

Intro to Small Unmanned Aircraft Systems & Recreational Drones

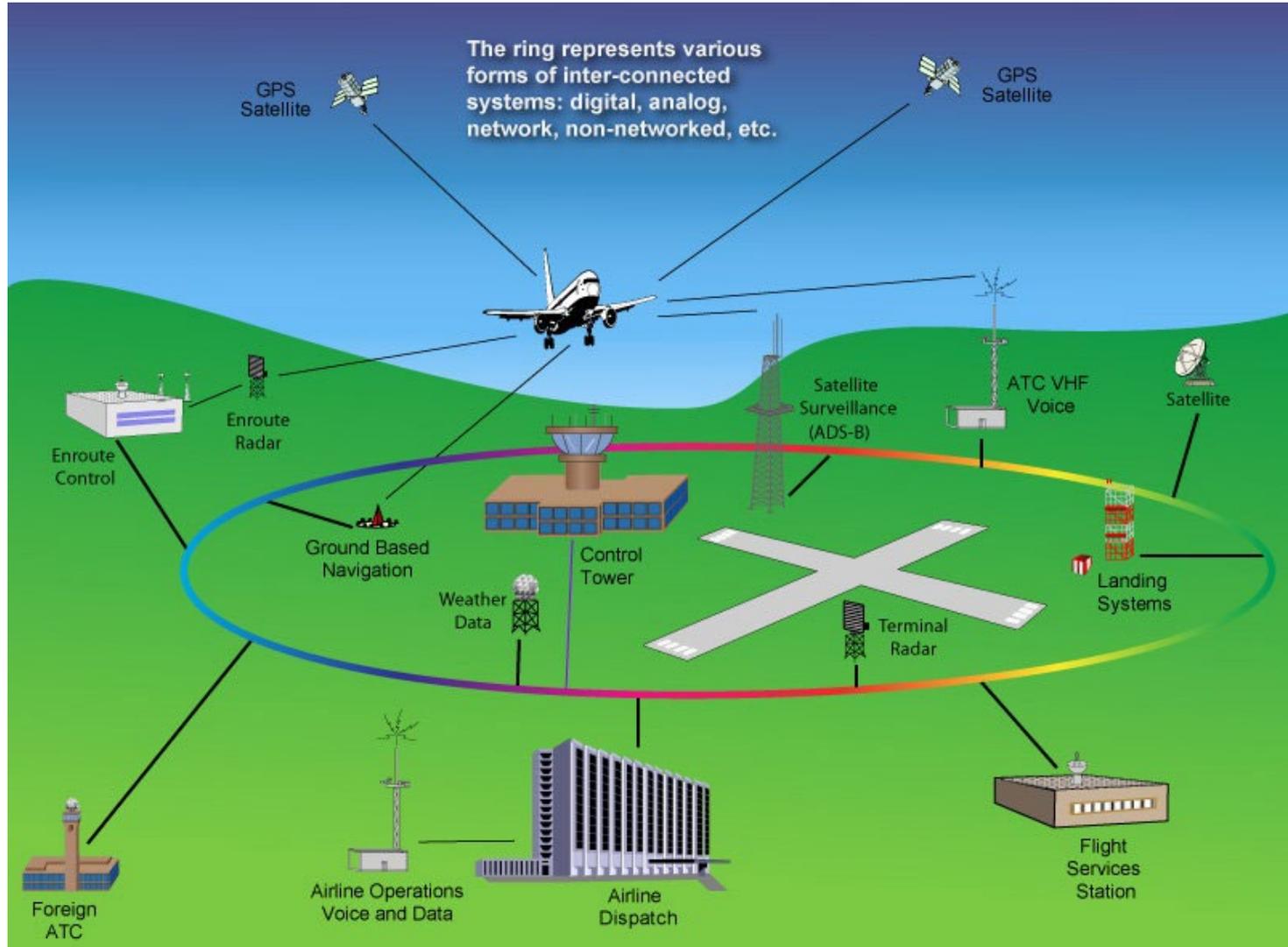




The mission of the FAA is **to provide the safest, most efficient aerospace system in the world** to satisfy the aviation needs of the United States

The FAA controls the **National Airspace System (NAS)**, which is a network of both controlled and uncontrolled airspace over land and sea. It includes air navigation, airports, aeronautical charts, information services, rules & regulations, procedures, and manpower & material.

National Airspace System (NAS)



Airspace & Drone Pilots

The FAA requires all drone pilots to have a basic understanding of the National Airspace.

The Part 107 Certified Remote Pilot test includes National Airspace questions. You must be able to proficiently read and understand the information and data on the FAA sectional charts used by Visual Flight Rule (VFR) pilots.



Airspace Classes

Class A – Airspace from 18,000 to 60,000 feet (MSL)

Class B – Large Airports with control tower

Class C – Medium Sized Airports with control tower

Class D – Small Airports with control tower

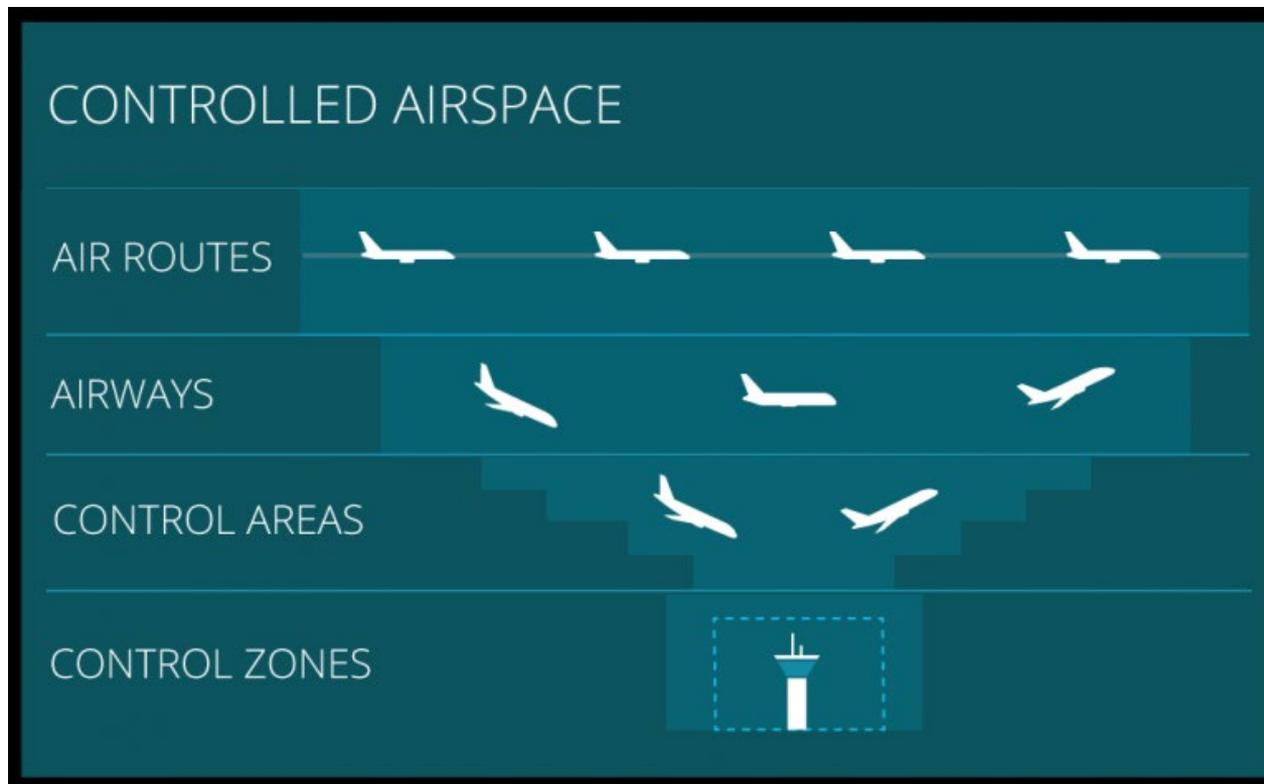
Class E – Small Airports or surface (SFC) & lateral airspace

Class G – Uncontrolled (ground up to controlled airspace)

* There is no **Class F** airspace in the US.

Controlled Airspace

Air Traffic Control services are provided in Controlled Airspace. The level of control varies with different classes of airspace.



Class A Airspace

- Not an issue for drone pilots – info only
- From 18,000 feet (MSL) to 60,00 feet (MSL)
- Instrument Flight Rules (IFR) only
- Altitudes are in “Flight Levels” not “Feet”
 - Flight Level 200 = 20,000 feet
 - Flight Level 500 = 50,000 feet

MSL = above Mean Sea Level

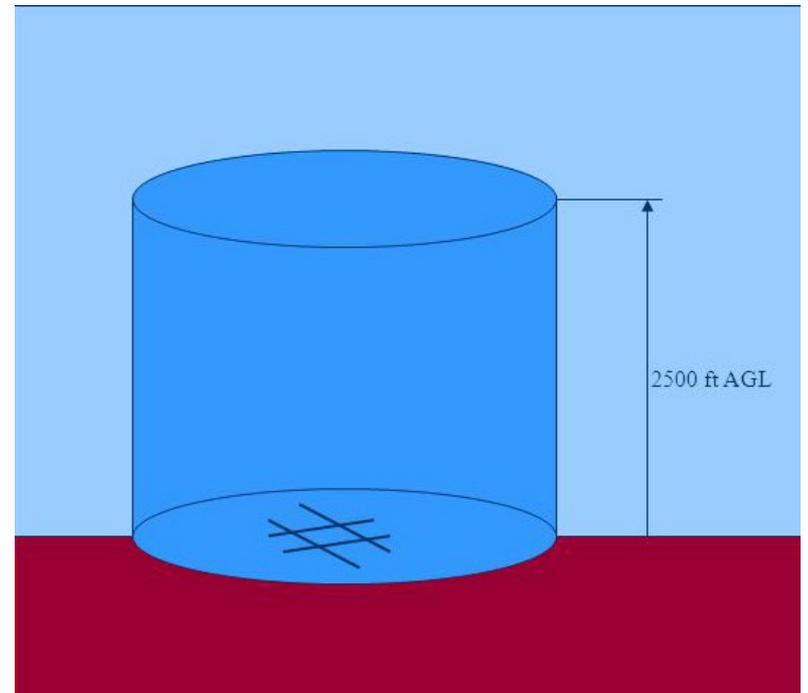
AGL = Above Ground Level

ALO is 873 feet above MSL



Class D Airspace

- Airport Traffic Control Tower (ATC)
- Instrument Flight Rule (IFR) operations
- Radar is optional
- May not have 24/7 operation
- Airspace usually consists of a surface area with a 4 NM radius (4.6 statute miles) that extends to 2,500 feet (AGL)
The chart lists the top altitude in mean sea level (MSL).





Waterloo Airport (ALO)

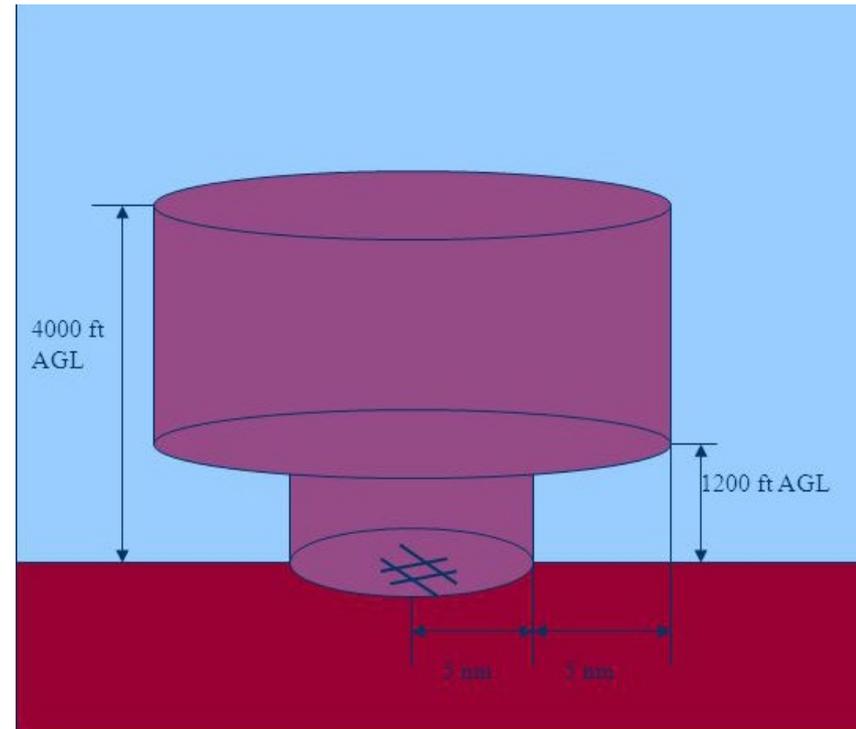
Waterloo Airport is FAA
Class D airspace.

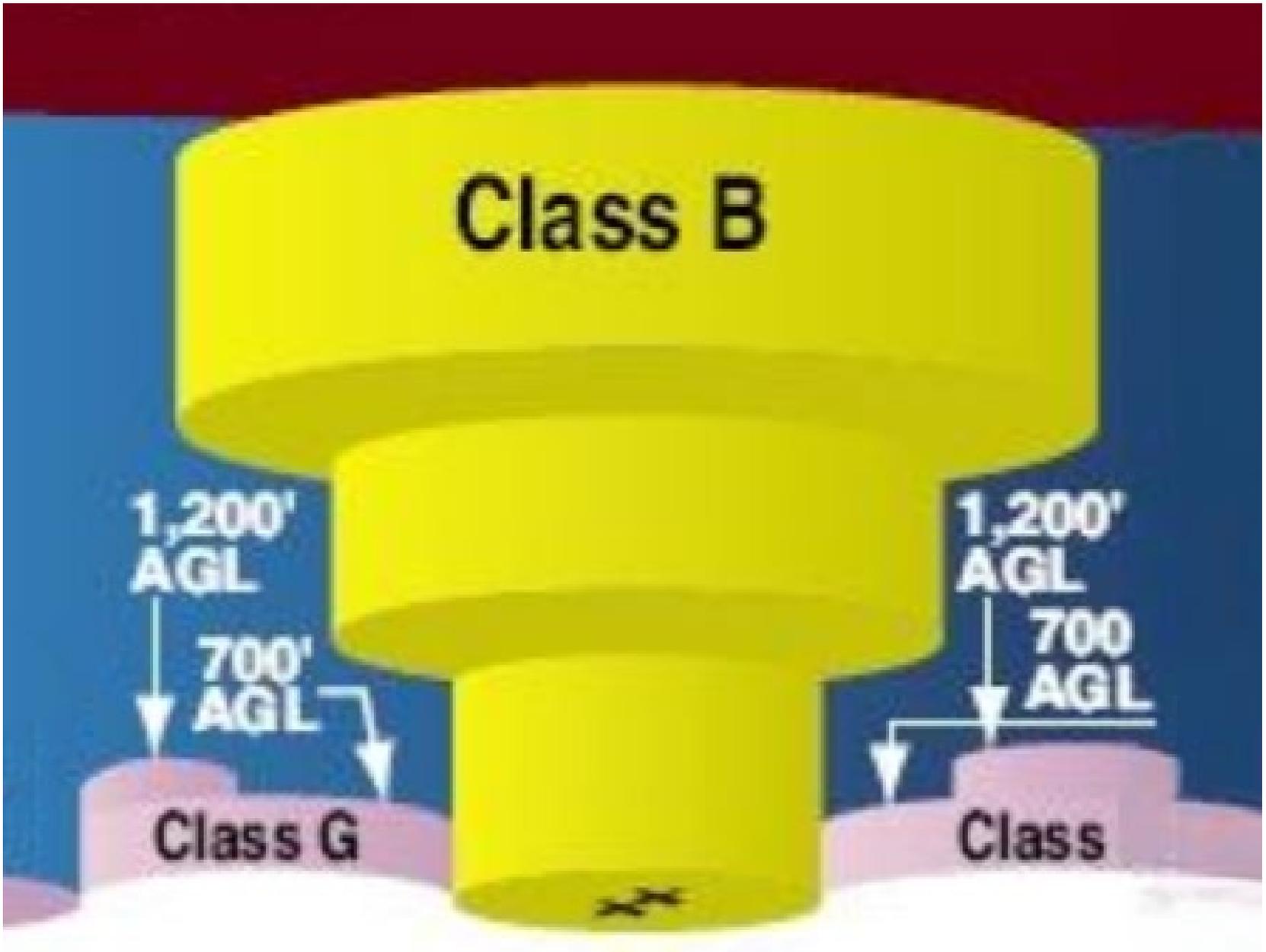
Class D airspace is generally cylindrical in form and extends from the surface to 2,500 feet AGL (above ground level).

