UAS Standards, Reg, Law & Exam

FAA Regulations: Part 107

Lesson 5b – Operations: Airport Operations

Objectives of Operations

- To determine that the applicant is knowledgeable in radio communication procedures
- To determine that the applicant is knowledgeable in airport operations
- To determine that the applicant is knowledgeable in sUAS emergency procedures
- To determine that the applicant is knowledgeable in aeronautical decision-making
- To determine that the applicant is knowledgeable in the physiological factors affecting remote pilot performance
- To determine that the applicant is knowledgeable in sUAS maintenance and inspection procedures

Airport Operations

- The types of airports, such as towered, uncontrolled towered, heliport, and seaplane bases
- ATC towers- concepts such as ensuring the remote pilot can monitor and interpret ATC communications to improve situational awareness
- Runway markings and signage
- Traffic patterns used by manned aircraft pilots
- Security Identification Display Areas (SIDA)
- Sources for airport data
- Aeronautical charts
- Chart Supplements
- Avoiding bird and wildlife hazards and reporting collisions between aircraft and wildlife

Types of Airport

- 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

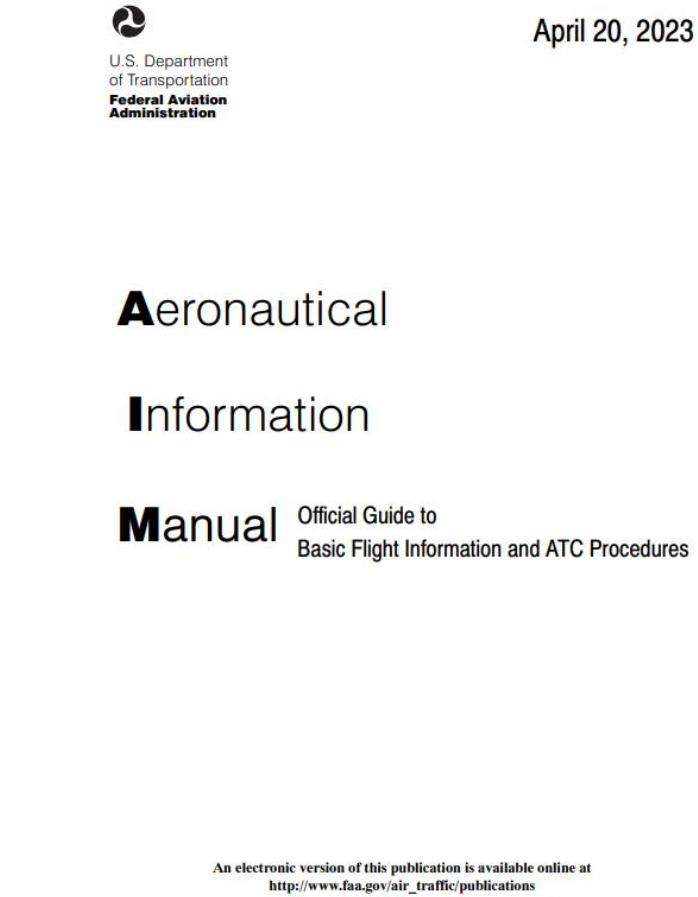
Towered vs. Non-Towered Airports

- A towered airport has an operating control tower managed by Air Traffic Control (ATC) that is responsible for the management of the airspace
  - Approximately 500 in the United States
  - Pilots operating from a towered airport are required to maintain two-way radio communication with ATC and to acknowledge and comply with their instructions
- A non-towered airport does not have an operating control tower
  - Two-way radio communication is not required even for manned aircraft.
  - But to ensure safety, It is recommended that manned aircraft pilots "self-announce" their intentions on the specified frequency for the benefit of other traffic in the area
  - Communications at in the vicinity of non-towered airports is conducted using the Common Traffic Advisory Frequency (CTAF). Check the appropriate frequency on Sectional Chart or the Chart Supplement U.S.

Runway Markings and Signage

- The FAA requires that RPIC know about runway marking and signage. In other words, it may show up on the Exam.
- All airport signs and markings are explained in the Aeronautical Information Manual (AIM). There is a copy on the course website.

Aeronautical Information Manual

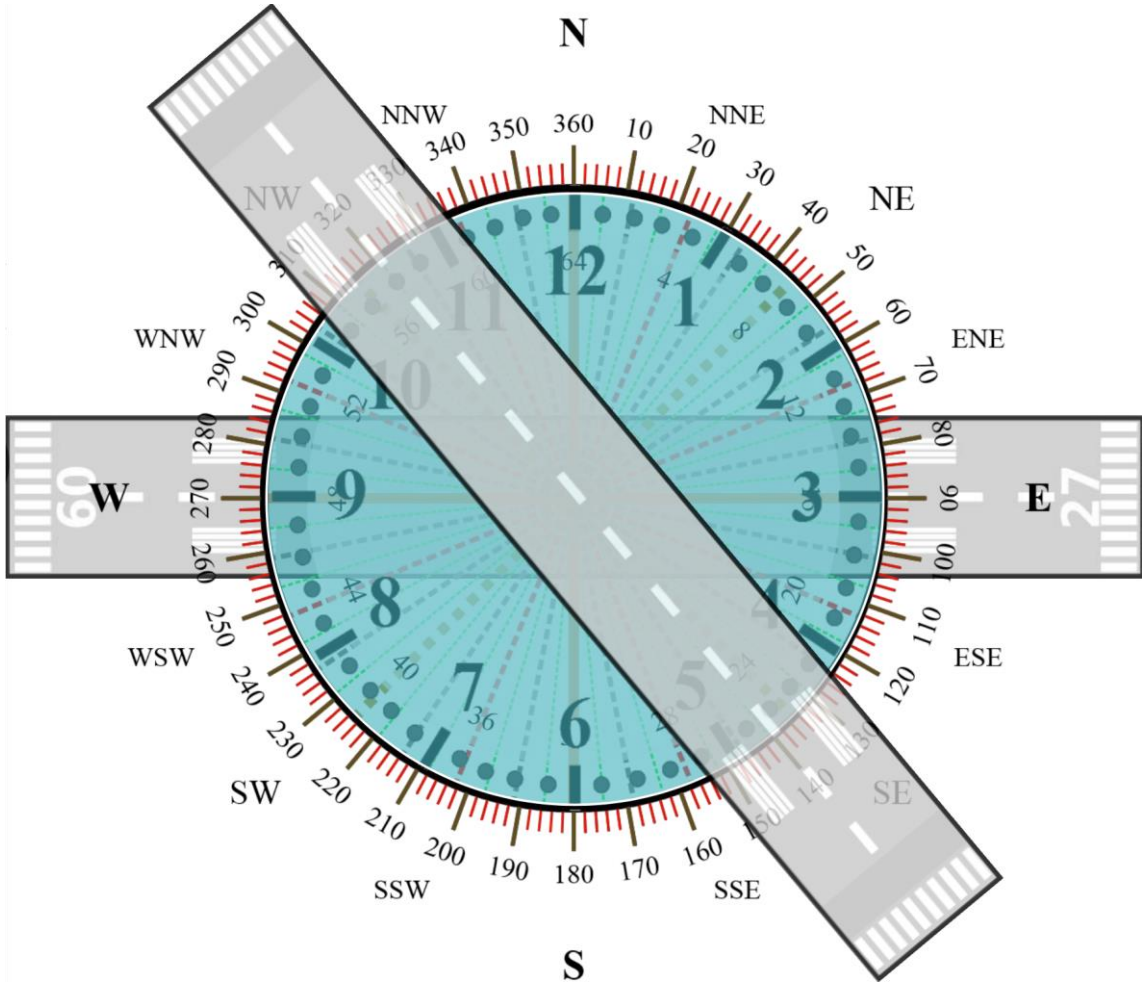


Runway Markings and Signage

- Each runway is labeled with a number between 1 and 36, and that number corresponds to the runway's magnetic alignment.
  - Runway 9 indicates 090° magnetic and Runway 27 indicates 270° magnetic.
  - Runway 18 indicates 180° magnetic and Runway 36 indicates 360° magnetic.
- North, East, South and West are called cardinal directions or points. Runways can usually be used in both directions and each direction is named separately.
  - e.g. Runway 9 in one direction is Runway 27 in the other direction or in this example, east vs. west.
  - The two numbers usually differ by 18, which is 180°.

