THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

Safety must be **#1 governing mental set for pilot**. Not just for yourself but also for you passengers, other pilots and people on the ground.

ISSUES: Collision Avoidance, Right-of-Way, Safe Altitudes, Taxiing, and Control Exchange

### COLLISION AVOIDANCE

Scan for traffic. Flying by visual flight rules (VFR) and some are flying by instrument flight rules (IFR). Must avoid other airplanes. Scan patterns below help (full left->right, or Center-Left to full right) in 10 degree segments.

HOW CAN YOU DETERMINE IF ANOTHER AIRPLANE IS ON A DIRECT, COLLISION COURSE WITH YOU (DAY / NIGHT)?
UNFORTUNATELY, it may take that period of time just to react (see below)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>see object</td>
<td>0.1</td>
</tr>
<tr>
<td>recognize a/c</td>
<td>1.0</td>
</tr>
<tr>
<td>become aware of collision course</td>
<td>5.0</td>
</tr>
<tr>
<td>decision to turn left or right</td>
<td>4.0</td>
</tr>
<tr>
<td>muscular reaction</td>
<td>0.4</td>
</tr>
<tr>
<td>aircraft lag time</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12.5</strong></td>
</tr>
</tbody>
</table>

Standing 12 ft away the illustration on the right is how a T-33 jet would appear out of the windshield →
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

Be vigilant not only for other airplanes but also for BIRDS

Statistics collected between 1990 and 2007 indicated there were 17,972 “reported” bird strikes.

While more than 70 percent of the nearly 80,000 bird strikes reported in the U.S. from 1990-2007 occurred below 500 feet AGL, about 2,000 occurred above 5,000 feet. One, Ruppell's Vulture was once struck at an altitude of 37,000 feet.

More than 31,000 of the 79,972 strikes (39%) reported from 1990 to 2007 occurred in August, September and October, with each month collecting more than 10,000 reports.

Watch for birds in the pattern, and all phases of flight.
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

VISIBILITY CAN BE DIFFICULT

Empty Field Myopia – sky, devoid of contrast causes the eye to focus 30 feet ahead. Focus on windshield and not on distant traffic.

CONTRAST

← Bad

Good →
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

KNOW YOUR AIRCRAFT “BLIND SPOTS”

Cessna (lower) cannot see Piper (above) & visa versa!!
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

WHAT CAN YOU DO TO MAKE SURE YOU ARE SEEN AND CAN SEE OTHER TRAFFIC IN A “PRACTICE – TRAINING AREA”?  

You should always perform “CLEARING TURNS” to see and be seen by other aircraft.

WHAT CAN TO DO TO BETTER BE SEEN AROUND AIRPORTS?

OPERATION “LIGHTS ON” - Especially around airports, TURN THE LANDING LIGHTS ON to be visible to other aircraft.
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

RIGHT-OF-WAY

Right of way rules are based on “least” to most maneuverable.
- Balloons
- Gliders
- Towing / Refueling Aircraft
- Airship
- Rotorcraft
- Airplanes
Overtaking aircraft fly to right

Head on both deviate right.

Converging (like “stop” signs) Aircraft to right has right of way

“In the pattern” – Lower and slower has right of way. NOT TO BE ABUSED. Cutting out other pilot is rude & unsafe.
HAZARDOUS TERRAINS: DO NOT FLY OVER OR AROUND MOUNTAINS, OR ACROSS LARGE BODIES OF WATER WITHOUT SPECIAL TRAINING.
THE FLIGHT ENVIRONMENT - SAFETY OF FLIGHT

TAXIING – CAREFUL OF WINDS – THE CAN FLIP AND AIRCRAFT IF YOU DO NOT PROPERLY ADJUST FOR HEAD/TAIL/CROSS WINDS

Tail draggers use UP elevators for headwinds and DOWN for tailwinds keeping tail “on-the-ground.”
DUAL CONTROLS AND PASSING OF FLIGHT CONTROLS BETWEEN INSTRUCTOR/STUDENT OR BETWEEN PILOT/CO-PILOT. MAKE SURE EACH KNOW WHEN S/HE AS CONTROL IF TRANSFER OCCURS.

1. STUDENT OR PILOT PASSING CONTROL TO ANOTHER STATES: “You have the flight controls.”

2. THE RECEIVING PILOT STATES: “I have the flight controls.”

3. THE PASSING PILOT CONFIRMS EXCHANGE STATING “You have the flight controls.”
AIRPORTS: Categories

- **Commercial Service Airports**—publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service. Passenger boardings refer to revenue passenger boardings on an aircraft in service in air commerce whether or not in scheduled service. The definition also includes passengers who continue on an aircraft in international flight that stops at an airport in any of the 50 States for a non-traffic purpose, such as refueling or aircraft maintenance rather than passenger activity. Passenger boardings at airports that receive scheduled passenger service are also referred to as Enplanements.

- **Cargo Service Airports**—airports that, in addition to any other air transportation services that may be available, are served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds. “Landed weight” means the weight of aircraft transporting only cargo in intrastate, interstate, and foreign air transportation. An airport may be both a commercial service and a cargo service airport.

- **Reliever Airports**—airports designated by the FAA to relieve congestion at Commercial Service Airports and to provide improved general aviation access to the overall community. These may be publicly or privately-owned.

