

Area of Operation II - Task B

Runway Incursion Avoidance



Key References:

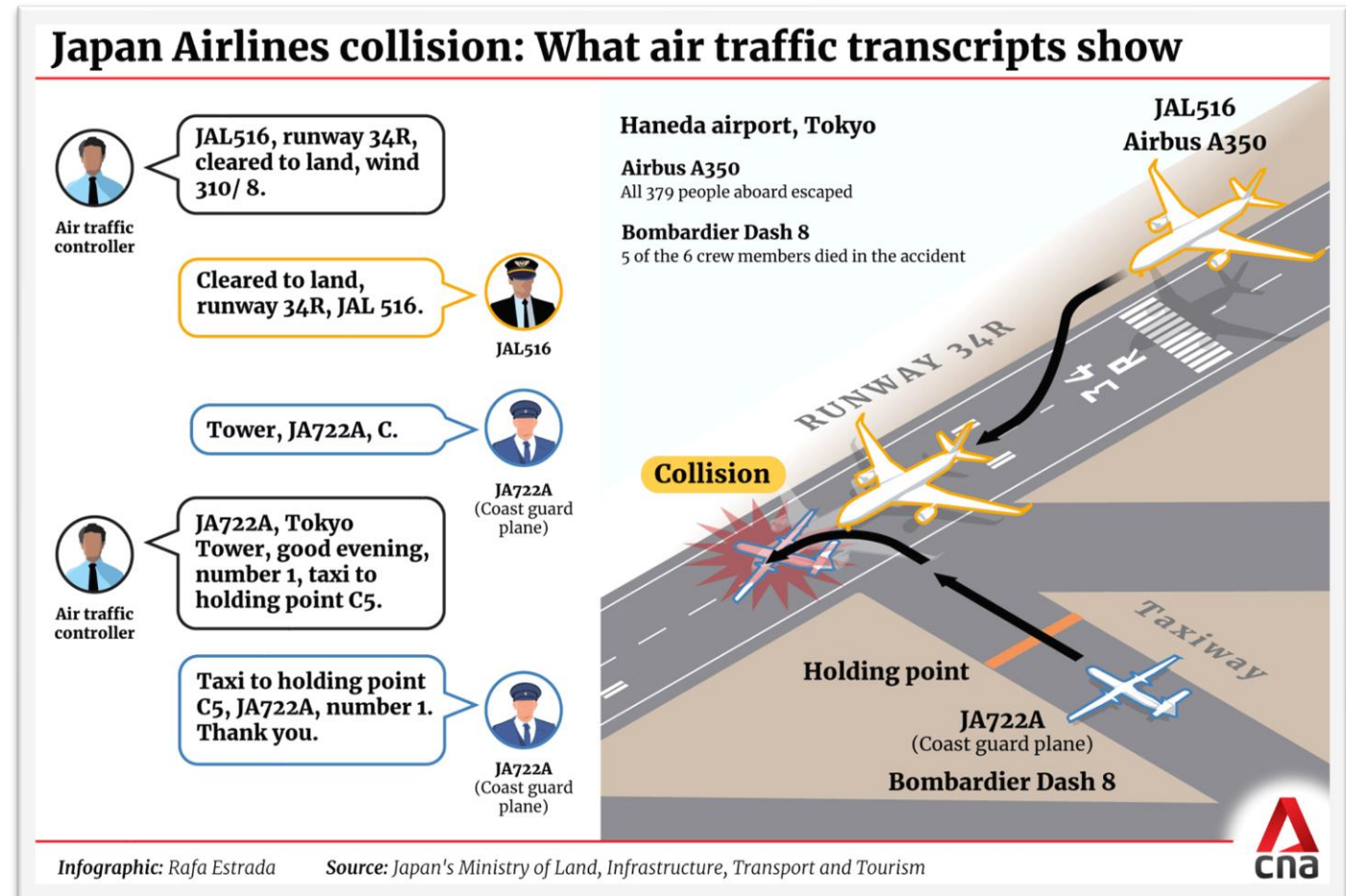
- Single Pilot, Flight School Procedures during Taxi (AC 91-73)
- Airplane Flying Handbook
- Pilot's Handbook of Aeronautical Knowledge, AIM

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1. Introduction

- **Runway Incursion Definition:** 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 takeoff of aircraft
- Runway incursion has led to serious accidents, and have been on the rise
 - ✓ Jan 2nd 2024: 380 survivors, 5 deaths



2. Taxiing Challenges

- **Situational Awareness**

- Unfamiliar airports and procedures, complex runway and taxiway layouts
- Busy and complex ATC communications
- Sight challenges (angle of view, marketing and signs, etc)

- **Distractions**

- Checklists, Radio calls, Setting up EFB

- **Maneuvering the Aircraft**

- Steering ability is limited, no ability to move in reverse
- Wings and tail not in view
- No rear mirrors, horn or traffic lights

