Federal Aviation Administration

RUNWAY SAFETY

A Best Practices Guide to Operations and Communications

Introduction

Runway Safety is a significant challenge and a top priority for everyone in aviation. In the United States, an average of three runway incursions* occur daily. Each of these incidents has the potential to cause significant damage to both persons and property. A pilot or flight crew member is expected to taxi an airplane safely whether moving to or from a runway, or otherwise moving about the airport. Scenarios including bad weather, low visibility, construction, unfamiliarity, time of day, distractions and miscommunications with air traffic control add greatly to the challenge.

* A runway incursion is defined as: Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take off of aircraft.

This Best Practices Guide is intended to provide airmen with basic information with respect to safely operating on the surface of both towered and untowered airports. The publication focuses on five areas that are the essence of safe surface operations.

Each section identifies safety measures you can take to avoid errors that lead to runway incursions. Runway incursions are a serious safety concern, and have involved air carrier aircraft, military aircraft, general aviation planes, and ground vehicles. Several have resulted in collisions and fatalities. It doesn't take much to be involved in a runway incursion.

Although the guide is aimed at surface movements for single-pilot operations, all of the information also is relevant for flight crew operations. Another excellent resource is the FAA's Office of Runway Safety's website at http://www.faa.gov/airports/runway_safety/pilots/. Additional information on surface operations also can be found in the Aeronautical Information Manual (AIM) at http://www.faa.gov/air_traffic/publications/atpubs/aim/

Thorough planning is essential for safe taxi operations. You should give as much attention to planning the airport surface movement of your flight as you give to other phases of flight.

- **Have the current airport diagram readily available.** Take time to study the airport layout and anticipate the taxi route based on information provided from the Automatic Terminal Information Service (ATIS), Notices to Airmen (NOTAMs) and recent experience at that airport. However, do not take for granted that this is the taxi route you will receive from the controller.

- **Pay special attention to any complex intersections,** or areas designated as "Hot Spots" and labeled on National Aeronautical Navigation Services (AeroNav, formerly NACO) diagrams. For current hot spot info, visit: http://www.faa.gov/airports/runway_safety/hotspots/hotspots_list/ See Figure 1.

- **Use the current airport diagram not only during** the planning phases, but also while taxiing at the departure, as well as arrival airports.

- **Verify your assigned route** on the airport diagram once taxi clearance has been received from ATC.

- **Prior to brake release, minimize cockpit tasks, observe** "sterile cockpit" procedures and

always practice a "heads up, eyes out" mode while taxiing. Remain especially vigilant of hold short, crossing clearances and Hot Spots, if applicable. (Airport diagrams are available for download at *www.faa.gov/airports/runway_safety/diagrams*).

- **When in doubt, STOP** while remaining clear of the runway and ask for help from ATC.

Airport diagrams provide the layout and names of runways and taxiways, and show the location of major

ATLANTA/DEKALB-PEACHTREE (PDK)
ATLANTA, GEORGIA
Hot Spot Chart
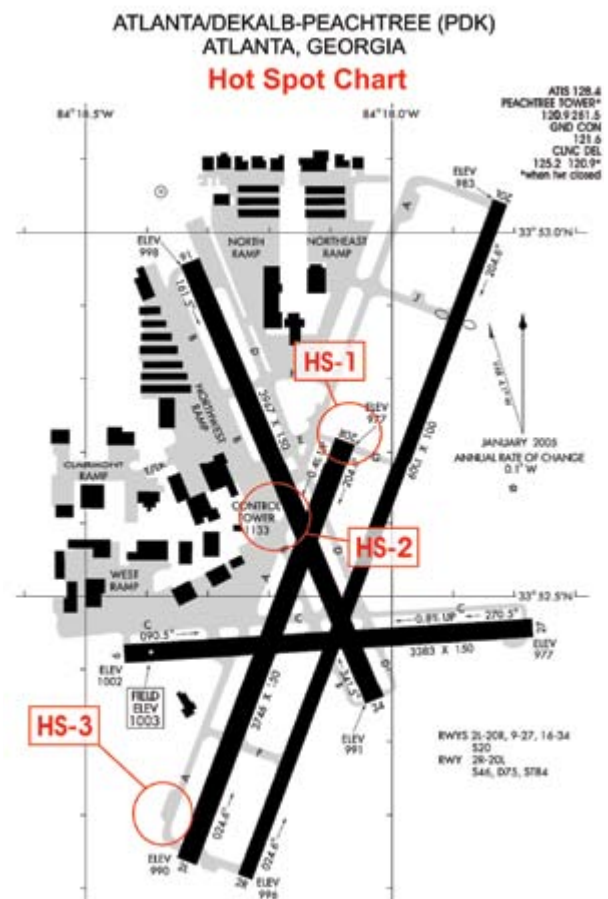
For informational purposes only. Not an official airport diagram.

*HOT SPOT: A location on an aerodrome movement area with a history or potential risk of collision or runway incursion and where heightened attention by pilots/drivers is necessary.

Planning Your Surface Operation

Taxi Procedures

facilities on the airfield. They are available through various sources, such as:

- **FAA Runway Safety Website** - www.faa.gov/go/runwaysafety

- **FAA National Aeronautical Navigation Services (AeroNav)**, formerly the National Aeronautical Charting Office (NACO) - www.faa.gov/air_traffic/flight_info/aeronav/

- **Airport/Facility Directory (A/FD)** - www.naco.faa.gov/index.asp?xml=aeronav/applications/d_afd

- **Instrument Approach Plates (IAP)** - www.naco.faa.gov/index.asp?xml=aeronav/applications/d_tpp

- **Direct User Access Terminal Service (DUATS)** - http://www.duats.com or https://www.duat.com/

- **AirNav** - www.airnav.com

Following good operating procedures while taxiing increases the safety of the surface operation. This section focuses on some of the common tasks that you should incorporate into your taxi procedures.