On the chart, ALO airspace is 3,400 feet above MSL (mean sea level) or 2527 AGL.

Class C Airspace

- Airport Traffic Control Tower (ATC)
- Radar approach control
- Requires a minimum number of Instrument Flight Rule (IFR) operations or passengers.
- Airspace usually consists of a surface area with a 5 NM radius (5.8 statute miles), an outer circle with a 10 NM (11.5 statute miles) radius that extends from 1,200 feet to 4,000 feet (AGL)





Class B Airspace

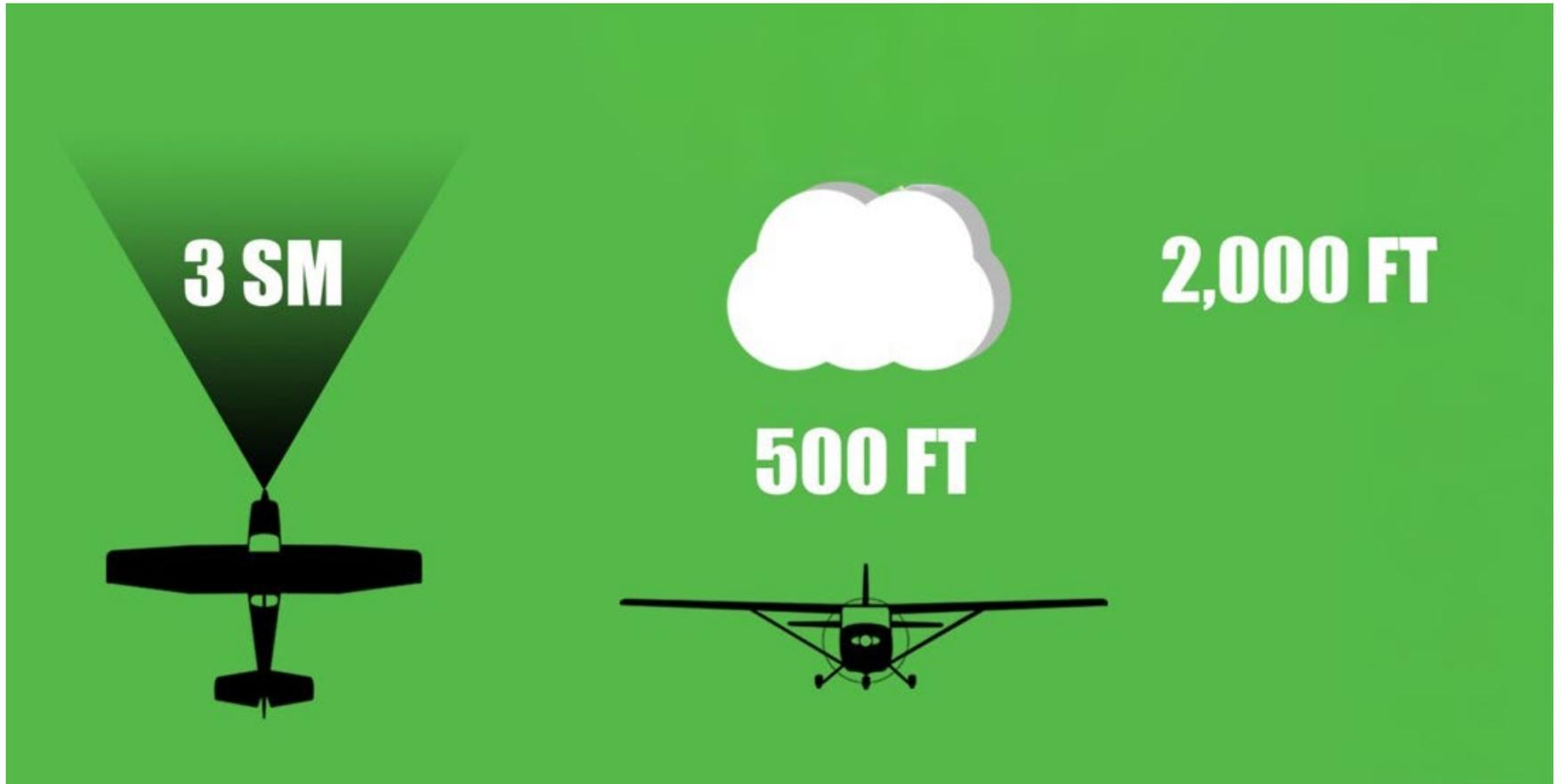
- Busiest Airports and Airspace
- Control from surface to 10,000 feet (AGL)
- Diameter of 30 NM (34.5 statute miles)
- There are 37 Class B airports in the USA. The nearest Class B airports are:
 - **ORD** – Chicago O’Hare
 - **MSP** – Minneapolis / St. Paul
 - **STL** – Lambert St. Louis
 - **MCI** – Kansas City
- Limited VFR allowed
- Information provided on **Terminal Area Charts (TAC)** and **Chart Supplements**.



Class E Airspace

- Class E Airspace is the most common Controlled Airspace and the most confusing!
- IFR aircraft must have ATC clearance to fly in Class E Airspace.
- VFR aircraft must have minimum clearance with clouds and 3 statute miles visibility.
- If an IFR aircraft comes out of the clouds, both aircraft have enough time to see and avoid the other aircraft.

Minimum Clearance & Visibility



Class E Airspace

Class E airspace is all the controlled airspace not described as A, B, C or D airspace.

- Most of this airspace is not near the surface, but aloft, where aircraft flying under IFR are in an en-route segment of flight.
- Over most of the country, the base of Class E airspace is at either 700 feet or 1,200 feet above the ground, so this isn't an issue for a drone operating at 400 feet and below.

Class E Surface (SFC)

Class E surface airspace extends down to the surface at some airports. All Class E surface airports are required to have a weather station and the ability for aircraft to contact Air Route Traffic Control Center (ARTCC) from the ground. Class E surface airspace has a **dotted magenta** line indicating the Class E area.

Class E Surface Airport



Lateral Class E Airspace

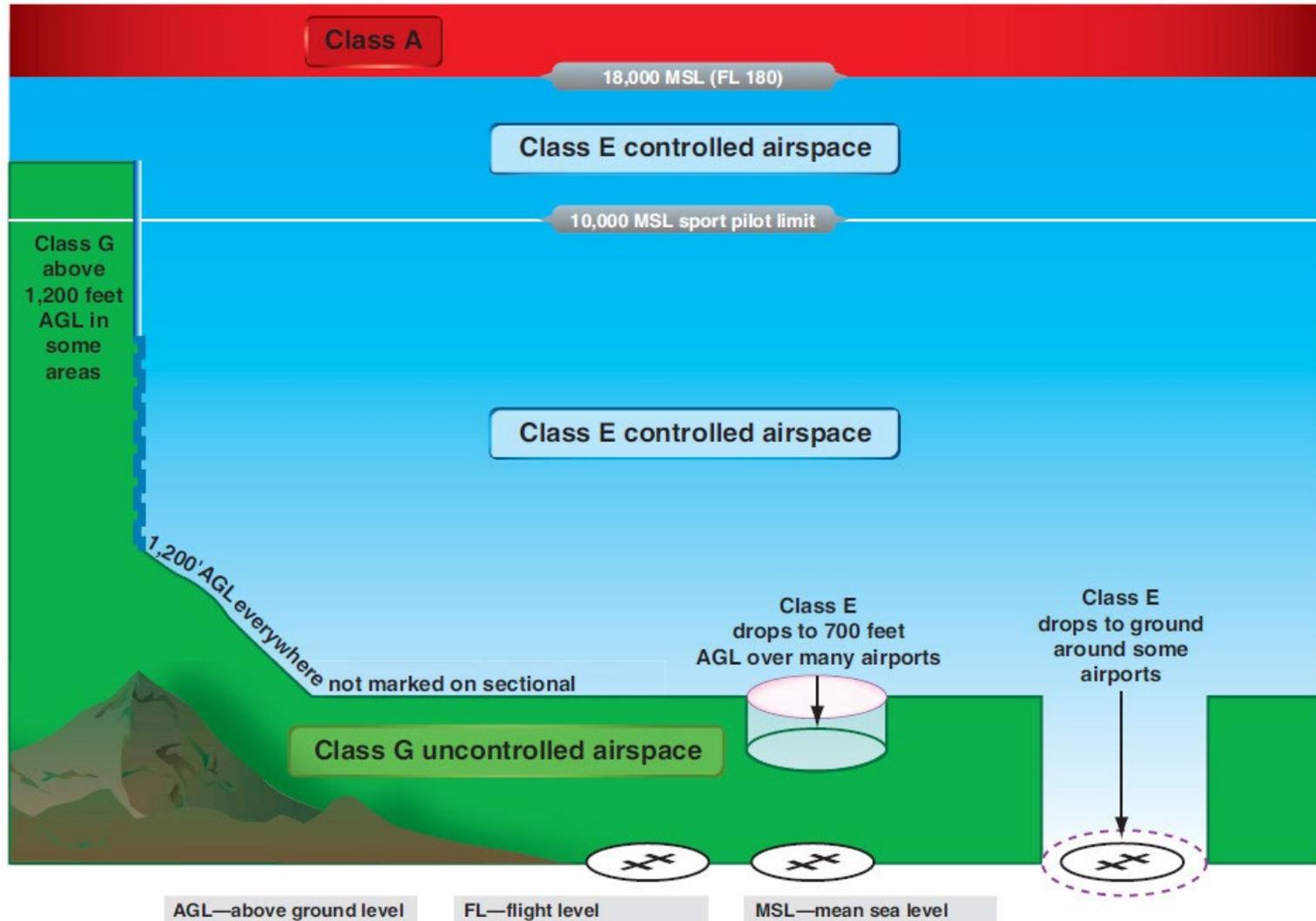


Figure 8-2. Class G uncontrolled airspace and Class E controlled airspace.



Lateral Class E Airspace

The lateral Class E Airspace lower altitude limits are shown on the Sectional Chart as follows:

Thin, dashed magenta (purple) line – surface up

Shaded magenta (purple) – 700 feet (AGL) up

Shaded cyan (greenish-blue) – 1200 feet (AGL) up

Lateral Class E Airspace

Waterloo airport has Class E airspace extending from the runways beyond the normal 4 NM (4.6 statute miles) radius down to ground level shown with a thin, dashed **magenta** line on the Sectional Chart.

Class E Airspace

Approval is not required to fly a drone in Class E Lateral Airspace, but a minimum of 1000' cloud ceiling is required when flying a drone in Class E Lateral.

Authorization is required to fly in Class E Surface airspace.

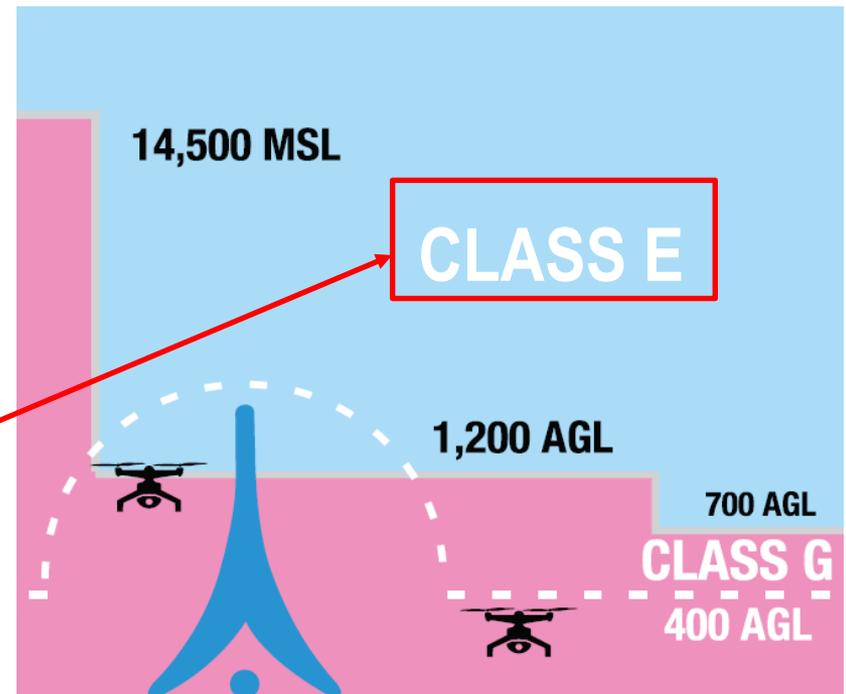
Class E Surface Airports in Iowa

<i>CODE</i>	<u>AIRPORT</u>	<u>CITY</u>
AMW	Ames Muni	AMES
BRL	Southeast Iowa Regional	BURLINGTON
CWI	Clinton Muni	CLINTON
DVN	Davenport Muni	DAVENPORT
FOD	Fort Dodge Regional	FORT DODGE
IKV	Ankeny Regional	ANKENY
MCW	Mason City Muni E	MASON CITY
MUT	Muscatine Muni	MUSCATINE
OTM	Ottumwa Regional	OTTUMWA
SLB	Storm Lake Muni	STORM LAKE
SPW	Spencer Muni	SPENCER
TNU	Newton Muni	NEWTON