- **General Aviation Airports**—the remaining airports are commonly described as General Aviation Airports. This airport type is the largest single group of airports in the U.S. system. The category also includes privately owned, public use airports that enplane 2500 or more passengers annually and receive scheduled airline service.
AIRPORTS: Types

There are two types of airports—towered and nontowered. These types can be further subdivided to:

Civil Airports—airports that are open to the general public.
Military/Federal Government airports—airports operated by the military, National Aeronautics and Space Administration (NASA), or other agencies of the Federal Government.
Private Airports—airports designated for private or restricted use only, not open to the general public

_Towered Airport_

A towered airport has an operating control tower. Air traffic control (ATC) is responsible for providing the safe, orderly, and expeditious flow of air traffic at airports where the type of operations and/or volume of traffic requires such a service. Pilots operating from a towered airport are required to maintain two-way radio communication with ATC and to acknowledge and comply with their instructions. Pilots must advise ATC if they cannot comply with the instructions issued and request amended instructions. A pilot may deviate from an air traffic instruction in an emergency, but must advise ATC of the deviation as soon as possible.
AIRPORTS: Types

Nontowered Airport
A nontowered airport does not have an operating control tower. Two-way radio communications are not required, although it is a good operating practice for pilots to transmit their intentions on the specified frequency for the benefit of other traffic in the area. The key to communicating at an airport without an operating control tower is selection of the correct common frequency. The acronym CTAF, which stands for Common Traffic Advisory Frequency, is synonymous with this program. A CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a Universal Integrated Community (UNICOM), MULTICOM, Flight Service Station (FSS), or tower frequency and is identified in appropriate aeronautical publications. UNICOM is a nongovernment air/ground radio communication station that may provide airport information at public use airports where there is no tower or FSS. On pilot request, UNICOM stations may provide pilots with weather information, wind direction, the recommended runway, or other necessary information. Nontowered airport traffic patterns are always entered at pattern altitude. How you enter the pattern depends upon the direction of arrival. The preferred method for entering from the downwind side of the pattern is to approach the pattern on a course 45 degrees to the downwind leg and join the pattern at midfield.

There are several ways to enter the pattern if you’re coming from the upwind leg side of the airport. One method of entry from the opposite side of the pattern is to announce your intentions and cross over midfield at least 500 feet above pattern altitude (normally 1,500 feet AGL.) However, if large or turbine aircraft operate at your airport, it is best to remain 2,000 feet AGL so you are not in conflict with their traffic pattern. When well clear of the pattern—approximately 2 miles—scan carefully for traffic, descend to pattern altitude, then turn right to enter at 45° to the downwind leg at midfield. An alternate method is to enter on a midfield crosswind at pattern altitude, carefully scan for traffic, announce your intentions, and then turn downwind. [Figure 14-3] This technique should not be used if the pattern is busy. Always remember to give way to aircraft on the preferred 45° entry and to aircraft already established on downwind.

In either case, it is vital to announce your intentions, and remember to scan outside. Before joining the downwind leg, adjust your course or speed to blend into the traffic. Adjust power on the downwind leg, or sooner, to fit into the flow of traffic. Avoid flying too fast or too slow. Speeds recommended by the airplane manufacturer should be used. They will generally fall between 70 to 80 knots for fixed-gear singles and 80 to 90 knots for high-performance retractable.
THE FLIGHT ENVIRONMENT - AIRPORTS

THE TRAFFIC PATTERN

Base Leg
The base leg provides a transition from downwind to your final approach to landing.

Downwind Leg
The downwind leg is flown parallel to the landing runway, but in a direction opposite to the intended landing direction.

Departure Leg
After takeoff, you will fly a straight course which is aligned with the runway, called the departure leg.

Crosswind Leg
If you remain in the traffic pattern after takeoff, you will turn onto the crosswind leg to transition to the downwind leg.

Normally, entering the pattern at a 45° angle to the midpoint of the downwind is recommended.

You begin the final approach leg at the completion of the base-to-final turn and continue on a descending flight path to the point of touchdown.

1000 AGL
Figure 14-2. Preferred Entry-Crossing Midfield.

1. Pattern altitude +500 feet
2. Fly clear of traffic pattern (approx. 2 mi.)
3. Descend to pattern altitude, then turn
4. Yield to downwind traffic and enter midfield downwind at 45°

Figure 14-3. Alternate Midfield Entry.

Pattern altitude

Yield to the preferred 45° and downwind traffic, then turn downwind
What is the difference Between Standard and Non-Standard Patterns?
Standard Patterns are “TURNS TO THE LEFT”.
Non-Standard Patterns are “TURNS TO THE RIGHT”.

LEGEND
- Standard left-hand traffic pattern (depicted)
- Right-hand traffic pattern (depicted)
<table>
<thead>
<tr>
<th>Facility at Airport</th>
<th>Frequency Use</th>
<th>Communication/Broadcast Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNICOM (no tower or FSS)</td>
<td>Communicate with UNICOM station on published CTAF frequency (122.7, 122.8, 122.725, 122.975, or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.</td>
<td>Before taxiing and before taxiing on the runway for departure.</td>
</tr>
<tr>
<td>No tower, FSS, or UNICOM</td>
<td>Self-announce on MULTICOM frequency 122.9.</td>
<td>Before taxiing and before taxiing on the runway for departure.</td>
</tr>
<tr>
<td>No tower in operation, FSS open</td>
<td>Communicate with FSS on CTAF frequency.</td>
<td>Before taxiing and before taxiing on the runway for departure.</td>
</tr>
<tr>
<td>FSS closed (no tower)</td>
<td>Self-announce on CTAF.</td>
<td>Before taxiing and before taxiing on the runway for departure.</td>
</tr>
<tr>
<td>Tower or FSS not in operation</td>
<td>Self-announce on CTAF.</td>
<td>Before taxiing and before taxiing on the runway for departure.</td>
</tr>
</tbody>
</table>

Practice Instrument Approach:
Departing final approach fix (name) or on final approach segment inbound.
Approach completed/terminated.
Uncontrolled Airport Best Practices and Communications

Summary
1. Look.
2. Know before you go.
3. Fly defensively.
4. Fly the appropriate pattern.
5. Use the CTAF.
6. Use landing lights.
7. Yield the right of way.
8. Be courteous.
9. Keep a sterile cockpit in the pattern.
10. Fly quietly.

The way to fly safely at nontowered airports is to REACT.

Radio - Listen to the automated weather observations, if available, and the common traffic advisory frequency (CTAF) for airport information and traffic advisories.

Eyes - Use them! Look for other traffic. This is the top priority when operating in the vicinity of a nontowered airport. Use landing lights so other pilots can see you more easily.

Announce - Report your position and intentions using standard phraseology.

Courtesy - A little courtesy will smooth out most problems. The “me first” attitude can be dangerous and rude.