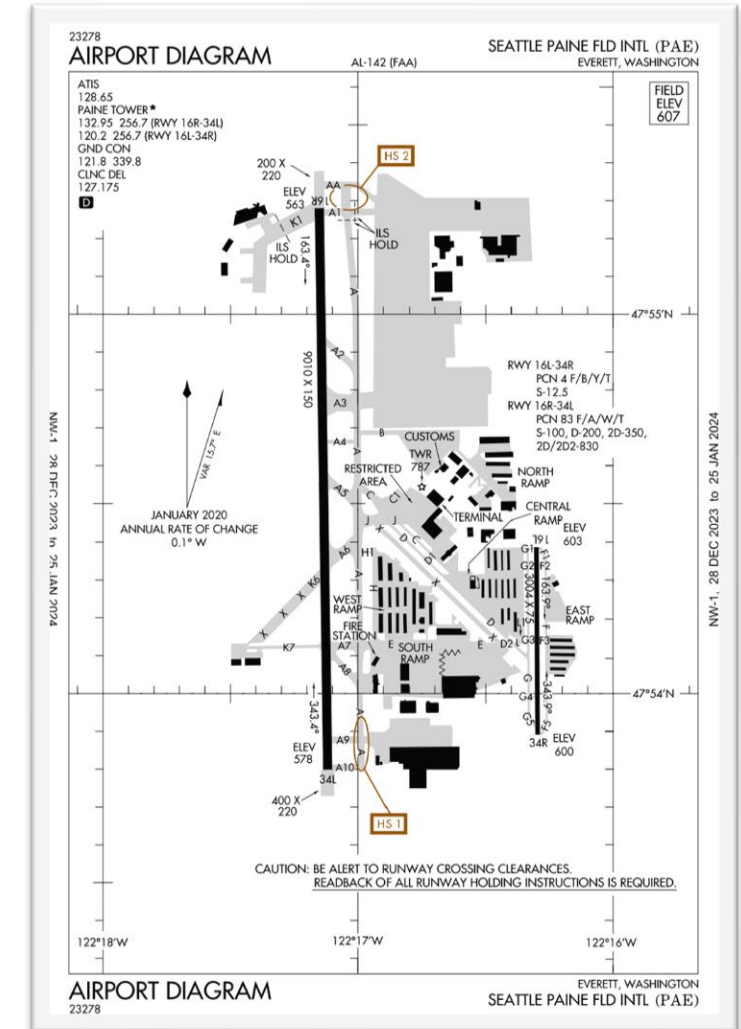
✓ *With increasing air traffic, runway incursions are on the rise*

✓ *Surface movement can cause catastrophic accidents*



3. Appropriate Cockpit Activities

- **Prior to Moving**
 - **Plan** – Have a **current copy of the airport diagram**, review expected taxi routes
 - **Brief** – Ground procedures, safety information, and expectations of others
 - **Review** – Write down ATC instructions and ask for clarification if necessary
- **Workload should be kept at minimum during taxi**
 - Heads-down activities only performed when the aircraft is stopped
 - Keep eyes outside, hand on the throttle
 - **Sterile cockpit** from taxi through climb
- **Continuous Loop Process**
 - **Always be aware of where you are and what is coming next** (turns, hot spots, other traffic, runways, etc.)
 - Ensure understanding of where you are going
 - Contact ATC any time there is concern about a potential conflict
 - If radio is unusually quiet, suspect radio problems/stuck microphone



4. Taxiing Procedures

- **Clearance**

- A taxi clearance is required prior to entering or moving in the movement area
- Clearance must also be obtained prior to crossing any runway



- **Taxi instructions will include:**

- The runway (or point) to taxi to, and taxi route instructions
- Hold short instructions or runway crossing clearances
- Write down complex instructions → Request progressive taxi if needed

- **Always read back:**

- Runway assignment
- Any clearance to enter a specific runway
- Any instruction to hold short of a specific runway (or taxiway)

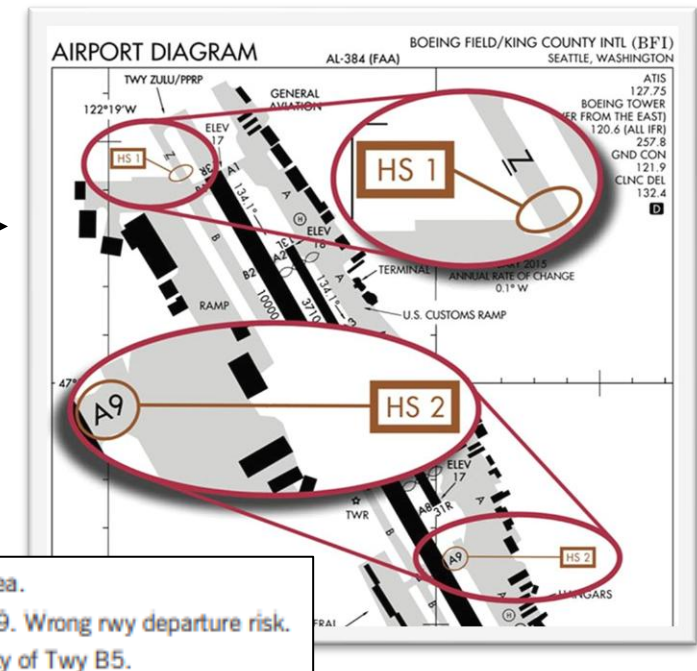
- **Uncontrolled Fields**

- Announce your intentions on CTAF
- Monitor CTAF to be aware of other aircraft and deconflict with them
- *NOTE: radio communication is not required at uncontrolled fields*