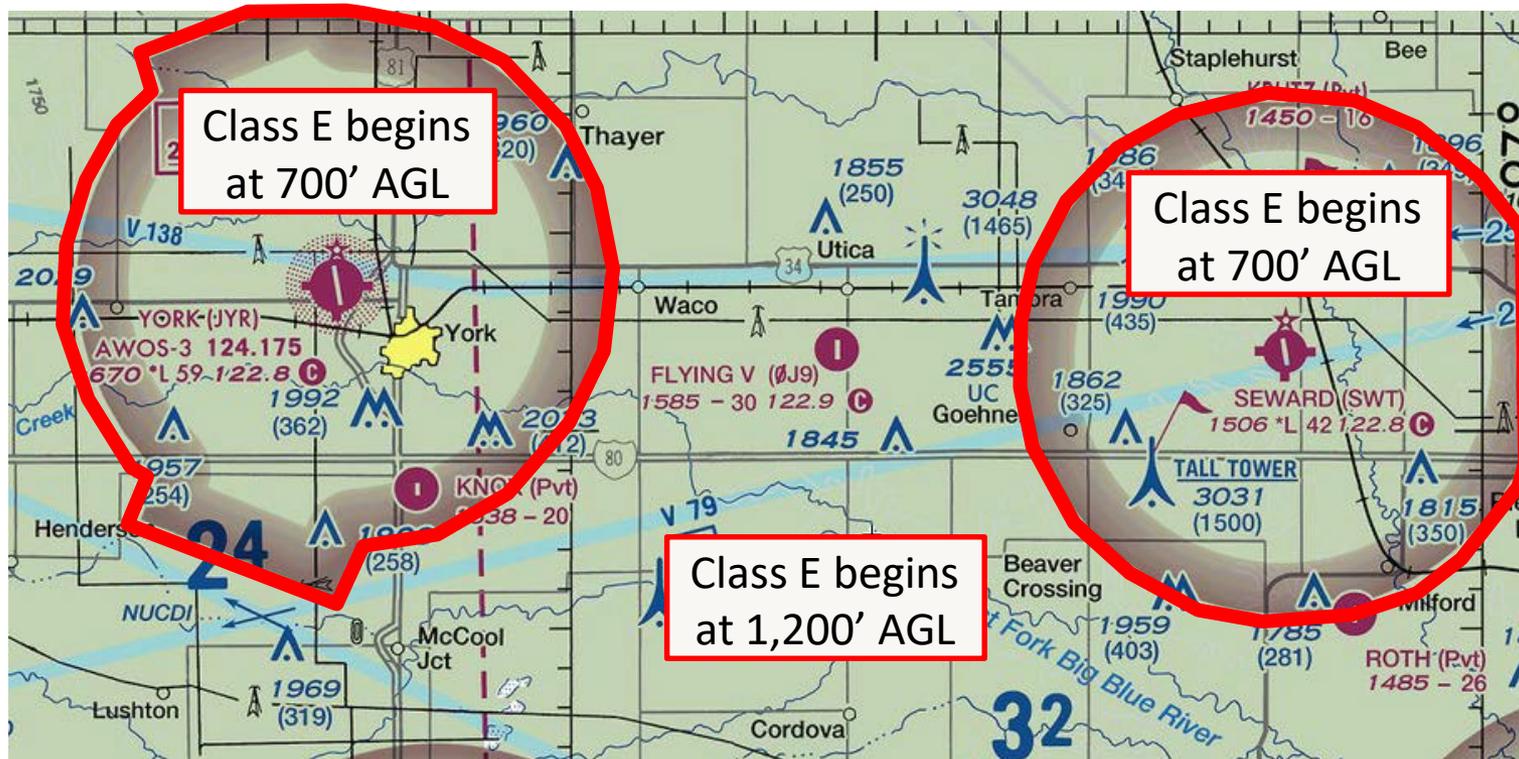
Class E Airspace

- Generally Class E begins where Class G ends
 - Typically, 700 ft or 1,200 ft Above Ground Level
 - Unless associated with an airport surface area

- **ATC authorization not required for Part 107 operations**



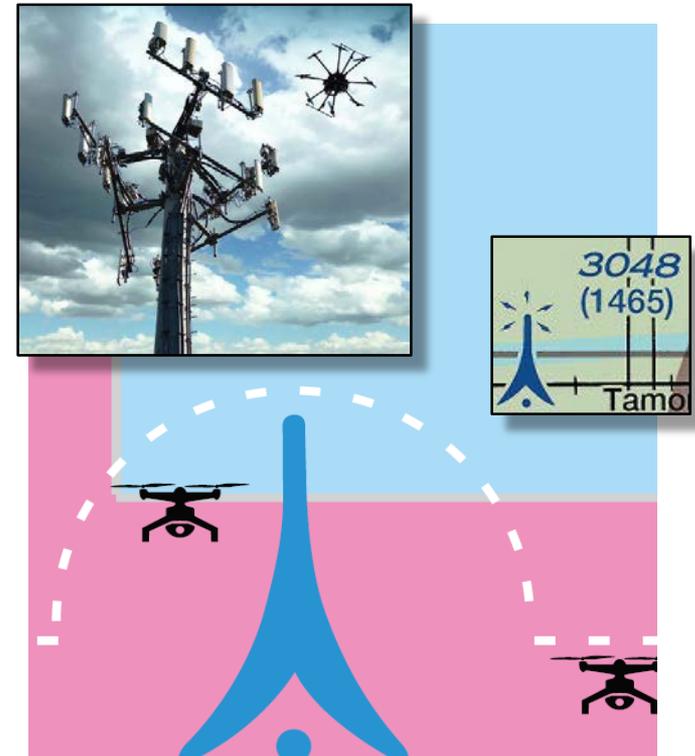
Class E Airspace



Class E Airspace

Tower Inspections:

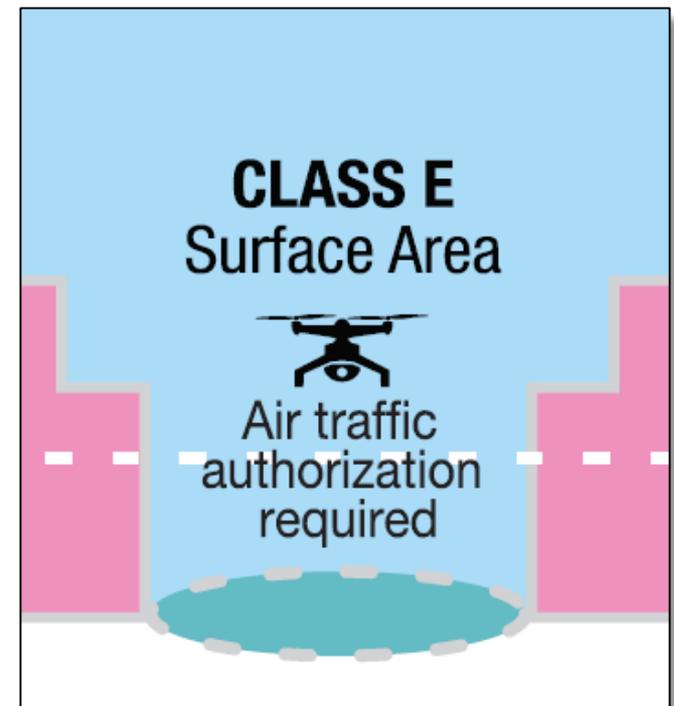
- **§107.51(b)**
 - Limits maximum altitude to 400 ft Above Ground Level
- **Exceptions:**
 - Is flown within a 400-foot radius of a structure; and
 - Does not fly higher than 400 feet above the structure's immediate uppermost limit



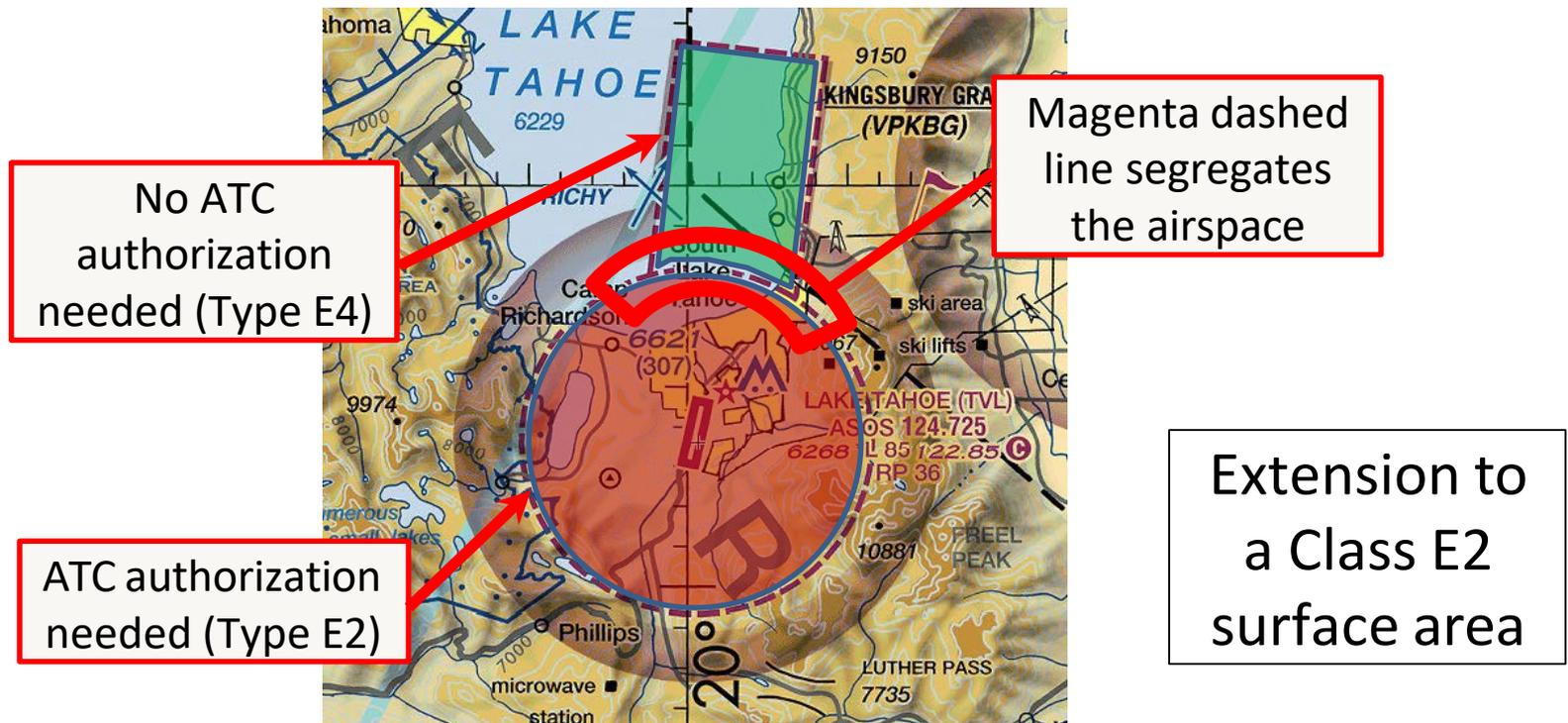
Surface Class E Airspace

Starts at ground level:

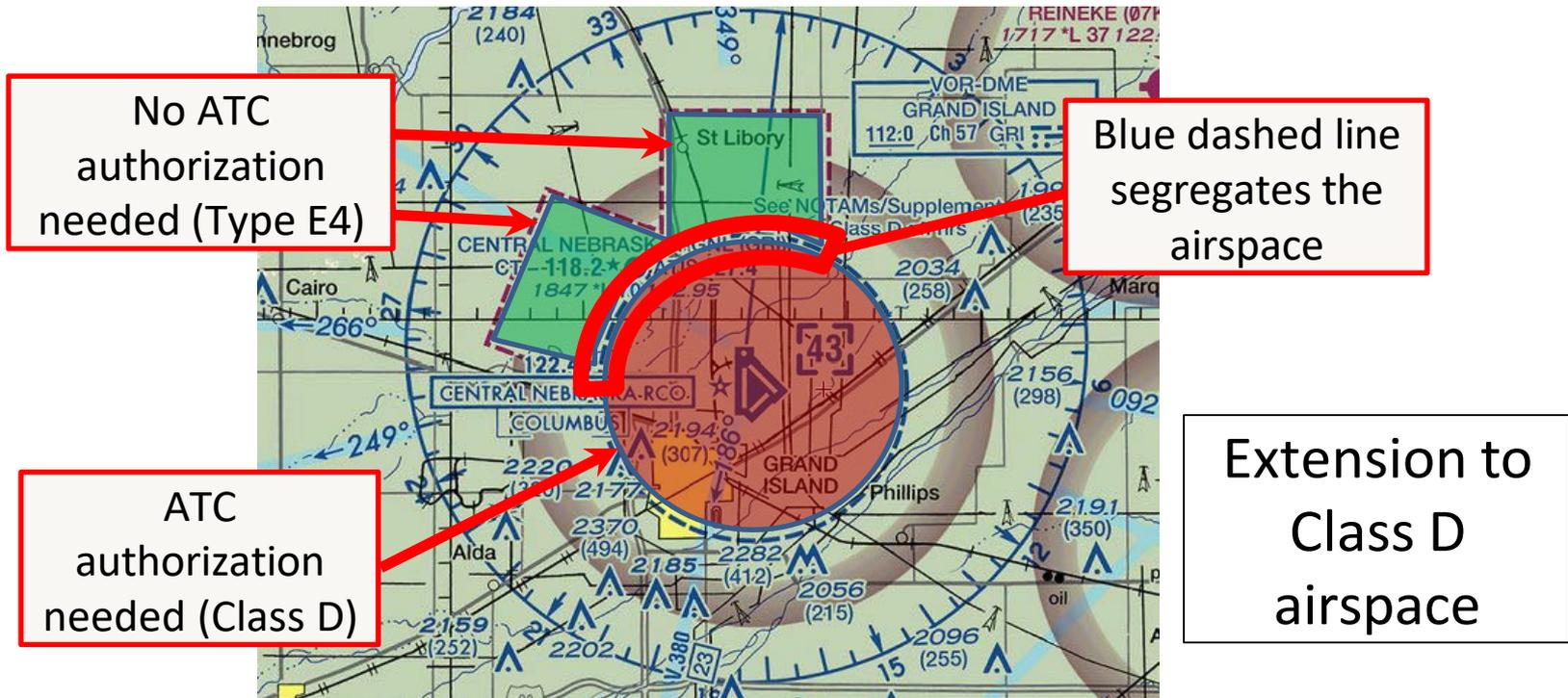
- **Type E4**
 - Extension to Class D or E surface area
- **Type E3**
 - Extension to a Class C surface area
- **Type E2**
 - Surface area designated for an airport
 - **AUTHORIZATION NEEDED**