### *Air Traffic Control (ATC) Instructions*

Once taxi instructions are received, you should:

- Write down taxi instructions, especially instructions that are complex. This can help reduce your vulnerability of forgetting part of the instruction.

- Monitor ATC clearances/instructions issued to other aircraft.

- Be especially vigilant if another aircraft has a similar sounding call sign.

- Listen carefully to avoid taking a clearance/instruction intended for someone else.

- Ask immediately if you are uncertain about any ATC instruction or clearance.

- Read back all clearances/instructions with your aircraft call sign.

- Not enter a runway unless you have been instructed to cross that specific runway, cleared to take off from that runway, instructed to taxi along that runway, or instructed to line up and wait on that runway.

- Never cross a hold line, including inactive or closed runways, without explicit ATC instructions. Instructions to cross a runway will be issued one at a time. An aircraft or vehicle must have crossed the previous runway before another runway crossing is issued.

- Advise ATC if you anticipate a delay, or are unable to comply with their instructions.

- Look for light gun signals from the tower if you suspect radio problems or experience radio failure.

Check your understanding of ATC instructions

Your call sign is N123QZ, you are located on the west ramp and have informed the tower that you want to take off on the runway specified in each of four scenarios. below. Assume that you will use the full length of the runway. Select a circled number on the airport diagram to indicate where you are required to stop.
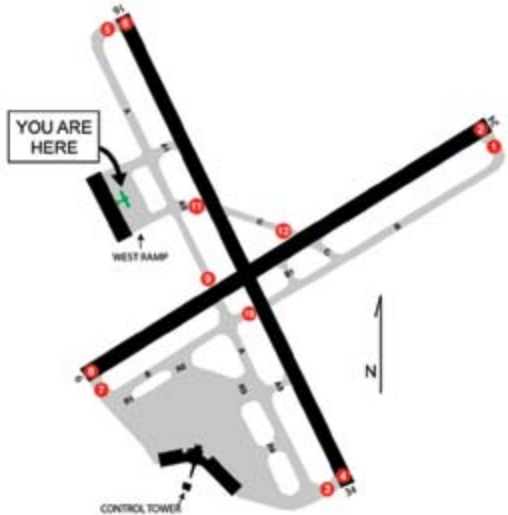
Scenario A: November 123QZ, Runway 16, taxi via Alpha.

Answer _____

Scenario B: November 123QZ, Runway 24, taxi via Alpha 2, Charlie and Bravo. Hold short Runway 34.

Answer _____

Scenario C: November 123QZ, Runway 34, taxi via Alpha.

Answer _____

Scenario D: November 123QZ, line up and wait Runway 6 via Alpha and Bravo, cross Runway 6.

Answer _____

READ BACK INSTRUCTIONS TO TAXI ONTO A RUNWAY, CROSS A RUNWAY, HOLD SHORT, OR LINE UP AND WAIT. ALWAYS INCLUDE YOUR AIRCRAFT'S CALL SIGN.

Do not acknowledge the ATC instructions or clearances by using your call sign and saying "Roger" or "Wilco" - Instead read back the entire instruction or clearance including the runway designator and aircraft call sign.

NOTE: Controllers are required to receive a readback of all hold short instructions issued. This readback should include the words "hold short," the runway or taxiway designator, and the aircraft's call sign.

Situational Awareness

When taxiing, be aware of your location on the airport, and how that location relates to your taxi route, and to other aircraft and vehicles that may be operating on the airport. This information is otherwise referred to as "situational awareness".

Maintain situational awareness by:

- Understanding and following ATC instructions and clearances.

- Using an airport diagram.

- Knowing the meaning of the visual aids available at the airport, such as airfield markings, signs and lights.

Answers – A-5   D-8   B-11   C-9 Hold short of Runway 6-24. Never cross a runway without a specific instruction to do so.

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Maintain a "sterile" cockpit. Focus on your pilot duties by avoiding distractions regarding non-flight related matters such as engaging in unnecessary conversation with other crewmembers and passengers, as well as refraining from using a mobile phone or text messaging.

- Monitoring the radio and using the airport diagram to assist you in locating other aircraft and vehicles that may be on the airfield.

- Avoiding distractions.

- Using aircraft lights to convey location and intent (see pages 16 and 17 for proper use of lights); and,

- Minimizing "heads down" activities while the aircraft is moving.

If you become uncertain about your location on the airport movement area, make sure you are clear of any runway and STOP THE AIRCRAFT. Advise ATC and, if necessary, request progressive taxi instructions.

While Taxiing
- Use extra caution when directed to taxi on a runway, especially at night and during reduced visibility conditions.

- Use all resources available to keep your aircraft on its assigned taxi route, including:
  - ► airport diagrams
  - ► airfield markings, signs and lights
  - ► heading indicators

- Never cross a hold line without explicit ATC instructions. Controllers are required to issue explicit instructions to cross or hold short of each runway, including inactive and closed runways that intersect a taxi route.

- Always scan the runway and its ends before entering, even if you have been cleared to proceed.

- Do not enter a runway unless you have been instructed to cross that specific runway, cleared to takeoff from that runway or instructed to line up and wait on that specific runway.

After Landing
- Use utmost caution after landing on a runway where the exit taxiways intersect another runway.

- Do not exit onto another runway without ATC authorization.

- Do not accept last minute turnoff instructions from the tower unless you clearly understand the instructions and are certain that you can safely comply.

- Do not initiate non-essential communications or actions after landing.