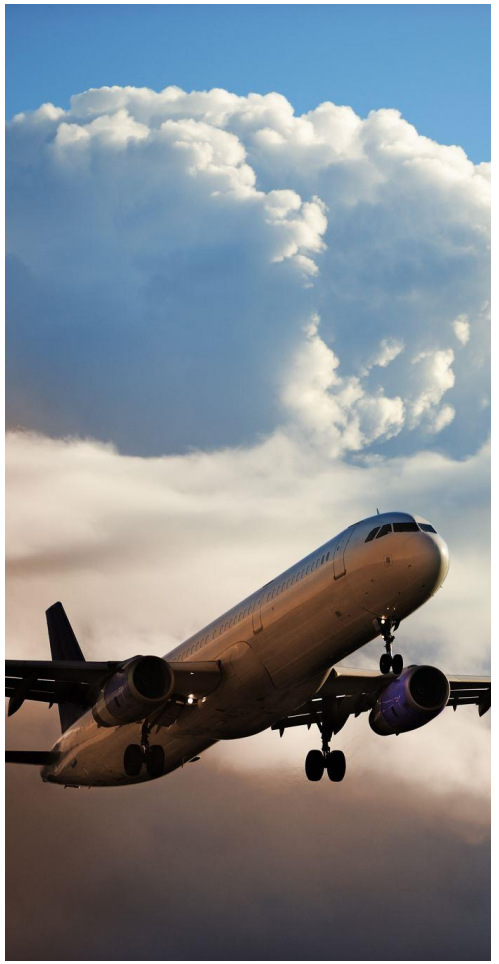
Runway Directional Markings

- Note: The label is determined based on the direction the aircraft is going. That means a runway usually has two designations.
- What is/are the label(s) for the unlabeled runway?

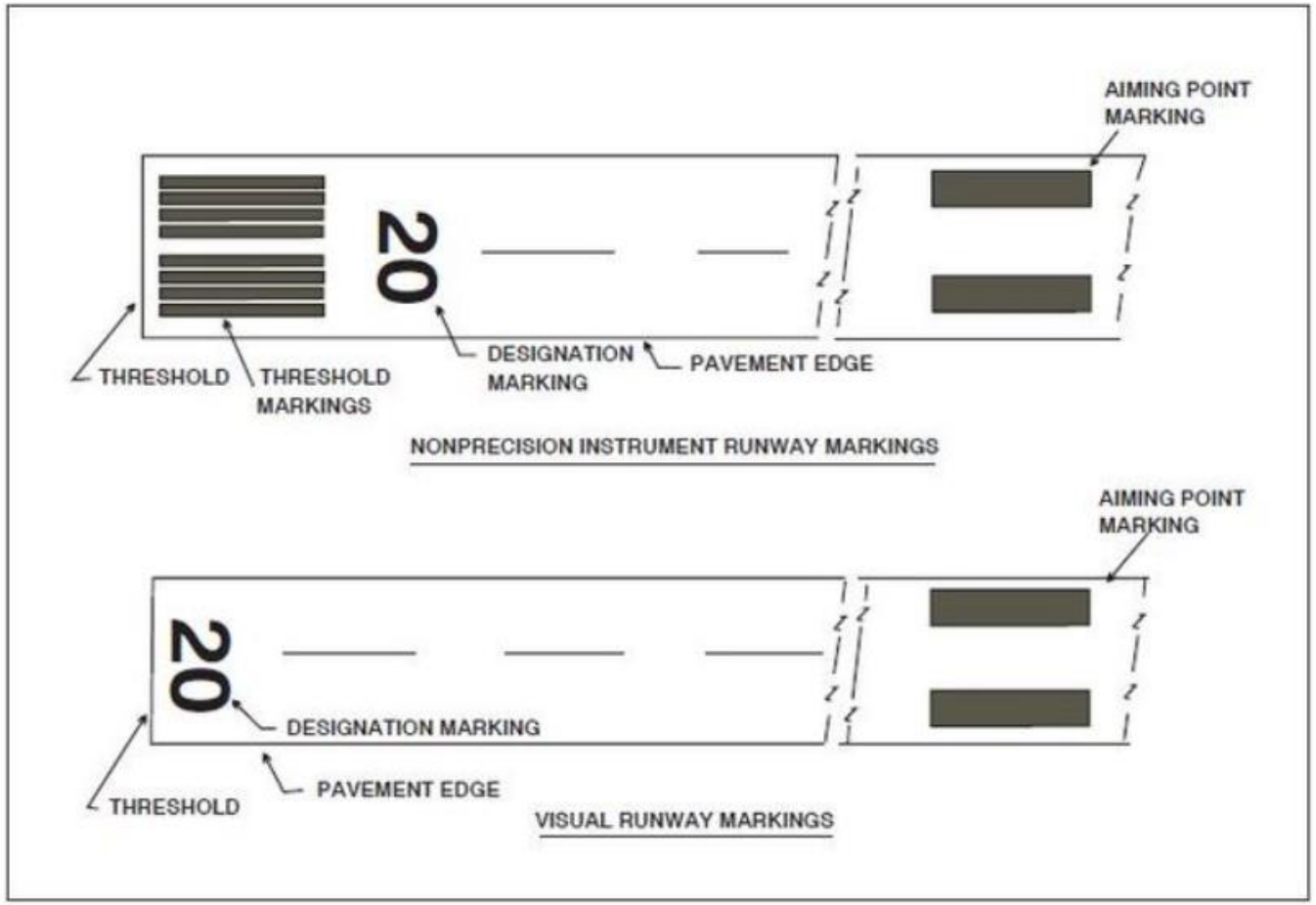


Note

- The following 16 slides contain information that may appear on the Part 107 exam.
- Runway Designations and Traffic Patterns will almost certainly show up on the exam, so you need to understand them.
- However, as a UAS RPIC it is unlikely that you will be flying at an airport where knowledge of the runway markings is critical.