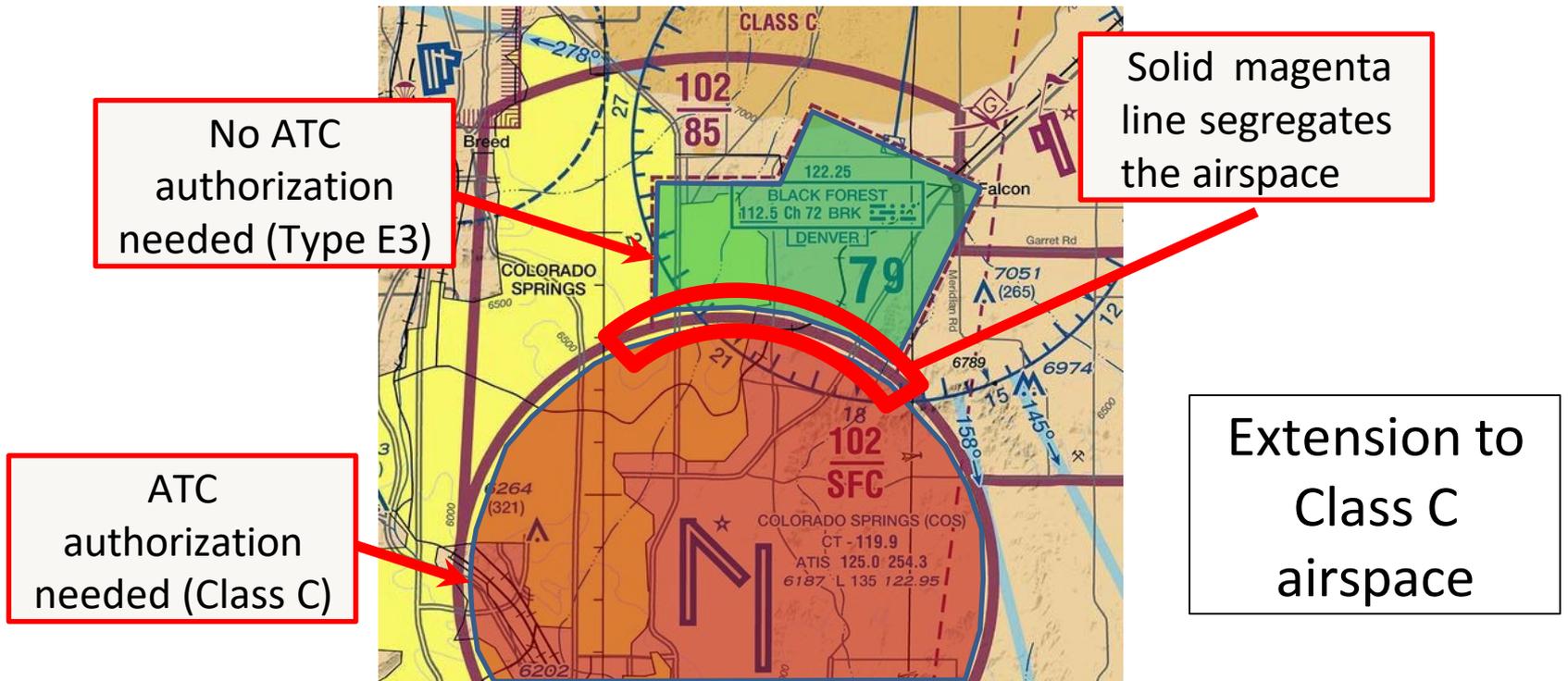
Surface Class E – Type E4



Surface Class E – Type E4



Surface Class E – Type E3

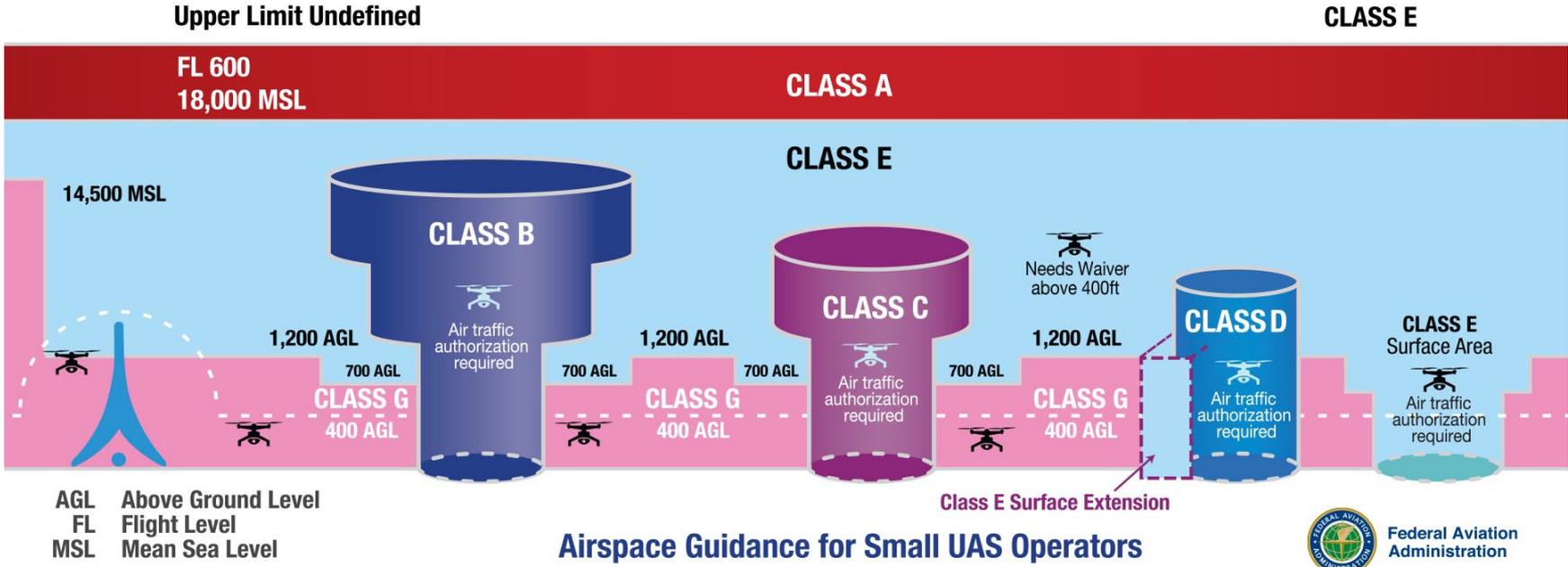


Class G Airspace

- Uncontrolled Airspace – No ATC
- From the ground to the bottom of the overlying Class E airspace
- Upper level is typically 700 feet to 1200 feet AGL with a maximum of 14,500 feet MSL in some areas over mountains.



Airspace Guidance





Airspace Violations

Drone **flight deviations** should be reported to the Federal Aviation Administration (FAA), specifically your local Flight Standards District Office (FSDO) or the FAA Regional Operations Center (ROC).



Sources of Information

Aeronautical Charts – 3 types of charts that cover any flying situation – Sectional, Terminal & En-Route



Chart Supplement U.S. – the most comprehensive information on a given airport



NOTAMs (Notice to Air Mission) – Temporary time-critical aeronautical information



Automated Terminal Information Service (ATIS) - weather, runways in use, specific ATC procedures and any airport construction activity that could affect taxi planning

Aeronautical Chart Types



VFR Sectional Chart – covers several states and provides information for VFR (Visual Flight Rules)



Terminal Area Chart (TAC) – covers the airspace around large Class B airport in a larger format



En-Route Chart – provides navigation information for IFR (Instrument Flight Rules)



VFR Sectional Aeronautical Chart

Sectional Aeronautical Charts are designed for visual navigation of slow to medium speed aircraft. The topographic information consists of a selection of visual checkpoints used for flight under Visual Flight Rules (VFR). The checkpoints include cities & towns, rivers & streams, roads, railroads, obstructions, airports, controlled airspace, restricted areas, and landmarks. The Sectional Charts also include radio aids for navigation.

These charts are updated every 56 days.

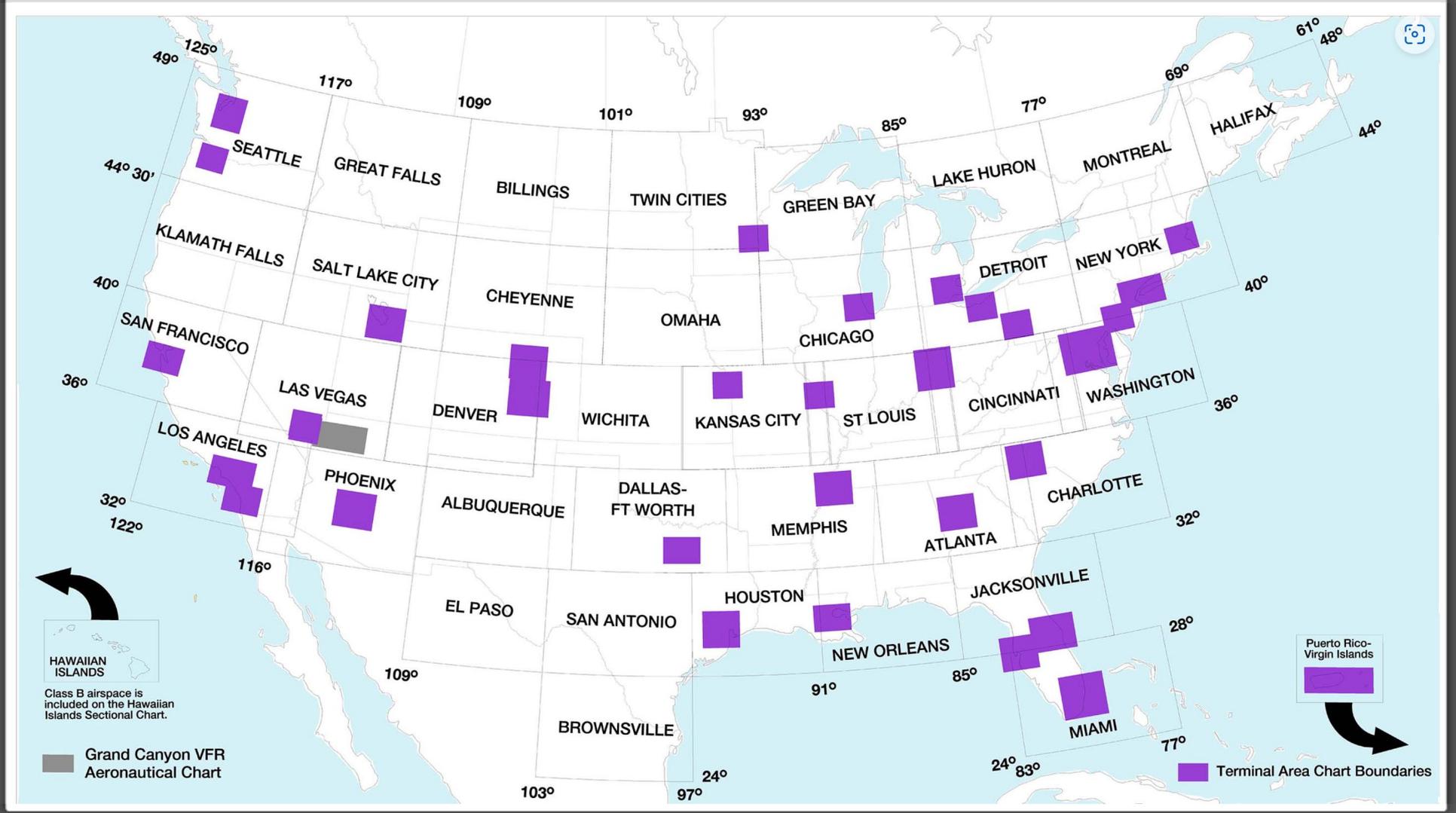
Terminal Area Chart (TAC)

Terminal Area Charts (TAC) are large-scale charts with more detail around major airports. They provide pilotage and local control requirements in airspace designated as Class B Airspace. Coverage of Terminal Area Charts are indicated by shaded boxes on the Sectional Chart.

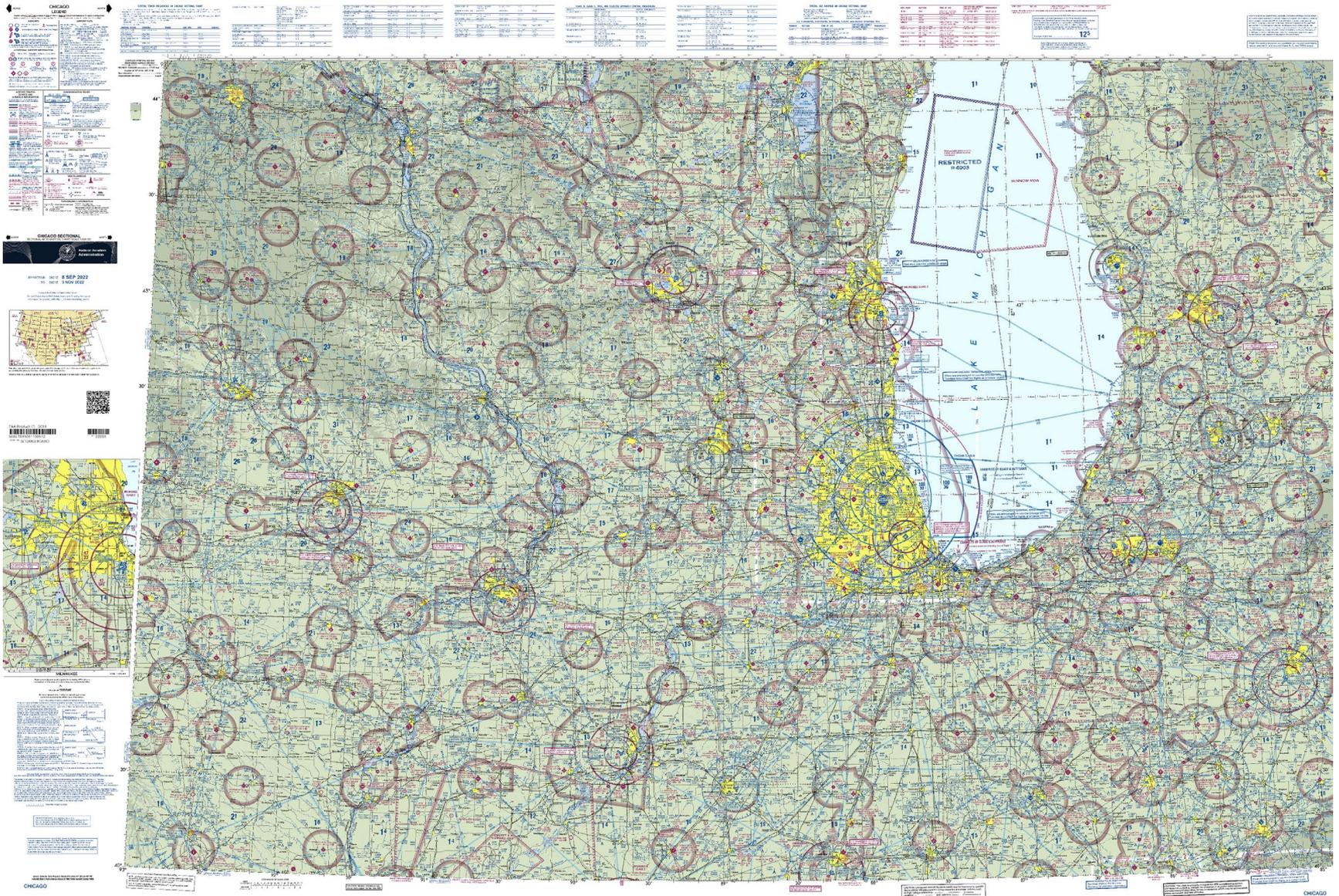
These charts are updated every 56 days.

Charted VFR Flyway Planning Charts are printed on the backs of selected Terminal Area Charts.

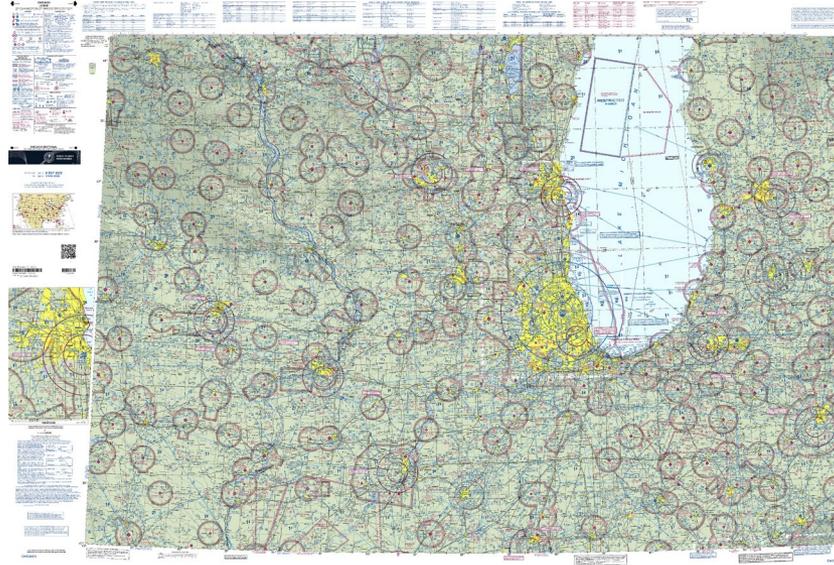
VFR Sectional Aeronautical Chart



VFR Sectional Aeronautical Chart



Why are Aeronautical Maps printed in funny colors?