Line Up and Wait (LUAW)

ATC now uses the line up and wait instruction when a takeoff clearance cannot be issued immediately due to traffic or other reasons. The words "line up and wait" have replaced "position and hold" in directing a pilot to taxi onto a runway and await takeoff clearance. Under LUAW phraseology, the controller will state the aircraft call sign, departure runway and "line up and wait". Be aware that "traffic holding in position" will continue to be used to advise other aircraft that traffic has been authorized to line up and wait on an active runway.

Pay close attention when instructed to line up and wait, especially at night or during periods of low visibility. Before entering the runway, remember to scan the full length of the runway and its approach end for other aircraft.

Consider lining up slightly left or right of centerline when holding for takeoff so that your aircraft is visible and can be differentiated from runway lights.

When ATC instructs a pilot to move into the line up and wait position, they should advise you of any delay in receiving your takeoff clearance. Examples may include: landing and departing aircraft, wake turbulence or traffic on an intersecting runway.

- If landing traffic is a factor, ATC is required to:

  ► Inform you of the closest traffic that is requesting a full-stop, touch-and-go, stop-and-go, option or to make an unrestricted low approach on the same runway, and

  ► Advise landing traffic that traffic is holding in position on the same runway.

    NOTE: ATC will normally withhold landing clearance to arrival aircraft when another aircraft is lined up and waiting on the runway.

- If you have been advised of a reason for the delay or the reason is clearly visible, you should expect an imminent takeoff clearance once the reason is no longer an issue.

- If a takeoff clearance is not received within 90 seconds after getting the line up and wait instruction, contact ATC immediately.

- When ATC issues intersection "line up and wait" instructions and takeoff clearances, the intersection designator will be included.

- If two or more aircraft call the tower ready for departure, one or more at the approach and one or more at the intersection, the controller will state the location of the aircraft at the full length of the runway when authorizing that aircraft to line up and wait or when clearing that aircraft for takeoff.

Did You Know?

There have occurred collisions and incursions involving aircraft holding in position awaiting a takeoff clearance. The FAA's analyses indicate that two minutes or more elapsed between the time a line up and wait instruction was issued and the resulting incident. CURRENT GUIDANCE IS TO CONTACT ATC AFTER HOLDING IN POSITION FOR 90 SECONDS.

Non-Towered Airports

Most of the preceding procedures also apply to operations at non-towered airports. However, some additional measures should also be taken at these airports.

- When flying to and from a non-towered airport, always monitor and transmit on the Common Traffic Advisory Frequency (CTAF) or the Unicom frequency. These frequencies are listed on sectional charts and in airport directories.

Taxi Procedures

- Proper use of CTAF builds situational awareness and increases the margin of safety for all pilots.

- Always transmit before taxiing, taking off, entering the traffic pattern, and landing.

- Routinely monitor and use CTAF within 10 miles of your destination airport.

- Remember some aircraft may not have a radio so always continuously scan the runways and approaches for other traffic.

- CTAF frequencies may be shared by several airfields in the same geographic area. For this reason, the message protocol is modified to begin and end the transmission with the airport name.

Radio Communications Format

- Identify the airport you are calling

- State your aircraft make, model and call sign (you may also want to identify your aircraft color)

- State your position and your intentions

- Repeat the airport name at the end of your transmission

Additional Best Practices for Pilots and Flight Crews BEFORE Taxi

► Study airport diagram and have it out BEFORE taxiing to know where you are, where you are going, and to identify complex intersections. Review identified Hot Spots.

► Make sure you have identified and are clear as to the correct departure runway in use and the taxi route to get there.

► Review NOTAMs and copy down ATIS information including any taxiway closures, runway closures, or any relevant airfield specific risks.

Taxi Procedures

► Prior to taxi, brief passengers to minimize conversation and questions while operating on the surface.

► Copy the taxi clearance, set heading bug to assigned runway heading and use the airport diagram to review the taxi route prior to brake release.

Additional Best Practices for Pilots and Flight Crews DURING Taxi

► Focus attention with your heads up and eyes out, maintaining a "sterile cockpit" at all times while taxiing.

► Listen for transmissions to and from other aircraft or vehicles to enhance situational awareness.

► Always use standard ATC phraseology and proper voice cadence.

► Know airport signage and lighting.

► Coordinate with your flight crew on:
  - Taxi instruction for takeoff
  - Hold short clearances
  - Identifying runway intersections
  - ATC instructions for parking.

► Be extra careful at night or during low visibility conditions. Focus on safe operation of the aircraft as it is moving. Running checklists and non-essential communication should be deferred until aircraft is stopped and brakes are set.

► REMINDER! You may not enter a runway unless you have been instructed to cross that specific runway, cleared to takeoff from or taxi along that runway, or instructed to line up and wait on that specific runway. This applies to any runway, including inactive and closed runways.

► Visually check to ensure there is not any conflicting traffic prior to crossing a runway as well as intersecting taxiways.

Taxi Procedures

Aircraft Lights

► If not sure about an ATC instruction, or if there is confusion as to your aircraft's location, STOP and ASK. Make every effort to avoid stopping on the runway.

► Before adding power, make one last instrument scan to ensure that the heading indicator is aligned with the heading bug, and that both properly correspond to the assigned runway heading.

► Upon receiving takeoff clearance at a towered airport, or when beginning takeoff roll at an untowered airport, turn on landing lights to indicate movement to other aircraft, vehicles or pedestrians.

Aircraft Lights

Anytime during operations, day and night, exterior aircraft lights may be used to make an aircraft on the airport surface more visible, conveying location and intent to other pilots.

Use Exterior Aircraft Lights as Follows:

- **Engines Running** – Turn on the rotating beacon.

