

# HOLDING PATTERNS

Tiziano Bernard, CFII



**plane\_old\_memes**

@plane\_old\_memes

The human brain is truly amazing. It functions 24 hours a day from the moment we are born and only stops when we have to figure out how to enter the hold.

# Mission Objectives

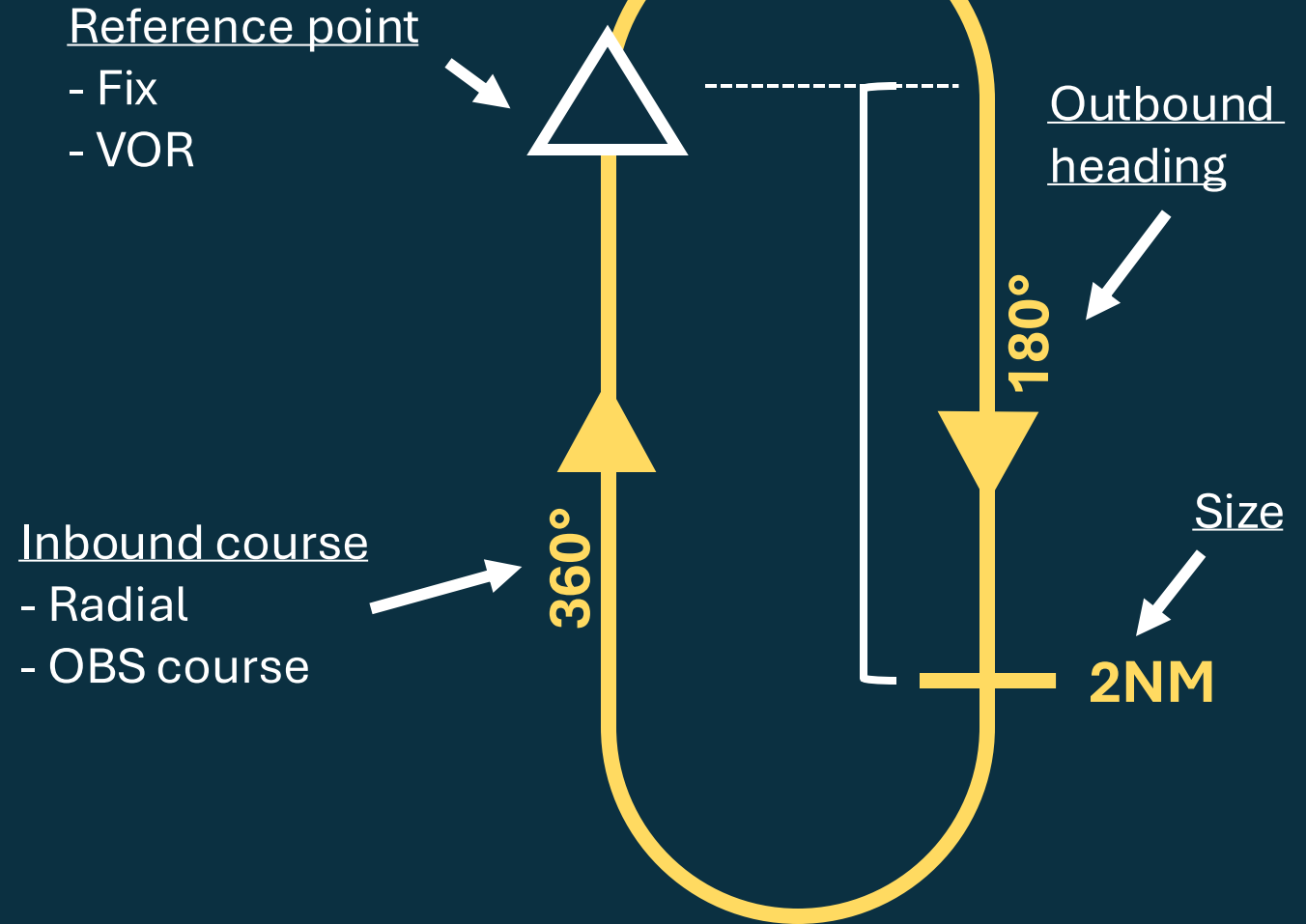
- Understand the purpose of holds.
- Understand how to theoretically execute a hold.
- Understand how to use the three entry methods.
- Learn Tizi's shorthand for hold entry procedures.
- Learn a means to visualize a hold on the HSI.
- Please see your CFII on how to use your specific avionics. If you learn the theory well, you can easily figure it out on your own.

# Purpose for Holding

- Holds are used to delay traffic.
- They can be requested to burn extra fuel, run a checklist, etc.
- At un-towered fields, only one airplane can depart or land under IFR at any given time. Holds can be assigned to delay an arrival.
- Holds in lieu of a procedure turn are used to facilitate arrivals to an initial approach fix (IAP).