You may be familiar with **RGB** digital color printing on your printer. Professional printing presses use four ink colors — cyan, magenta, yellow, and black — also known as the **CMYK process**. This method of printing limits the number of printing plates required to four.

VFR Chart Supplement

The Chart Supplements includes data that cannot be readily depicted in graphic form: e.g., airport hours of operation, types of fuel available, runway data and lighting codes



May be downloaded as PDF files.

Waterloo Chart Supplement

WATERLOO RGNL (ALO)(KALO) P (ARNG) 4 NW UTC-6(-5DT) N42°33.51' W92°24.06'

873 B ARFF Index—See Remarks NOTAM FILE ALO

RWY 12-30: H8399X150 (ASPH-GRVD) S-55, D-75, 2D-140 PCN 59 R/A/X/T

HIRL

RWY 12: MALS. PAPI(P4L)—GA 3.0° TCH 57'. RVR-T Tree.

RWY 30: MALS. VASI(V4L)—GA 3.0° TCH 52'. RVR-R

RWY 18-36: H6003X150 (ASPH-CONC-GRVD) S-50, D-75 PCN

51 F/B/X/T MIRL

RWY 18: REIL. VASI(V4L)—GA 3.0° TCH 42'. Tree.

RWY 36: REIL. PAPI(P4L)—GA 3.0° TCH 51'. Tree.

LAND AND HOLD—SHORT OPERATIONS

LDG RWY	HOLD—SHORT POINT	AVBL LDG DIST
RWY 30	18-36	4800
RWY 36	12-30	3650

RUNWAY DECLARED DISTANCE INFORMATION

RWY 12: TORA-8399 TODA-8399 ASDA-8399 LDA-8399

RWY 18: TORA-6003 TODA-6003 ASDA-6003 LDA-6003

RWY 30: TORA-8399 TODA-8399 ASDA-8399 LDA-8399

RWY 36: TORA-6003 TODA-6003 ASDA-6003 LDA-6003

SERVICE: S4 FUEL 100LL, JET A OX 1, 2, 3, 4 LGT When

ATCT clsd ACTVT MALS. Rwy 12; MALS Rwy 30; VASI Rwy 18;

PAPI Rwy 36; MIRL Rwys 18-36, and HIRL Rwy 12-30—CTAF.

MILITARY—FUEL

J4(Mil)-PPR. (NC-100LL, A - O/R 0400-1100Z±, svc fee,

C319-291-4483.)

AIRPORT REMARKS: Attended 1100-0300Z±. Birds on and in/ov arpt. Arpt sfc conds unmon 0400-1030Z±

dly. Fuel avbl on request, fee for service. Class I, ARFF Index A. Clsd to unskd acf ops with more than 10 psgr seats excp 72 hours PPR amgr. Call amgr 319-291-4483. Cell 319-529-1388. ARFF Index B provided. ARFF Index C avbl on 72 hrs req. Air carrier ops over 9 psgr seats not auth over 15 minutes before or after sked arr or dep times excp with prior coord with amgr. When departing all rwys, ends of other rwys not visible. Personnel and equipment performing snow removal ops will monitor CTAF. When ATCT clsd and durg snow events, all arr/dep acft annc their intns on CTAF 5 min prior to using the rwys. Rwy 30 is calm wind rwy.

MILITARY REMARKS: ARNG ARNG OPS ctc DSN 431-5520, C319-234-1372.

AIRPORT MANAGER: 319-291-4483

WEATHER DATA SOURCES: ASOS 120.65 (319) 233-8984.

COMMUNICATIONS: CTAF 125.075 ATIS 120.65 UNICOM 122.95

RCO 122.05 (FORT DODGE RADIO)

Ⓜ APP/DEP CON 118.9 126.75 (1200-0200Z±)

Ⓜ CHICAGO CENTER APP/DEP CON 118.9 (0200-1200Z±)

TOWER 125.075 (1200-0200Z±) GND CON 121.9

ANG OPS 36.7 142.6 231.55

CLEARANCE DELIVERY PHONE: For CD ctc Waterloo ATCT at 319-233-4835. When Waterloo ATCT clsd, for CD ctc Chicago ARTCC at 630-906-8921.

AIRSPACE: CLASS D svc 1200-0200Z±; other times CLASS E.

RADIO AIDS TO NAVIGATION: NOTAM FILE ALO.

(L) (L) VORW/DME 112.2 ALO Chan 59 N42°33.39' W92°23.94' at fld. 866/0E.

VOR unusable:

017°-062° byd 35 NM blo 2,500'

063°-073° byd 18 NM

074°-356° byd 35 NM blo 2,500'

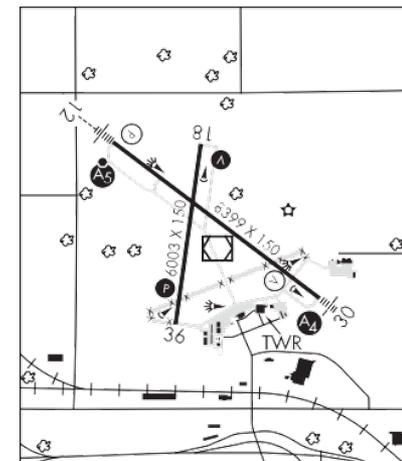
357°-016°

DME unusable:

007°-026° byd 25 NM

027°-006° byd 35 NM blo 2,500'

ILS/DME 111.7 I-ALO Chan 54 Rwy 12. Class IA. Unmonitored when twr clsd.



WATERLOO RGNL (ALO)(KALO) P (ARNG) 4 NW UTC-6(-5DT) N42°33.51' W92°24.06'

873 B ARFF Index—See Remarks NOTAM FILE ALO

RWY 12-30: H8399X150 (ASPH-GRVD) S-55, D-75, 2D-140 PCN 59 R/A/X/T

HIRL

RWY 12: MALSR. PAPI(P4L)—GA 3.0° TCH 57'. RVR-T Tree.

RWY 30: MALS. VASI(V4L)—GA 3.0° TCH 52'. RVR-R

RWY 18-36: H6003X150 (ASPH-CONC-GRVD) S-50, D-75 PCN

51 F/B/X/T MIRL

RWY 18: REIL. VASI(V4L)—GA 3.0° TCH 42'. Tree.

RWY 36: REIL. PAPI(P4L)—GA 3.0° TCH 51'. Tree.

LAND AND HOLD—SHORT OPERATIONS

LDG RWY	HOLD—SHORT POINT	AVBL LDG DIST
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RWY 30	18-36	4800
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RWY 36	12-30	3650
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RUNWAY DECLARED DISTANCE INFORMATION

RWY 12:	TORA-8399	TODA-8399	ASDA-8399	LDA-8399
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RWY 18:	TORA-6003	TODA-6003	ASDA-6003	LDA-6003
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RWY 30:	TORA-8399	TODA-8399	ASDA-8399	LDA-8399
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RWY 36:	TORA-6003	TODA-6003	ASDA-6003	LDA-6003
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SERVICE: S4 FUEL 100LL, JET A OX 1, 2, 3, 4 LGT When

ATCT clsd ACTVT MALSR Rwy 12; MALS Rwy 30; VASI Rwy 18;

PAPI Rwy 36; MIRL Rwys 18-36, and HIRL Rwy 12-30—CTAF.

MILITARY—FUEL

J4(Mil)-PPR. (NC-100LL, A - O/R 0400-1100Z‡, svc fee, C319-291-4483.)

AIRPORT REMARKS: Attended 1100-0300Z‡. Birds on and infov arpt. Arpt sfc conds unmon 0400-1030Z‡

dly. Fuel avbl on request, fee for service. Class I, ARFF Index A. Clsd to unsked acf ops with more than 10 psgr seats excp 72 hours PPR amgr. Call amgr 319-291-4483. Cell 319-529-1388. ARFF Index B provided. ARFF Index C avbl on 72 hrs req. Air carrier ops over 9 psgr seats not auth over 15 minutes before or after sked arr or dep times excp with prior coord with amgr. When departing all rwys, ends of other rwys not visible. Personnel and equipment performing snow removal ops will monitor CTAF. When ATCT clsd and durg snow events, all arr/dep acft annc their intns on CTAF 5 min prior to using the rwys. Rwy 30 is calm wind rwy.

MILITARY REMARKS: ARNG ARNG OPS ctc DSN 431-5520, C319-234-1372.

AIRPORT MANAGER: 319-291-4483

WEATHER DATA SOURCES: ASOS 120.65 (319) 233-8984.

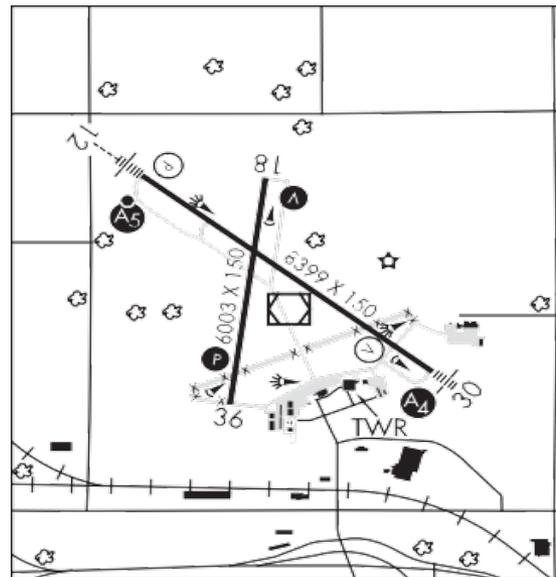
COMMUNICATIONS: CTAF 125.075 ATIS 120.65 UNICOM 122.95

RCO 122.05 (FORT DODGE RADIO)

®APP/DEP CON 118.9 126.75 (1200-0200Z‡)

®CHICAGO CENTER APP/DEP CON 118.9 (0200-1200Z‡)

TOWER 125.075 (1200-0200Z‡) GND CON 121.9



Attended 1100-0300Z Tower 1200-0200Z - Subtract 5 hours to convert to Central Daylight Time (CDT) or subtract 6 hours to convert to Central Standard Time (CST).

Waterloo Regional Airport





RUNWAY NUMBERS

Runway numbers are determined by rounding the magnetic compass bearing of the runway end to the nearest 10 degrees and truncating the last digit, meaning runways are numbered from 1 to 36....

So, if you're on runway 9, you're heading east (90° on a compass). The opposite end of runway 9 is numbered 27 (or 270° on a compass). If an airport has parallel runways, these would then be marked Left, Center and Right, e.g., 9L/9C/9R

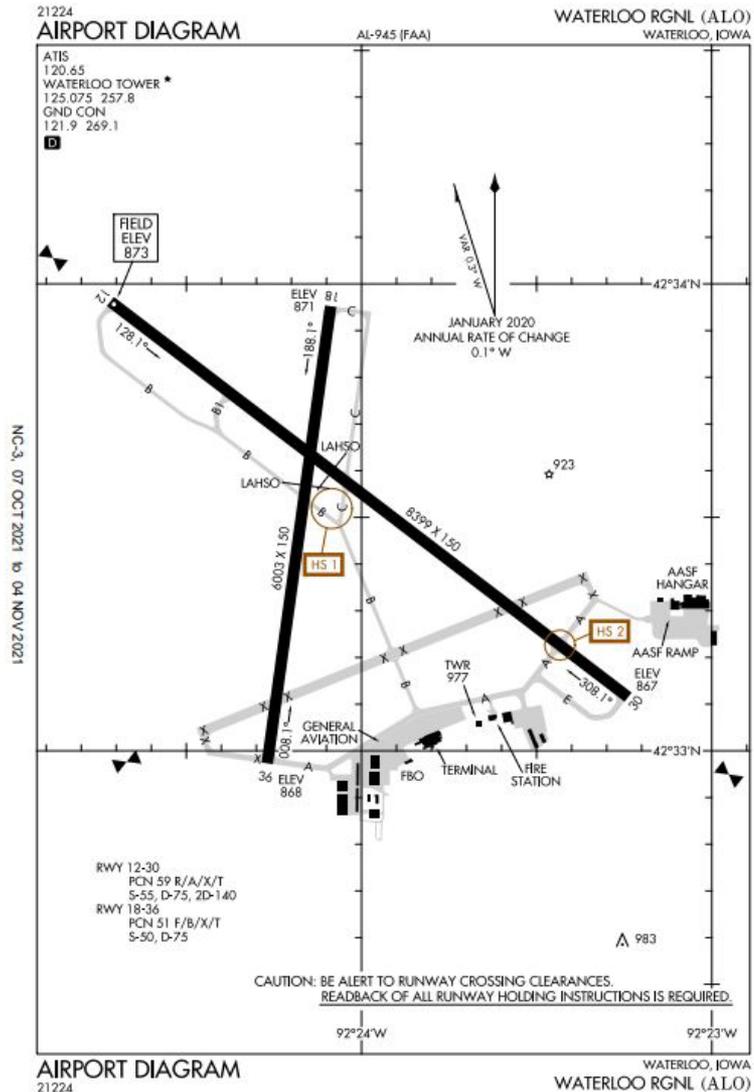
Waterloo Regional Airport

Runways

12/30

18/36

~~6/24~~



Airspace Symbols

Controlled airspace floors of 700' above the ground are defined by a **magenta** vignette.

Controlled airspace floors other than 700' that laterally abut uncontrolled airspace (Class G) are defined by a **blue** vignette.

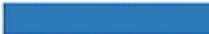
Differing floors greater than 700' above the ground are annotated by a symbols and a number indicating the floors.



Sectional Chart Airspace Identification

AIRPORT TRAFFIC SERVICE AND AIRSPACE INFORMATION

Only the controlled and reserved airspace effective below 18,000 ft. MSL are shown.

	Class B Airspace
	Class C Airspace (Mode C - see FAR 91.215/AIM.)
	Class D Airspace
	Ceiling of Class D Airspace in hundreds of feet (A minus ceiling value indicates surface up to but not including that value.)
	Class E (sfc) Airspace
	Class E Airspace with floor 700 ft. above surface that laterally abuts Class G Airspace.
	Class E Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E Airspace
	Class E Airspace with floor 1200 ft. or greater above surface that laterally abuts Class G Airspace

Class D Airspace Ceiling

----- Class D Airspace

[40]

Ceiling of Class D Airspace in hundreds of feet. (A minus ceiling value indicates surface up to but not including that value).

Generally, Class D airspace extends from the surface to 2,500 feet above the airport field elevation. The number in the box represents the ceiling of Class D airspace in hundreds of feet MSL (mean sea level).

Airport Symbols

Airports with a **control tower** and their data are shown in **blue**. All other airports and their data are shown in **magenta**.

AIRPORTS

		Other than hard-surfaced runways		Seaplane Base
		Hard-surfaced runways 1500 ft. to 8069 ft. in length		
		Hard-surfaced runways greater than 8069 ft. or some multiple runways less than 8069 ft.		
		Open dot within hard-surfaced runway configuration indicates approximate VOR, VOR-DME, 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 landmark value



Military - Other than hard-surfaced; all military airports are identified by abbreviations AFB, NAS, AAF, etc.