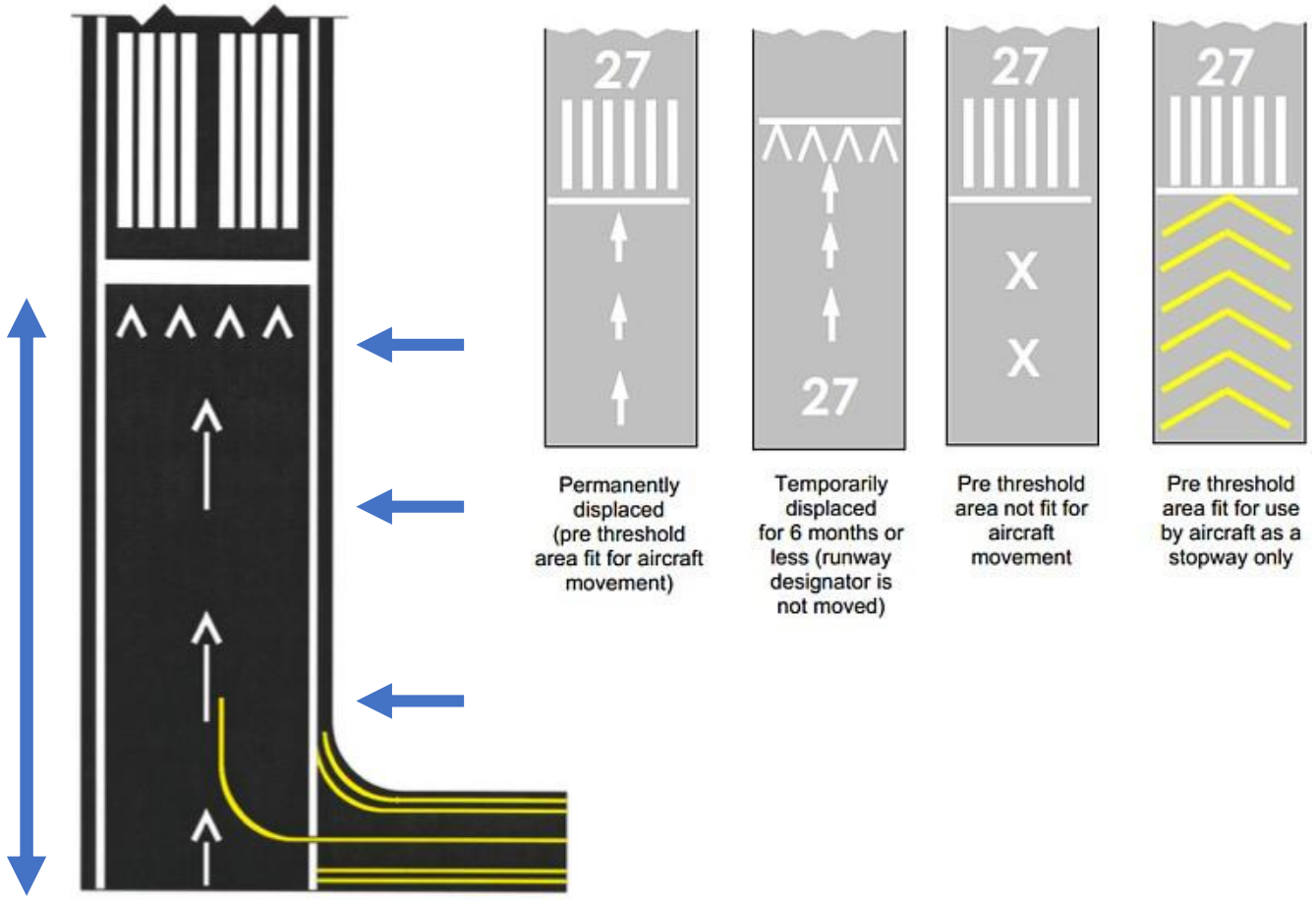
Visual Runway Markings



Source: AIM Figure 2-3-2

Displaced Threshold

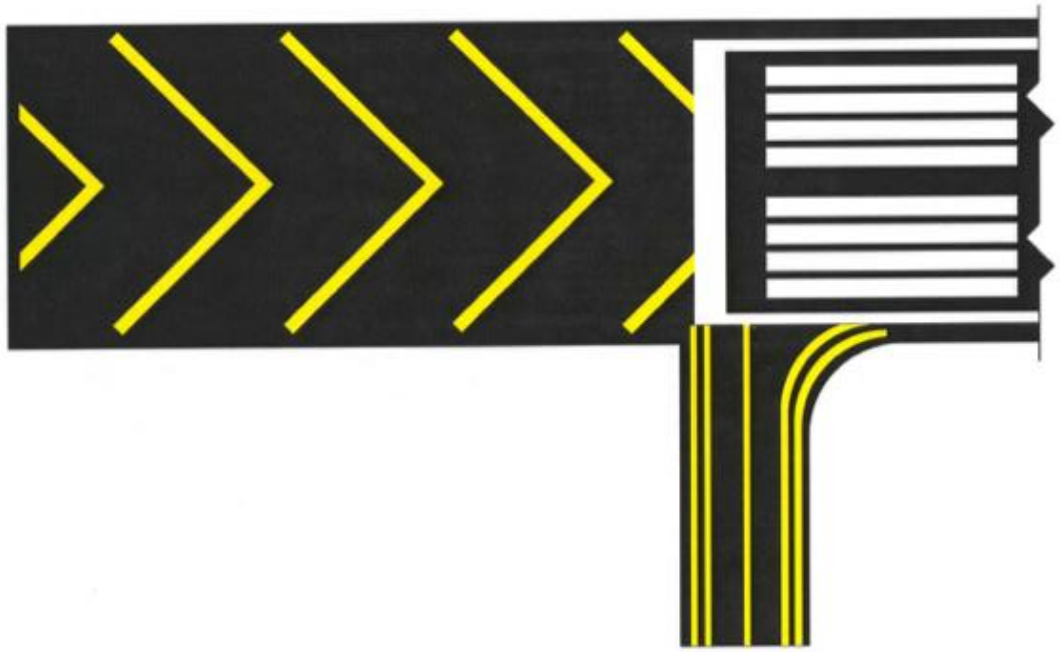
- Threshold markings – solid white lines (large white rectangular stripes) painted on the runway to indicate the precise location of the threshold. Additionally, different arrows or symbols are used for different conditions. See the figure on the right.
- A runway threshold is the designated beginning of the portion of the runway usable for landing.
- A displaced threshold (DTHR) is a runway threshold that's located at a different point than the runway's physical beginning or end. Displaced thresholds can be temporary or permanent, and they can reduce the length of runway available for landings in one direction. However, the runway behind the displaced threshold can be used for takeoffs in either direction and landings from the opposite direction.
- In some cases, the threshold may be displaced from the runway's physical end due to obstacles, noise abatement, or other considerations. Landings can begin beyond this point, but the displaced area can still be used for takeoff or rollout.



Source: AIM Figure 2-3-2

Unusable Runway Area

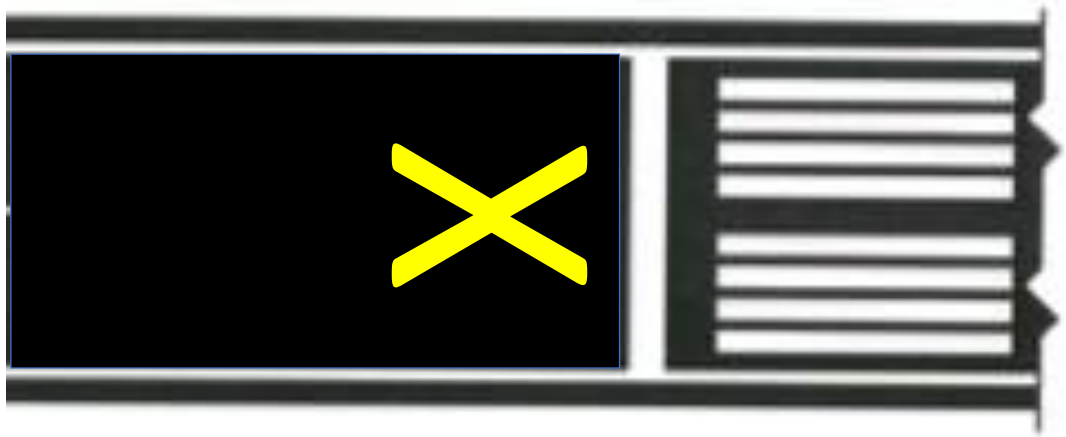
- Yellow “V” or chevron pattern lines on the runway mark an unusable area of the runway (Blast Pads).
- No taxiing here. Just emergency overrun if you absolutely need it.



Source: AIM Figure 2-3-4

Closed Runways

- Closed runways are marked with an “X” on each of the runway ends.
- Any federally funded airport will use a yellow “X”, while some private operators will use a white “X”.



Runway Hold Position Sign

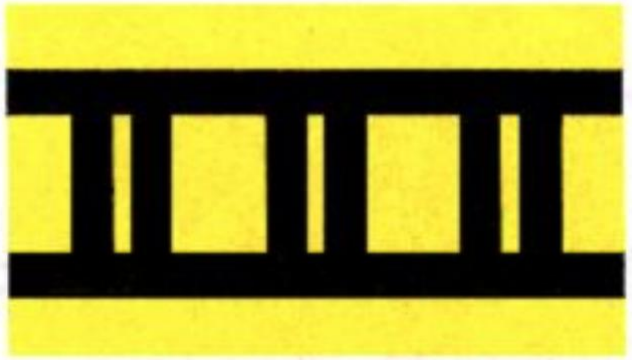
- Used to alert pilots to the entrance of a runway, when clear of the runway, and to signal when the aircraft should be held short of the runway.
- White on Red signs located at the holding position on taxiways and runways that intersect with other runways.
- The sign displays the runway designation, such as “15” or “33”, to indicate the runway you are about to enter or cross.

Runway Holding Position Markings

- Runway hold position signs are placed adjacent to runway holding position markings (four yellow lines, two solid, and two broken), and these carry out the same functions as the hold position signs.
- An aircraft is only clear once the entire aircraft has crossed the hold position.

Instrument Landing System (ILS) Critical Area Boundary Sign

- An ILS critical area boundary sign is visible to an aircraft leaving an ILS critical area.
- Aircraft taxiing beyond this point may interfere with the instrument landing system signal.
- Hold short of this location when instructed by ATC.



Taxiway Location Sign

- A taxiway location sign (yellow letter on black background) shows pilots the name of the taxiway on which they are located.
- A taxiway direction sign (black letter on yellow background) with an arrow indicates the direction the aircraft must turn in order to taxi onto another runway.