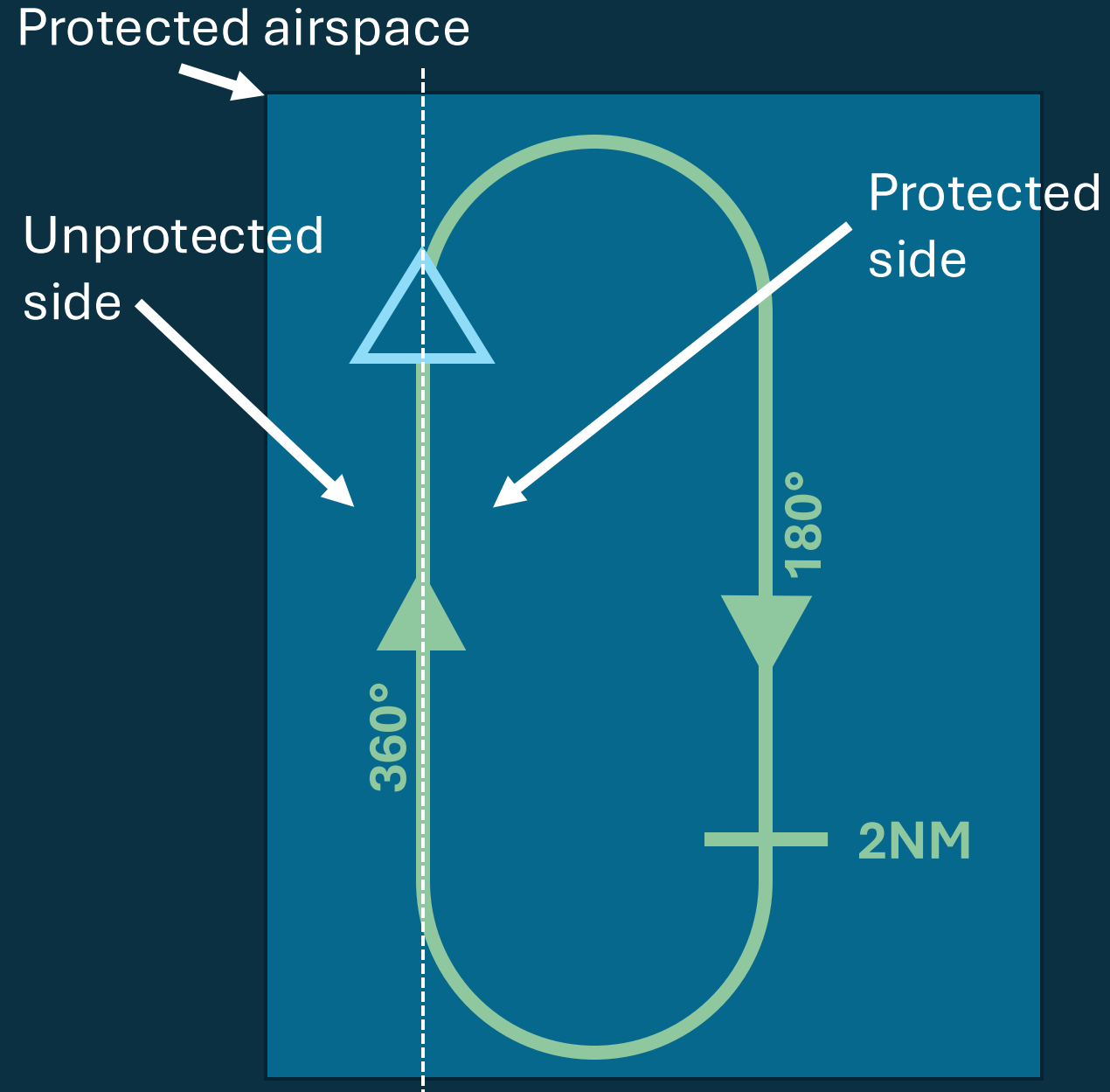
# Hold Geometry

- Holds are defined by their geometry:
- Inbound course into a fix. ALWAYS into a fix.
- Outbound heading
- Direction
- Size. Defined by the outbound leg. Begins when you are wings level and abeam the reference point. The default is 1 min.