Traffic Pattern - Follow the recommended procedures before you fly. Research the necessary information about your departure and destination airports.
WHAT IS WAKE TURBULENCE

WHAT IS IT’S EFFECT ON YOUR AIRCRAFT?
Wake Turbulence from heavy aircraft must be avoided during landings and take-offs.
THE FLIGHT ENVIRONMENT - AIRPORTS

RUNWAYS are marked by magnetic heading to nearest 10 degree heading.
What direction do you want to land at an uncontrolled airport? INTO THE WIND
How can you determine what runway to use at an uncontrolled airport?

Aircraft communications (CTAF), Windsock, Wind Tee, or Tetrahedron
AN UNCONTROLLED AIRPORT WILL PROVIDE A WAY TO DETERMINE WINDS AND ALL YOU TO DETERMINE WHICH RUNWAY TO LAND AND TAKE OFF. "THE SEGMENTED CIRCLE" TELLS YOU THE TRAFFIC PATTER FOR EACH RUNWAY.
AIRPORTS

WHAT RUNWAY?  Want to land into the wind.  How can you tell?
CTAF, Unicom or EYEBALL The **Windsock**, The **Wind Tee**, or **Tetrahedron**
THE FLIGHT ENVIRONMENT - AIRPORT VISUAL GUIDES

LIGHTING – BEACONS TELL YOU NOT ONLY WHERE THE AIRPORT IS BUT ALSO THE "TYPE" OF AIRPORT (CIVILIAN, MILITARY, HELIPORT, WATER)

- Alternating green-white
- Alternating green-white-white
- Alternating green-yellow
- Alternating green-yellow-white
Pilot Controlled Runway Lighting
Uncontrolled (non-tower) Airports

<table>
<thead>
<tr>
<th>KEY MIKE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 times within 5 sec</td>
<td>Highest intensity available</td>
</tr>
<tr>
<td>5 times within 5 sec</td>
<td>Medium or lower intensity (Lower REIL or REIL off)</td>
</tr>
<tr>
<td>3 times within 5 sec</td>
<td>Lowest intensity available (Lower REIL or REIL off)</td>
</tr>
</tbody>
</table>
THE FLIGHT ENVIRONMENT - AIRPORTS

CONTROLLED AIRPORTS – COMMUNICATIONS WITH ATC
ATIS (AUTOMATED TERMINAL INFORMATION SERVICE)
CLEARANCE DELIVERY (IFR/VFR)
GROUND CONTROL
CONTROL TOWER
DEPARTURE CONTROL
APPROACH CONTROL

ATC can also use a “Light Gun” signal to direct you if you have radio failure →

Communication frequencies on charts and AFD

1. The airport name and location identifier;
2. Control tower frequency;
3. ATIS (automated terminal information service), ASOS (automated surface observation system), or AWOS (automated weather observation system) frequency, whichever is applicable to the airport;
4. Airport elevation in feet;
5. Runway lighting; and
6. Length of longest runway in hundreds of feet.

IF REQUIRED… USE “NOISE ABATEMENT PROCEDURES” FOUND IN THE AFD.
PRECISION RUNWAYS HAVE IFR GLIDESLOPES
**THE FLIGHT ENVIRONMENT - AIRPORT VISUAL GUIDES**

<table>
<thead>
<tr>
<th>Runway Width</th>
<th>Number of Stripes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 feet (18 m)</td>
<td>4</td>
</tr>
<tr>
<td>75 feet (23 m)</td>
<td>6</td>
</tr>
<tr>
<td>100 feet (30 m)</td>
<td>8</td>
</tr>
<tr>
<td>150 feet (45 m)</td>
<td>12</td>
</tr>
<tr>
<td>200 feet (60 m)</td>
<td>16</td>
</tr>
</tbody>
</table>
DISPLACEMENT THRESHOLD

This area is available for taxiing, takeoff, and landing rollout, but may not be used for landing.

These white arrows up to the runway takeoff area.

This solid white line marks the beginning of the landing portion of the runway.

BLAST PAD/STOPWAY

These yellow chevrons indicate that the structure of the pavement is unusable for normal operations. Because of this, taxiways will not extend into the area.
CLOSED

RUNWAYS

Marked with “X”
# THE FLIGHT ENVIRONMENT - AIRPORT VISUAL GUIDES

## AIRPORT SIGNS

<table>
<thead>
<tr>
<th>AIRPORT SIGN SYSTEMS</th>
<th>TYPE OF SIGN AND ACTION OR PURPOSE</th>
<th>TYPE OF SIGN AND ACTION OR PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4-22</strong></td>
<td>Taxiway/Runway Hold Position: Hold short of runway on taxiway</td>
<td>Runway Safety Area/Obstacle Free Zone Boundary: Exit boundary of runway protected areas</td>
</tr>
<tr>
<td><strong>26-8</strong></td>
<td>Runway/Runway Hold Position: Hold short of intersecting runway</td>
<td>ILS Critical Area Boundary: Exit boundary of ILS critical area</td>
</tr>
<tr>
<td><strong>8-APCH</strong></td>
<td>Runway Approach Hold Position: Hold short of aircraft on approach</td>
<td>Taxiway Direction: Defines direction &amp; designation of intersecting taxiways</td>
</tr>
<tr>
<td><strong>ILS</strong></td>
<td>ILS Critical Area Hold Position: Hold short of ILS approach critical area</td>
<td>Runway Exit: Defines direction &amp; designation of exit taxiway from runway</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Identifies taxiway on which aircraft is located</td>
<td>Outbound Destination: Defines directions to takeoff runways</td>
</tr>
<tr>
<td><strong>22</strong></td>
<td>Identifies runway on which aircraft is located</td>
<td>Inbound Destination: Defines directions for arriving aircraft</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Runway Distance Remaining Provides remaining runway length in 1,000 feet increments</td>
<td>Taxiway Ending Marker: Indicates taxiway does not continue</td>
</tr>
<tr>
<td></td>
<td>Direction Sign Array: Identifies location in conjunction with multiple intersecting taxiways</td>
<td></td>
</tr>
</tbody>
</table>

**Diagram:**

- Airport signs with various symbols and their corresponding meanings are depicted in the diagram. The symbols include directions, critical area boundaries, and runway holds.

