

!! Print as 'Booklet' (Print On Both Sides) !!

Crossing Runways: If an aircraft is about to land on a runway you need to cross, stop and yield to the aircraft. Be aware that many pilots use airports without operating control towers for training purposes and may be executing a “touch and go” landing—immediately after landing, the pilot applies full power and takes off again. Do not enter the runway until the aircraft has landed and either exited the runway or passed the point on the runway where you wish to cross. Then proceed. Sometimes the runway gradient makes it impossible to see the entire length of the runway. An aircraft can suddenly appear as you are crossing. For this reason, it's best to cross at the end of the runway.

For both pilots and vehicle operators, extra vigilance is the key to operating at airports without an operating control tower. Your eyes and ears are two of the most important safety features you have. Although many of these airports may not be very busy, don't be lulled into complacency. Just because there is normally very little traffic, do not assume that this is always the case. Always use your vehicle's rotating beacon, if equipped, anytime you are moving about the airport surface.

For further information on the subject of airport vehicle driver safety, contact the FAA Airports Division or contact the Runway Safety Program Manager (RSPM) in your region:

Region	Airports Division	RSPM
Alaska Region	(907) 271-5438	(907) 271-5293
Central Region	(816) 329-2600	(816) 329-3044
Eastern Region	(718) 553-3331	(718) 553-3326
Great Lakes Region	(847) 294-7272	(847) 294-7853
New England Region	(781) 238-7600	(781) 238-7027
Northwest Mountain Region	(425) 227-2600	(425) 227-1369
Southern Region	(404) 305-6700	(404) 305-5558
Southwest Region	(817) 222-5600	(817) 222-5045
Western-Pacific Region	(310) 725-3600	(310) 725-3550

Or visit our web site at www.faa.gov/runwaysafety/

Driving on the Airport Operations Area



Airport Vehicle Operator Safety Study Guide



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If you are ever working on a runway or taxiway and your radio quits, move your vehicle off the runway or taxiway, turn your vehicle toward the tower, and flash your headlights. This signals the controllers that you need assistance. This may take some time if the controller's attention is directed toward another part of the airport. Rather than use light gun signals, the controller may call airport operations to provide you with an escort. Be patient. **Even a failed radio is not an excuse for proceeding without a proper clearance.**

Airports Without Operating Control Towers

At some airports the control tower does not operate on a 24-hour basis while other airports may not have a control tower. The rules for driving on the AOA are basically the same as those at an airport with an operating control tower. The major difference is in radio communication. Since there is no control tower, you do not have to get a controller's permission before driving on a runway or taxiway. At some of these airports, the airport operator may only authorize you to drive on specific areas, e.g., ramps or ramps and certain taxiways.

If you need to drive on taxiways or runways, carry a radio tuned to the airport's Common Traffic Advisory Frequency (CTAF). If the tower is closed, the CTAF will usually be the same as the local control frequency; if the airport does not have a tower, the CTAF will usually be the same as the UNICOM frequency. Monitor radio transmissions on this frequency to maintain the location of aircraft relative to your location. Before entering and while driving on runways and taxiways, always announce your intentions on the CTAF. This allows both you and pilots operating on the airfield to maintain situational awareness.

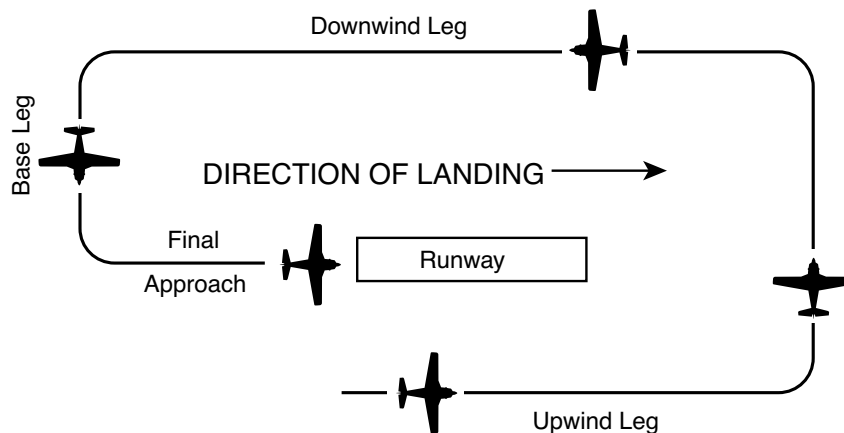
Remember, aircraft at these airports may not be radio equipped or the pilot may not be making radio position reports. Therefore, **always** consider all runways to be active in both directions.