- **Taxiing** – Prior to commencing taxi, turn on navigation/position, strobe*, taxi, and logo lights, if available.

- **Crossing a Runway** – All exterior lights should be illuminated when crossing a runway. You should consider any adverse effects to safety that illuminating the forward facing lights will have on the vision of other pilots or ground personnel during runway crossings.

- **Line Up and Wait** – When taking position on the runway, pilots should make their aircraft more visible to aircraft on final behind them and to ATC by turning on lights (except landing lights) that highlight the aircraft's silhouette.

- **Entering the Departure Runway After Takeoff Clearance Received** – Turn on all exterior lights to make your aircraft more visible.

- **Takeoff - landing lights** should be turned on when takeoff clearance is received, or when commencing takeoff roll at an airport without an operating control tower.

Aircraft Lights

Turn off your taxi or landing lights when stopped, yielding or as a consideration to other pilots, drivers or ground personnel.

Standardized Aircraft Lighting						
💡 = Turn on	Rotating beacon	Navigation/Position lights	Strobe light*	Taxi lights	Logo lights	Landing lights
Engine(s) running	💡					
Taxiing	💡	💡	💡	💡	💡	
Crossing a runway	💡	💡	💡	💡	💡	💡
Entering departure runway for line up and wait	💡	💡	💡	💡	💡	
Takeoff	💡	💡	💡	💡	💡	💡

*   *Strobe lights should not be illuminated if it will have an adverse effect on others.*

Communications

Effective pilot/controller communications are key to safe surface operations. You can help enhance the controller's understanding by responding appropriately and using standard phraseology. Guidelines for clear and accurate communications include:

- Use proper communications procedures when contacting ATC. Your initial transmission should contain these elements:

  - ► Who you are calling
  - ► Your call sign
  - ► Where you are located on the airfield
  - ► Acknowledgement of ATIS information and its current alpha code
  - ► Your intentions, stated briefly

- State your location whenever making initial contact with any tower or ground controller, regardless of whether you have previously stated your location to a different controller.

- Use standard ATC phraseology at all times in order to facilitate clear and concise pilot/controller communications.

- Focus on what ATC is instructing. Do not perform any non-essential tasks while communicating with ATC.

Good Radio Technique

Your transmission should be well thought out. Before keying your transmitter, check to make sure you are on the proper frequency and know what you want to say.

Communication with ATC should be concise and to the point. For unusual situations or lengthy communications, initial contact should be established first.

Acknowledge all clearances with your aircraft call sign. Proper technique requires that you begin or end your transmission with your call sign.

- Read back all clearances/instructions to enter a specific runway, hold short of a runway, or "line up and wait."

- In your transmission, include the runway designator and taxiway intersection when appropriate.

- When lined up and waiting for takeoff and when on final approach, actively monitor the assigned tower frequency, or the Common Traffic Advisory Frequency (CTAF), for potential conflicts involving your runway.

- Read back all runway assignments.

- Read back all takeoff and landing clearances, including the runway designator.

- If unfamiliar with the taxi routes at an airport, ask for progressive taxi instructions.

- When you are instructed to monitor a frequency, you should listen without initiating contact. The controller will initiate contact.

- Clarify any misunderstanding or confusion concerning ATC instructions or clearances.

What's that aircraft doing on the runway?

Question: You are approaching an airport and have received a landing clearance. As you continue your approach, you notice an aircraft sitting on the runway you are cleared to land on. What should you do?

Answer: Never land on a runway that is occupied by another aircraft. In all probability, the controller is aware of the traffic and is planning to issue a takeoff clearance to that aircraft in a timely fashion. But mistakes do happen, and if you are uncomfortable with the spacing, do not hesitate to ask the controller about the traffic and be prepared to execute a go-around.

Do not make the "Assumption Mistake"

Hearing what we expect to hear is human tendency. Experience and skill cannot compensate for this natural perceptual limitation.

You can help avoid this mistake with active listening. The "assumption mistake" has numerous variations. Some examples of common mistakes include:

- If any portion of the transmission is garbled or stepped on, do not assume that the unheard portion is irrelevant. Request that the transmission be repeated by stating "say again".

- If your call sign is not included in the transmission, don't assume that the transmission is for you. Ask for clarification: "Was that for ...?"

- Listen carefully. Don't assume that a transmission is exactly what you expected.

Aircraft #1, maintenance taxi, was told to hold short of Runway 13 on Taxiway C. Aircraft #1 read back instructions. Ground control issued crossing instructions to Aircraft #2 holding at Taxiway N. Aircraft #1 took those crossing instructions as his and crossed the hold short marking for Runway 13 before the tower stopped him. Aircraft #3 on ¾ mile final to Runway 13 was sent around to avoid loss of separation.

Communications

Readback errors

A readback is a pilot's acknowledgement of an air traffic controller's transmission that repeats the information that the controller conveyed. A pilot readback presents the first and most efficient opportunity to catch miscommunications. It provides a "reality check" in two ways:

First, it tells the controller, "This is what the pilot heard," and secondly, it provides the controller the opportunity to reaffirm that is what he/she meant to say.

An effective readback can mitigate the effects of expectation, because it gives the controller an opportunity to correct the error. In the next example, a readback of what the pilot expected, rather than what was said, saved the pilot from an unauthorized landing, or worse. The controller, recognizing from the readback that the pilot had lined up on the wrong runway is able to amend the clearance to reflect the runway that the aircraft is approaching.

