisories before entering the advisory area**

National Wildlife Areas

- **Although not regulatory, aircraft are requested to maintain at least 2,000 AGL above any National Wildlife Refuge, National Park, or National Seashore**

Special Use Airspace

Restricted

- See [73 Subpart B]
- Restricted areas have defined vertical and horizontal limits, and may also have hours of operation. The horizontal limits are marked on the chart, and the vertical limits and hours of operation are available in the chart legend.
- **Restricted areas may contain serious military activity, such as guided missiles or aerial gunnery**
- **[91.133] – Operations may be conducted with the approval of the controlling agency**

Prohibited

- See [73 Subpart C]
- Prohibited areas have defined vertical and horizontal limits. The horizontal limits are marked on the chart, and the vertical limits and hours of operation are available in the chart legend.
- Prohibited areas exist around areas of national security, such as the White House, and all civilian flight is prohibited.

Temporary Flight Restriction

- See [91.137, 91.139, 91.141, 91.143]
- A Temporary Flight Restriction (TFR) is put in place whenever national security or safety needs warrant it
- TFRs are very common after 9/11, and pilots *must* check for their existence before every flight

IFDC 2/0449 ZSE WA.. FLIGHT RESTRICTIONS PORT TOWNSEND, WA
EFFECTIVE IMMEDIATELY UTC UNTIL FURTHER NOTICE. PURSUANT TO 14 CFR SECTION
91.137A(1) TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT FOR NATIONAL SECURITY WITHIN
2 NAUTICAL MILE RADIUS OF 4804N/12244W AND THE SEATTLE /SEA/ VORTAC 317 DEGREE
RADIAL AT 41.5 NAUTICAL MILES AT AND BELOW 3000 FEET MSL. REGIONAL WATCH OFFICER
TELEPHONE 360-315-5123/FAX 360-315-5305 IS IN CHARGE OF THIS OPERATION. SEATTLE AFSS /SEA/
TELEPHONE 206-764-6609 IS THE FAA COORDINATION FACILITY.

Military Operations Area (MOA)

- MOAs have defined vertical and horizontal limits, and may also have hours of operation. The horizontal limits are marked on the chart, and the vertical limits and hours of operation are available in the chart legend.
- MOAs exist to separate IFR traffic from dangerous military activity
- There is no restriction preventing VFR traffic from flying in a MOA
- **MOAs may contain military training activities including aerobatic flight and abrupt flight maneuvers**
- **It is generally a good idea to avoid an active MOA, or to be in contact with the controlling agency for flight advisories**
- **When in a MOA, exercise extreme caution**

Warning

- A warning area is similar to a restricted area but exists over international waters
- The same kinds of dangers may exist in a warning area as a restricted area, but flight is not prohibited because there is no control authority

Alert

- An alert area is used to indicate areas of especially heavy-use airspace, such as intensive training operations
- Flight is not prohibited, but caution should be exercised

Military Training Routes (MTR)

- **Military training routes mark routes used by high-speed (more than 250 KTS), low-level military aircraft**
- **If the route is marked “VR” the use is under VFR, and if it’s marked “IR” the use is under IFR**
- **A 4-digit route number indicates use only at and below 1,500 AGL**
- **A 3-digit route number indicates use both above and below 1,500 AGL**
- The training may be conducted within several miles of the marked center line
- While flight is not prohibited in this area, extreme caution should be exercised

Charts

- There are three types of VFR charts:
 - World Aeronautical Charts (WAC) are the coarsest and contain information about a wide area
 - Sectional Charts are used for most flying and contain detailed information about an area several hundred miles wide
 - Terminal Area Charts are used around especially busy airspace, such as SFO or LAX
- Chart information checklist:
 - Airport information
 - **Airport symbols (red, blue, fuel)**
 - Beacon
 - **Elevation**
 - Runway length
 - Runway pattern
 - Lighting
 - Frequencies: ATIS, AWOS, ASOS, CTAF, tower
 - **No Special VFR**
 - Airspace information
 - **Class B, C, D, and E airspace including altitudes**
 - TRSA

- Victor airways
- Military Training Routes
- MOAs, restricted areas, prohibited areas, alert areas, and warning areas
- National wildlife refuge
- o Obstacles
 - **Height MSL and AGL**
 - **Lighting**
- o Navigation aids
 - **VOR, VORTAC, VOR-DME**
 - NDB
- o **Visual reporting points**
- o Terrain features
 - Contour lines
 - Mountain passes
 - Cities
 - Lakes
 - Roads
 - Railroad tracks
 - Power lines
 - Special ground markings (mines, oil fields, etc)
- o **Longitude and latitude markings**
- o Isogonic lines
- o ADIZ
- o VFR corridors

Airport/Facility Directory

- The A/FD contains information about each public use airport, such as:
 - o **Airport location**
 - o **Frequencies for tower and approach control**
 - o **Runways and traffic pattern information**
 - o Fuel availability
 - o Maintenance availability
 - o **Parachute jumping**
 - o **Glider operations**
 - o Noise abatement procedures
- A wide variety of other information is also available in the A/FD

Class	Charting	Communications	Transponder	Visibility	Clouds	Prohibited	Min License
A "Above"	Not charted	Always	Required	N/A	N/A	VFR Aerobatics Ultralights Parachuting	Private + instrument
B "Big/busy"	Solid blue line	Always Clearance required	Required	3 SM	Clear of clouds	Aerobatics Ultralights Parachuting	Private (Student with endorsement)
C "Communications"	Solid red line	Always Communication must be established before entry	Required	3 SM	500 below 1000 above 2000 horiz	Aerobatics Ultralights Parachuting	Student
D "Dialogue"	Dashed blue line	Always Communication must be established before entry	Not required	3 SM	500 below 1000 above 2000 horiz	Aerobatics Ultralights	Student
E "Everywhere"	Dashed red line or Blue/red vignette	Only for IFR	Not required	Below 10,000: 3 SM At or above 10,000: 5SM	Below 10,000: 500 below 1000 above 2000 horiz At or above 10,000: 1000 below 1000 above 1 SM horiz	Surface-based class E: Aerobatics Ultralights	Student
G "Go ahead" or "Government free"	Not charted	Not required	Not required	Day, below 10,000: 1 SM Night, below 10,000: 3 SM At or above 10,000: 5 SM	Day, at or below 1,200 AGL: Clear of clouds Night, or below 10,000 and above 1,200 AGL: 500 below 1000 above 2000 horiz At or above 10,000 and above 1,200 AGL: 1000 below 1000 above 1 SM horiz		Student