---

*Ground School 2017*

*Created by Steve Reisser*
WHEN “ILS” OPERATIONS IN PROGRESS, HOLD LINE FURTHER AWAY FROM ACTIVE RUNWAY

Runway Holding Position Marking
Noncompliance with a runway holding position marking may result in the FAA filing a Pilot Deviation against you. Runway holding position markings consist of four yellow lines, two solid and two dashed, that are painted on the surface and extend across the width of the taxiway to indicate where the aircraft should stop when approaching a runway. These markings are painted across the entire taxiway pavement, are in alignment, and are collocated with the holding position sign.
Know where to taxi by signage: Deviation from taxi instructions will get you “violated”.

Figure 14-20. Orientation of signs is from left to right in a clockwise manner. Left turn signs are on the left and right turn on the right. In this view, the pilot is on Taxiway Bravo.
THE “RAMP” – PARKING. OFTEN AIRCRAFT PARKED BY HAND SIGNALS
RUNWAY INCURSION AVOIDANCE – “Any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off or intending to take off, landing or intending to land”.

AVOIDANCE

1. Know the airports (study AFD) before you fly.
2. Complete as many checklists as possible before taxi.
3. Use clear communications (use read back to verify).
4. While taxiing, know where you are and pay attention.
5. Ask for assistance if you are unsure of anything.
6. At run-up, position to see landing aircraft (avoid pulling out in front of aircraft).
7. Monitor appropriate frequencies.
8. After landing, stay on tower frequency until instructed to change.
9. Use taxi/landing lights to be visible to the traffic.
10. Report deteriorating or hard to read signs so operators can repair.
11. Make sure you understand “land and hold short operations” (LAHSO) if in effect.
LAHSO means you may not use the entire runway because of other traffic that is likely to cross your active runway as shown above.
Airport HOT SPOTS: Areas prone to conflict are marked on AFD airport diagrams.
GREAT INTERNET REVIEW AND ILLUSTRATIONS ON ALL AIRPORT OPS 😊
THE FLIGHT ENVIRONMENT - AIRPORT VISUAL GUIDES

VISUAL APPROACH SLOPE INDICATORS (VASI)

Above Glide Path: If both light bars are white, you are too high.

Below Glide Path: If you see red over red, you are below the glide path.

On Glide Path: If the far bar is red and the near bar is white, you are on the glide path. The memory aid "red over white you're all right," is helpful in recalling the correct sequence of lights.
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APPROACH LIGHTING SYSTEMS
APPROACH LIGHTING SYSTEMS

NOTE: Civil ALSF-2 may be operated as SSALR during favorable weather conditions.
Runway Status Lights integrates airport lighting equipment with approach and surface surveillance systems to provide a visual signal to pilots and vehicle operators indicating that it is unsafe to enter/cross or begin takeoff on runway. The system is fully automated based on inputs from surface and terminal surveillance systems. Airport surveillance sensor inputs are processed through light control logic that commands in-pavement lights to illuminate red when there is traffic on or approaching the runway. This system is now active at Orlando International Airport (KMCO).

Runway Entrance Lights (REL) provide signal to aircraft crossing entering runway from intersecting taxiway. Takeoff Hold Lights (THL) provide signal to aircraft in position for takeoff.

VIDEO  
http://www.faa.gov/tv/?mediaId=349
THE FLIGHT ENVIRONMENT - AIRPORT VISUAL GUIDES
Sources of Airport Data

Aeronautical Charts
Aeronautical charts provide specific information on airports. Chapter 16, “Navigation,” contains an excerpt from an aeronautical chart and an aeronautical chart legend, which provides guidance on interpreting the information on the chart.

Chart Supplement U.S. (formerly Airport/Facility Directory)
The Chart Supplement U.S. (formerly Airport/Facility Directory) provides the most comprehensive information on a given airport. It contains information on airports, heliports, and seaplane bases that are open to the public. The Chart Supplement U.S. is published in seven books, which are organized by regions and are revised every 56 days. The Chart Supplement U.S. is also available digitally at www.faa.gov/air_traffic/flight_info/aeronav. We will go into detail later in the course.

Notices to Airmen (NOTAM)
Time-critical aeronautical information, which is of a temporary nature or not sufficiently known in advance to permit publication, on aeronautical charts or in other operational publications receives immediate dissemination by the NOTAM system. The NOTAM information could affect your decision to make the flight. It includes such information as taxiway and runway closures, construction, communications, changes in status of navigational aids, and other information essential to planned en route, terminal, or landing operations. Exercise good judgment and common sense by carefully regarding the information readily available in NOTAMs. Prior to any flight, pilots should check for any NOTAMs that could affect their intended flight.

Automated Terminal Information Service (ATIS)
The Automated Terminal Information Service (ATIS) is a recording of the local weather conditions and other pertinent non-control information broadcast on a local frequency in a looped format. It is normally updated once per hour but is updated more often when changing local conditions warrant.
Charts

Types used by Sport/Private Pilots

**Sectional Chart**: 1:500,000 inches PRIMARY VFR (detailed)

**World Aeronautical Chart**: 1: 1,000,000 (the larger the coverage-the less the detail)

**Terminal Area Chart (TAC)**: 1:250,000 inches

*May also have VFR Flyway Planning Chart printed on back of the TAC.*

Latitudes and Longitudes

You must learn to identify airports and your current position using Lat/Long
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHARTS
LATITUDE & LONGITUDE

North Pole = 90 N Latitude
Equator = 0 Latitude
South Pole = 90 S Latitude

Prime Meridian=0 Longitude

180W<->180E Longitude intersect on International Date Line
The **TYPE of Aeronautical chart** used depends on whether you are flying in accordance with regulations for VFR or IFR.

**What is VFR and IFR?**
TYPES OF CHART

VFR CHARTS

Sectional Charts: Primary emphasis of this course. FAA Tutorial can be found at http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/aero_guide/

Terminal Area Charts: Enlarged region of Class B airspaces

World Aeronautical Charts: Twice the scale of Sectional Charts used for planning.