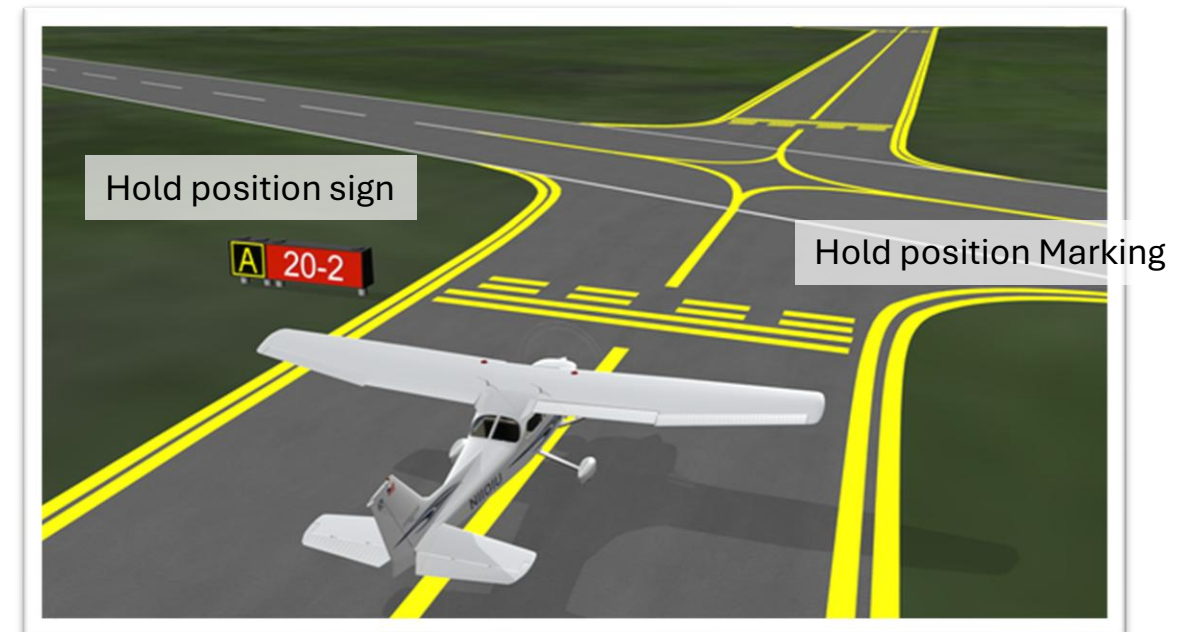
4. Taxiing Procedures

- Execute “Before Taxi Checklist”
- Keep your eyes outside and **do not multitask** → Checklists should be accomplished when stopped
- Steering with Rudder pedals and Brakes, Maintain centerline and **be aware of the airplane’s wingspan**
- **Taxi at a safe speed**, Slow down prior to turning → **Hand on the throttle always**
- Rotating beacon, taxi lights and position lights (if at night) should be on → **be cautious with strobes**
- Maintain a sterile cockpit and Apply right-of-way rules
- **Be mindful of illusions**
- Always have a taxi diagram and **be aware of hot spots** →
- Know where you are and where you are going
- **Build a mental picture of other traffic on the airport**
- Know airport signage, Review NOTAMs
- After landing, clear the runway