Direction to taxiway H (Hotel)

On Taxiway D (Delta)

Runway Location Sign

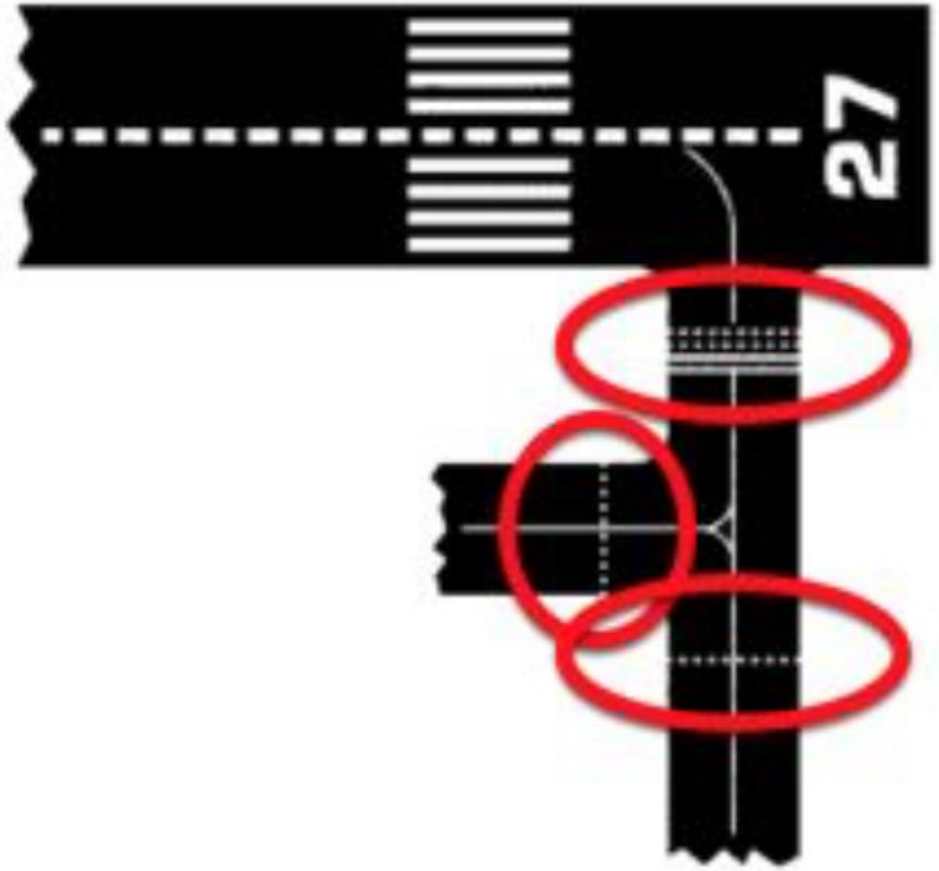
- Runway location signs look very similar to taxiway location signs, except runways are distinguished by number or number-letter combinations while taxiways are distinguished by letter or letter-number combinations.
- What direction are you landing if you are landing on runway 15?

Taxiway Ending Markers

- Taxiway ending markers feature bold, yellow stripes that are angled on the dark runway background.
- These just show that the taxiway no longer continues beyond this point and usually show up at far end of an intersection.

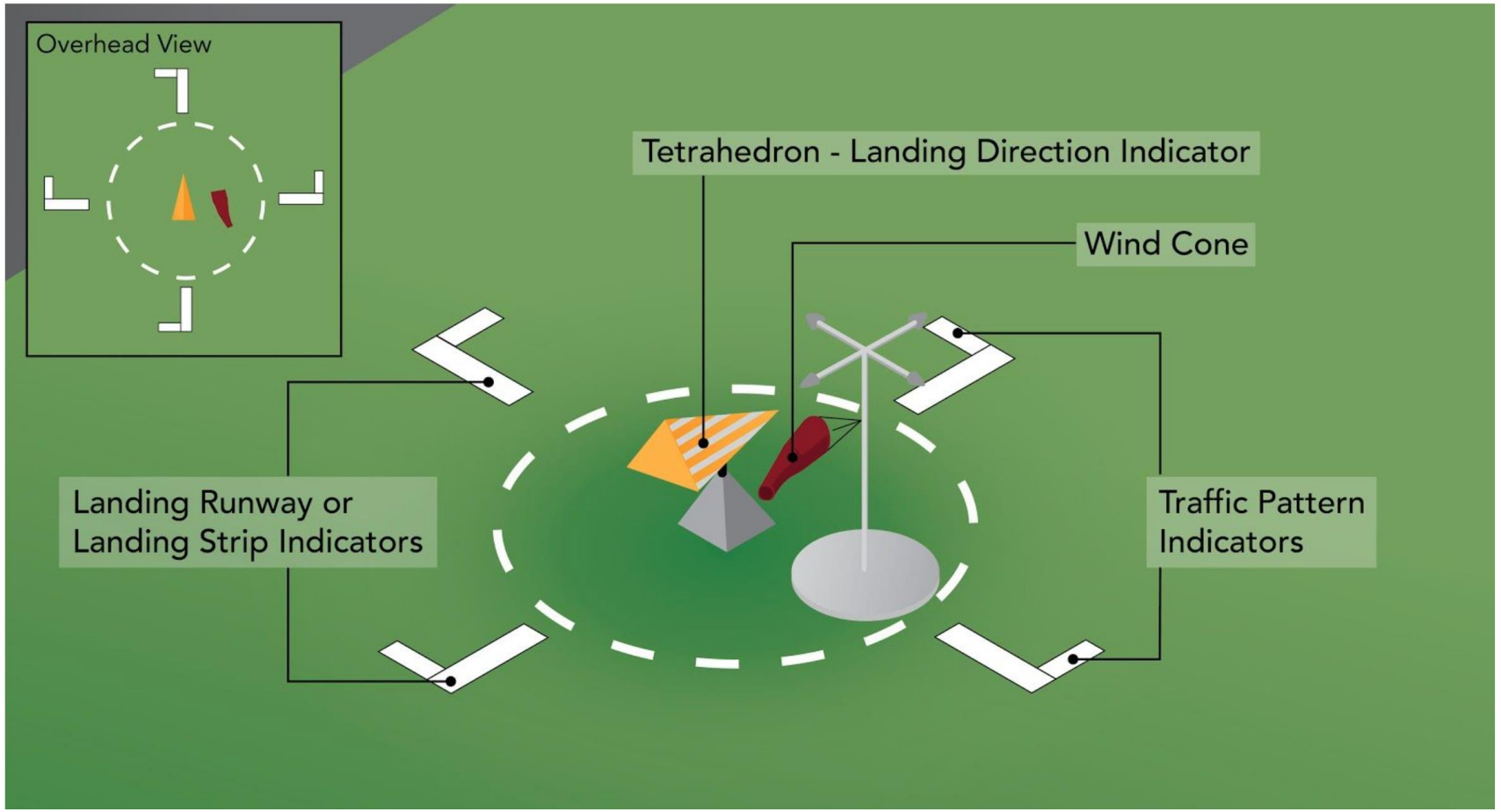
Taxiway Holding Position Markings

- Taxiway holding position markings consist of one dashed line that extends across the width of the taxiway.
- You'll find these on taxiways where ATC normally holds aircraft short of a taxiway intersection.