IFR Charts

Low Enroute Charts
High Enroute Charts
U.S. Terminal Procedural Charts
SECTIONAL CHARTS
Keep Your Charts Current

Aeronautical information changes rapidly, so it is important that pilots check the effective dates on each aeronautical chart and publication. To avoid danger, it is important to always use current editions and discard obsolete charts and publications. To confirm that a chart or publication is current, refer to the next scheduled edition date printed on the cover. Pilots should also check Aeronautical Chart Bulletins and NOTAMs for important updates between chart and publication cycles that are essential for safe flight.
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

AIRPORTS
- Other than hard-surfaced runways: 1,500 ft. to 8,069 ft. in length.
- Hard-surfaced runways greater than 8,069 ft. or some multiple runways less than 8,069 ft.
- Open dot within hard-surfaced runway configuration indicates approximate VOR, VOR-DME, or VORTAC location.

All recognizable hard-surfaced runways, including those closed, are shown for visual identification. Airports may be public or private.

ADDITIONAL AIRPORT INFORMATION
- Private "(Pvt)" - Non-public use having emergency or landmark value.
- Military - Other than hard-surfaced. All military airports are identified by abbreviations AFB, NAS, AAF, etc. For complete airport information consult DOD FLIP.
- Heliport Selected
- Unverified
- Abandoned - paved having landmark value, 3,000 ft. or greater
- Ultralight Flight Park Selected

Services-fuel available and field tended during normal working hours depicted by use of ticks around basic airport symbol. (Normal working hours are Mon thru Fri 10:00 A.M. to 4:00 P.M. local time.) Consult A/FD for service availability at airports with hard-surfaced runways greater than 8,069 ft.

Rotating airport beacon in operation Sunset to Sunrise.

AIRPORT DATA
- Box indicates F.A.R. 93 Special Air Traffic Rules & Airport Traffic Patterns
- R - Airport Surveillance Radar
- CT - Control Tower
- R - Runways with Right Traffic Patterns (public use)
- RP - (See Airport/Facility Directory)
- F.S - Flight Service Station
- NO - Fixed-wing special VFR flight is prohibited.
- CT - Control Tower (CT) - primary frequency
- Radar
- ATIS 123.8 - Automatic Terminal Information Service
- AWOS 135.42 - Automated Surface Weather Observing Systems. Some ASOS/AWOS facilities may not be located at airports.
- UNICOM - Aeronautical advisory station
- VFR Advisy - VFR Advisory Service shown where ATIS not available and frequency is other than primary CT frequency.

285 - Elevation in feet
- L - Lighting in operation Sunset to Sunrise
- *L - Lighting limitations exist, refer to Airport/Facility Directory.
- 72 - Length of longest runway in hundreds of feet; usable length may be less.

When facility or information is lacking, the respective character is replaced by a dash. All lighting codes refer to runway lights. Lighted runway may not be the longest or lighted full length. All times are local.
For detail examples, see the Jewel box
Filename: VFR_Symbols.pdf
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

- Control Towers “Blue” (Airspace Types “B”, “C”, “D”)
- Ticks=Fuel
- Not-hard surface
- Closed
- Seaplane base
- Exact runway layouts for airports with 1 rwy >8,069 ft.
- Private Airports

Ground School 2017
Created by Steve Reisser
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

UNIV OF ILLINOIS-WALDO 0600-2400 120.4 122.4 121.8 124.85 ASR/PAR
YORK HQ 0000-1400 MON-FRI ORP 120.5 236.6 121.5 273.8 ASR/PAR
WATERLOO 0600-2300 118.1 257.8 121.5 248.2 120.65
WALKEGAN REGIONAL 0600-2000 120.05 350.15 121.65 122.4
WALKESHA CO NF 0600-2100 123.7 121.8
WITMAN REGIONAL 0600-2200 118.5 257.6 121.8 125.9

CTAF, Unicom, Multicom

Surveillance Radar Available
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

121.5 EMERGENCY
FSS 122.2 and EFAS 122.0 always available even though it is not listed.

TWEB
HIWAS

Bold Box = FSS on field

Underlined = no voice

“R” indicate FSS doesn’t send & receive. Just receives – sends over navigation frequency

FSS name in [ ] means control at another location

Non-Directional Beacon (NDB)
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

TOPOGRAPHY
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

CAUTION

MSL vs (AGL)
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART
THE FLIGHT ENVIRONMENT - AERONAUTICAL CHART

TERMINAL AREA CHARTS (Class B Airspaces) 2x detail of Sectional chart
THE FLIGHT ENVIRONMENT - VFR AREA CHARTS

The title block of the terminal area chart identifies its location.

The symbology used to designate ceilings and floors within the Class B airspace is shown on the front panel.

TWICE the detail of Sectionals

Legend information on the back panel is the same as found on sectional charts.
ARGONIC LINES: SEGMENTED RED

These are important to navigation as they indicate a value added (W) or subtracted (E) from course due to magnetic variation. They are shown on the sectional as vertical red segmented lines.
Chapter 15
Airspace

Introduction
The two categories of airspace are: regulatory and non-regulatory. Within these two categories, there are four types: controlled, uncontrolled, special use, and other airspace. The categories and types of airspace are dictated by the complexity or density of aircraft movements, nature of the operations conducted within the airspace, the level of safety required, and national and public interest. Figure 15-2 presents a profile view of the dimensions of various classes of airspace. Also, there are excerpts from sectional charts that are discussed in Chapter 16, Navigation, that are used to illustrate how airspace is depicted.
AIRSPACE