Heliport
Selected



Unverified



Abandoned - paved
having landmark value,
3000 ft. or greater



Ultralight
Flight Park
Selected



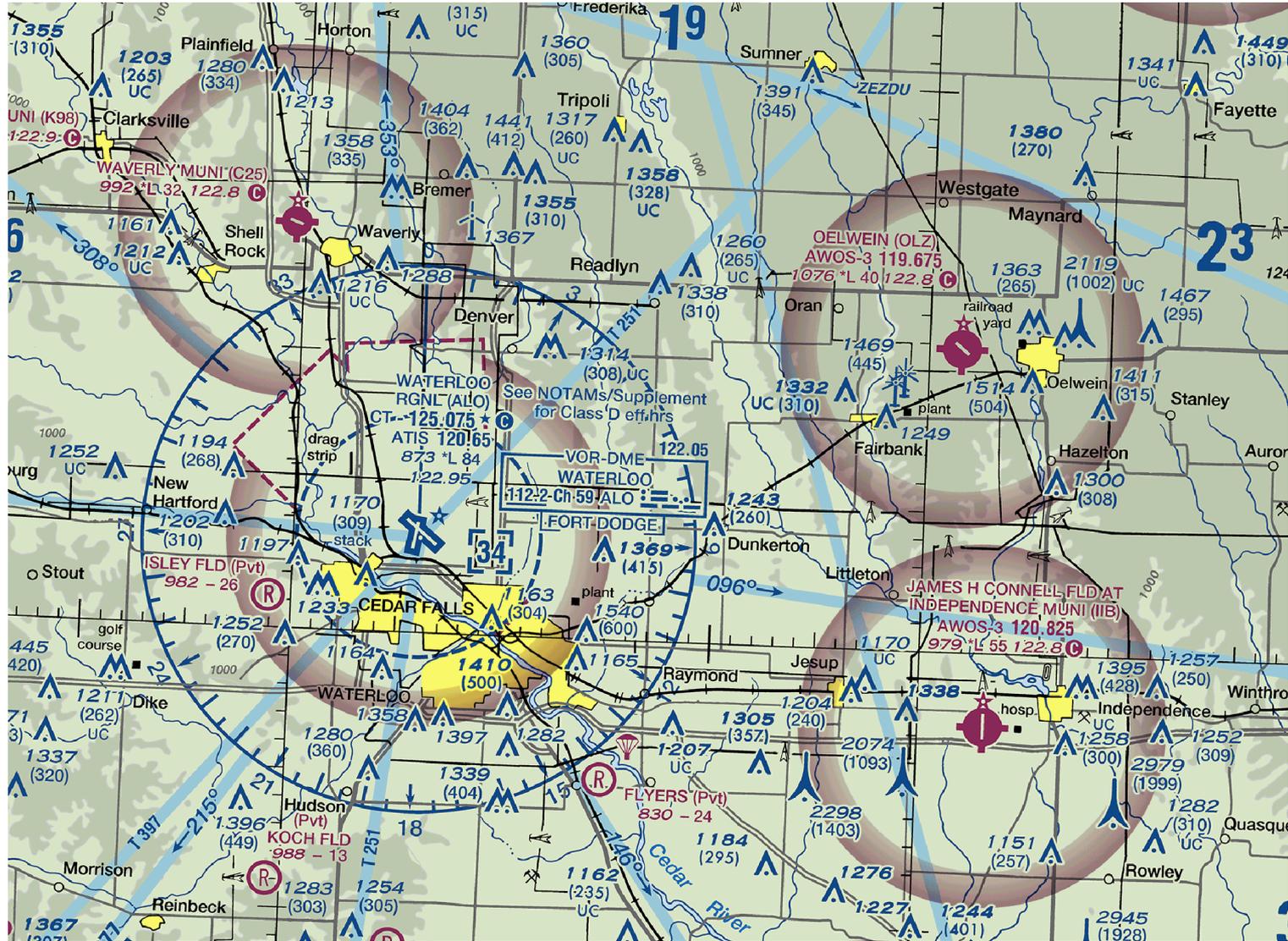
Fuel availability indicated by use of tick marks around basic airport symbol. Consult Supplement for details and availability at airports with hard-surfaced runways greater than 8069 ft.



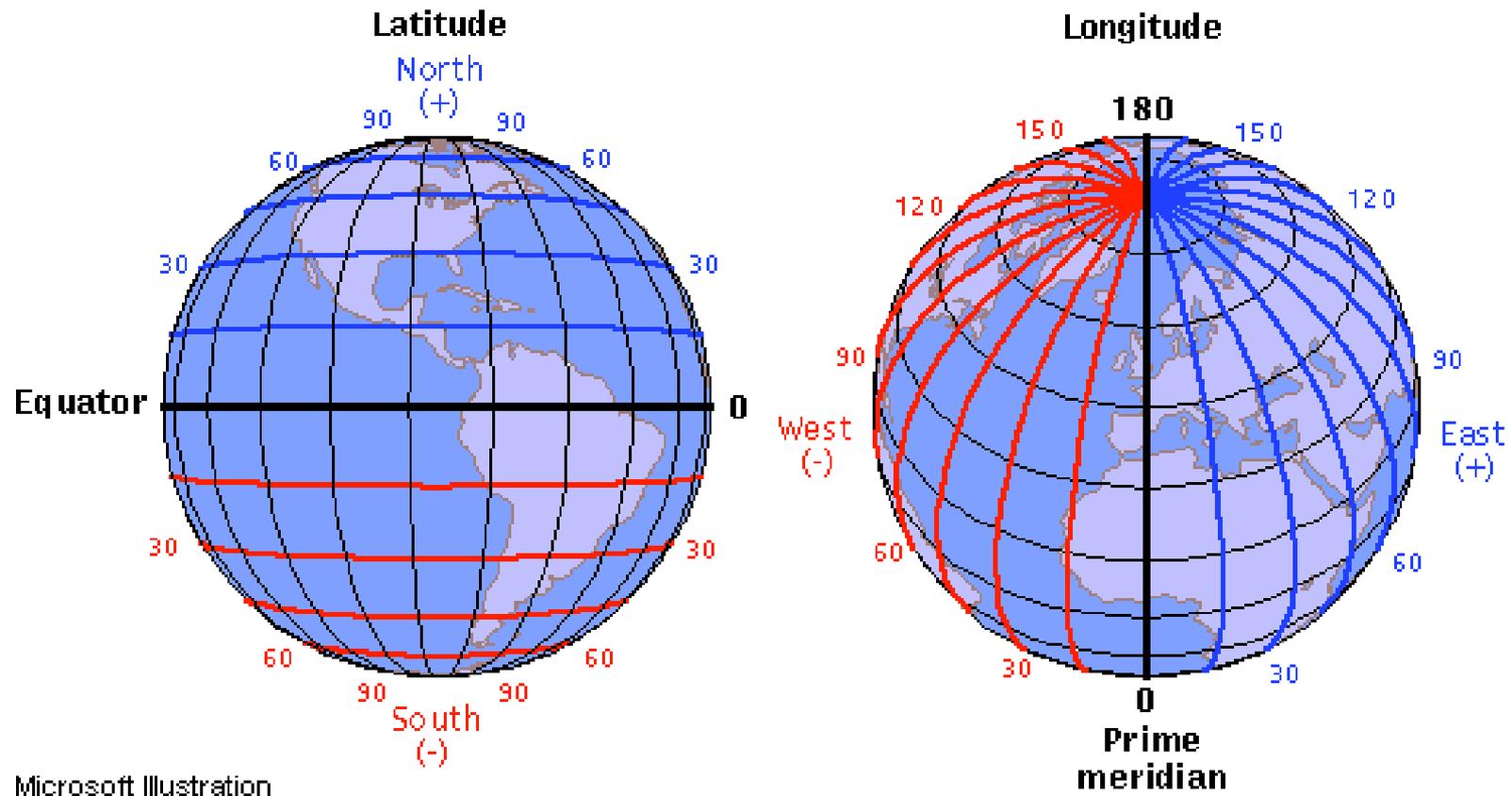
Rotating airport beacon in operation Sunset to Sunrise

OBJECTIONABLE - Airport may adversely affect airspace use.

Airport Color Code

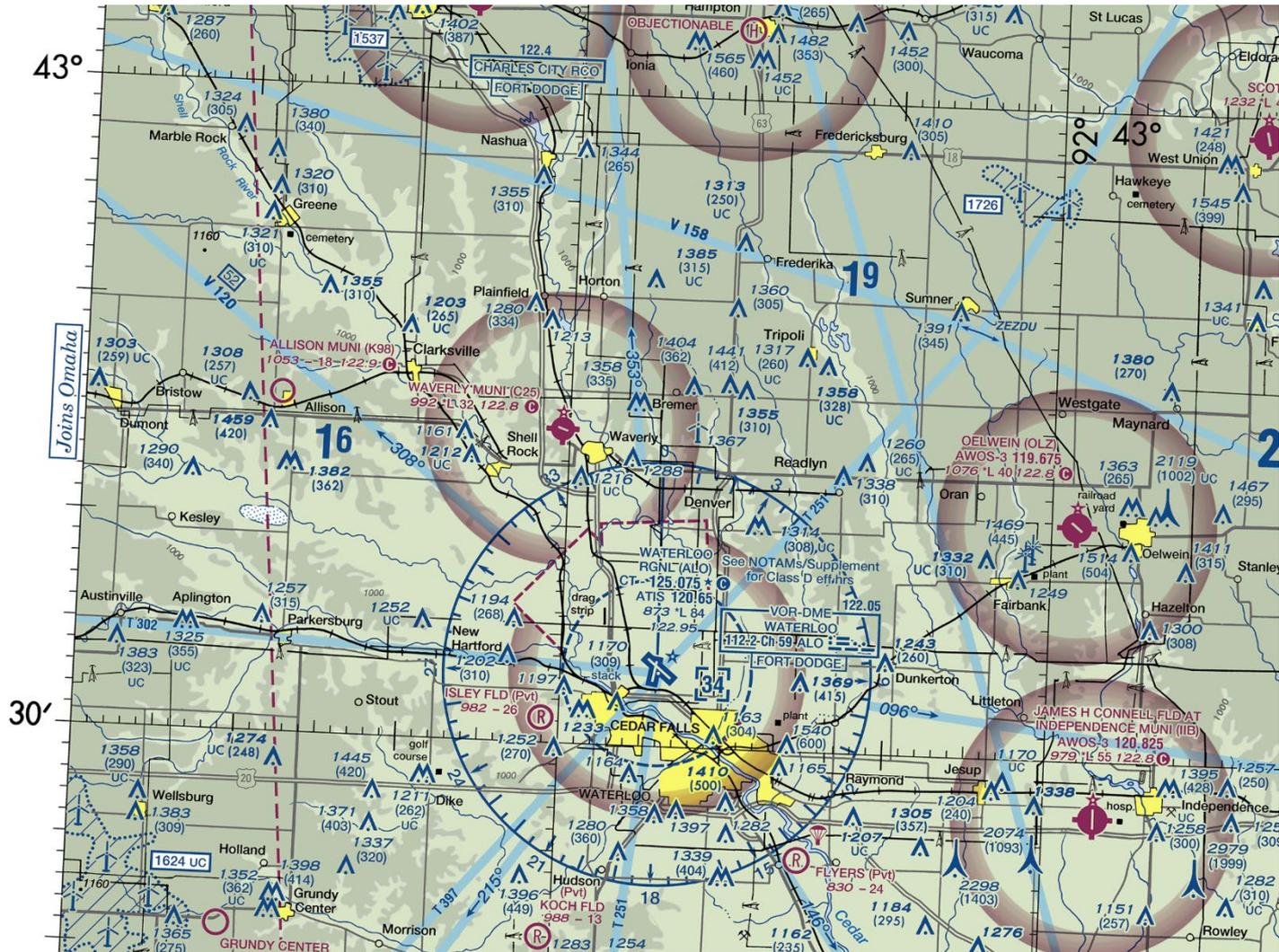


Latitude & Longitude

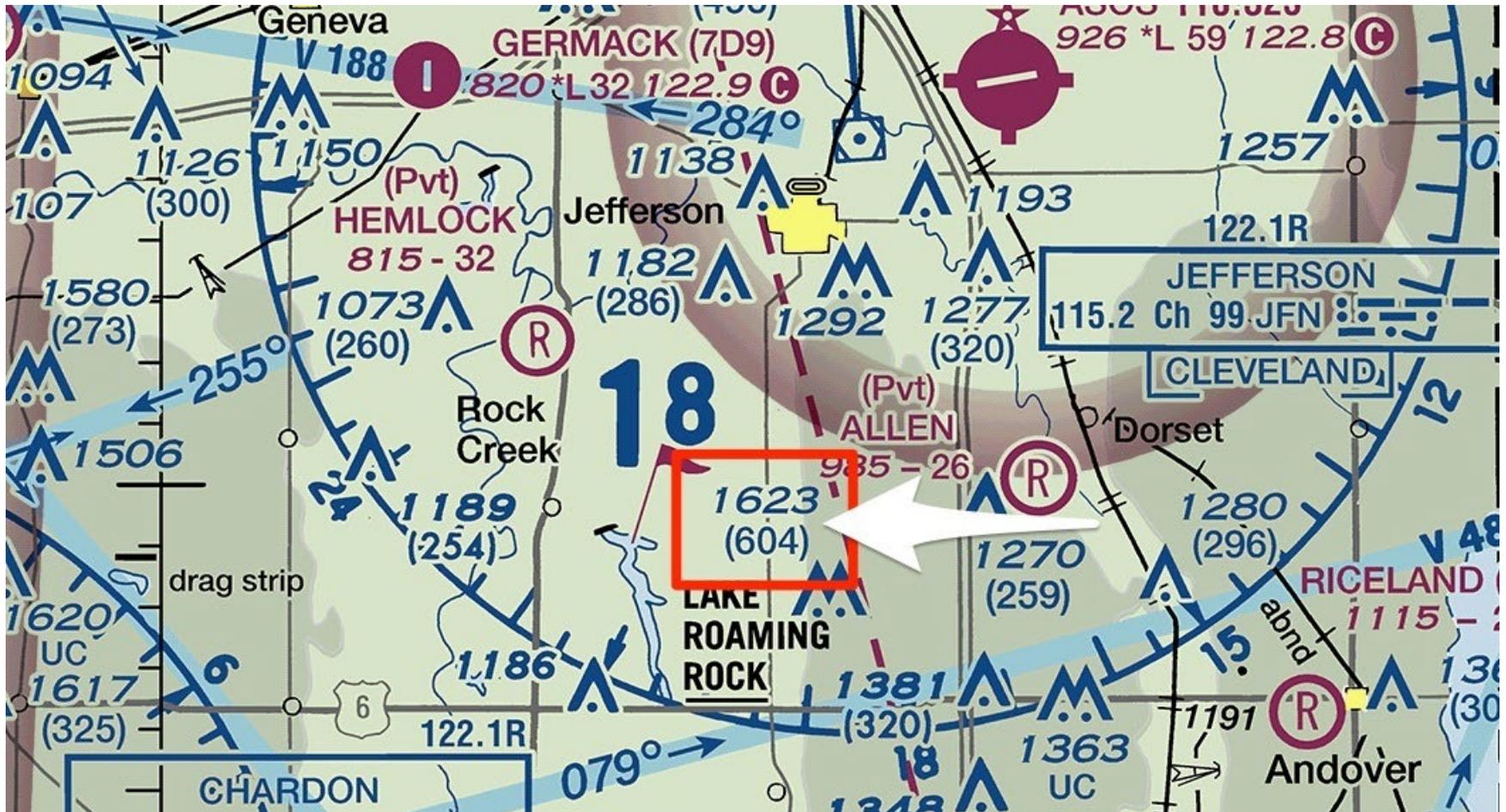


KALO Latitude $42^{\circ} 33.51'$ & Longitude $-92^{\circ} 24.06'$

Latitude & Longitude



Maximum Elevation Figure (MEF)



MEF = highest point (MSL) + 100 feet rounded up to the next 100' increment.