(obtain taxi instructions before further movement)



5. Hold Position Lines

- Indicate where an aircraft must stop when approaching a runway without a clearance to enter
- Unauthorized crossing could result in an incursion
- **Approaching from the solid side** (*entering runway*)
 - **Controlled** airports → pilots **must not cross without ATC clearance**
 - **Uncontrolled** airports → pilots must ensure adequate separation from other aircraft and announce intentions
- **Approaching from dashed side** (*exiting runway*)
 - Cross the dashed lines and stop when fully beyond solid lines
- **Clarify with ATC if there's any confusion**

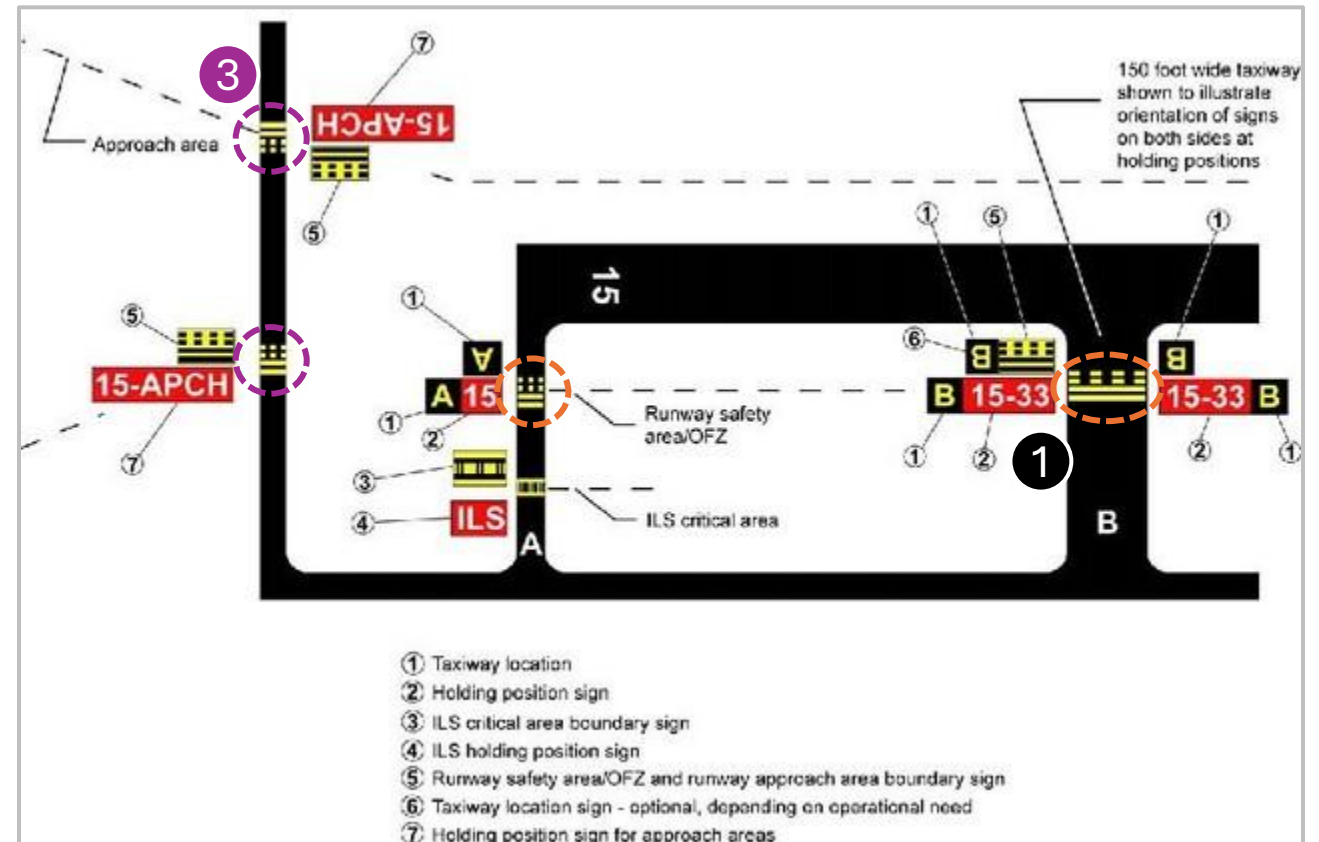
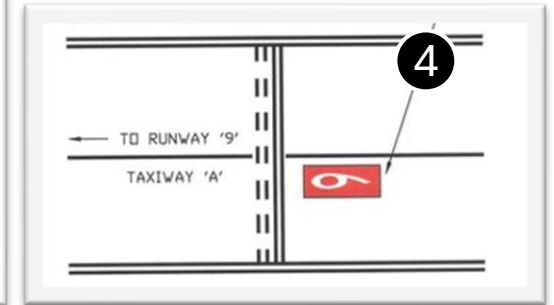
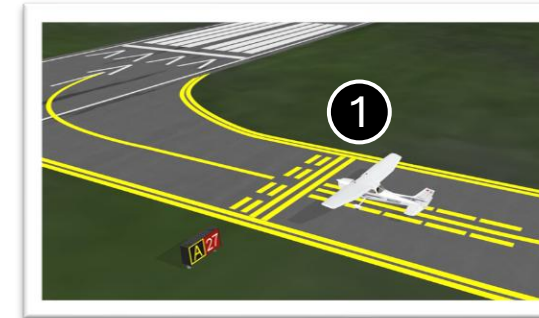
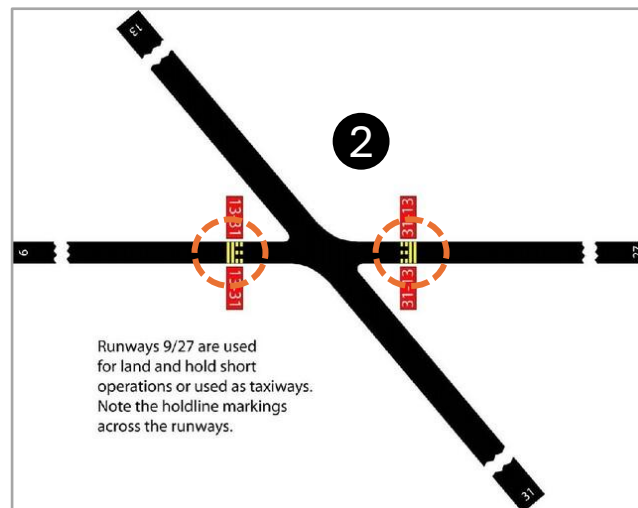
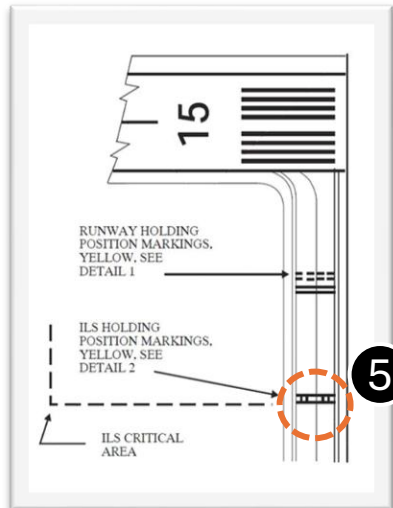


