Objectives	▪ The student will understand the elements related to runway incursion avoidance
Elements	▪ Challenges unique to taxiing ▪ Cockpit activities ▪ Steering, maneuvering, maintaining taxiway, runway position, & situational awareness ▪ Hold lines ▪ Landing and Roll-Out ▪ Airports with a control tower ▪ LAHSO ▪ Airports without a control tower ▪ Exterior Lights, Night operations, and Low Visibility Operations
Schedule	▪ Review lesson objectives ▪ Review lesson material ▪ Conclusion & Review
Equipment	▪ White Board / Markers ▪ Taxiway Diagram ▪ References
CFI Actions	▪ Present lesson ▪ Use teaching aids ▪ Ask/ answer questions
Student Actions	▪ Participate in discussion ▪ Take notes ▪ Ask / answer questions
Completion Standards	▪ Student can safely plan and navigate the airport and avoid runway incursions

Additional Notes: _____
_____
_____
_____

CE = Common Error

Introduction

Overview

Review objectives / Elements

What

A runway incursion is 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. Preventing these can be done using the methods described in this lesson.

Why

Runway incursions are very dangerous and they have accounted for significant loss of life and aircrafts. For the safety of us and everyone else, it's important to practice proper runway incursion avoidance

How

Challenges Unique to Taxiing

- Especially at times of increased air traffic, surface accidents are surprisingly easy to come by.
- Larger airports can have confusing and complex surface layouts that may cause problems for pilots

Appropriate Cockpit Activities

- **For safety reasons the pilot's workload should be at a minimum during taxi operations**
  - This can be accomplished through SOPs that direct attention only to essential tasks while taxiing
  - Complete pre-taxi checklists and data entry prior to taxi
  - All heads down activities should be done only when the aircraft is stopped
- **A sterile cockpit should be implemented from taxi through climb to focus on taxiing / ATC instruction**
  - No cell phones, conversations, or anything else unnecessary to the duties of flight

Planning, Review and Briefing

- **Route planning –**
  - Have a current airport diagram
  - Review pre-designated routes (if they exist)
  - Based on runways that are in use, review expected routes
- **Review –**
  - Always write down ATC instructions
    - Once you readback your route, you are expected to follow it so it cannot be forgotten
  - Review the route that was given by ATC:
    - Draw the route out on ForeFlight or similar
    - Ask ATC if confused
    - Review where the hold lines are (ILS hold lines if applicable)
    - Look for hot spots if applicable
- **Briefing –**
  - Taxi route and operations should be briefed prior to movement, these items may include:
    - Ground Procedures
      - Timing and execution of checklists/communications
      - Expected route
      - Critical locations (hold lines, hot spots, etc.)
      - Any other items that would seem important to brief
    - Expectations of Others
      - Sterile cockpit
      - Use of airport diagrams
      - Cell phones

Taxiing Near Other Aircraft

- **Pilots should use a "continuous loop" process to monitor and update their progress and location**
  - This means: know your present location and mentally calculate the next location on the route that will require increased attention
    - Crossing traffic, hot spots, etc.
- **Awareness is enhanced by understanding the clearance issued to pilots, and other aircraft**
  - Listen to other aircraft on the radio and the instruction they are given, develop a picture of other aircraft in relation to you, maintain situational awareness!
- **Be especially vigilant if another aircraft with a similar call sign is on frequency**
  - Care should be taken to avoid inadvertently executing a clearance for another aircraft
  - Ask if you're unsure of who the radio call was for
- **Be aware that wind correction may need to be input for jetbast.**

Steering, Maintaining Taxiway, Runway Position & Situational Awareness

Steering

- **Use the rudder pedals to turn the nose wheel and maintain centerline**
  - In the Seminole, place the centerline on the right side of the nose rivet line
  - In the Cessna, place the centerline such that it passes through your right leg
- **In the Cessna, the nose wheel can only move 15° therefore, differential braking should be avoided**
- **The piper Seminole has 30° nose wheel deflection and two engines therefore making differential thrust the preferred method of tight turns.**

Maintaining Position

- **Always use updated taxiway diagrams. Apps like foreflight can plot your location on this chart**
- **If uncertain of your location, stop (unless you are on a runway and ask ATC)**
  - Progressive taxi is always an option

Situational Awareness

- **Use all available resources, Foreflight, Markings, signs and lights to help you.**
- **Before taxi, properly brief the route to avoid needing to constantly look down.**
- **During taxi, stay ahead of the airplane, know what turns need to be made where**
  - Look out for other aircraft

Hold Lines

- **The hold lines mark the protected area of the runway**
  - This could mean that you cannot cross a taxiway that goes under the approach end of the runway
- **A clearance is required to pass the solid side but not the dashed side**
  - No clearance = runway incursion
- **Upon arriving at the hold short lines:**
  - On the solid side, await clearance to cross, never assume just ask if you are confused.
  - On the dashed side, completely clear the line and stop (unless instructed otherwise)
- **ILS critical hold line – Prevents reflection error associated with the ILS system**
  - ATC may instruct you to hold short of the ILS critical area when the field is IFR