- **A** – At and **Above** 18000 (IFR)
- **B** – **Busiest** airports
- **C** – **Congested**
- **D** – **Direct** Communications
- **E** – Just about **everywhere**
- **G** – **UNCONTROLLED** (below 700-1200 AGL)
<table>
<thead>
<tr>
<th>Class</th>
<th>At or above 10,000 feet MSL</th>
<th>1,200 feet or less above the surface (regardless of MSL altitude).</th>
<th>More than 1,200 feet above the surface and at or above 10,000 feet MSL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class B</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class C</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class D</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class E</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class F</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
<tr>
<td>Class G</td>
<td>Flight Visibility</td>
<td>Distance from Clouds</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airspace</th>
<th>Flight Visibility</th>
<th>Distance from Clouds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Class B</td>
<td>3 statute miles</td>
<td>Clear of clouds</td>
</tr>
<tr>
<td>Class C</td>
<td>3 statute miles</td>
<td>1,000 feet above 500 feet below 2,000 feet horizontal</td>
</tr>
<tr>
<td>Class D</td>
<td>3 statute miles</td>
<td>1,000 feet above 500 feet below 2,000 feet horizontal</td>
</tr>
<tr>
<td>Class E</td>
<td>5 statute miles</td>
<td>1,000 feet above 1,000 feet below 1 statute mile horizontal</td>
</tr>
<tr>
<td>Class F</td>
<td>3 statute miles</td>
<td>1,000 feet above 1,000 feet below 2,000 feet horizontal</td>
</tr>
<tr>
<td>Class G</td>
<td>1 statute mile</td>
<td>Clear of clouds</td>
</tr>
<tr>
<td></td>
<td>3 statute miles</td>
<td>1,000 feet above 500 feet below 2,000 feet horizontal</td>
</tr>
<tr>
<td></td>
<td>3 statute miles</td>
<td>1,000 feet above 500 feet below 2,000 feet horizontal</td>
</tr>
<tr>
<td></td>
<td>5 statute miles</td>
<td>1,000 feet above 1,000 feet below 1 statute mile horizontal</td>
</tr>
</tbody>
</table>
THE FLIGHT ENVIRONMENT - AIRSPACE

<table>
<thead>
<tr>
<th>Airspace Features</th>
<th>Class G</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFR Min. Vis. and Distance from Clouds 1,200 ft AGL or less (Regardless of MSL Altitude)</td>
<td>Day 1 s.m., Clear of Clouds</td>
</tr>
<tr>
<td></td>
<td>Night 3 s.m., 500 ft Below 1,000 ft Above 2,000 ft Horizontal</td>
</tr>
<tr>
<td>VFR Minimum Visibility</td>
<td>Below 10,000 ft MSL - Day 1 s.m., Night 3 s.m.</td>
</tr>
<tr>
<td></td>
<td>At or Above 10,000 ft MSL - 500 ft Below</td>
</tr>
<tr>
<td></td>
<td>1,000 ft Above 2,000 ft Horizontal (above 1,200 ft AGL)</td>
</tr>
<tr>
<td>VFR Minimum Distance from Clouds</td>
<td>At or Above 10,000 ft MSL -</td>
</tr>
<tr>
<td></td>
<td>1,000 ft Below 1,000 ft Above</td>
</tr>
<tr>
<td></td>
<td>1 s.m. Horizontal (above 1,200 ft AGL)</td>
</tr>
<tr>
<td>Minimum Pilot Qualifications</td>
<td>Student Pilot Certificate</td>
</tr>
<tr>
<td>VFR Entry and Equipment Requirements</td>
<td>None</td>
</tr>
<tr>
<td>ATC Services</td>
<td>VFR Traffic Advisories on Request (workload permitting)</td>
</tr>
</tbody>
</table>

The division between controlled and uncontrolled airspace is depicted by color-coded tint bands. The lateral limits of controlled airspace are shown by a hard edge. The color dissolves into the controlled portion.

The terrain southeast of Lake County Airport extends to 13,908 feet MSL. In this area, 14,500 feet MSL is lower than 1,500 feet above the surface. Here, Class G airspace extends up to 1,500 feet AGL, or 15,308 feet MSL.

On the hard edge of the blue band, Class G airspace extends from the surface to 14,500 feet MSL.

On the soft edge of the blue band, Class G airspace begins at the surface and extends up to 1,200 feet AGL (where Class E begins).

FL 600 MSL 18,000

14,500 MSL

CLASS B

CLASS C

CLASS E

CLASS G

1200 AGL

Nontowered Airport

700 AGL

MSL - mean sea level

AGL - above ground level

FL - flight level
BASIC VFR MINIMUMS IN CLASS G AIRSPACE

Shown below are the basic VFR weather minimums within Class G (uncontrolled) airspace for three altitude levels: from the surface up to and including 1,200' AGL, more than 1,200' AGL but less than 10,000' MSL, and at or above 10,000' MSL up to but not including 14,500' MSL.
Controlled Airspace

Controlled airspace is a generic term that covers the different classifications of airspace and defined dimensions within which air traffic control (ATC) service is provided in accordance with the airspace classification. Controlled airspace consists of:

- Class A
- Class B
- Class C
- Class D
- Class E
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE  E=MAGENTA

There are areas where the Class E airspace boundary coincides with the lateral dimensions of the airport. For example, if you fly beyond 4 n.m. from the center of VQ16 to the hand side of the blue band, you will be in Class E airspace up to 14,500 feet MSL.

The total mileage between VORs on VE10 is 1.15 nautical miles.

As you approach Avondale County Airport, you will pass from the hand side of the magenta band where the floor of the Class E airspace is 1,200 feet AGL to the hand side of the magenta band, indicating that the floor of the Class E is near 700 feet AGL.

VFR Min. Visibility

VFR Min. Distance from Clouds

Minimum Pilot Qualifications

VFR Traffic Advisories at Request (weather permitting)

ATC Services

IFR/VR Separation

In most cases, the airspace surrounding a Federal airway in Class E beginning at 1,200 feet AGL, so the lateral dimensions of the airport are not depicted on the chart.

Approaching the airport at Durango, Class E starts at 1,200 feet AGL, ends at 700 feet AGL, and finally at the surface as indicated by the dashed magenta line.

An extension of Class E airspace, such as this one, is normally aligned with an instrument procedure.

This extension of Class E airspace coincides with an instrument procedure.

The magenta arrows indicate that Class E airspace extends from 1,200 feet AGL to the base of the existing controlled airspace.
In this example…
E sits atop G-Airspace at this airport to 700ft (Fuzzy side)

E ends on the
But G may continue on the outside (Hard side)
Stops at 1,200 on Victory Highways
Blue lines represent radio navigation routes.