5. Hold Position Lines

AIM 2-3-5

Aircraft **Must Stop** until clear to cross by ATC

- ① Runway Holding Position Markings on Taxiways
- ② Runway Holding Position Markings on Runways
- ③ Taxiways located in Runway Approach Area
✓ *Stop only when instructed*
- ④ Surface Painted Holding Position Sign
- ⑤ ILS Hold Position Marking (*stop when instructed*)



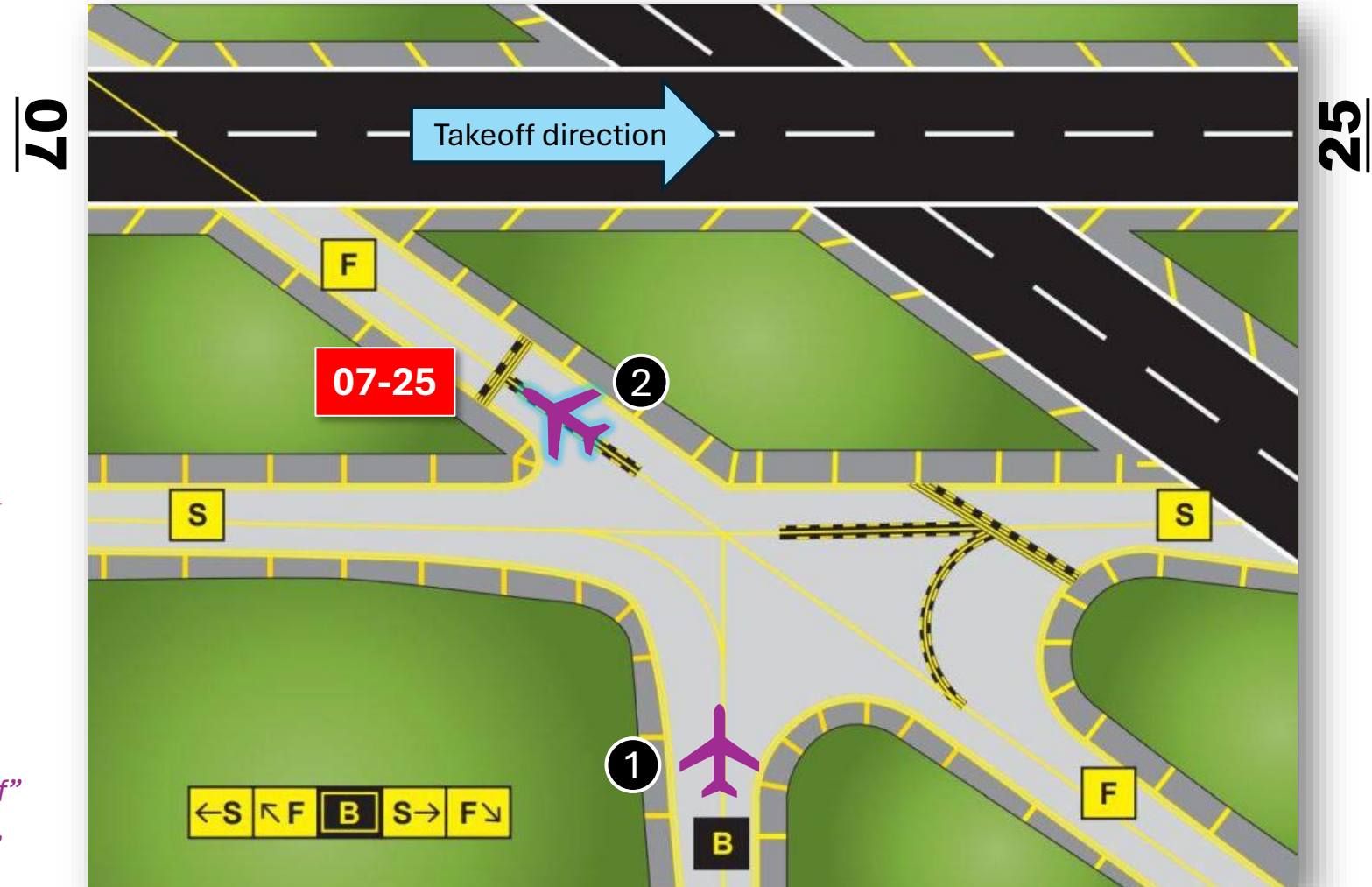
5. Hold Position Lines

1 Complex intersections

- Check location sign
- Use direction signs
- Check for other airplanes / obstruction

2 Intersection Takeoff

- Departure initiated from an intersection position, other than the runway threshold
- Hold Position Sign is **NOT a direction sign**
- Pilot not obligated to accept it
- Special attention on verifying the runway
- Follow proper phraseology
 - ✓ Pilot: "...Holding Short Runway 07, **F2**"
 - ✓ ATC: "...Runway 07 **at F2**, Clear for Takeoff"
 - ✓ Pilot: "Clear for Takeoff, Runway 07, **F2**..."



6. Landing and Rollout

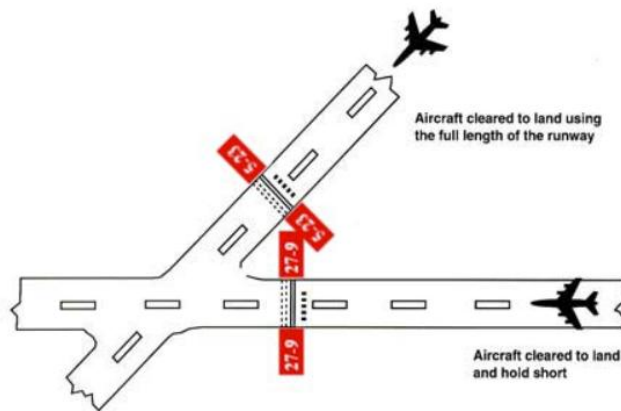
- **Plan and Brief**
 - Review and brief the airport diagram beforehand
 - Estimate your runway exit point, and how it will affect the taxi and taxi route
 - ✓ Taxiway, Another runway, Hot Spot(s), Closed taxiways and runways
- **Situational Awareness**
 - Make sure the runway is clear
 - ✓ Attention to aircraft holding short
 - Heads-down activities only performed when the aircraft is stopped
 - Keep eyes outside, hand on the throttle, Sterile cockpit
- **Hold Lines**
 - Ensure the entire aircraft has crossed the hold short line
 - Advise ATC if unable to fully clear the runway
 - Pay attention when exiting between parallel runways
 - ✓ Area might be small and higher potential for incursion
- **“Continuous Loop Procedure”**



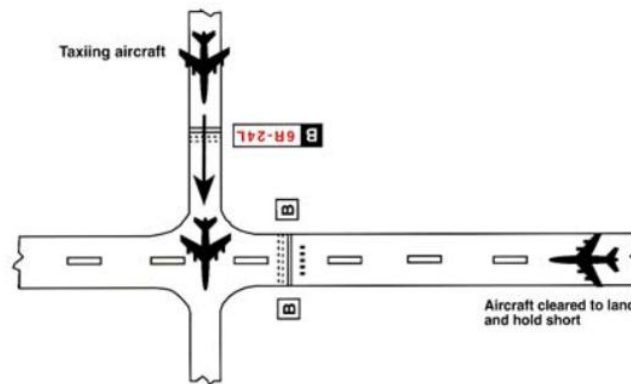
7. Landing and Hold Short Operations (LAHSO)

AIM 4-3-11(c)

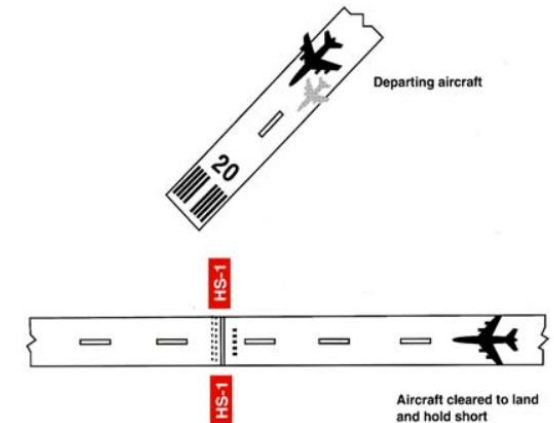
- **LAHSO** means holding short at a specific point of the runway after landing
- **Weather minimums:** Basic VFR (1000ft ceiling and 3sm visibility)
- **Pilot Responsibilities**
 - Preflight Planning (review **Airport information**, Aircraft **performance capabilities**)
 - Understand LAHSO markings, signs, and lighting
 - **PIC has the final authority to accept or decline clearance** (full readback required)



Intersecting Runway



Intersecting Taxiway



Other Designated Point

8. Controlled vs Uncontrolled Airports

Operations and Expectations are different when the airport does not have an active tower/ATC