"The initial approach controller told us to expect an approach to Runway 18R. This 'expect' call, plus recent flights into [Airport X] with construction on Runway 18L had us all thinking Runway 18R. The final controller apparently cleared us for 18L. We had the ILS set up for Runway 18R, and the captain read back, 'Cleared for 18R.' I headed for Runway 18R. The tower then cleared us to land on 18R. On landing roll, the tower advised us to contact the approach controller about a little problem with our approach. We were all wearing headsets, but we heard what we expected instead of what was really coming over the headset." (ASRS Accession Number 162629) (taken from an Aviation Safety Reporting System submission)

Pilot readbacks of controller instructions provide a critical part of the safety net. With no readback, there is a hole in the safety net.

A first officer who did not believe in readbacks of clearances, as that tends to clutter the frequency, responded, "Roger" to a clearance to "line up and wait" that was intended for another aircraft. This runway incursion necessitated a go-around for an incoming aircraft. (taken from an Aviation Safety Reporting System submission)

Pilots should NEVER guess or readback what they thought they might have heard, and expect the controller to catch and correct any discrepancies. When in doubt, ASK.

Examples of Taxi Instructions

Initial Call-up with Specific Requests

Make clear any special requests on initial contact.

Example:

Pilot: Teterboro ground, Gulfstream November 322ZQ, ACME aviation, with information alpha, request taxi to runway one niner.

Controller: November 322ZQ, Teterboro ground, runway one niner, taxi via lima.

Line Up and Wait

Read back all line up and wait instructions, including the runway designator and intersection.

Example of Full Length Departure Instructions:

Controller: November 523QQ, runway two seven (full length), line up and wait, traffic landing runway three right.

Pilot: November 523QQ, runway two seven (full length), line up and wait.

Line up and wait on intersecting runways

Line up and wait can be authorized on intersecting runways. When this is done, traffic advisories shall be issued to both aircraft.

Example of Departure Instructions:

Controller: November 523QQ, runway three six at golf four, line up and wait, traffic departing runway two seven.

Controller: November 523QQ, runway two seven, cleared for takeoff, traffic holding in position runway three six.

Example of Departure and Arrival:

Controller: November 477ZA, runway six, line up and wait, traffic landing runway two seven.

Controller: November 477ZA, runway two seven, cleared to land, traffic holding in position runway six.

Example of Intersection Departure:

ATC must state the name of the intersection to a pilot before a line up and wait instruction. You should question ATC if this does not happen. Pilots should state that they are at an intersection when requesting a takeoff clearance. A controller must also state the name of the intersection when issuing a takeoff clearance.

Controller: November 477ZA, line up and wait, runway four, intersection bravo.

Pilot: Line up and wait, runway four, intersection bravo, november 477ZA.

Pilots should ensure that when they read back a clearance for an intersection line up and wait or intersection takeoff, they state the name of the intersection, even if the controller did not include it in the clearance

Examples of Landing Clearance:

ATC may withhold or rescind a landing clearance when an aircraft is in line up and wait on the runway.

Controller: November 477ZA, runway four, continue, traffic holding in position.

Controller: November 477ZA, landing clearance cancelled, traffic holding in position, continue.

Takeoff Clearance/Landing Clearance

Read back all landing and takeoff clearances with a call sign including the runway designator.

Example:

Controller: November 123QY, Boston tower, runway four right, cleared to land.

Pilot: November 123QY, cleared to land, runway four right.

Example:

Controller: November 123QY, Charlotte tower, runway five, cleared for takeoff.

Pilot: November 123QY, cleared for takeoff, runway five.

Land and Hold Short

Land and hold short instructions require a pilot readback.

Example:

Controller: November 123QY, DFW tower, runway one eight right, cleared to land, hold short of taxiway bravo for crossing traffic.

Pilot: November 123QY, cleared to land runway one eight right, hold short of taxiway bravo.

Braking Action Reports

When a braking action report is requested, the condition should be described in the following terms only:

Good   Fair   Poor   Nil

Braking actions that affect only a portion of a runway or taxiway should be reported as such.

Example:

Controller: Cajun fifty-two say braking action.

Pilot: Cajun fifty-two, braking action on runway two two is good first half of the runway, fair on the second half.

Controller: Cajun fifty-two, roger.

Runway Exiting

After landing and reaching taxi speed, you are expected to exit the runway at the first available taxiway, or as instructed by ATC. You should remain on tower frequency until advised to contact ground control.

Example:

Controller: Unity thirty-two, turn right on taxiway golf two and contact ground point niner.

Pilot: Unity thirty-two, right on golf two, ground point niner.

Initial Contact After Landing

Example:

Pilot: Constable ground, November 123QY, exiting runway two at bravo, taxi to the ramp.

Controller: November 123QY, Constable ground, taxi to the ramp via bravo.

Hold Short Instructions

A controller is required to obtain a readback for all runway hold short instructions issued. To minimize the need for additional radio transmissions, it is important that a pilot or vehicle operator always readback the hold short instruction, including the runway identifier, along with call sign or vehicle identification.

Taxi and Hold Short Instructions:

Controller: November 477ZA, runway four, taxi via echo, hold short of runway two five at taxiway delta.

Pilot: November 477ZA, runway four via echo, hold short of runway two five at taxiway delta.

Non-Towered Airports

Arrival Example:

Frederick traffic, November 123QY, (location/ position), (altitude), (descending or) entering downwind/base/final (as appropriate) runway one two full stop, Frederick.

Frederick traffic, November 123QY, clear of runway one two, Frederick.

Departure Example:

Frederick traffic, November 123QY, [location on airport], taxiing to runway two three via taxiway bravo, Frederick.