Segmented Circle

- Visual Indictor System
- At airports without towers

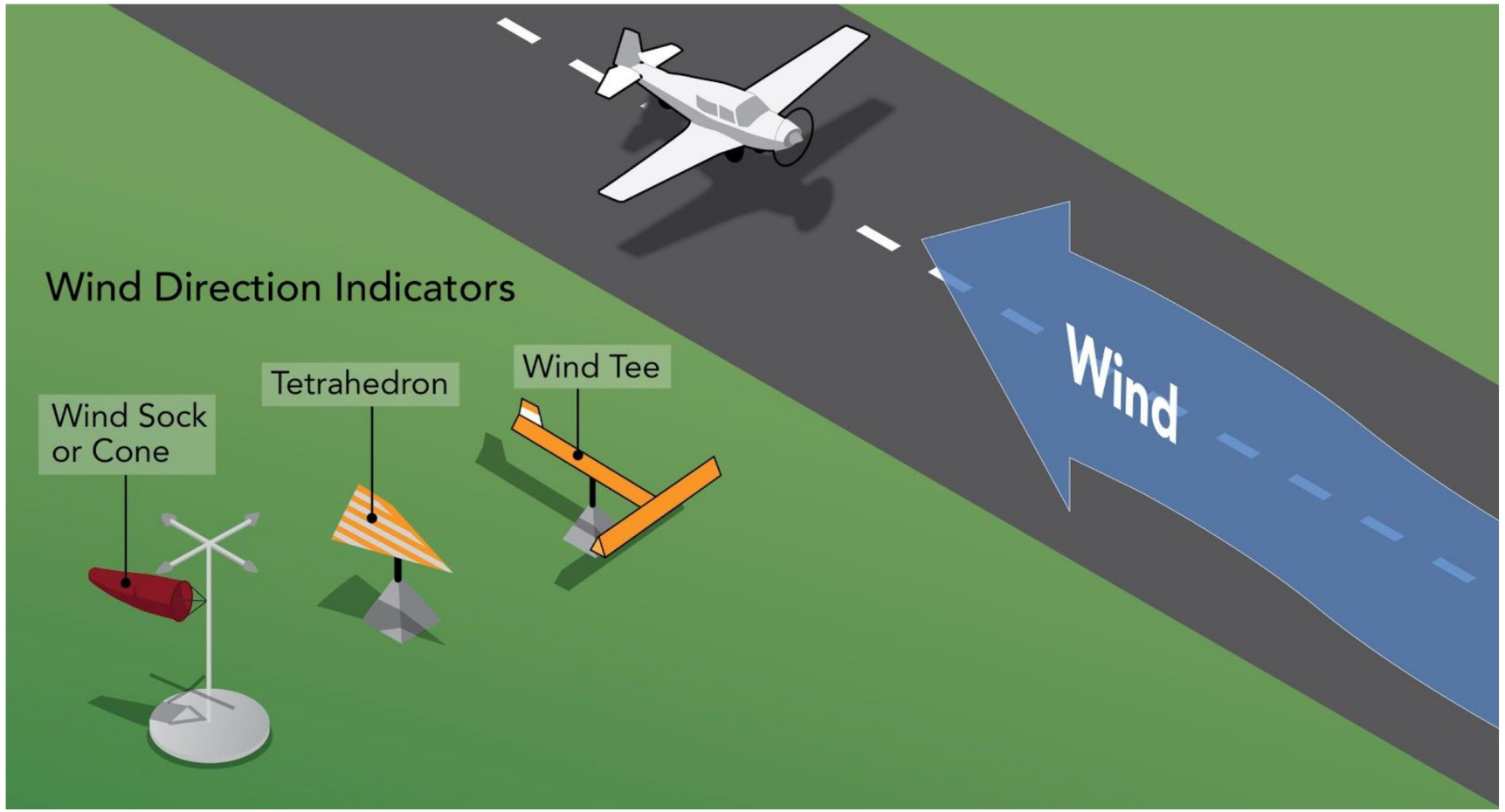


Segmented Circle

- Segmented circle – located in a position that affords maximum visibility to pilots in the air and on the ground and provides a centralized point for the other elements of the system.
- Landing strip indicators – these show the alignment of landing runways (the legs sticking out of the segmented circles). They are oriented in the same directions as the actual runways of that airport.
- Traffic pattern indicators – indicators at right angles to the landing strip indicator showing the direction of turn from base to final, indicating if it is a "left" pattern or a "right" pattern.
- Wind direction indicator – a wind cone, wind sock, or wind "T" installed near the runways to indicate wind direction (the key thing to remember here is that the large end of the cone/sock and the cross-bar of the wind "T" all indicate from where the wind is blowing).
- Landing direction indicator – a tetrahedron is installed to indicate the direction of landings and takeoffs when conditions at the airport warrant its use. It should be located at the center of a segmented circle and may also be lighted for night operations. The small end of the tetrahedron points in the direction of landing (i.e., the small end points into the wind). For example, if the tetrahedron's small point is pointing northwest, the wind is coming from the northeast and heading southwest.

Wind Direction Indicators

- Wind Sock or Cone
- Tetrahedron
- Win Tee

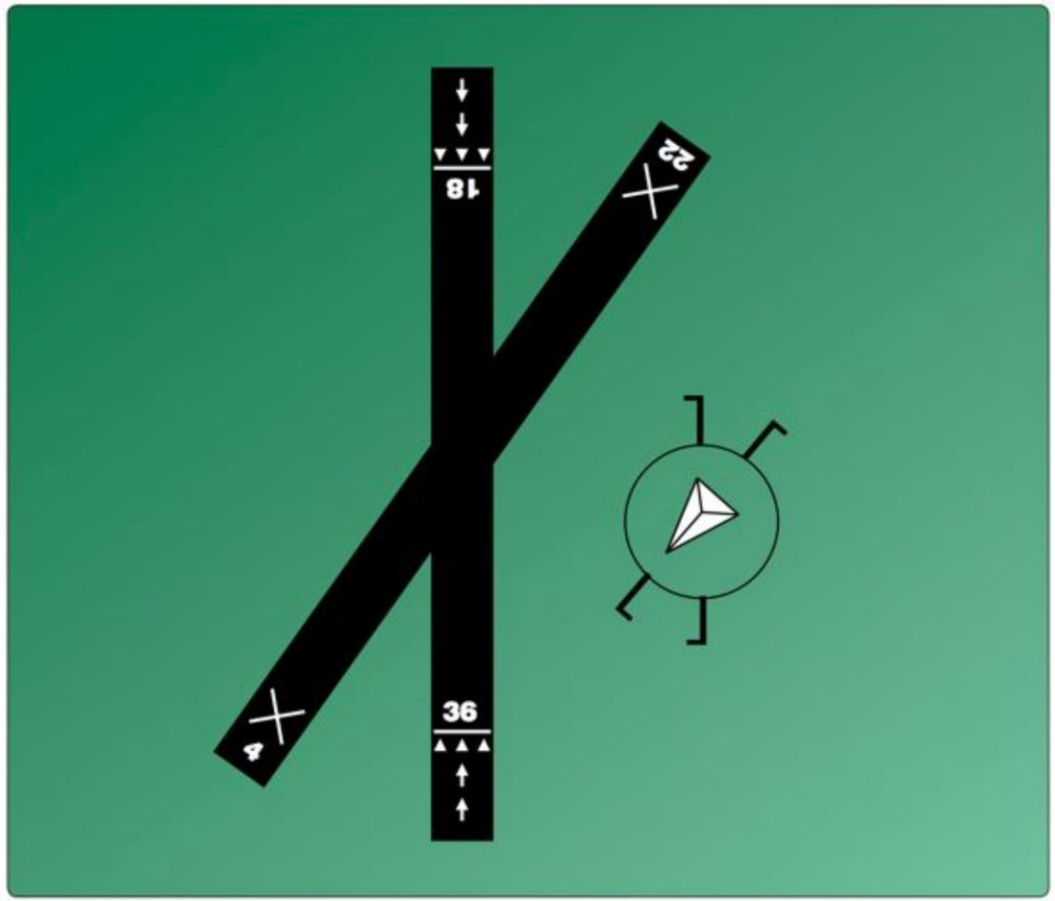


Things to Remember About Landing When Using Indicators

- You land in the same direction as the tip of the tetrahedron is pointing.
- You land as if you were flying out of the large, open end of the wind cone.
- You land toward the cross-bar end of the wind “T”.

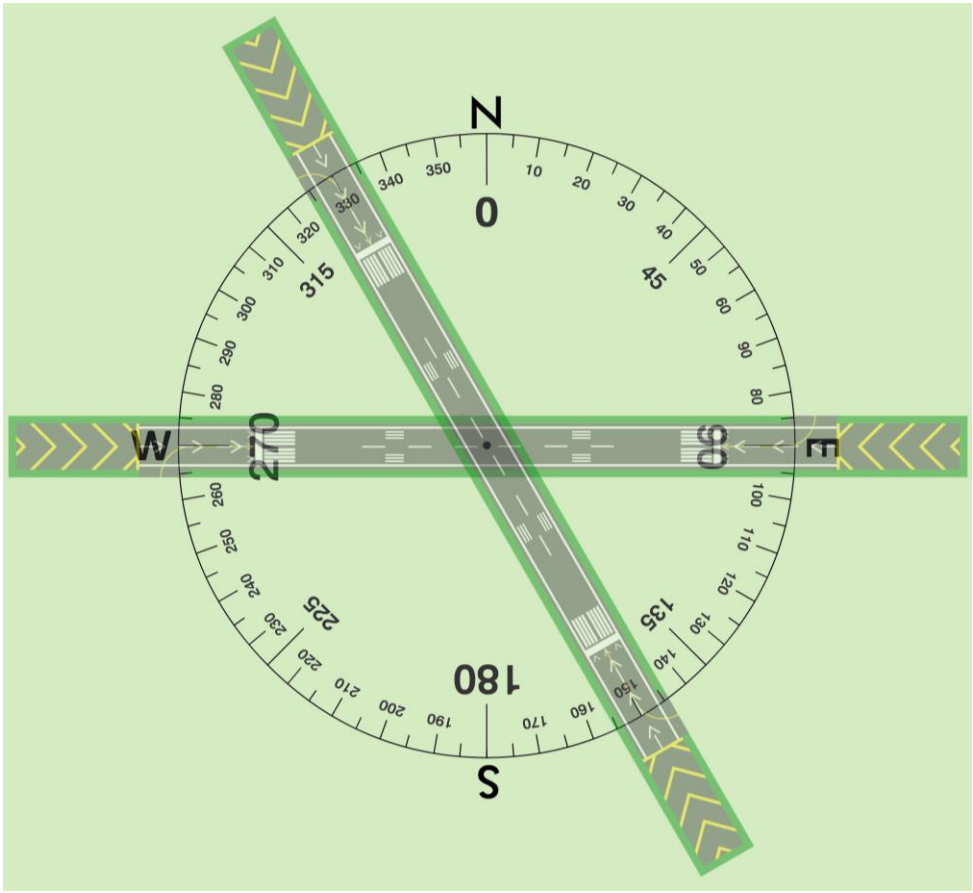
Airport Summary

- The tetrahedron indicates that the wind is blowing from southwest to northeast.
- See the "X" on Runways 4 and 22? That means that the runways are closed.
- According to the traffic pattern indicators (see how the landing strip indicators match up with the design of the runway?), Runways 22 and 36 use a left traffic pattern, and Runways 4 and 18 use a right traffic pattern.
- The area behind the displaced thresholds of Runways 18 and 36 (marked by arrows) can be used for taxiing and takeoff, but not for landing.