In mountainous areas E and G intermingle. Note in this case the lateral airspace of E is not magenta but blue
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

If “D” not continuous, it reverts to all “E”

Radio communication with the control tower is required prior to entering Class D airspace, but is not required to enter this extension of Class E airspace which begins at the surface (designated by the dashed magenta line).

Class D airspace is designated by a dashed blue line. The Class D airspace at Roswell Industrial Airport begins at the surface and extends to 6,200 feet MSL.
### THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

<table>
<thead>
<tr>
<th>Airspace Features</th>
<th>Class C</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFR Min. Vis. and Distance</td>
<td>N/A</td>
</tr>
<tr>
<td>from Clouds 1,200 ft AGL or loss</td>
<td></td>
</tr>
<tr>
<td>(Regardless of MSL Altitude)</td>
<td></td>
</tr>
<tr>
<td>VFR Minimum Distance from Clouds</td>
<td>3 Statute Miles</td>
</tr>
<tr>
<td>500 ft Below 1,000 ft Above</td>
<td></td>
</tr>
<tr>
<td>2,000 ft Horizontal</td>
<td></td>
</tr>
<tr>
<td>Minimum Pilot Qualifications</td>
<td>Student Pilot Certificate</td>
</tr>
<tr>
<td>VFR Entry and Equipment</td>
<td>IFR/FR Separation</td>
</tr>
<tr>
<td>Requirements</td>
<td>IFR/WFR Separation</td>
</tr>
<tr>
<td>ATC Services</td>
<td>VFR Traffic Advisories (workload permitting)</td>
</tr>
</tbody>
</table>

If you see above it
Is rises to
The floor of the type airspace above it.
Usually B

The outer area associated with Class C airspace extends 10 n.m. beyond the shell area. VFR pilots are not required to contact ATC prior to entering the outer area, but it is helpful to do so. For approach, departure, or overflights, ATC normally provides the same radar services in the outer area as it does within the Class C airspace.

Solid magenta circles represent the boundaries of Class C airspace. The shell area of Grand Rapids Class C airspace extends from 2,000 feet MSL to 4,800 feet MSL.

The core area begins at the surface and extends to 4,800 feet MSL.
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

Solid blue lines encircling an airport designate the lateral boundaries of Class B airspace.

This area of the Memphis Class B airspace has a floor of 1,800 feet MSL and extends to 10,000 feet MSL.

The ceiling of the Memphis Class B airspace is 10,000 feet MSL. Within this blue boundary, the floor of Class B airspace begins at 5,000 feet. If you are operating above 10,000 feet MSL or below 5,000 feet MSL, you are not in the Memphis Class B airspace. Aircraft within the Class B area may be assigned altitudes at or near the floor of that airspace, so if you do not give yourself an extra margin of clearance when you are circumnavigating a Class B area, you are increasing the potential for a collision.

This thin blue line depicts the 30 n.m. boundary in which you must have an operating transponder with Mode C capability.
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

Published VFR Routes Approaching and Thru Class B

On the reverse side of some, eventually all, Terminal Area Charts (TAC) are Special Airspace Rules to facilitate approach and transition VFR traffic into our through Class B airspace.

They include:

- VFR Flyway Planning Charts,
- VFR Corridors, and
- VFR Transitions Routes
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

VFR Flyway Planning Charts

These airways are designed to help VFR pilots avoid major controlled traffic flows.

Per the AIM, “for use by pilots in planning flights into, out of, through or near complex terminal airspace to avoid Class B airspace. An ATC clearance is NOT required to fly these routes.” UNLESS IT ENTERS CLASS B AIRSPACE.
A VFR Corridor is defined as airspace through Class B airspace, with defined vertical and lateral boundaries, in which aircraft may operate without an ATC clearance or communication with air traffic control. This type of structure is rare due to ever-increasing volume of air traffic in Class B airspace.
A VFR Transition Route is defined as a specific course depicted on the TAC for transitioning a specific Class B Airspace. These routes include specific ATC assigned altitudes, and pilots must obtain an ATC clearance prior to entering Class B airspace on the route.

An example of the TAMPA TAC “Bridge Transition” is shown on the following frame.
LAX VFR Corridor has been replaced by 5 Transition Routes
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

A

ABOVE = “E’
TRSA

Terminal Radar Service Area

Airspace in which radar and air traffic control services are made available to pilots flying under instrument flight rules or (optionally) visual flight rules for the purposes of maintaining aircraft separation. TRSAs are most often encountered surrounding busy U.S. airports. In recent years many of them have gradually been replaced by Class B or Class C airspace. Terminal Radar Service Area was established as part of a program to create Terminal Radar stations at selected airports. Because these were never subject to the rulemaking process of 14 CFR Part 91, they do not actually fit into any of the existing U.S. classifications of airspace and have been classified as non-part 71 airspaces. While operating in these airspaces a pilot who chooses to participate will receive radar services, but participation is not required.

TRSAs will encompass a primary airport with a class "D" designation and the TRSA will be above other controlled airspace (Typically Class E Airspace) with a typical floor of 700 feet or 1,200 feet AGL (Above Ground Level).

TRSAs are shown on VFR (Visual Flight Rules) "Sectional" charts as a solid black/gray.
Do Aircraft have to obey Speed limits?

YES
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

**SPEED LIMITS?**
Below 250 knots (288 mph)

Within airspace types C / D, or below 2,500 within 4 nm of airport, or any area under type B = 200 knots (230)

**VFR or “Special VFR”**

What are visibility and ceiling restrictions for VFR and SVFR?

- **VFR:** 3sm & 1000 AGL ceiling
- **SVFR:** visibility dropped to 1sm

How do you determine if it is allowed?
THE FLIGHT ENVIRONMENT - CONTROLLED AIRSPACE

Identify type, base-ceiling of each.

What is above, How high?

Rwy 04 & 22 ceiling
THE FLIGHT ENVIRONMENT – AIRSPACE SUMMARY
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

ALERTS, MOA, WARNINGS, RESTRICTED, PROHIBITED, CONTROLLED-FIRING, NSA, TFR AREAS LISTED IN LEGENDS (EXCEPT TFR)
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

This alert area surrounding the U.S. Air Force Academy near Colorado Springs was established due to intensive student pilot training and parachute jumping.