Controlled



- **Plan, Brief, Review**
- **Communicate with ATC**
 - Standard phraseology
 - Write down and review instructions
 - Clarify with ATC if necessary
- **Readback all clearances**
- **Do not cross any runway without ATC clearance**
- Pay attention to radio calls (situational awareness)

Uncontrolled

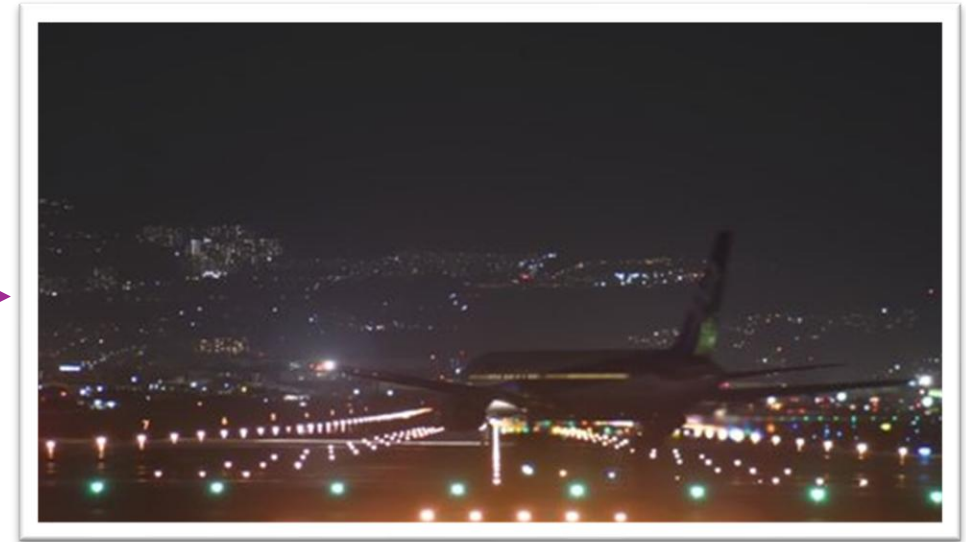


- **Plan, Brief, Review**
 - ATC will not give you instructions
 - Be familiar with local procedures
- **Look, Listen, Tell**
 - Monitor and communicate on CTAF from engine start until 10 miles from the airport
 - Look for other aircraft
 - Special attention to aircraft on the ground
- **Radios are not required**, assume there are aircraft in the area not communicating

9. Night Operations

- **Night Taxi Considerations**

- Taxi slower, be more cautious (less time to react)
- Avoid blinding other aircraft and be mindful of illusions
- Sterile cockpit, focus outside
- It is hard to spot an airplane on the ground at night!



- **Aircraft Exterior Lights (AIM 4-3-23)**

- Engines running: Rotating beacon on
- Taxiing: Navigation/position, and anti-collision lights on (*)
 - ✓ (*) Strobe lights should not be used if PIC determines it poses hazard to others -- 91.209(b)
 - ✓ Turn on taxi light when moving or intending to move, turn it off when stopped / yielding
- Crossing a Runway: All exterior lights should be illuminated
- Line up and wait: all lights on, except the landing light (turn it on when clear to takeoff)
 - ✓ Line up approximately 3' off the centerline (allows landing aircraft to differentiate you from runway lights)
 - ✓ Cleared for takeoff (controlled field) or starting takeoff roll (uncontrolled): Landing lights on

10. Low Visibility Operations

- **Taxiing During Low Visibility (AIM 4-3-19)**

- Similar considerations as Night Operations and more
- Pilot be aware that the Tower might not be able to see you!
- Communicate with ATC about any difficulties or becoming disoriented
- Withhold checklists and nonessential comms until stopped and breaks set



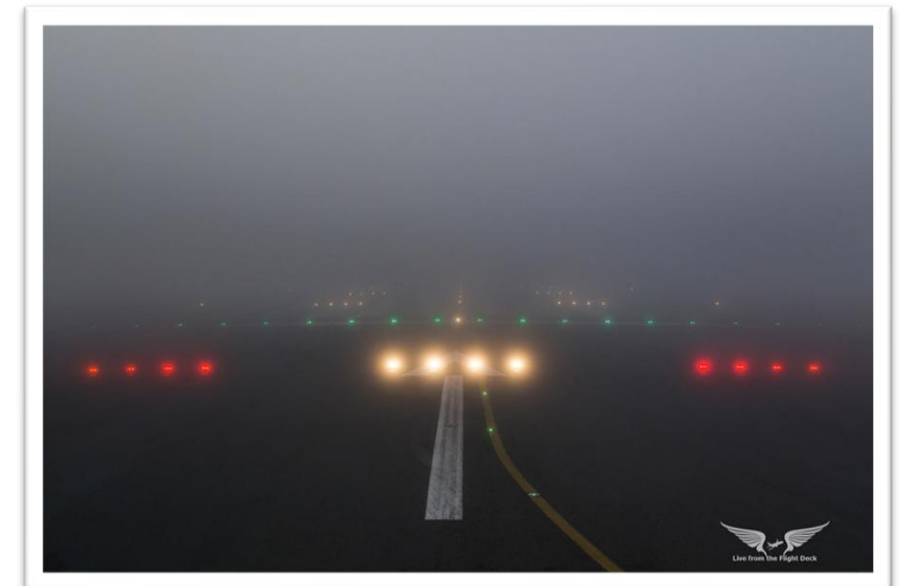
Runway Safety:
[Providence, RI \(2013\) \(youtube.com\)](#)

- **Low Visibility Operations (LVO) Surface Movement Guidance & Control System (SMGCS): AC 120-57**

- Low visibility taxi plan for airports with operations below 1,200' RVR
- Mandates additional lighting, markings, and procedures
- Two levels:
 - Operations from 1,200' RVR to 500' RVR
 - Operations less than 500' RVR

- **Low Visibility Taxi Charts**

- Depicts low visibility taxi routes/markings
- Required when operating w/ SMGCS
- Enable taxi below 1200ft RVR (or below 500ft RVR)
- 3rd party only: Jeppesen Low Visibility Charts