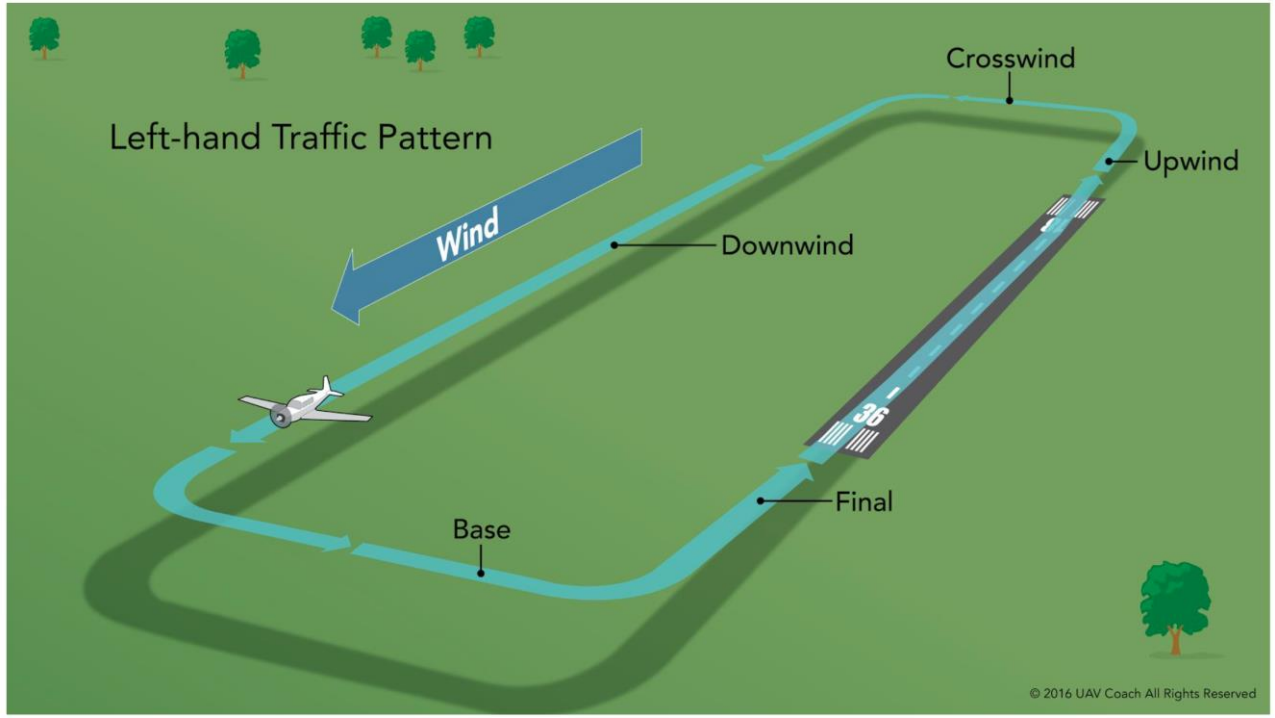
How Are These Runway Directions Determined?

- Runway directions are primarily determined based on the prevailing wind patterns at the airport location, aiming to allow aircraft to take off and land into the wind as much as possible.
- Wind data analysis
- Magnetic heading
- Geographical and environmental factors
- Noise abatement
- Operation requirements
- ATC requirements



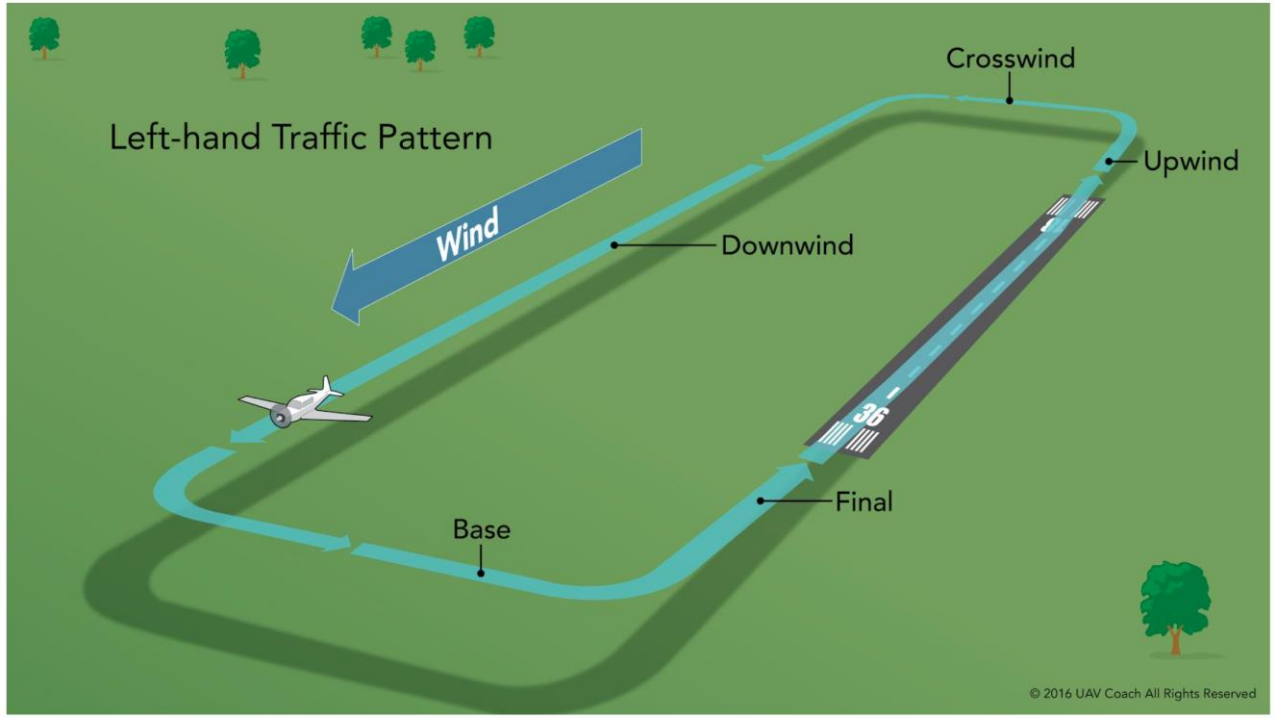
Traffic Patterns Used by Manned Aircraft Pilots

- When operating in the typical pattern at a non-towered airport, all turns should be made to the left of the pilot unless otherwise specified. Geographical and environmental factors
- The normal traffic pattern is a “left” pattern.
- The recommended entry position to an airport traffic pattern is to enter 45° at the midpoint of the downwind leg at traffic pattern altitude.



Traffic Patterns Used by Manned Aircraft Pilots

- An aircraft announcing that they are "midfield left downwind to RWY 36,"
- Means that the aircraft is west of the runway, on a 180° course (parallel, but heading in the opposite direction from landing).
- In the illustration if a plane will be landing on runway 36 (in the direction of the arrow labeled "final leg"), then when it is on the downwind leg, it will be west of the runway traveling in the opposite direction of the landing runway.