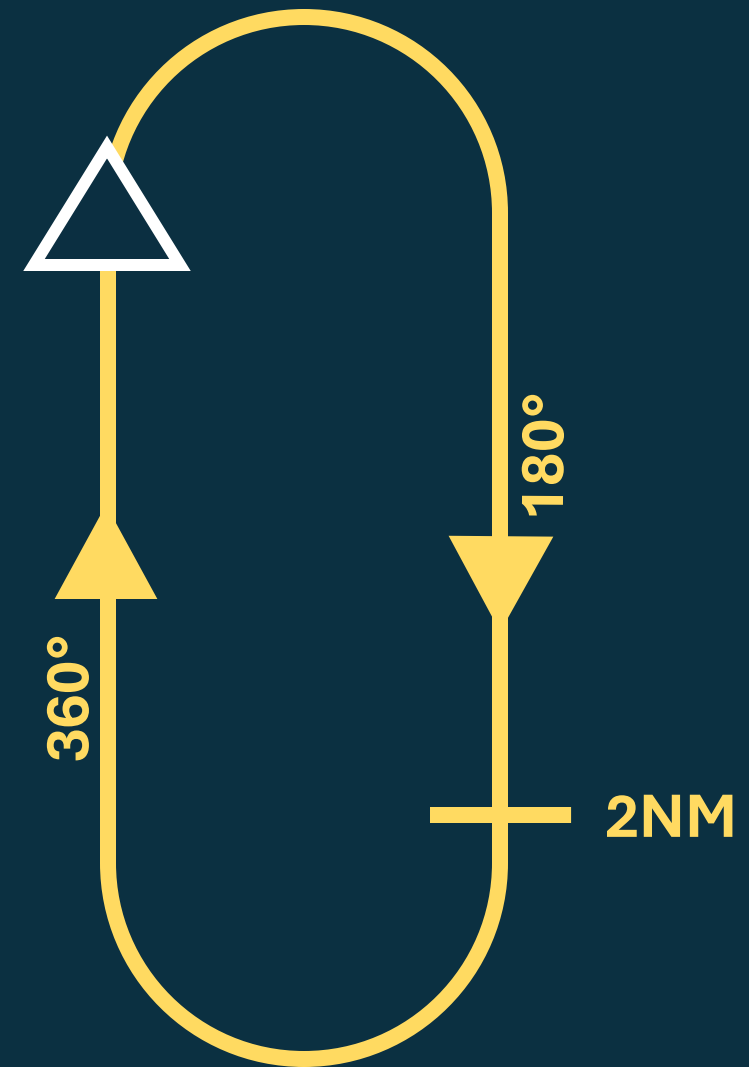
# Protected Airspace

- ATC protects the airspace defined by the hold to guarantee separation while you hold undisturbed.
- The direction of the hold defines the protected side. Right turns = right side.
- ATC will still protect a bit of the unprotected side for you.
- At times, ATC will just protect a specific distance from the fix in all quadrants.



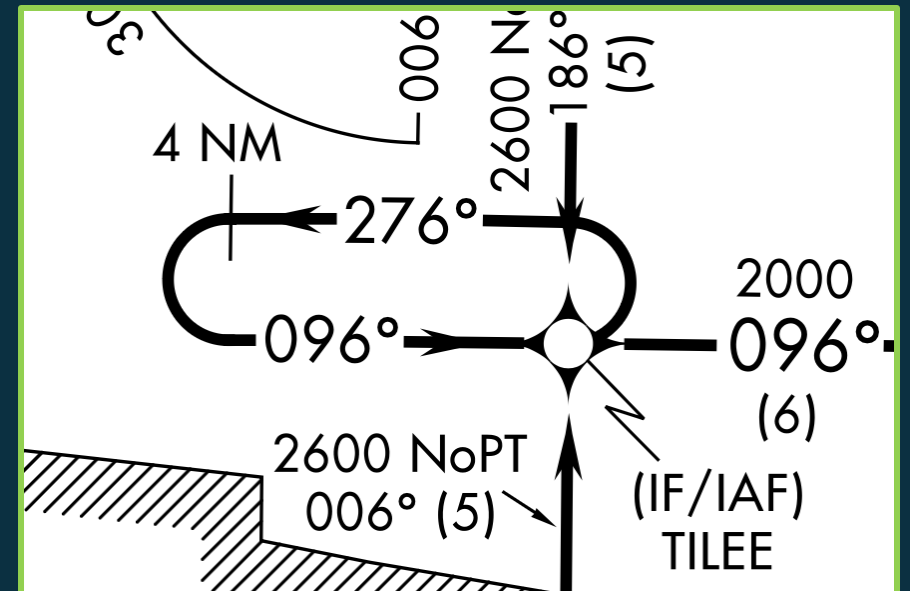
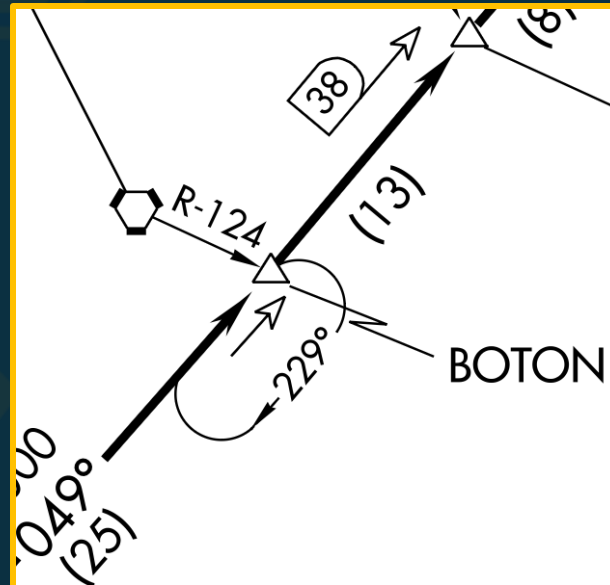
# How to fly it

1. Fly into the fix on the 360 course (could be a radial).
  2. Sequence the fix, and begin turning right at standard rate.
  3. Fly heading 180.
  4. Once you are abeam the fix and wings level, begin a timer if it's a timed hold, or continue on 180 heading until you reach 2 NM from the fix.
  5. Begin a standard rate turn to the right to intercept the 360 course.
- NOTE: The 180 heading works with no winds. Based on how you re-intercept the 360 radial, you can determine winds and correct. Begin by correcting 30° heading into the wind. Then iterate.



# Holding Clearances (1/2)

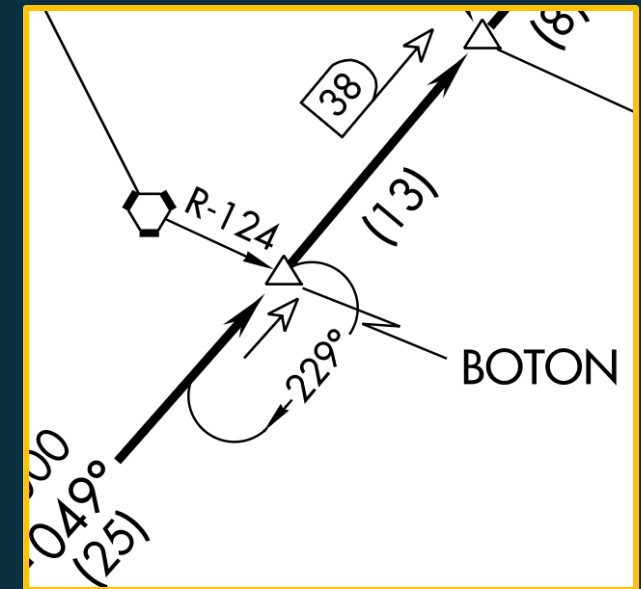
- Holds can be published or unpublished.
- Published – **enroute**, standard terminal arrival route (**STAR**), holds in lieu of a **procedure turn**.