10. Low Visibility Operations

- **Taxiway Edge Lights**

- Outline the edges of taxiways (Blue)

- **Taxiway Centerline Lights**

- **Facilitate taxiing** during low visibility conditions (Green)

- **Clearance Bar Lights**

- In-pavement steady yellow lights
- Increase visibility of a **holding position** in low visibility, or indicate the location of an intersecting taxiway

- **Runway Guard Lights**

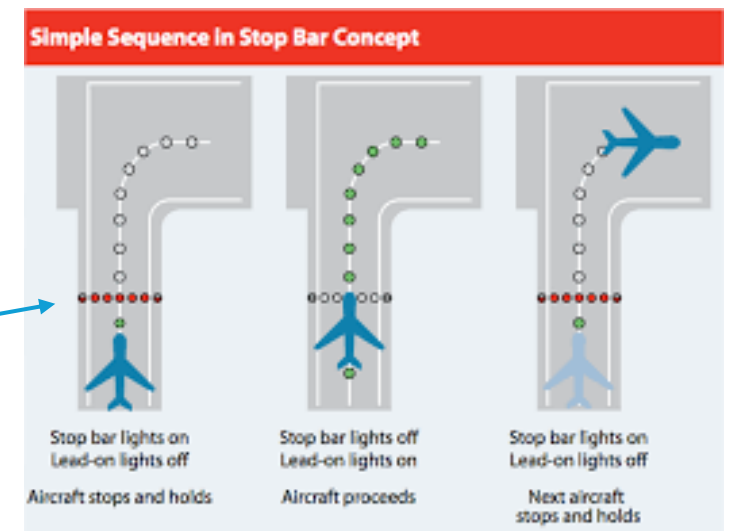
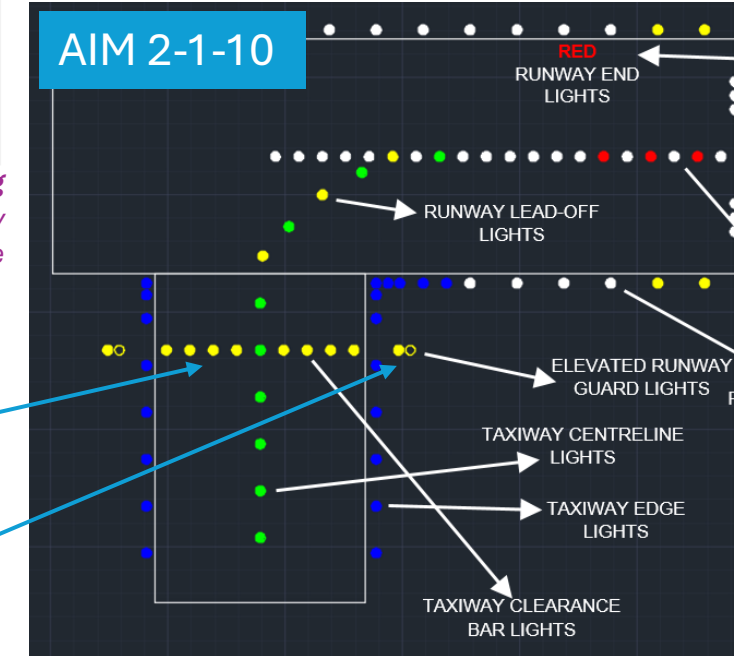
- Enhance visibility of **taxiway and runway intersections**
- Elevated flashing yellow lights on each side of a taxiway, or a row of in-pavement yellow lights across the taxiway

- **Stop Bar Lights & Lead On/Off**

- Confirm ATC clearance to enter / cross an active runway
- Row of red, steady in-pavement lights across the entire taxiway
- Lead On/Off: alternating green/yellow connecting runway and taxiway