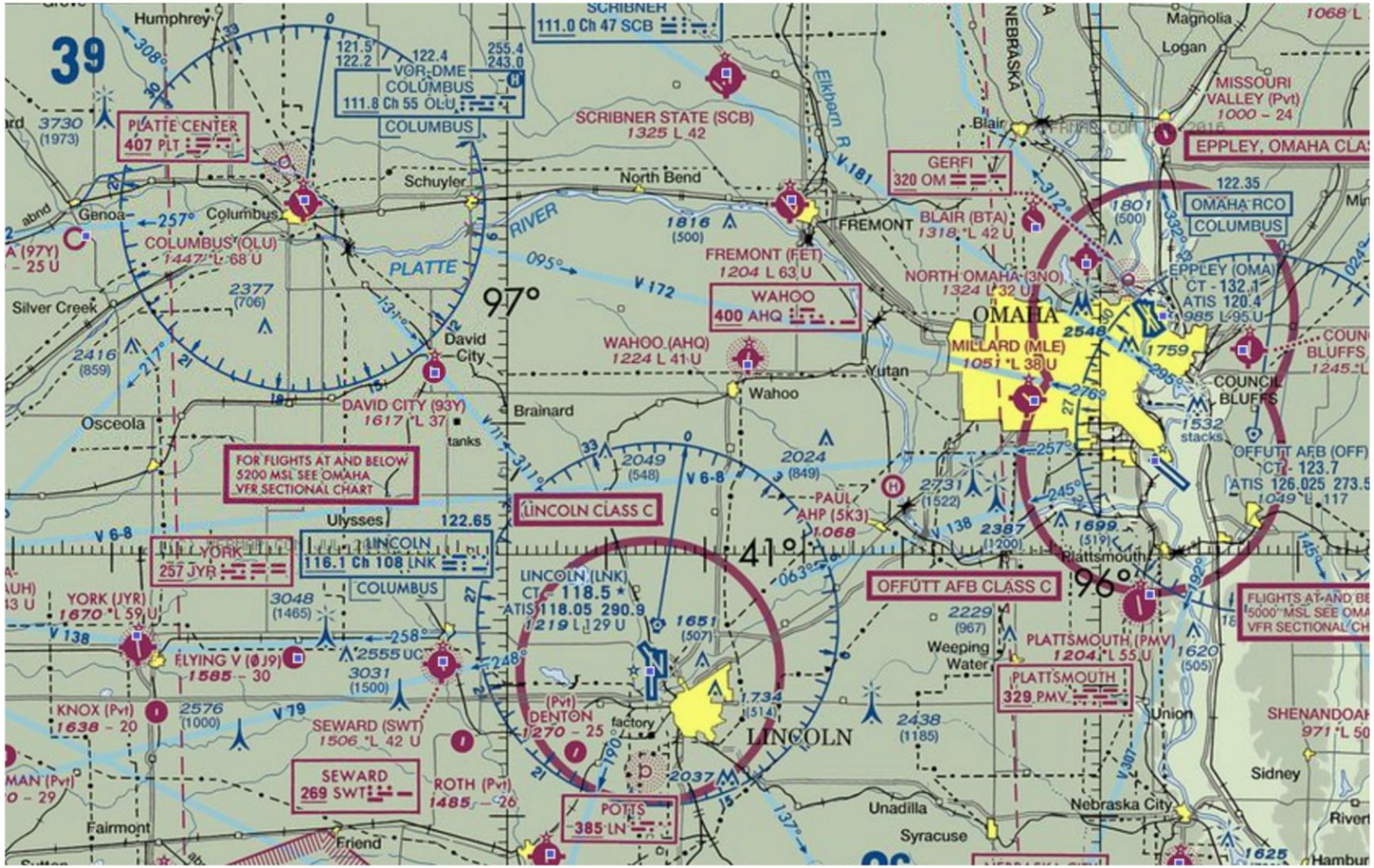
Security Identification Display Areas (SIDA)

- Security Identification Display Areas (SIDA) are limited access areas within airports that require a person to have a badge issued in accordance with the procedures in CFR 49 Part 1542. This normally includes sensitive operational areas of an airport, such as taxiways and runways.
- You can't go into these areas without proper identification.

Sources for Airport Data

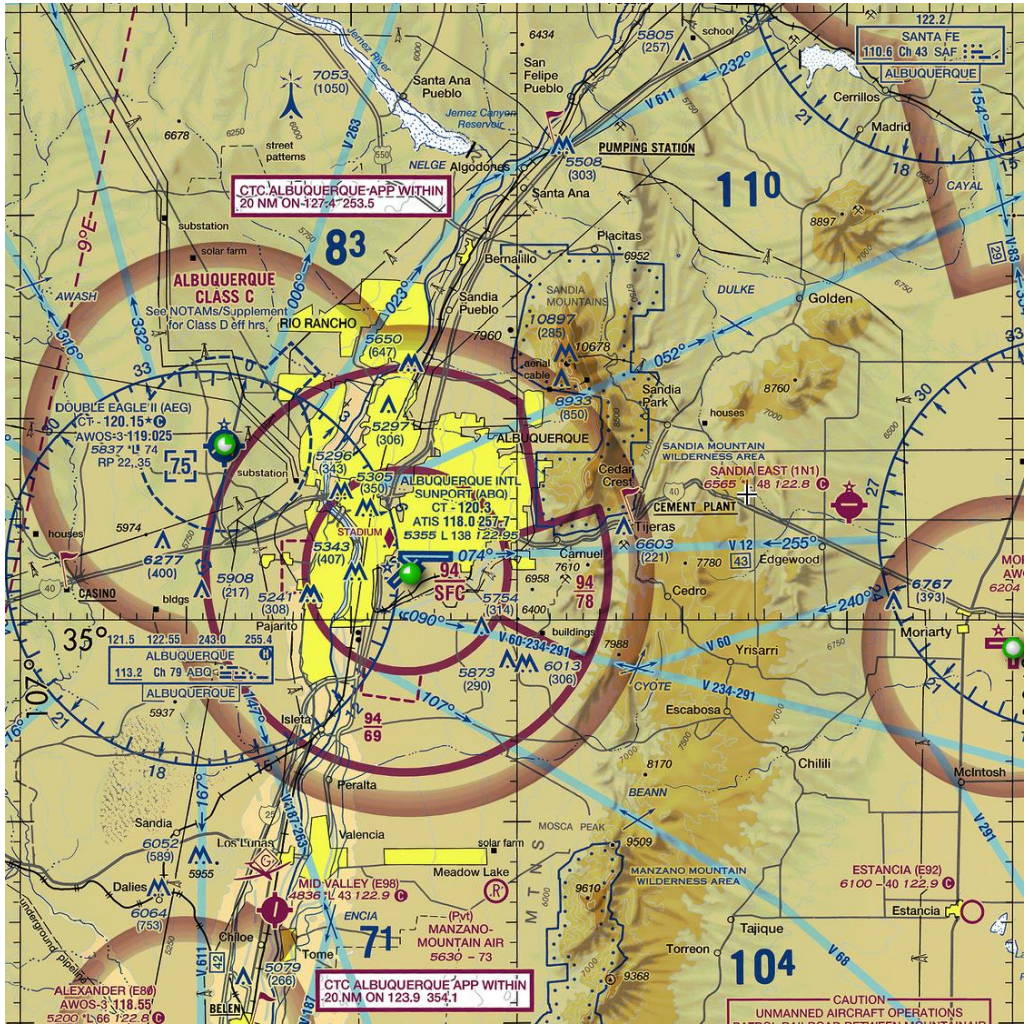
- Aeronautical Charts
- Chart Supplement U.S. (formerly the Airport/Facility Directory)
- Notices to Airmen (NOTAMs)
- Automated Terminal Information Service (ATIS)

Sources for Airport Data – Aeronautical Charts (Sectional Charts)



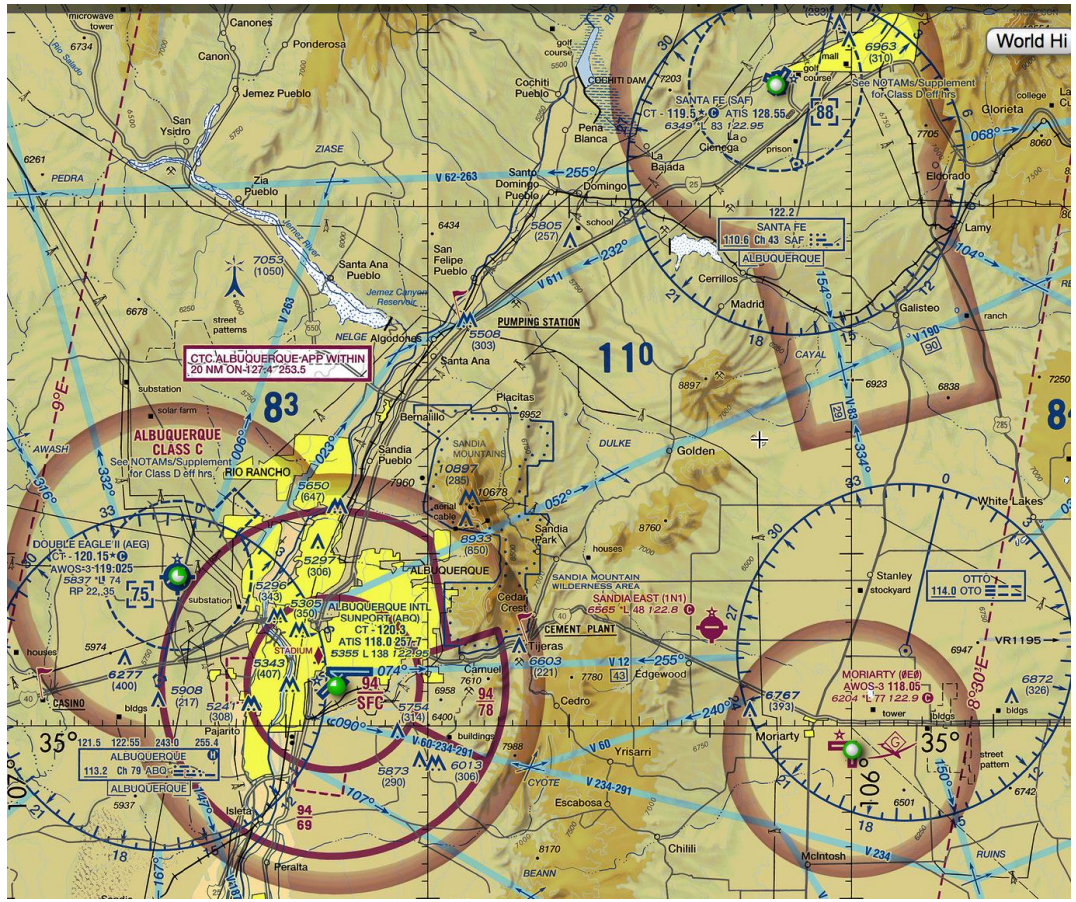
Maximum Elevation Figure (MEF)