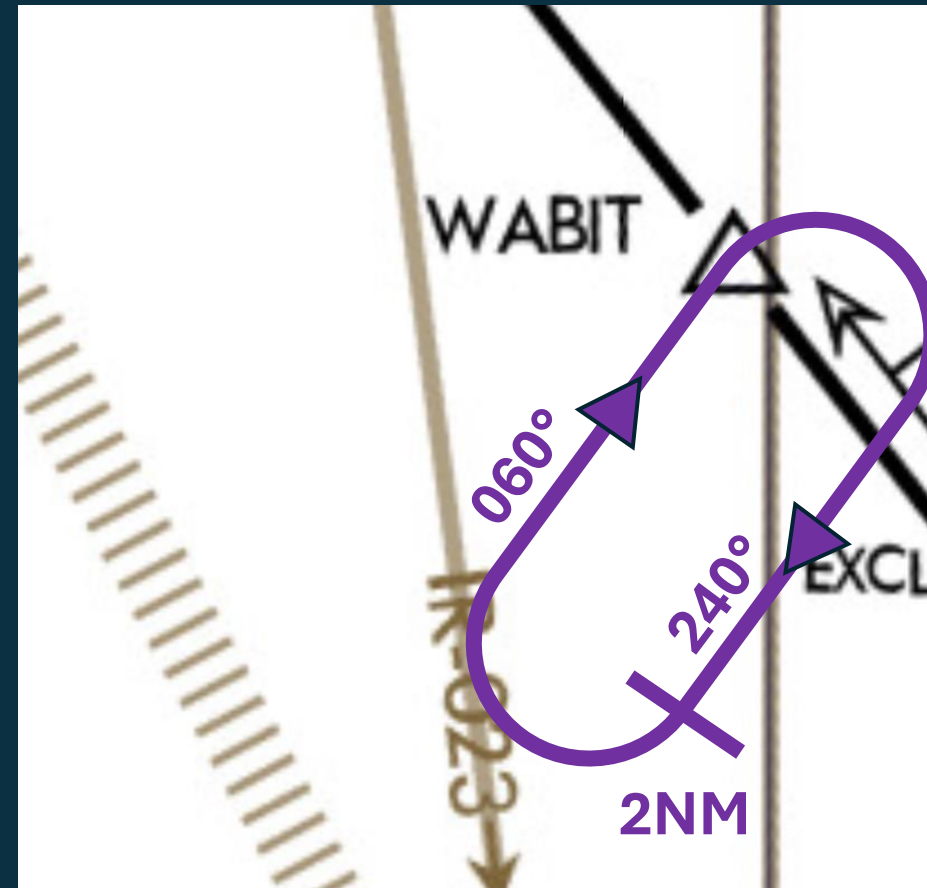
# Holding Clearances (2/2)

- If published, ATC will typically say “Hold at [FIX] as published”
- Unpublished hold clearances follow the following format:
  1. **Quadrant** (e.g., Northeast, West, etc.)  
This is the quadrant where the **inbound** leg is positioned.
  2. **Fix**
  3. **Radial**  
ATC only knows “outbound” courses, like radials.
  4. **Direction**  
Can be right or left. Right turns is standard
  5. **Size** (time/distance)  
Size of the outbound leg
  6. **Expected Further Clearance Time (EFTC)**  
How long you should expect to hold (for planning)