When you get near runways and taxiways, SLOW DOWN! Look both ways, and then look up for aircraft landing or taking off. **Always yield the right-of-way to aircraft.**

Driving on Taxiways: Give taxiing aircraft plenty of room. If an aircraft is on the same taxiway, move out of the aircraft's way.

Traffic Pattern Terminology

Aircraft approaching a runway for landing follow a pattern. The standard pattern is a rectangular box with the pilot making all turns to the left. (Check with your airport manager to find out what traffic patterns are used at your airport.) Each side of the pattern has a name, as shown in the diagram. Pilots use these names to report their position on the radio when they are in the traffic pattern. For example, a pilot may say, “Entering downwind for runway 9,” or, “Turning base for runway 4.” Familiarity with these names will help you locate an aircraft when the pilot reports his/her position on the radio.



Light Gun System

Air traffic controllers have a backup communication system to use in the event an aircraft, vehicle, or controller's radio fails. Controllers use a **Light Gun** with different colored lenses to tell pilots or vehicle drivers what to do.

Meanings of light gun signals:

- **Steady Green** — It's okay to cross the runway or taxiway.
- **Steady Red** — Stop!
- **Flashing Red** — Move off the runway or taxiway.
- **Flashing White** — Return to your starting point on the airport.
- **Alternating Red & Green** — Proceed with extreme caution.

Driving on the Airport Operations Area

The Airport Operations Area, commonly known as the AOA, can be a confusing, congested place for a vehicle operator. Many different types of vehicles operate simultaneously to service aircraft as well as maintain the airfield and navigational aids. Vehicle operations could have an adverse impact on aviation safety if a driver does not follow established safety procedures and practices on the AOA.

To help maintain high safety standards, the FAA has created this study guide to be used in conjunction with the video entitled, “*Driving on the Airport Operations Area*.” This study guide is intended to be used as a supplement to the video and any other training you may receive. Like the video, the study guide addresses vehicle operations on airports with operating control towers. However, many of the general safety concerns and procedures are also applicable to airports without control towers. A section is included in this study guide that specifically addresses driving at non-towered airports.

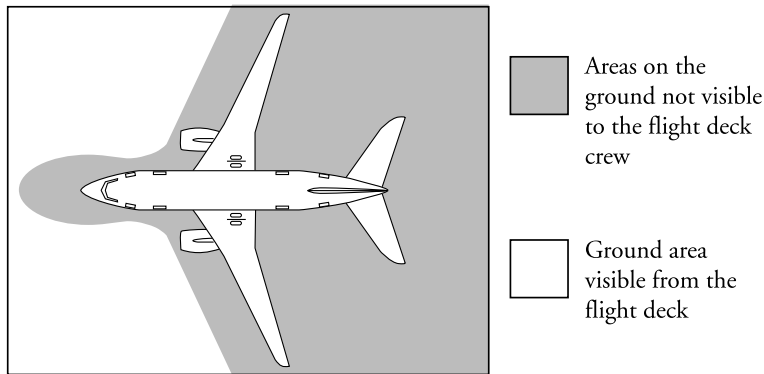
This study guide is generic in nature and should be used with airport diagrams and any specific rules or procedures regarding safety and security that are used at your airport. It is important to remember that you, as a vehicle operator, have the same accountability and responsibility as that of a pilot taxiing an aircraft.

Airport Operations Area (AOA)

The AOA consists of all restricted ground areas of the airport, including taxiways, runways, loading ramps, and parking areas. In other words, everything inside the perimeter fence. The AOA is usually divided into two distinct areas: the movement area and the non-movement area. Both of these areas will be discussed in detail later in this guide.

General Points to Remember When Driving on an AOA

- Know and understand vehicle operating procedures at your specific airport and **never** deviate from them.
- Be patient, observant, and non-assuming.
- Drive slowly.
- Always know your exact location and be aware of activity around you.
- Never drive under any part of an aircraft or allow its wing to pass over your vehicle.
- Maintain a safe distance from parked or taxiing aircraft.
- Aircraft **always** have the right-of-way.
- Display proper identification and security access permits.
- Make sure your vehicle is properly equipped for the area where you operate, i.e., radio, beacons, reflective markings, lighting.
- Pilots have a limited field of view from the cockpit—don't assume they can see you.



- Be aware of emergency vehicles—always yield to them.
- Report any accident, no matter how minor, to your supervisor immediately.
- Use extreme caution when driving at night and/or in poor weather conditions.
- Realize that you can become disoriented even in the best conditions—when disoriented, stop and request assistance.
- Be alert to any foreign object debris (FOD)—either pick it up or notify someone who can.