Parallel/intersecting Runways

- **When the airport has parallel runways, there will be hold lines for EACH runway.**
  - Ensure that you abide by all hold lines in this case

Landing & Roll-Out

- **When landing and rolling out onto a taxiway that will cross/approach another runway, ensure to brief the situation**
  - Know where you are required to stop
  - Taxi slow to ensure you don't blow past the hold lines for the next runway
- **If stopped between parallel runways, you must await a clearance to cross**
  - Never cross a solid hold line w/o a clearance
- **After landing, ensure the entire aircraft has crossed the hold short line**
  - If you cannot clear the runway due to constraints, notify ATC immediately
- **Sterile cockpit as it's a critical phase of flight**

Airports with a Control Tower

- **Perform your plan, brief, and review**
- **Communication with ATC**
  - Use standards phraseology
  - Use the Who, Where, What when making initial contact (they may want ATIS information as well)
  - Focus on the communications:
    - Avoid distractions while talking with ATC
    - Write everything down even if you think you can remember it (you can't)
  - Read back all clearances with callsign

LAHSO (Land and Hold Short Operations)

- **When landing on intersecting runways, ATC may issue a LAHSO clearance**
  - This does not need to be accepted however, once you do accept it you need to land in the declared distance
  - Exceeding this distance will result in runways incursion with the intersecting runway
  - Don't accept a LAHSO if you are unfamiliar with the airport or don't feel comfortable landing well within the declared distance

Airports without a Control Tower

Planning

- **Be familiar with the local traffic pattern direction and pattern altitude**
  - During calm wind conditions, be aware that flight operations may occur at more than one runway at the airport
- **Be aware instrument approaches may be flown to runways other than the runway in use for VFR operations**
- **Be alert, communicate your intentions on the common traffic advisory frequency (CTAF), and listen for other aircraft operating on, to, and from the airport**

Maintain situational awareness

- **Be aware of the route and know where you and other aircraft are at all times**

Departing

- **Not all aircraft are radio-equipped; therefore, before entering or crossing a runway, scan the full length of the runway, including the final approach and departure paths**

Communication

- **Monitor/communicate on the CTAF from engine start, taxi, and until 10 miles from the airport**

Exterior Lights, Night operations, and Low Visibility Operations

Exterior Lights

- **Engine Start: 91.209(b) anti-collision lights must be illuminated at all times during aircraft operation.**
  - This can be a rotating beacon or white strobes or both (whichever is installed).
- **Taxiing: Turn on the Taxi light**
- **Crossing a runway: Turn on every single light as you want to make yourself as visible as possible**
- **Entering a runway for takeoff: all lights should be illuminated with exception of position lights during day.**
- **At night: Position light are required at sunrise to sunset per 91.209(a)(1)**
- **At night Holding short: turn off landing light and strobes as it may affect vision of pilots on final approach**

Night Operations and Low Visibility Operations

- **Lights should be used as discussed above**
- **When lined up on a runway, line up a few feet offset from centerline, this makes it easier to see aircraft at night**
- **Due to the decreased visibility, the pilot must use ALL available resources to maintain situational awareness**
  - Taxi slower to allow more time to react
  - Know what all signs, markings and lights indicate

Conclusion & Review

Conclusion

Briefly review the main points

Review

1. Distinct challenges and requirements during taxi operations not found in other phases of flight operations.
2. Procedures for appropriate cockpit activities during taxiing including taxi route planning, briefing the location of hot spots, (can be found in AFD) communicating and coordinating with ATC.
3. Procedures for steering, maneuvering, maintaining taxiway, runway position, and situational awareness.
4. The relevance/importance of hold lines.
5. Procedures for ensuring the pilot maintains strict focus on the movement of the aircraft and ATC communications, including the elimination of all distractions (i.e. cell phone, texting, conversations with passengers) during aircraft taxi, takeoff and climb out to cruise altitude.
6. Procedures for holding the pilot's workload to a minimum during taxi operations.
7. Taxi operation planning procedures, such as recording taxi instructions, reading back taxi clearances, and reviewing taxi routes on the airport diagram.
8. Procedures for ensuring that clearance or instructions that are actually received are adhered to rather than the ones expected to be received.
9. Procedures for maintaining/enhancing situational awareness when conducting taxi operations in relation to other aircraft operations in the vicinity as well as to other vehicles moving on the airport.
10. Procedures for briefing if a landing roll-out to a taxiway exit will place the pilot in close proximity to another runway which can result in a runway incursion.
11. Appropriate after landing/taxi procedures in the event the aircraft is on a taxiway that is between parallel runways.
12. Specific procedures for operations at an airport with an operating air traffic control tower, with emphasis on ATC communications and runway entry/crossing authorizations.
13. ATC communications and pilot actions before takeoff, before landing, and after landing at towered and non-towered airports.
14. Procedures unique to night operations.
15. Operations at non-towered airports.
16. Use of aircraft exterior lighting.
17. Low visibility operations.