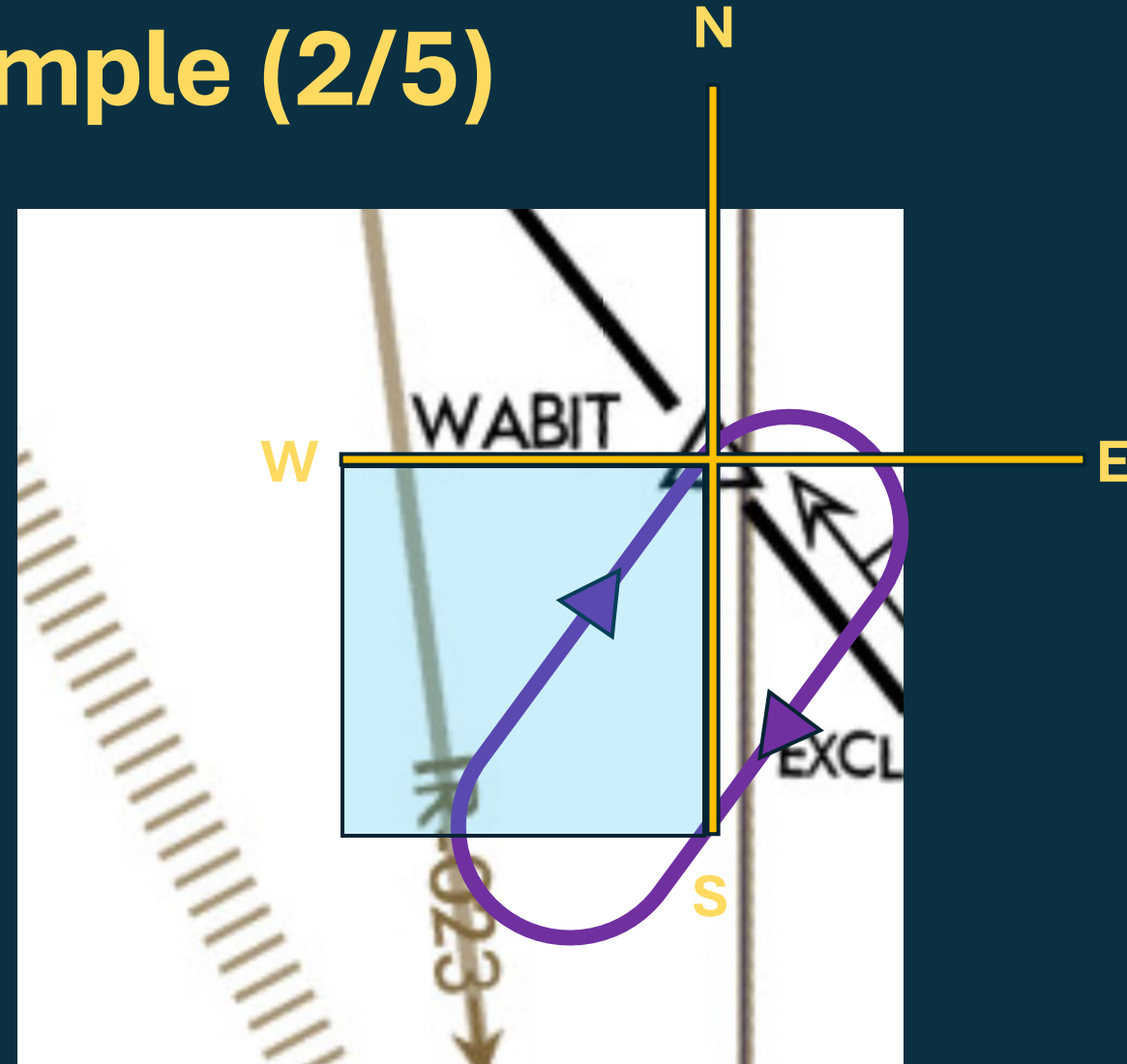
# Holding Instruction Example (1/5)

- “Skyhawk 7TW, hold southwest of WABIT on the 240 radial, right turns, 2 NM legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”
- Note: the 240 radial is defined outbound, so you need to calculate the reciprocal to determine the inbound course.
- Let’s brake it down...



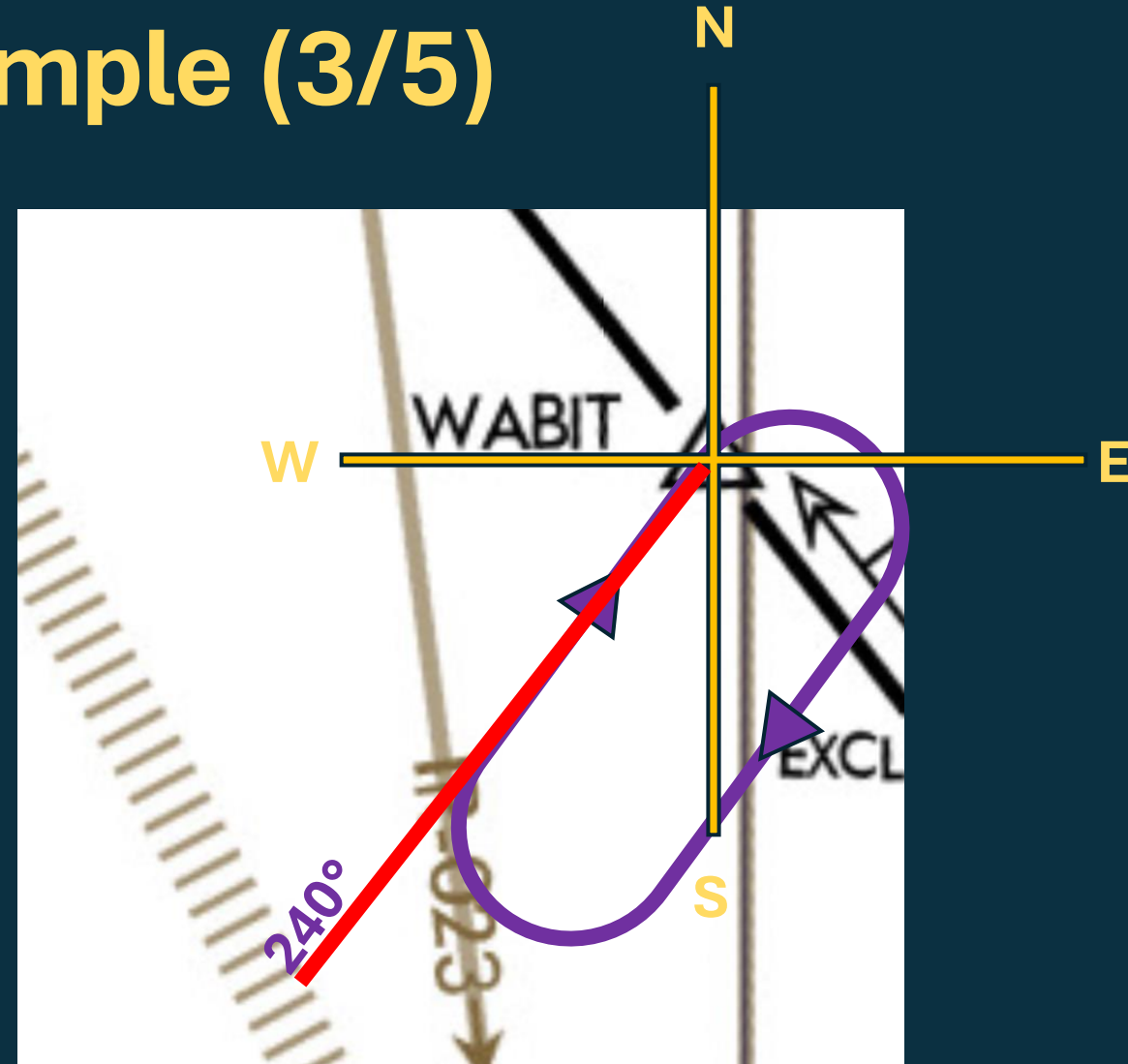
# Holding Instruction Example (2/5)