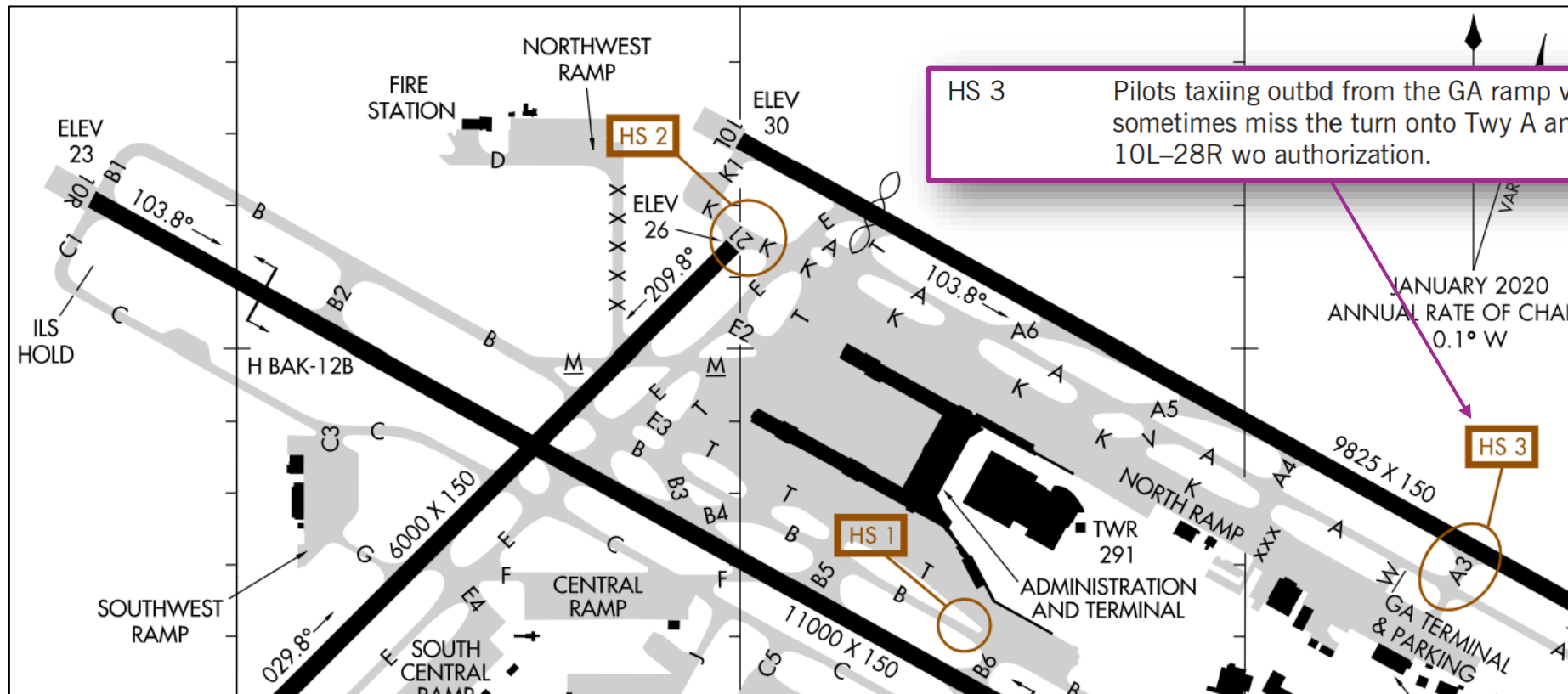


Geographic Position Marking
Identifies aircraft location during low visibility
Left of the taxiway centerline



11. Scenario

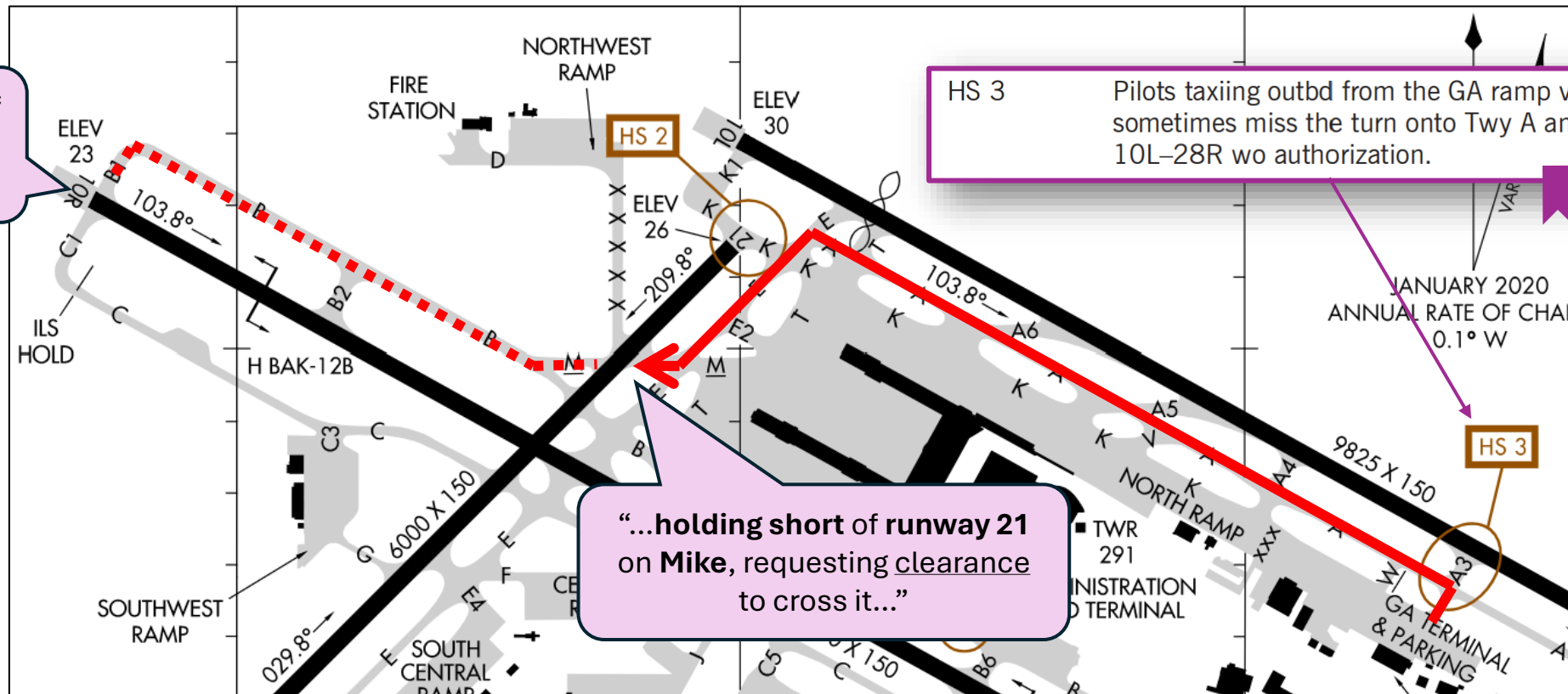
- Runways 10L-28R and 21-03 are closed (NOTAM)
- You are parked at the GA Ramp and requested takeoff 10R
- ATC clearance received: “...runway one-zero right, taxi via Alpha, Echo, Mike, Bravo”



11. Scenario

- Runways 10L-28R and 21-03 are closed (NOTAM)
- You are parked at the GA Ramp and requested takeoff 10R
- ATC clearance received: “...runway one-zero right, taxi via Alpha, Echo, Mike, Bravo”

Correction: “...runway one-zero right, taxi via Alpha 3, Alpha, Echo, Mike, **Cross Runway two-one (21)**, Bravo”



“...holding short of runway 10R ready for departure”

HS 3
Pilots taxiing outbd from the GA ramp via Twy A3 sometimes miss the turn onto Twy A and enter Rwy 10L-28R wo authorization.

“...holding short of runway 21 on Mike, requesting clearance to cross it...”

JANUARY 2020
ANNUAL RATE OF CHAN
0.1° W

Questions?