Check this out — the view from the top of Pikes Peak inspired Katherine Lee Bates to compose America the Beautiful.

Glider activity also exists in this area.
The hatched magenta line marks the boundary of Reese 4 MOA.

Military activities can occur from sunrise to sunset Monday through Friday.

As shown on the margin of the Dallas Ft. Worth sectional chart, operations in Reese 4 MOA begin at 10,000 feet MSL and extend up to but not including 18,000 feet MSL.

Prior to entering Reese 4 MOA (if it is active), you should contact Lubbock air traffic control tower for advisories.

*Altitudes indicate floor of MOA. All MOAs extend to but do not include FL 180 unless otherwise indicated in tabulation or on chart.

1. Enter area by NOTAM contact FSS
2. ZFW - Fort Worth, ZKC - Kansas City
The lateral dimensions of Warning Area 497B off the coast of Florida are shown by the blue hatched line.
### THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

The vertical height of these three restricted areas varies. Restricted Area 6612 extends from the surface to only 7,000 feet MSL while R-6611A and R-6613A begin at the surface and continue to 40,000 feet MSL.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

Prohibited Area 56 in Washington D.C. includes the White House, the Lincoln Memorial, the Washington Monument, the U.S. Capitol Building and the Naval Observatory.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

NATIONAL SECURITY AREA

The dashed magenta line indicates the lateral boundaries of this NSA.

For reasons of National Security, pilots are requested to avoid flight below 6,500 feet MSL within this NSA.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

Local airport advisory service (LAA) from the flight service station at Iliamna, Alaska is only available from May 1 through September 30.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

Operations on this MTR are conducted under IFR with segments above 1,500 feet AGL.

This MTR has no segment above 1,500 feet AGL and applies to VFR operations only.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

TFR – Short term are not published. Get notices from AOPA or check NOTAMS.

The magenta circle represents the temporary flight restriction area.

The site number is shown inside the magenta triangle. You can refer to the chart legend for information regarding a specific site.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

You can contact St. Petersburg FSS for the current NOTAMs regarding flight limitations in this area.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

Parachute Jump Aircraft Area

ZPH   SFC-13,500 MSL

This symbol represents a parachute jump area near Perry Airport.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

This blue dashed line denotes Class D airspace underlying the TRSA with a ceiling of 3,100 feet MSL.

In this area the TRSA begins at 2,500 feet MSL and extends to 8,000 feet MSL.

These solid gray lines represent the lateral boundaries of Muskegon TRSA.
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

You must file a DVFR flight plan and have an operating Mode C transponder to cross the ADIZ.
Land-Based ADIZ

A Land-Based ADIZ is established to control air traffic in the interest of national security. Unlike the Contiguous ADIZ, a Land-Based ADIZ:

- Is created and disseminated by notam, which includes dimensions, activation dates, and other relevant information
- Can be activated and deactivated over U.S. metropolitan areas as needed
- Does not require 12" tall registration numbers
THE FLIGHT ENVIRONMENT - SPECIAL USE AIRSPACE

What used to be a temporary ADIZ (Air Defense Identification Zone) is now a permanent FRZ (Flight Restricted Zone) surrounded by an SFRA (Special Flight Rules Area). An FAA final rule has established the new airspace configuration around the nation's capital. The FRZ is a 15-nautical-mile-radius ring emanating from Washington National Airport. Flights within the FRZ are restricted to those authorized by the FAA and the Transportation Security Administration (TSA).

Complex, with many embedded types of airspace. Significant requirements for both uncontrolled and controlled airspaces – even pattern work (T&Gs) have ATC, and special transponder requirements.
Laser Warning: Red, Red, Green
Multiple locations—won’t damage eyes or equipment
You will see it day or night!!
Intercept Procedures

In the unfortunate event that you stray into a TFR, or fly unannounced into an ADIZ, you may be intercepted by a military or Coast Guard aircraft. If you are intercepted:

- Monitor 121.5 for instructions
- Comply with any instructions given by the intercepting aircraft
- Squawk 7700 unless told otherwise
- If possible, notify ATC that you have been intercepted
- If you are given conflicting instructions by ATC, always comply with the intercepting aircraft
# In-Flight Intercept Procedures

If you are intercepted by a U.S. Military or law enforcement aircraft, immediately:

1. Follow the instructions given by the intercepting aircraft. *(See chart at right.)*
2. Notify ATC, if possible.
3. Attempt to communicate with ATC on the emergency frequency **121.5 MHz**, giving the identity and position of your aircraft and the nature of the flight.
4. If equipped with a transponder, squawk 7700, unless otherwise instructed by ATC. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, request clarification while continuing to comply with the instructions given by the intercepting aircraft.

<table>
<thead>
<tr>
<th>Intercepting aircraft signal</th>
<th>Meaning</th>
<th>Intercepted aircraft response</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocks wings. After acknowledgment initiates a slow level turn, normally to the left, into the desired heading. (Also, at night flash the navigational lights.)</td>
<td>You have been intercepted.</td>
<td>Rocks wings and follows. (Also, at night flash navigational lights.)</td>
<td>I understand and will comply.</td>
</tr>
<tr>
<td>Performs an abrupt breakaway maneuver consisting of a climbing 90 degree turn, or more, without crossing the intercepted aircraft's flight path.</td>
<td>You may proceed.</td>
<td>Land at this airport.</td>
<td>I understand and will comply.</td>
</tr>
<tr>
<td>Circles airport, lowers landing gear, and overflies runway in the direction of landing. (Also, at night turn the landing lights on.)</td>
<td>Lowers landing gear, follows the intercepting aircraft and lands if the runway is considered safe. (Also, at night turn the landing lights on.)</td>
<td>I understand and will comply.</td>
<td></td>
</tr>
</tbody>
</table>
Section Map Review

Next Session – The Flight Computer/Navigation Plotter

Study for exam on The Flight Environment

BRING YOUR E6B AND PN-1

“That’s All Folks”