- “Skyhawk 7TW, **hold southwest** of WABIT on the 240 radial, right turns, 2 NM legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”
- The inbound leg is positioned in the southwest quadrant of the fix.
- This is usually a sanity check. Build the hold based on the instructed radial and then verify it’s in the right position.



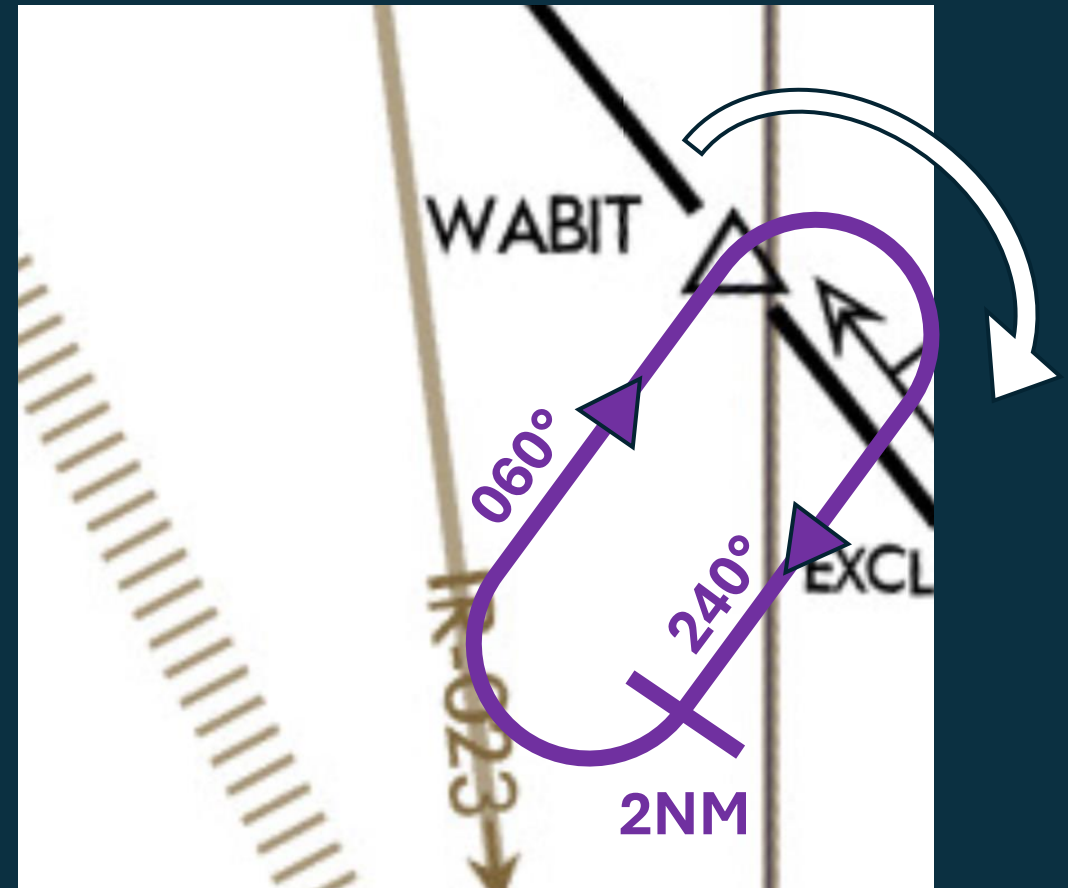
# Holding Instruction Example (3/5)

- “Skyhawk 7TW, hold southwest of WABIT on the 240 radial, right turns, 2 NM legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”
- Draw the **radial (240)** from the fix. That is your inbound leg.
- Calculate the reciprocal to determine your inbound course:  $240 - 200 = 040$ .  $040 + 20 = 060$ .