- MEFs are determined by taking the point of highest elevation within a quadrangle, adding 100 feet for vertical error, then adding the height of the highest obstacle in the quadrangle or 200 feet, whichever is higher, then rounding up to the next hundred feet.
- MEF are MSL altitude.es



Magenta Airports on Aeronautical Charts

- Airports having control towers are shown in blue.
- All others in magenta.

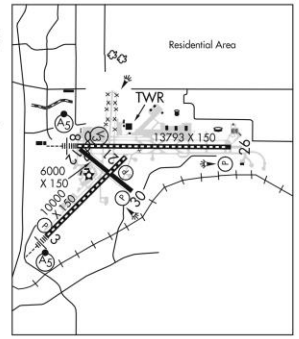


Example – Albuquerque Sunport

- Chart Supplement U.S.
- All others in magenta.
- The Chart Supplement U.S. provides the most comprehensive information on a given airport.
- Available from: https://skyvector.com
- What is the UNICOM frequency? – 122.95
- What is D-ATIS?
- How would you contact the D-ATIS?
- DIGITAL-AUTOMATIC TERMINAL INFORMATION SERVICE
- Radio Freq. 118.0 or
- Phone @ 505-856-4928

ALBUQUERQUE

ALBUQUERQUE INTL SUNPORT (ABQ)(KABQ) P (AF ANG DOE USFS) 3 SE UTC–7(–6DT) **ALBUQUERQUE H–4L, L–8I IAP, AD**
N35°02.34′ W106°36.50′
5355 B LRA ARFF Index—See Remarks NOTAM FILE ABQ
RWY 08–26: H13793X150 (CONC–GRVD) S–100, D–210, 2S–175, 2D–360, 2D/2D2–720 HIRL CL
RWY 08: MALSR. TDZL. VASI(V6L)—GA 2.95° TCH 54′. RVR–T Thld dsplcd 1000′. Rgt tfc.
RWY 26: REIL. PAPI(P4L)—GA 3.0° TCH 83′. 0.5% down.
RWY 03–21: H10000X150 (CONC–GRVD) S–100, D–210, 2S–175, 2D–360, 2D/2D2–720 HIRL CL
RWY 03: MALSR. TDZL. REIL. PAPI(P4L)—GA 3.0° TCH 62′. RVR–T Rgt tfc.
RWY 21: REIL. PAPI(P4L).
RWY 12–30: H6000X150 (CONC–GRVD) S–65, D–120, 2S–155, 2D–155 MIRL
RWY 12: Rgt tfc.
RWY 30: REIL. PAPI(P4L)—GA 3.0° TCH 40′.



RUNWAY DECLARED DISTANCE INFORMATION
RWY 03: TORA–10000 TODA–10000 ASDA–10000 LDA–10000
RWY 08: TORA–13793 TODA–13793 ASDA–13793 LDA–12793
RWY 12: TORA–6000 TODA–6000 ASDA–6000 LDA–6000
RWY 21: TORA–10000 TODA–10000 ASDA–10000 LDA–10000
RWY 26: TORA–13793 TODA–13793 ASDA–13793 LDA–13793
RWY 30: TORA–6000 TODA–6000 ASDA–6000 LDA–6000
SERVICE: S4 **FUEL** 100LL, JET A, A1, A1+ **OX** 1, 2, 3, 4 **LGT** PAPI Rwy 26 does not provide obstacle clearance byd 3.5 NM from thld, unusable byd 3.5 NM.
AIRPORT REMARKS: Attended continuously. Bird haz Oct–Dec, and Mar–May. Heavy student helicopter tfc, ctl firing area south of arpt. Dep on Rwy 03 are rstd and rqr prior coord. Rwy 08–26, Rwy 03–21 and Rwy 12–30 grvd 130′ wide. Use extreme care taxiing north on Twy E–1 to Rwy 08, holding position for Rwy 08–26 co–lctd with Rwy 12–30 holding position prior to Rwy 12 thld. Ramp north of Rwy 08–26 clsd to helicopters and general aviation acft. Class I, ARFF Index C. ARFF protection provided by USAF. Fighter acft depart south only. Air carrier gnd handling not avbl btn the hrs of 0800–1130Z‡. Twy D north of Twy B clsd indef. Twy H mil use only. Wx forecast svc avbl Nov–Mar 1200–0400Z‡, and Mar–Nov 1100–0300Z‡ clsd weekend and hol. DSN 246–9707, C505–846–9707. Remote and trans aircrew wx brief call 250WS Davis Monthan AFB, DSN 228–6598. Flight Notification Service (ADCUS) available. NOTE: See Special Notices—Continuous Power Facilities.
AIRPORT MANAGER: 505-244-7778
WEATHER DATA SOURCES: ASOS (505) 242–4044 **HIWAS** 113.2 ABQ. LLWAS. WSP.
COMMUNICATIONS: D–ATIS 118.0 505–856–4928 UNICOM 122.95
RCO 122.55 (ALBUQUERQUE RADIO)
Ⓡ **APP CON** 123.9 (S of V12) 127.4 (on or N of V12) 126.3
Ⓡ **DEP CON** 127.4 (on or N of V12) 123.9 (S of V12)
TOWER 120.3 123.775 **GND CON** 121.9 **CLNC DEL** 119.2
CPDLC (LOGON KABQ)
AIRSPACE: CLASS C svc ctc **APP CON**
VOR TEST FACILITY (VOT) 111.0
RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.
(H) VORTACW 113.2 ABQ Chan 79 N35°02.63′ W106°48.98′ 079° 10.3 NM to fld. 5749/13E. **HIWAS.**
TACAN AZIMUTH unusable:
040°–055° byd 30 NM blo 15,000′
ILS 111.5 I–BZY Rwy 03. Class IE.
ILS/DME 111.9 I–SPT Chan 56 Rwy 08. Class IE.
ASR

Bird and Wildlife Hazards

- 90% of reported bird strikes occur at or below 3,000 feet AGL.
- Avoid flying over known areas of bird concentration.
- Charted wildlife refuges and other natural areas contain unusually high local concentration of birds, which may create a hazard to your unmanned aircraft.

Bird and Wildlife Hazards

- Pilots are urged to report any bird or other wildlife strike using FAA Form 5200−7, Bird/Other Wildlife Strike Report (Appendix 1).
- Additional forms are available at any Flight Service Station (FSS), at any FAA Regional Office, or at http://wildlife.faa.gov/.
- The data derived from these reports are used to develop standards to cope with this potential hazard to aircraft and for documentation of necessary habitat control on airports.

Charted U.S. Wildlife Refuges, Parks, and Forest Service Areas

- The National Park Service (NPS) generally prohibits the operation of drones within the boundaries of national parks, including take-off and landing.
- Exceptions:
  - When forced to land due to an emergency beyond the control of the operator
  - At officially designated landing sites
  - Due to approved official business of the Federal Government

Flights over Certain Federal Lands

- Manned aircraft pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following areas administered by the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and the U.S. Forest Service (USFS):
  - National Parks (NPS)
  - Monuments (NPS)
  - Seashores (NPS)
  - Lakeshores (NPS)
  - Recreation Areas and Scenic Riverways (NPS)
  - National Wildlife Refuges (USFWS)
  - Big Game Refuges (USFWS)
  - Game Ranges and Wildlife Ranges (USFWS)
  - Wilderness and Primitive Areas (USFS)