Frederick traffic, November 123QY, departing runway two three. Departing the pattern to the [direction], climbing to [altitude], Frederick.
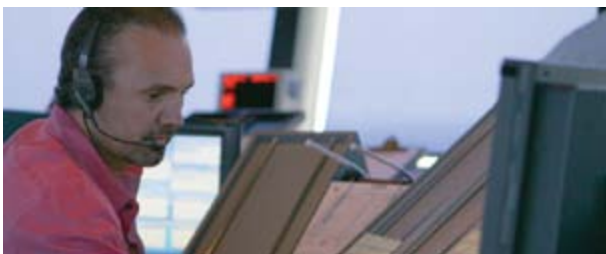
Glossary of Phraseology

This section contains a glossary of terms commonly used in ground or surface operations. For a complete listing of all ATC phraseology, consult the FAA Aeronautical Information Manual (AIM), which can be accessed at: http://www.faa.gov/air_traffic/publications/atpubs/aim/

- **Acknowledge** – Let me know that you have received and understood this message.

- **Advise Intentions** – Tell me what you plan to do.

- **Affirmative** – Yes.

- **Confirm** – My understanding of your transmission is _____: Is that correct?

- **Correction** – An error has been made in the transmission and the correct version follows.

- **Expedite** - Used by ATC when prompt compliance is required to avoid the development of an imminent situation.

- **Final** – Commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area.

- **Go Ahead** – Proceed with your message. Not to be used for any other purpose.

- **Hold or Hold Position or Hold For** – Stay in place where you are currently located.

- **Hold Short of...** – Proceed to, but hold short of a specific point and maintain appropriate distance to avoid interfering with other traffic.

With respect to runways, always stop at the runway holding position marking unless otherwise directed by ATC. A read back confirmation to ATC is required anytime a "hold short" instruction is given.

- **Line Up and Wait (LUAW)** – This phrase has replaced the "position and hold" instruction by a controller to direct a pilot to enter the runway and await takeoff clearance. **It is not authorization for takeoff.** It is used when a takeoff clearance cannot immediately be issued because of traffic or other reasons.

- **Negative** – No; Permission not granted; 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 your last transmission; but not to be used to answer a question requiring a "yes" or "no" response (see Affirmative, Negative).

- **Say Again** – Repeat what you just said.

- **Stand By** – Wait for further information, as in "stand by for clearance". Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. The caller should reestablish contact if a delay is lengthy. "Stand by" is not an approval or denial.

- **Unable** – Indicates inability to comply with a specific instruction, request or clearance.

- **Verify** – Request confirmation of information.

- **Without Delay** – Follow instructions expeditiously, specifically and safely.

- **Wilco** – I have received your message, understand it and will comply.

SIGNS AND MARKINGS

As a pilot, it is important that you know the meanings of the signs and markings used on airports as navigational aids. Sometimes the information on the sign is also painted on the airport pavement. An overview of some of the most common signs and markings is described on the following pages. For more detailed information, see the FAA Aeronautical Information Manual (AIM).
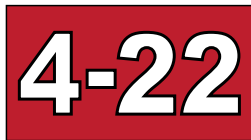
Runway Holding Position Marking

Painted yellow on the taxiway pavement and collocated with the holding position sign, this is an airport version of a stop sign. As you approach the runway, you will see two solid yellow lines with two dashed lines. Prior to reaching the solid lines, it is imperative that you **STOP** and do not cross the line until you have clearance from ATC. When the tower is closed or you are operating at a non-towered airport, you may cross only when the runway is clear of aircraft, and then cross with extreme caution. Always look both ways before you cross any runway!

> When exiting a runway, you will see these same markings, except your aircraft will be approaching the dashed lines. Your aircraft must completely cross both the dashed and the solid lines to be clear of the runway.

Runway Holding Position Sign

May be seen as a sign and/or painted on the pavement, it has white characters on a red background. This sign/marking is collocated with the surface painted holding position markings on taxiway and runway intersections.

Do not taxi past this sign or marking without a clearance from ATC. Doing so without clearance from the tower poses a hazard to yourself and others. When the tower is closed or you are operating at a non-towered airport, you may cross only when the runway is clear of aircraft, and then you should proceed with extreme caution.

Location Signs and Markings Black background with yellow letters and/or numbers. These signs and surface-painted markings indicate your location. *REMEMBER: BLACK SQUARE, YOU'RE THERE. (See Figure 2.1)*
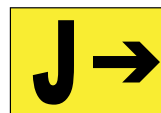
Runway **Taxiway**

Taxiway Direction Signs and Markings These signs and markings with a yellow background and black characters indicate the direction toward a different taxiway leading off a runway or out of an intersection. *YELLOW ARRAY, LEADS THE WAY. (See Figures 2.1 and 2.2)*

ILS Critical Area Holding Position Signs and Markings May be seen as a sign (as shown here), and/or as a painted surface marking. These are utilized to show the boundary of the runway's ILS critical area. Hold short of this area when instructed to by ATC.
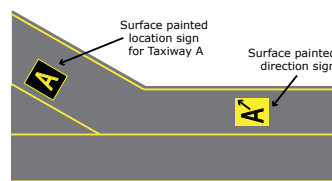
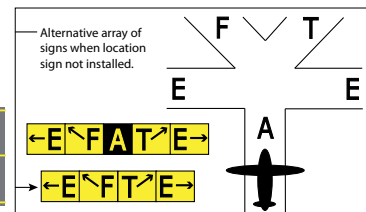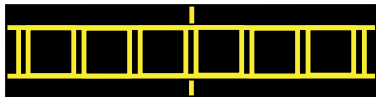**Figure 2.1** – Surface painted location and direction markings.

Figure 2.2 – Examples of taxiway sign arrays with and without current location on Taxiway Alpha.

Airfield Markings, Signs, and Lights

Holding position markings for ILS critical areas appear on the pavement as a yellow horizontal ladder and extend across the width of the taxiway. An ILS holding position sign with white characters on a red background is typically situated adjacent to these ILS holding position markings. Hold short of this area when instructed to by ATC.