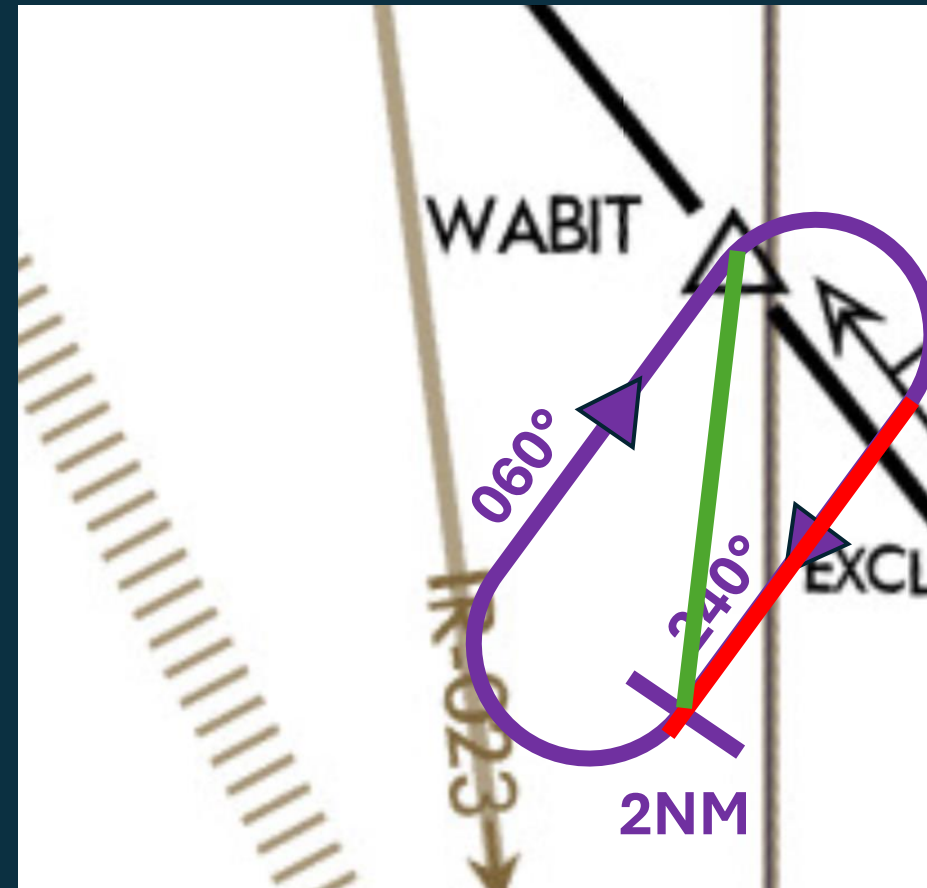
# Holding Instruction Example (4/5)

- “Skyhawk 7TW, hold southwest of WABIT on the 240 radial, **right turns**, 2 NM legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”
- Turn right after sequencing the fix.



# Holding Instruction Example (5/5)

- “Skyhawk 7TW, hold southwest of WABIT on the 240 radial, right turns, **2 NM legs**, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”
- 2 NM is the **outbound leg distance**.
- The GPS will use **distance from the fix**... close enough.



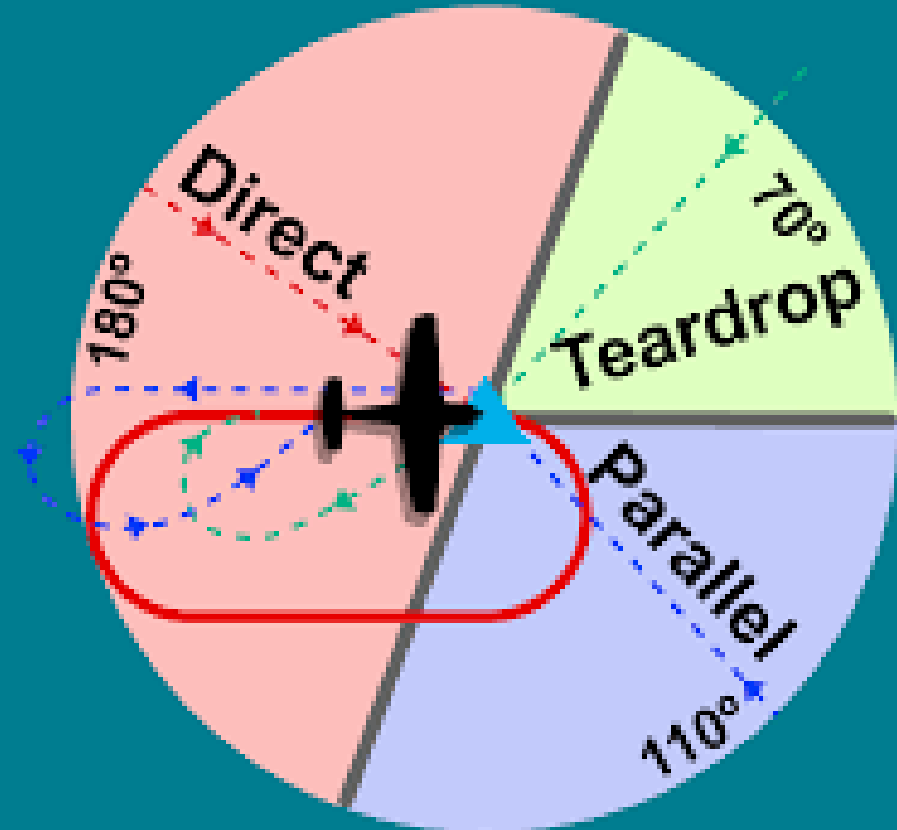
# Established in the Hold

- So far we've seen only how to hold once you're "established".
- Established = you have completed the entry procedure, have sequenced the fix, and are now holding.
- Mandatory reporting – you need to report that you're established in the hold. Report "established", altitude, and time.
  - *"Cherokee 73N established in the hold, level 5000, currently 12:18Z"*
- Based on direction of arrival to the holding fix, there are three types of recommended entry procedures.