The Aviation Alphabet

The following is the International Civil Aviation Organization (ICAO) phonetic alphabet that is used in radio communications. Use the words in place of letters to reduce confusion. For example, Taxiway B would be referred to as Taxiway Bravo.

A	Alpha	AL-FAH	N	November	NO-VEM-BER
B	Bravo	BRAH-VOH	O	Oscar	OSS-KAH
C	Charlie	CHAR-LEE	P	Papa	PAH-PAH
D	Delta	DELL-TAH	Q	Quebec	KEH-BECK
E	Echo	ECK-OH	R	Romeo	ROW-ME-OH
F	Foxtrot	FOKS-TROT	S	Sierra	SEE-AIR-RAH
G	Golf	GOLF	T	Tango	TANG-GO
H	Hotel	HOH-TEL	U	Uniform	YOU-NEE-FORM
I	India	IN-DEE-AH	V	Victor	VIK-TEH
J	Juliett	JEW-LEE-ETT	W	Whiskey	WISS-KEY
K	Kilo	KEY-LOH	X	X-ray	ECKS-RAY
L	Lima	LEE-MAH	Y	Yankee	YANG-KEY
M	Mike	MIKE	Z	Zulu	ZOO-LOO

1	One	WUN	6	Six	SIX
2	Two	TOO	7	Seven	SEV-EN
3	Three	TREE	8	Eight	AIT
4	Four	FOW-ER	9	Nine	NIN-ER
5	Five	FIFE	0	Zero	ZEE-RO

Aviation Phraseology

Acknowledge — Let me know you have received and understand this message.

Advise intentions — Tell me what you plan to do.

Affirmative — Yes.

Confirm — My version is . . . is that correct?

Correction — An error has been made in the transmission, and the correct version follows.

Go ahead — State your request (never means “proceed”).

Hold — Stop where you are.

Hold short of . . . — Proceed to, but hold short of a specific point.

Negative — No, or permission is not granted, or that is not correct.

Proceed — You are authorized to begin or continue moving.

Read back — Repeat my message back to me.

Roger — I have received all of your last transmission. (It should not be used to answer a yes or no question.)

Say again — Repeat what you just said.

Standby — Wait . . . I will get back to you. (Standby is not an approval or a denial. The caller should reestablish contact if the delay is lengthy.)

Unable — Indicates inability to comply with a specific instruction, request, or clearance.

Verify — Request confirmation of information.

Wilco — I have received your message, understand it, and will comply.

FOD

Foreign Object Debris is any debris on the airfield that can cause damage to an aircraft. A few examples are tools, plastic packing material, cans, rocks, or discarded parts from maintenance activities. Any of these objects can shred internal parts if sucked into a jet engine and can become deadly projectiles. FOD can create a hazard during taxiing, takeoff, and landing. Therefore, it is crucial that everyone on the airfield be alert to FOD and remove it immediately.

Non-Movement Areas

Areas such as parking areas, loading ramps, and maintenance ramps are known as non-movement areas. The majority of vehicle operations on the AOA occur in the non-movement area, and most drivers on the AOA are only authorized to operate in the non-movement area.

Before driving anywhere on the AOA, know the location of the boundary between the non-movement area and the movement area.

Ramps/Aprons

These are areas where aircraft are parked, loaded and unloaded, and serviced between flights. Vehicles and aircraft operate in close proximity in these areas, so it is vital to maintain a safe distance between your vehicle and aircraft. Always yield to aircraft and never drive under an aircraft or its wings. Slow speed and extreme caution are required in these areas. Always drive in vehicle lanes if they are marked.

Perimeter Roads

Perimeter roads provide vehicle access from one area of the airfield to another. Even though the travel distance and time may be longer, **always** use a perimeter road when it is available.

Markings on Non-Movement Areas

Ramps/aprons may contain a variety of markings for aircraft parking, tie-downs, or vehicle lanes. You may also see markings that identify the boundary between the non-movement area and the movement area that is under Air Traffic Control (ATC). These markings consist of two yellow lines—one solid, one dashed.



The dashed line is located on the movement side—the area controlled by ATC. The solid line is on the non-movement side. Always stay in the non-movement area unless you are authorized by the airport operator and have permission from the control tower to be in the movement area. If there is no boundary marking present between the movement and non-movement area, check with the airport manager's office to find out where the actual boundary is located.