Sectional Chart Symbols



A - Aerobic Practice Area
(See Supplement.)

G - Glider Operations

H - Hang Glider Activity

U - Ultralight Activity

UA - Unmanned Aircraft Activity



Parachute Jumping
Area (See Supplement.)

MISCELLANEOUS



STADIUM
Intermittent TFR site
(within 3 NM, up to
& incl 3000' AGL)



Space Launch
Activity Area



Marine Light



Isogonic Line
(2020 VALUE)



VPXYZ

VFR Waypoints



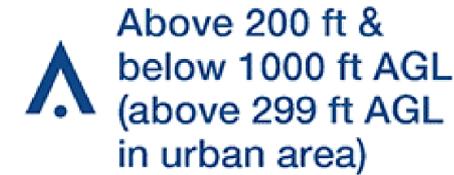
NAME
(VPXYZ)

Isogonic lines are drawn on your sectional charts to show different lines of magnetic variation to help with planning your magnetic heading.

VFR Waypoints or Flags are VFR navigation aids. You would expect increased VFR activity around waypoints.

Sectional Chart Symbols

OBSTRUCTIONS (may be lit or unlit)



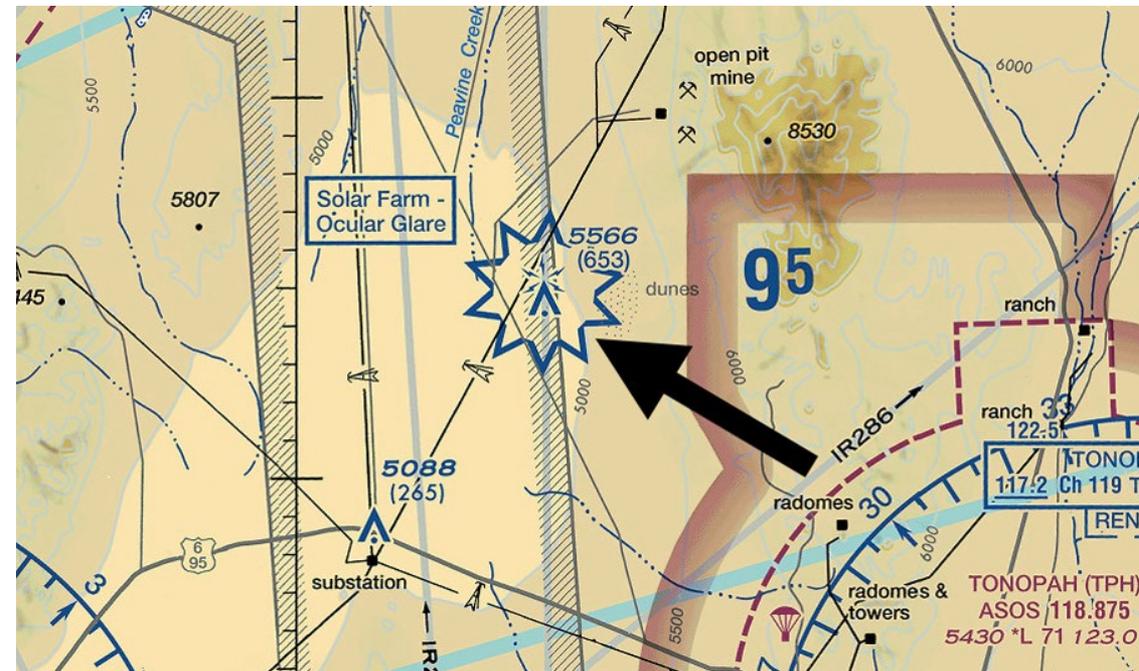
Wind Turbine Farm

Elevation of the top above mean sea level → 2049
 Height above ground → (1149)
 Under construction or reported: position and elevation unverified → UC

NOTICE: Guy wires may extend outward from structures.



Sectional Chart Symbols



Sample Test Question

The most comprehensive information on the Waterloo airport is provided by:

- 1) Chart Supplements U.S.
- 2) Notice to Air Missions (NOTAMs)
- 3) Terminal Area Chart (TAC)

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Sample Test Question

What is the only type of Class E airspace that requires an airspace authorization?

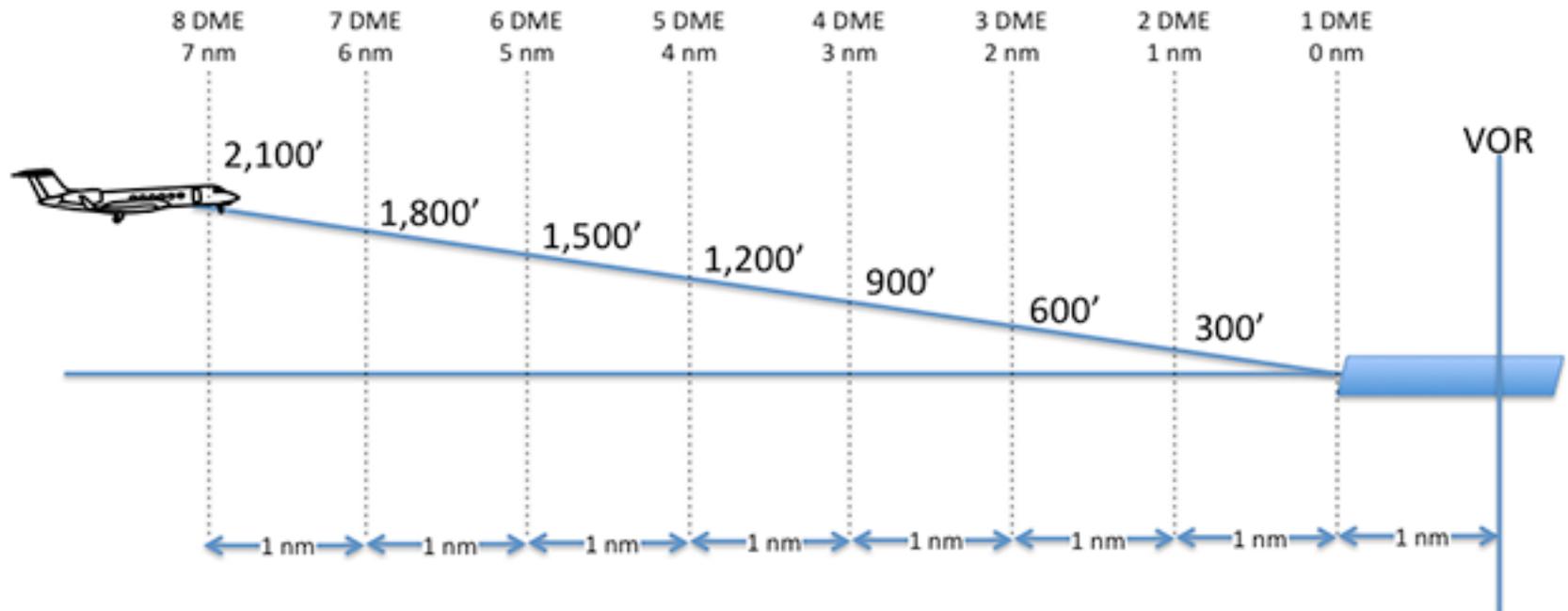
1. Class E Surface Area
2. Class E Extension
3. Class E Transition airspace that starts at 700 ft AGL

Sample Test Question

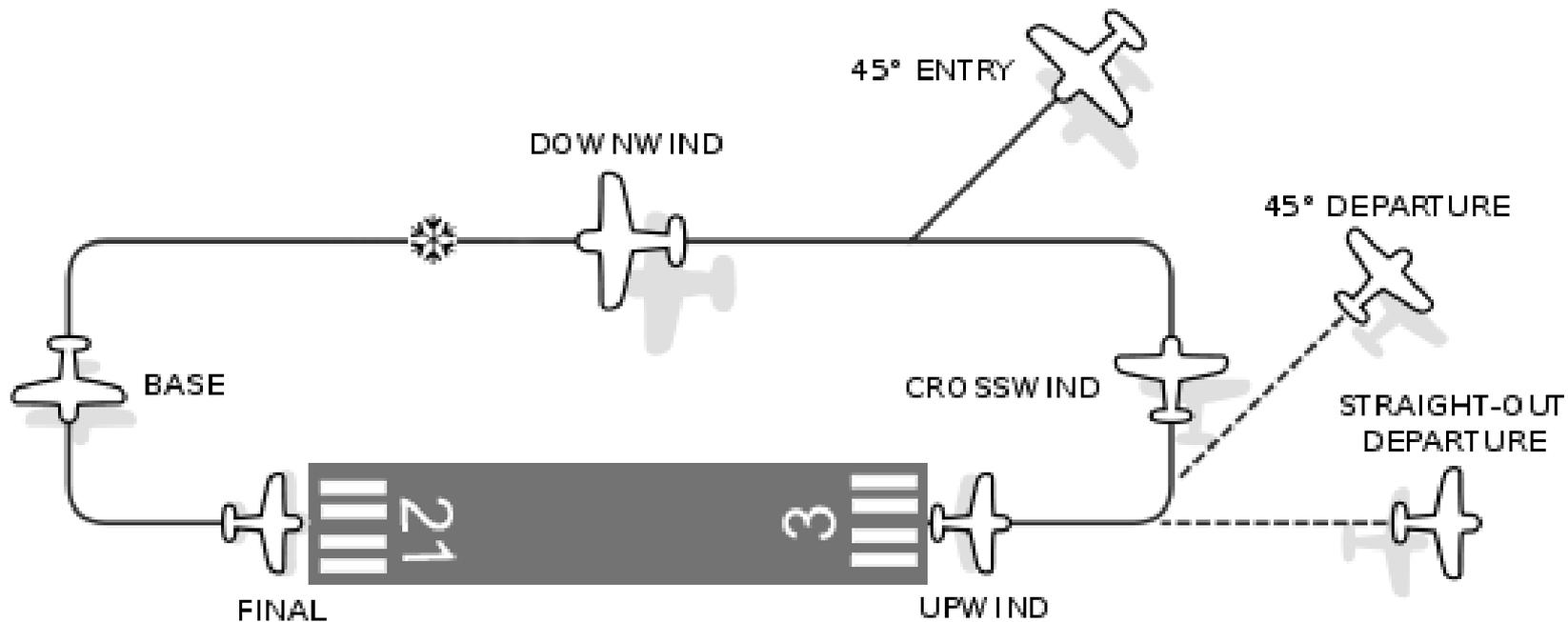
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Aircraft Altitude (AGL) on Approach to Runway



Standard Airport Traffic Pattern for uncontrolled airports



**There are five different legs of the traffic pattern:
Upwind, Crosswind, Downwind, Base and Final.**

Sample Test Question

When flying near the Independence Iowa Airport, what direction will aircraft be landing from?

- 1) Northwest
- 2) Southwest
- 3) Northeast



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When flying near the Independence Iowa Airport, what direction will aircraft be landing from?

- 1) Northwest
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Sample Test Question

You are listening on a Common Traffic Advisory Frequency (CTAF) and an aircraft announces, *“left downwind for runway two six”*. What is the aircraft’s current heading?

- 1) 80 degrees
- 2) 160 degrees
- 3) 260 degrees



Sample Test Question

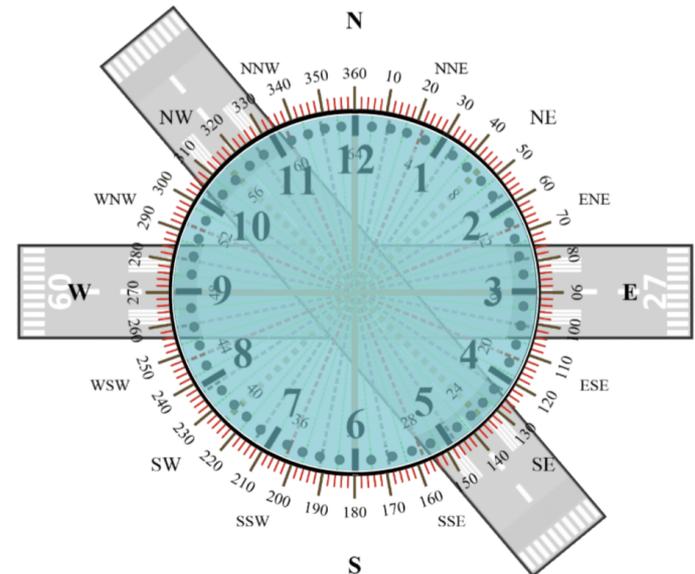
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- 1) **80 degrees**
- 2) 160 degrees
- 3) 260 degrees

Sample Test Question

While monitoring Cooperstown Common Traffic Advisory Frequency (CTAF) an aircraft announces, “*left midway downwind to runway one three*”. Where is the aircraft located relative to the runway?

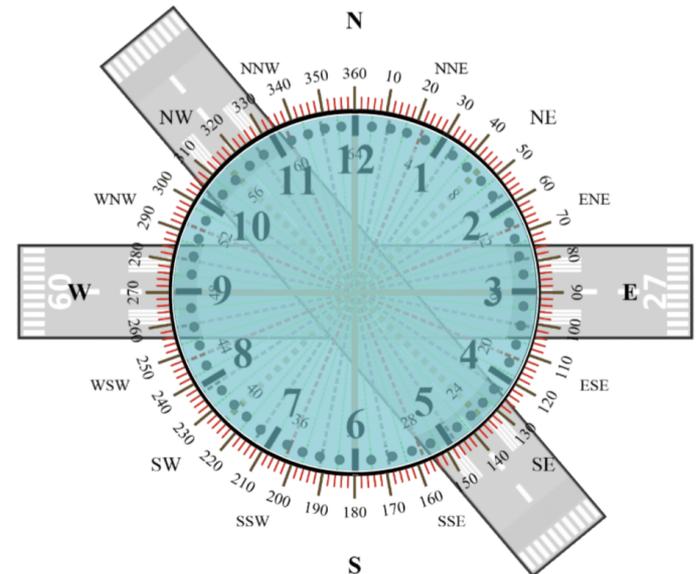
- 1) The aircraft is East
- 2) The aircraft is South
- 3) The aircraft is West



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Sample Test Question

While monitoring the Common Traffic Advisory Frequency (CTAF) an ATC issues an advisory to a manned aircraft flying north, “*unmanned aircraft activity at 9 o’clock, 2 miles*”. Where should the Remote Pilot look for the aircraft?

- 1) The aircraft is East
- 2) The aircraft is South
- 3) The aircraft is West

Sample Test Question

While monitoring the Common Traffic Advisory Frequency (CTAF) an ATC issues an advisory to a manned aircraft flying north, “*unmanned aircraft activity at 9 o’clock, 2 miles*”. Where should the Remote Pilot look for the aircraft?

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Two types of Airspace

Regulatory – FAA rules apply

- Class A, B, C, D, and E
- Restricted
- Prohibited

Non-Regulatory – areas outside FAA control used by the military or over the ocean

- Military operations area (MOA)
- Warning Areas
- Alert Areas
- Controlled Firing Areas

Special Areas



Prohibited, Restricted,
and Warning Areas



*Alert Area and Military
Operations Area (MOA)

*Alert Areas do not extend into Class A, B, C
and D airspace, or Class E airport surface
areas.



Special Airport Traffic Area
(See FAR 93 for details.)



National Defense Airspace
Temporary Flight Restriction
Area



ADIZ - Air Defense
Identification Zone



MODE C
(See FAR 91.215/AIM.)