ILS Boundary Sign This sign identifies the boundary of the ILS Critical Area for pilots and vehicle operators exiting the runway. Pilots and vehicle operators must proceed beyond this sign to clear the ILS Critical Area when instructed to do so by ATC.
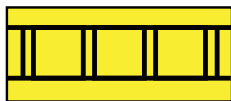
Non-Movement Area Boundary Markings A single solid line along with single dashed yellow lines, this marking divides the movement and non-movement areas on the airfield. When you are positioned on the solid line side of the marking, or the non-movement area, ATC clearance is required for you to taxi across the solid line into the movement area.

Runway Safety Area Boundary Sign Yellow sign with black markings. Visible only when exiting the runway. The sign is typically used on towered airports where a controller commonly requests a pilot to report clear of a runway, which occurs when this sign is passed.

Airfield Markings, Signs, and Lights

Geographic Position Markings Pink with black and white. Some large airports use these markings in low visibility conditions as position points on the taxiway.
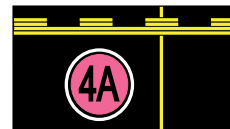
Helicopter Landing Area Marking Some airports have a designated helicopter landing pad. This area is depicted with an "H" inside of a square. Be especially careful when you taxi near helipads.

Destination Signs Yellow background with black letters. The taxiways at your airport may have these signs next to them to identify the direction to a specific destination, e.g. parking area.

Enhanced Taxiway Centerlines A dashed line painted on each side of the existing taxiway centerline extending up to 150' from the holding position marking. This is to further alert aircraft and vehicles that they are approaching a runway safety area.

Relocated Threshold A point on the runway other than the beginning of the full strength pavement, which is not available for the landing or takeoff of aircraft. Thus, a relocated threshold marks the end of the runway. The abandoned runway area may or may not be available for taxiing. Possible causes for threshold relocation include construction or other airport maintenance.

Chevrons Large yellow painted arrows that identify paved blast pads, stop areas, and EMAS (engineered materials arresting systems). A minimum of two chevrons will be painted and aligned with the

runway end. The pavement marked by chevrons is not to be used, unless in conjunction with an EMAS when it may be used to help stop an aircraft overrun.

Aprons/Ramps

Aprons/Ramps have markings for aircraft parking and tie-downs. Some airport aprons/ramps also have special markings for vehicle operations. In addition, taxiways may be marked on the apron to show aircraft routes to gates and parking areas.
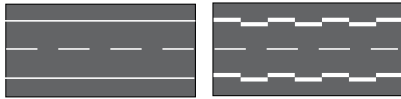
Examples of vehicle surface markings; roadways bounded by "zipper" markings are also used by aircraft.

If a road or taxiway is close enough to an ILS to affect it, there should be an ILS holding position sign like the one depicted on page 33.

LIGHTING

There are many different lighting combinations that may be located on some airports, especially where aircraft operations are conducted in lower visibility ranges.

Runway Edge and Centerline Lights Runway edge lights are clear/white, except on instrument runways where yellow replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings. Centerline lights alternate red/white starting 3,000 feet from the end, and are solid red starting 1,000 feet from the end.
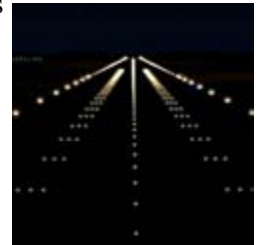
Taxiway Edge Lights or Reflectors are blue in color and used to outline the edges of taxiways during periods of darkness or restricted visibility conditions.

Taxiway Centerline Lights or Reflectors are green except for the lead-on and lead-off lights, which alternate yellow and green to indicate that you are entering or leaving the runway environment.

Runway Guard Lights are flashing yellow lights that can be in-pavement or elevated and are used to help identify a runway holding position.

In-Pavement Runway Guard Light

Elevated Runway Guard Light

Runway Status Lights

(RWSL) provide a visual warning to vehicle drivers and pilots that the runway is not safe to enter. RWSL consist of the following warning signals: runway entrance lights (REL) and runway intersection lights (RIL) for vehicles and aircraft crossing or entering a runway from intersecting taxiways or runways, and takeoff hold lights (THL) for aircraft awaiting takeoff. The system will be operational at 23 of the nation's major airports by the end of 2015.

Runway Entrance Lights
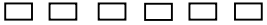
Takeoff Hold Lights

LIGHT GUN SIGNALS

Air traffic controllers have a backup system for communicating if radios fail. Controllers use a light gun that flashes different colors to tell pilots or vehicle drivers what to do. Even a failed radio is not an excuse for proceeding without a proper clearance. If you are on a runway or taxiway and radio communication fails, you should:

→ Turn toward the tower.

→ Flash your landing lights several times.

→ Wait for the controller to signal you with the light gun.

→ Be patient for a response. If the controller's attention is diverted, it may take a few minutes for a response.

→ If your radios are working, try a frequency other than ground.

→ Call the tower on your cell phone if you have the number available.

Light Gun Signals	
Steady Green	**Steady Red**
Cleared to go; OK to cross runway or taxiway.	STOP!
Flashing Green	**Flashing Red**
Cleared to taxi. **DOES NOT APPLY TO VEHICLES!**	Clear the taxiway or runway IMMEDIATELY!
Alternating Red/Green	**Flashing White**
Exercise extreme caution. This warning signal can be followed by another light signal as circumstances permit.	Return to starting point on airport.