Driving on Non-Movement Areas

- Know where the boundary is between movement and non-movement areas.
- Always use perimeter roads.
- Unless otherwise posted, the speed limit is 15 mph or less.
- Never drive behind an aircraft that is being pushed back or is powering back.
- Use vehicle lanes when marked.
- Do not drive through fuel spills—they can ignite.
- Do not block fire lanes.
- Beware of the danger of jet blast and prop wash—watch for flashing beacons on aircraft to indicate the engine is running or about to start.

Warning: Do not get too close to aircraft as damage or injury could occur if the engine is started. Jet blast or prop wash can be extremely dangerous. Flashing beacons located on the tail, top, or bottom of the aircraft indicate that the engine is running or about to start.

Movement Areas

The movement area consists of taxiways, runways, and other designated areas as determined by each airport. You are required to have authorization from airport management to drive in these areas. *You must monitor your radio at all times and get permission from ATC to enter and drive on any movement area.*

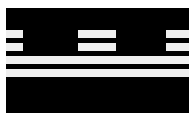
- If the instructions you receive from ATC are unclear, ask that they be repeated by stating, “Say again”.
- If there is anything about the instructions you do not understand, ask for further explanation.
- Repeat or “Read-back” your instructions to ATC.

Radio Communication Procedures

1. Use an aviation two-way radio with the airport's ground control and tower frequencies on it. Each vehicle should have a call sign identifying the vehicle.
2. Think about what you are going to say before calling the controller.
3. Know and use the proper phraseology. (Refer to the Aviation Phraseology and Aviation Alphabet tables at the end of this section.) Never use Citizen's Band (CB) lingo or law enforcement “ten” codes.
4. Use the proper sequence in calling the controller. Before you start talking, make sure that no one else is already talking. Then key your microphone and do the following:
 - a) State whom you are calling and identify yourself by using your vehicle call sign, “Oak City Ground, Maintenance One.”
 - b) Wait for the controller to respond. Be patient as it sometimes takes a while if the controller is busy. When the controller responds, “Maintenance One, Oak City Ground,” state where you are and where you want to go. For example, “Maintenance One is on the terminal ramp and would like to cross 1-8 Right (18R) at Taxiway Bravo and proceed to the VOR.” Wait for the controller's response.
 - c) The controller will either approve or deny your request, or give you modified instructions, e.g., “Maintenance One, proceed via Taxiway Bravo, hold short of Runway 1-8 Right.”
 - d) Always read back all hold short instructions. “Maintenance One, roger, will hold short of Runway 1-8 Right.”

Note: Use extreme caution when you hear the phrase “go ahead.” Controllers use this to mean, “state your request.” It never means, “proceed!”

Hold Position Markings on the Movement Area



Runway hold position markings (also called hold lines) identify the location on the movement area where a vehicle must stop when the operator does not have clearance to proceed on the runway. They consist of four yellow lines—two solid and two dashed extending across the width of the taxiway or runway. Vehicles must stop short of the first solid line. These lines will always be accompanied by a red and white runway hold position sign.



ILS (Instrument Landing System) Critical Areas have hold position markings to show pilots and vehicle operators where to stop to avoid interfering with navigational signals. This ladder-like marking will be accompanied by a red sign with the letters “ILS” in white adjacent to the taxiway.

Visor Placards may be available for use in airport vehicles to serve as quick reference guide to identify airport signs and markings. Check the Runway Safety Office web site at www.faa.gov/runwaysafety/ for information on how to obtain copies.

Driving on Movement Areas

- Do not enter a movement area unless you have authorization from airport management **and** permission from ATC.
- Monitor your aviation two-way radio at all times.
- After receiving permission from ATC, proceed only after you have looked in all directions, including up.
- Never drive your vehicle on or across runways unless absolutely necessary **and** you have authorization from airport management and permission from ATC.

Communication at Towered Airports

When driving on the movement area at tower-controlled airports, clear and proper communication is vital. Both you and the air traffic controller must ensure that your communications are understood.

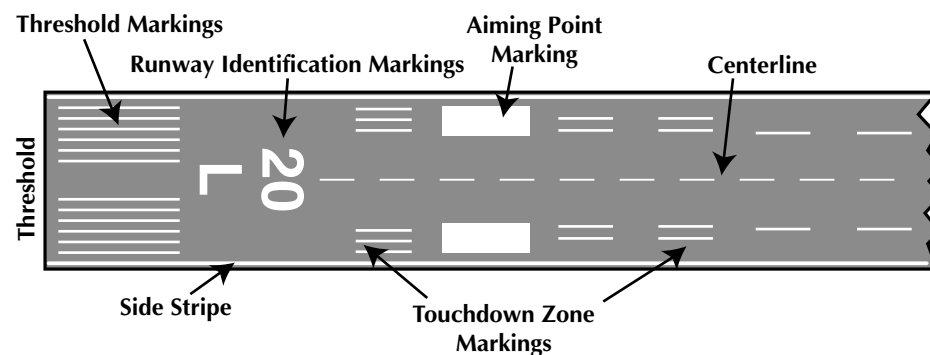
- Never assume anything.
- Always ask for assistance if you have any doubt about whether to proceed.