National Security Area



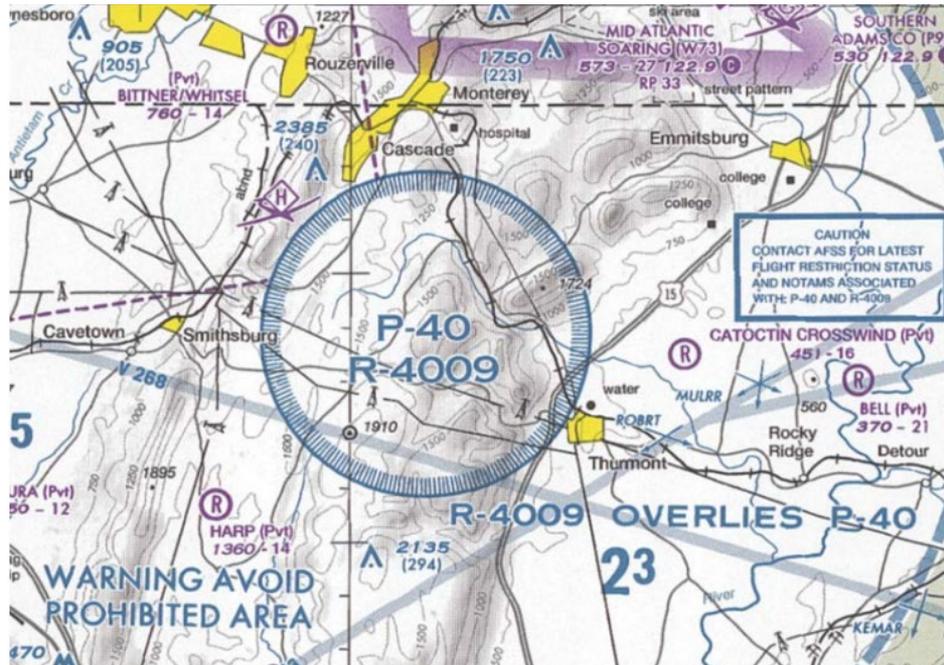
Terminal Radar Service
Area (TRSA)



MTR - Military
Training Route

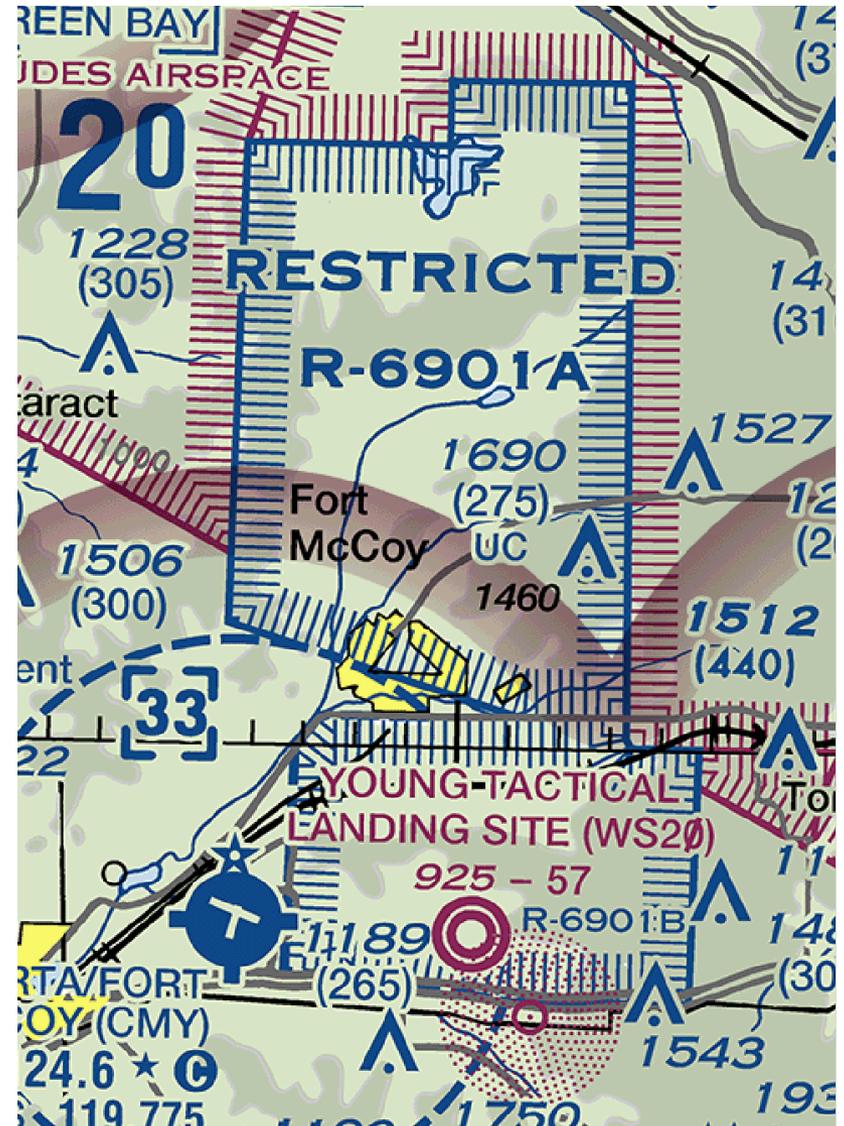
Special Use Airspace (SUAS)

Prohibited Area – charted as a “P” followed by a number (e.g., P-49) and a blue hatched line. Examples of include Camp David and the National Mall in Washington, D.C. Drone flights are always prohibited.



Special Use Airspace (SUAS)

Restricted – charted with an “R” followed by a number (e.g., R-6901) and a blue hatch line. Restricted airspace is usually a military base or facility, and drone flights are prohibited unless approved by the controlling military command.



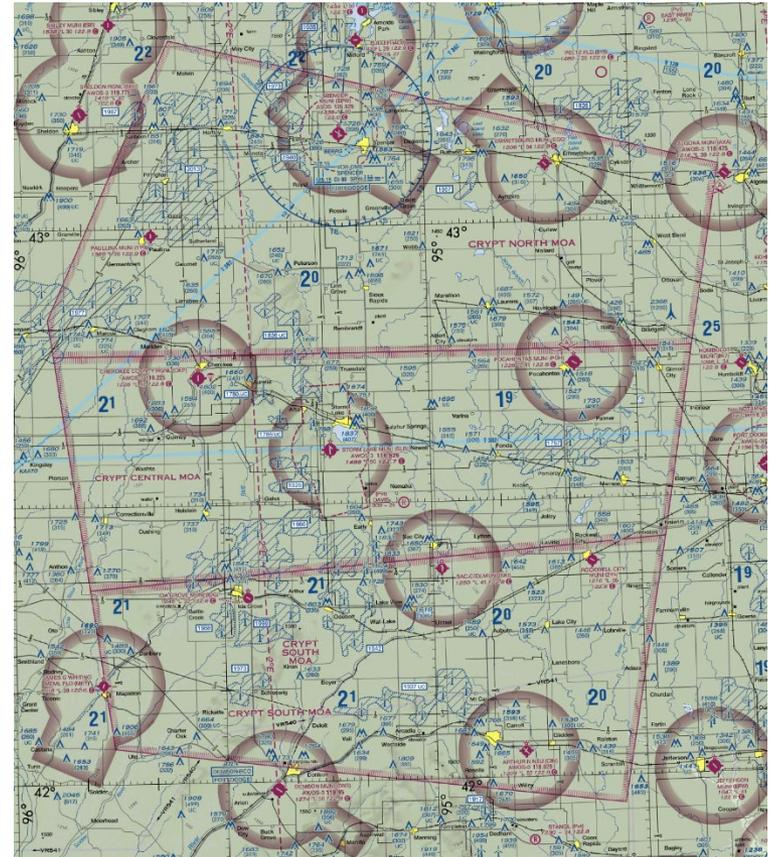
Special Use Airspace (SUAS)

Warning Area – designated with a “W” followed by a number (e.g., W-237) and a magenta hatched line is only found 3 NM offshore in US and international waters. It’s might be cool to fly there but it’s hazardous to nonparticipating aircraft..



Special Use Airspace (SUAS)

Military Operation Area (MOA) – depicted on sectional charts in magenta with a name (e.g., “CRYPT MOA”). MOAs are not restricted but require extra caution as military operations may take place in the area. For activity, altitude, time of use contact the controlling agency.



Military aircraft may fly at airspeeds in excess of 250 knots below 10,000 feet MSL within active MOAs.



CRYPT MOA in Iowa

The **CRYPT MOA** covers much of NW and Central Iowa. It's divided into 3 sections and has a floor of 8000 feet MSL.

Controlling Agency: Iowa Air National Guard, 133rd Air Control Squadron (ACS), Fort Dodge, IA

The Iowa Air National Guard 185 Air Refueling Wing (ARW) in Sioux City conducts operations in the CRYPT MOA.

The Iowa Air National Guard F16 Wing in Des Moines has been disbanded.

Special Use Airspace (SUAS)

Controlled firing areas (CFA) – CFA include rocket testing, ordnance disposal, small arms fire, chemical disposal, static testing of rockets and blasting.

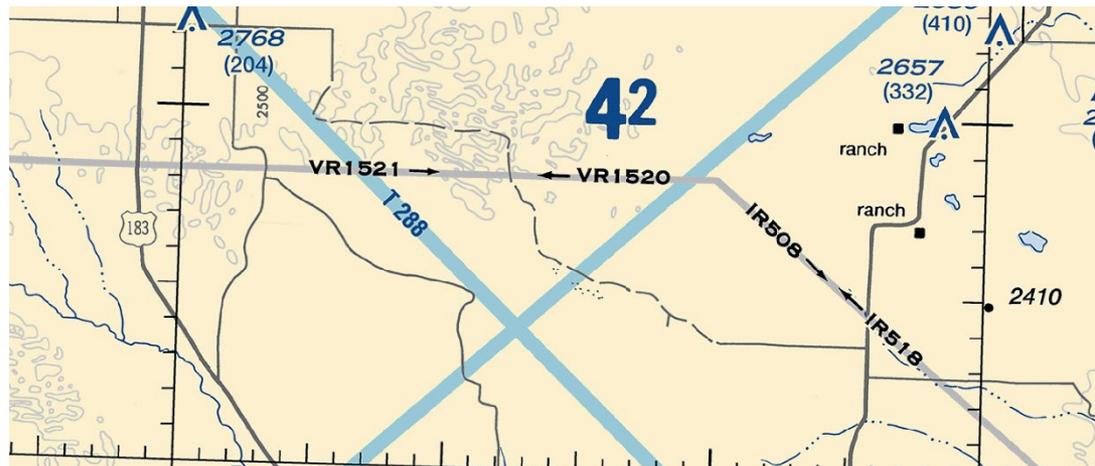
- They are never found in NOTAMs
 - There are no dimensions
 - They are not charted
 - There is no controlling agency to contact
- CFA activities are suspended when a spotter aircraft, radar or ground lookout indicates an aircraft is approaching the area.

Drone pilots are not allowed in CFA. They are usually fenced and/or posted “No Trespassing – Keep Out”

Special Area Of Operation (SAO)

Military Training Route (MTR) – routes used by military aircraft to maintain proficiency in tactical flying. VFR sectional charts depict IR and VR areas. Routes are identified in gray as IFR (IR), and VFR (VR), followed by a number.

- MTRs with no segment above 1,500 feet AGL are identified by four number characters (e.g., IR1206, VR1207).
- MTRs that include one or more segments above 1,500 feet AGL are identified by three number characters (e.g., IR206, VR207).



Sample Test Question

A Sectional Chart shows a gray line with “*VR1642 and VR1678*”. Could these areas present a hazard for small UAS operations?

- 1) No, all operations will be above 400 feet.
- 2) Yes, these are military training routes with a least one segment below 1500 feet AGL.
- 3) Yes, military training routes are used to separate civilian air traffic from military air traffic.

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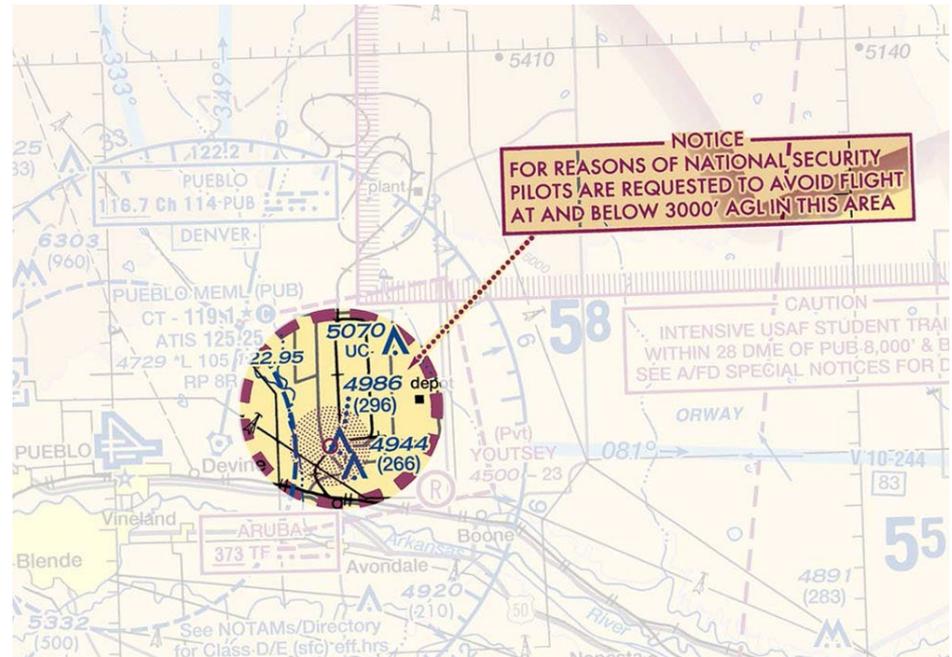


Special Area Of Operation (SAO)

- **Temporary Flight Restriction (TFR)** – A Notice to Missions (NOTAM) is issued to designate a TFR.
- **Chartered VFR Flyways**– for transitioning around, under, or through some complex airspace. These routes are generally found on VFR Terminal Area Charts.
- **Terminal Radar Service Areas (TRSA)** – areas with additional radar services. The purpose is to provide separation between IFR operations and VFR aircraft.

Special Area Of Operation (SAO)

National Security Areas (NSA) – NSAs are delimited by a **heavy dashed magenta border** and a special notation. An NSA airspace needs increased security of ground facilities. Pilots are requested to voluntarily avoid flying through these areas



RADIO AIDS TO NAVIGATION



VHF OMNI RANGE (VOR)



VOR-DME



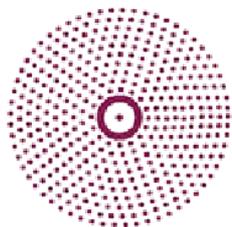
DME



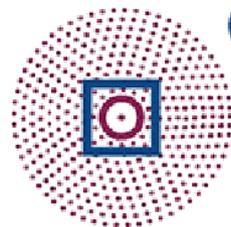
VORTAC



Other facilities, i.e., FSS Outlet,
RCO, WX CAM (AK)
(see Supplement), etc.



Non-Directional
Radio Beacon (NDB)



NDB - DME

VOR – VHF Omni Range – directional radio – gives pilot the heading to the VOR station – being phased out in favor of GPS

DME – Distance Measuring Equipment – indicates distance to DME station

VORTAC – VOR + TACAN (tactical air navigation system) – military DME system

NDB – non-directional radio beacon

RCO – Remote communications outlets relay communications to Flight Service Station (FSS)



Any
Questions