International Civil Aviation Organization (ICAO) Phonetics

A – Alpha	S – Sierra
B – Bravo	T – Tango
C – Charlie	U – Uniform
D – Delta	V – Victor
E – Echo	W – Whiskey
F – Foxtrot	X – X-ray
G – Golf	Y – Yankee
H – Hotel	Z – Zulu
I – India	0 – Zee-ro
J – Juliett	1 – One
K – Kilo	2 – Two
L – Lima	3 – Three
M – Mike	4 – Four
N – November	5 – Five
O – Oscar	6 – Six
P – Papa	7 – Seven
Q – Quebec	8 – Eight
R – Romeo	9 – Niner

For more information on Runway Safety, visit

www.faa.gov/go/runwaysafety

Self Assessment

1. Which of the practices below should be adopted when planning your airport surface movement?

    A. Anticipate your taxi route based on ATIS, NOTAMs, and recent experience.

    B. Focus pre-taxi plans on the departure airport and pre-landing plans on the arrival airport.

    C. Have the appropriate, current airport diagram readily available for pre-flight review and during taxi operations.

    D. All of the above.

2. You are departing an unfamiliar airport. When the Ground Controller issued your taxi clearance, it seemed very complicated; and you did not write it down. What should you do?

    A. Begin taxi – the ground controller will be watching and will correct any wrong turns.

    B. Do not taxi until you explicitly understand your taxi instructions.

    C. Express your uncertainty, ask for clarification, or request "Progressive" taxi instructions.

    D. Answers B and C.

3. Due to traffic or other reasons, the tower controller cannot issue an immediate take off clearance, but he wants you on the runway ready to start your takeoff roll. What would the instruction be?

    A. "Taxi onto the runway and be ready."

    B. "Line up and wait."

    C. "Taxi into position and hold."

    D. None of the above.

4. If you become disoriented or uncertain about your location on the airport, what should you do?

    A. Make sure you are clear of any runways and stop the aircraft.

    B. Call the ground control for taxi assistance.

    C. Keep going surely you'll see something familiar.

    D. A and B.

5. As you taxi out for take off, you encounter the depicted taxi line below. What does it mean, and what should you do?
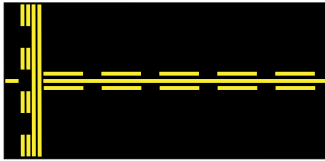
    A. You are approaching a runway holding position and should go into a "heads-up" mode to determine the exact location of the holding position.

    B. The airport had extra yellow paint and decided to use it on the taxiways.

    C. You are approaching the airport movement area.

    D. None of the above.

6. The yellow painted marking at the beginning of this runway indicates:

    A. The pavement can be used for takeoff only.

    B. The pavement can be used for landing only.

    C. The runway threshold has been relocated.

    D. Only applies to vehicles.

7. Effective pilot/controller communications are key to safe surface operations. On initial contact with Ground Control, pilots should state which of the following:

    A. Who you are calling and your call sign.

    B. Where you are located on the airfield

    C. Alphabetical code for the ATIS, if available and requested actions.

    D. All of the above.

8. When communicating with ATC, which of the following is correct?

A. Read back all clearances/instructions to enter a specific runway, hold short of a runway or "line up and wait" including runway designator.

B. Read back all takeoff and landing clearances, including the runway designator.

C. If unfamiliar with the taxi route at an airport, ask for progressive taxi instructions.

D. All of the above.

9. You are approaching an airport and have received a clearance to land. You notice an aircraft on the runway in position for takeoff. What should you do?

A. Continue the approach and land; the other aircraft is holding for you.

B. Ask the controller about the aircraft on the runway if you don't hear them being issued a takeoff clearance.

C. Execute a go around.

D. Both B and C.

10. The red and white sign next to the taxiway is called a runway holding position sign. This sign indicates:

A. Runway 15/33 is ahead. This sign is collocated with surface painted holding position markings and indicates that you must have clearance from ATC to proceed.

B. That you should follow the sign to get to the parking apron.

C. Nothing for a pilot, it is there for airport vehicle drivers.

D. None of the above.

**11. What does "Explicit Runway Crossing Clearance" mean?**

A. A "taxi to" clearance will allow you to cross multiple runways.

B. Typically, instructions to cross a runway will be issued individually for each runway encountered.

C. It replaced "Position and Hold."

D. It is a trick question, no such instruction exists.

**12. On a runway you see this sign. What does it mean?**

- A. You are approaching runway 22.

- B. You are on runway 22.

- C. It is informational only.

- D. There are 2,200 feet remaining to the end of the runway.

13. When exiting a runway, you see this sign. What should you do?
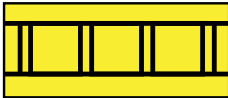
- A. Stop on the taxiway before you reach abeam the sign.

- B. This sign identifies the ILS Critical Area, which you must taxi beyond when exiting the runway.

- C. Identifies a fence ahead for deer.

- D. This is a runway hold sign for another runway in close proximity.

14. What is the procedure when you approach these painted markings from the solid line side?
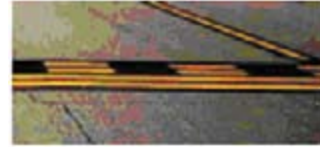
- A. Proceed with caution.

- B. No permission needed prior to crossing

- C. You must always have permission from air traffic control prior to crossing.

- D. Look both ways before moving across the line.

15. The signs below are located beside a taxiway. What does it mean?

- A. You must have clearance from air traffic control to taxi past these signs.

- B. Taxiway Bravo is west of your position on the airport.

- C. They are directional signs informing you that Taxiway Bravo is to the left, and runways 22 and 33 are to the right at the intersection ahead.

- D. None of the above.

Self Assessment Answers

1.	D	9.	D
2.	D	10.	A
3.	B	11.	B
4.	D	12.	B
5.	A	13.	B
6.	C	14.	C
7.	D	15	C
8.	D		