Runways

Runways are rectangular-shaped, paved surfaces designed for the landing and takeoff of airplanes. Only drive on runways when necessary for airport operations. Do not enter or cross a runway unless you have authorization from airport management and permission from ATC.

Runway Identifications: Runways are numbered from 1 to 36 based on their magnetic direction rounded off to the nearest 10 degrees. For example, a runway aligned to the magnetic heading of 180 degrees would be Runway 18. Each runway will have two identifications based upon the direction of travel. For example, if one end of the runway is numbered “18,” the other end will be numbered “36.” If there are parallel runways, each runway’s identification number will have an “L,” “C,” or “R” to indicate its relative location (left, center, or right) to the other parallel runway(s).

Runway Markings: Runway markings are white. Each runway will have a centerline and a runway identification marking located at each end. Runways may also have other markings such as side stripes, thresholds, aiming points, and touchdown zone markings.



Runway Lights: Edge lights on runways are white but may change to yellow for the last 2,000 feet. Threshold lights are located at each runway end; these are green on the approach side and red on the runway side. Some airports have runway centerline lights; these lights are white except for the last 3,000 feet. They alternate white and red from 3,000 feet to 1,000 feet from the end and are solid red the last 1,000 feet.

Safety Areas: If you are required to drive on or work in areas adjacent to runways and taxiways, be aware that aircraft wings and engines may extend over these areas. These safety areas are also designed to be used by aircraft in emergency situations if the aircraft leaves the pavement. If it is necessary to park your vehicle, always park it outside the safety area. At some airports, regulations prohibit vehicle operations in the runway safety area while aircraft are using the runway.

Taxiways

Taxiways are used by aircraft to get to and from the ramp/apron and the runway.

Taxiway Identification: Taxiways are identified by letters or letter/number combinations.

Taxiway Markings: Taxiway markings are yellow. They have a solid yellow centerline stripe and may also have solid or dashed double edge lines. Each taxiway that enters the runway will have a hold position marking (see discussion on hold markings) indicating where you should stop to remain clear of the runway.

Taxiway Lights: Taxiway edge lights are blue, and centerline lights are green. Some airports may not have taxiway lights; others may use blue edge reflectors or green centerline reflectors in lieu of lights.

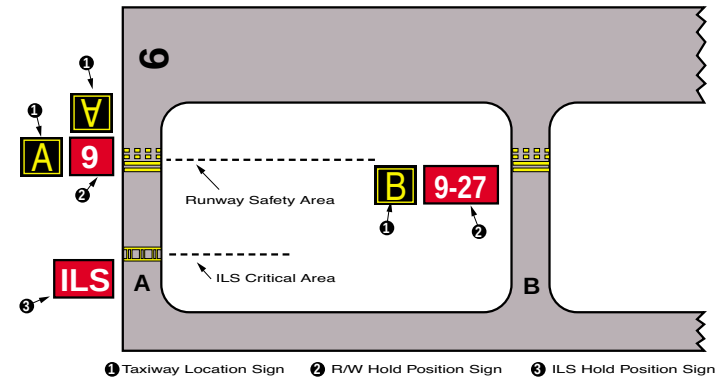
Movement Area Signs

There are three basic types of signs that you may encounter on the movement area—mandatory instruction, location, and guidance signs. These signs are color-coded for easy recognition and are located adjacent to runways and taxiways. These signs may also be painted on the pavement at some airports.

Mandatory Instruction Signs: A red sign with a white inscription is a mandatory instruction sign—**do not** proceed past one of these signs without explicit clearance from ATC. The most common form of this sign is the **runway hold position**. Both runway identifications are usually included on the sign with the numbers arranged to indicate the direction of each threshold. For example,

33-15

33-15 indicates that the threshold for runway 33 is to the left and the threshold for runway 15 is to the right.



Location Signs: A black sign with a yellow inscription is a **location sign** that identifies the taxiway or runway that you are on.



Guidance Signs: A yellow sign with a black inscription is a **guidance sign**. These signs always have arrows. The arrow shows the direction to turn onto the indicated taxiway. Sometimes, these signs may be co-located with a location sign and/or other guidance signs in an array.



Guidance signs may also indicate a direction to a destination on the airport such as a runway or terminal building.