# Entry Procedures

- The AIM prescribes three recommended entries.
- Each have a very specific geometry...
- Doing public math in the air is difficult, so I ignore this 😁.

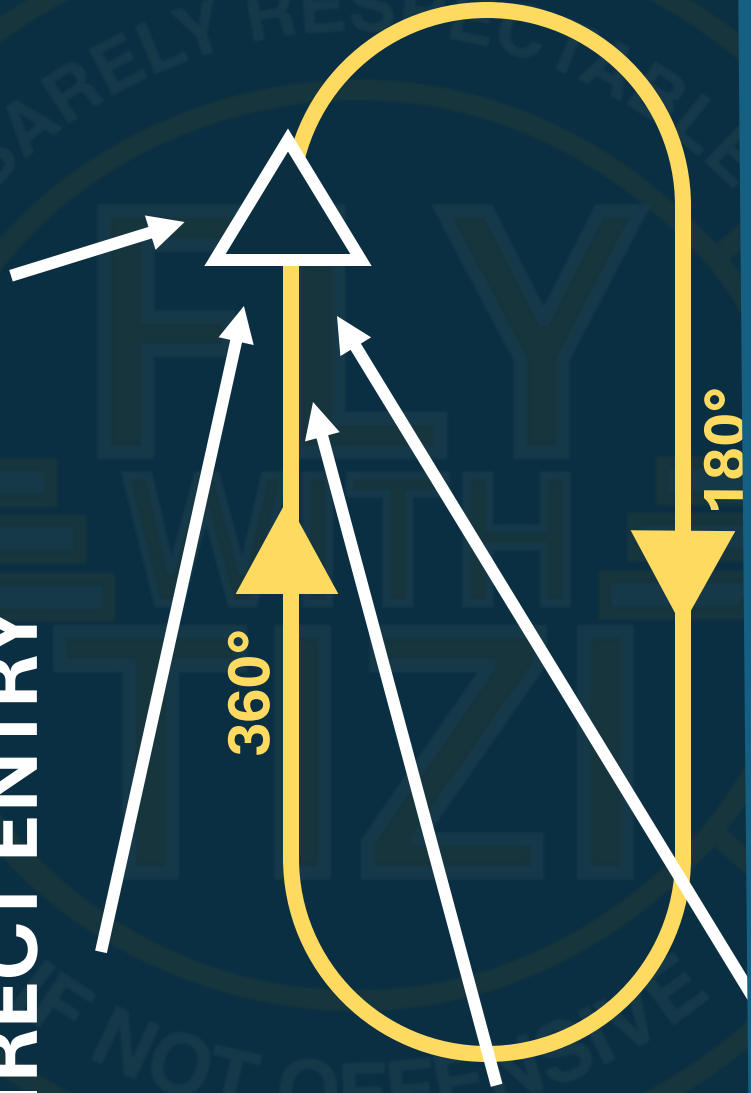
## Holding Pattern Entries



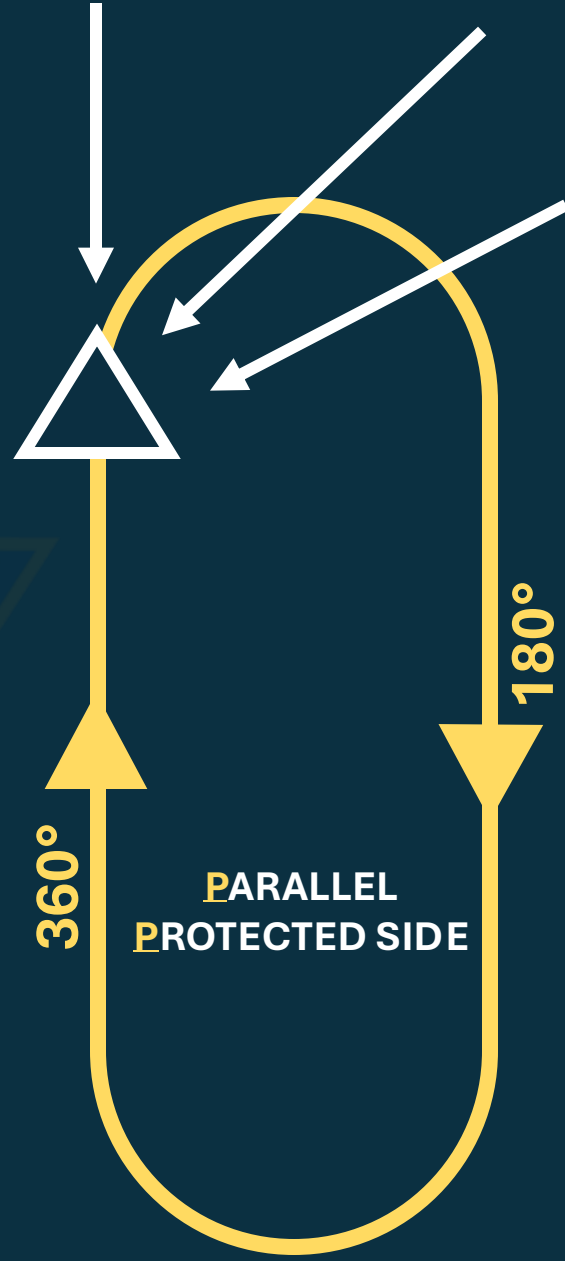
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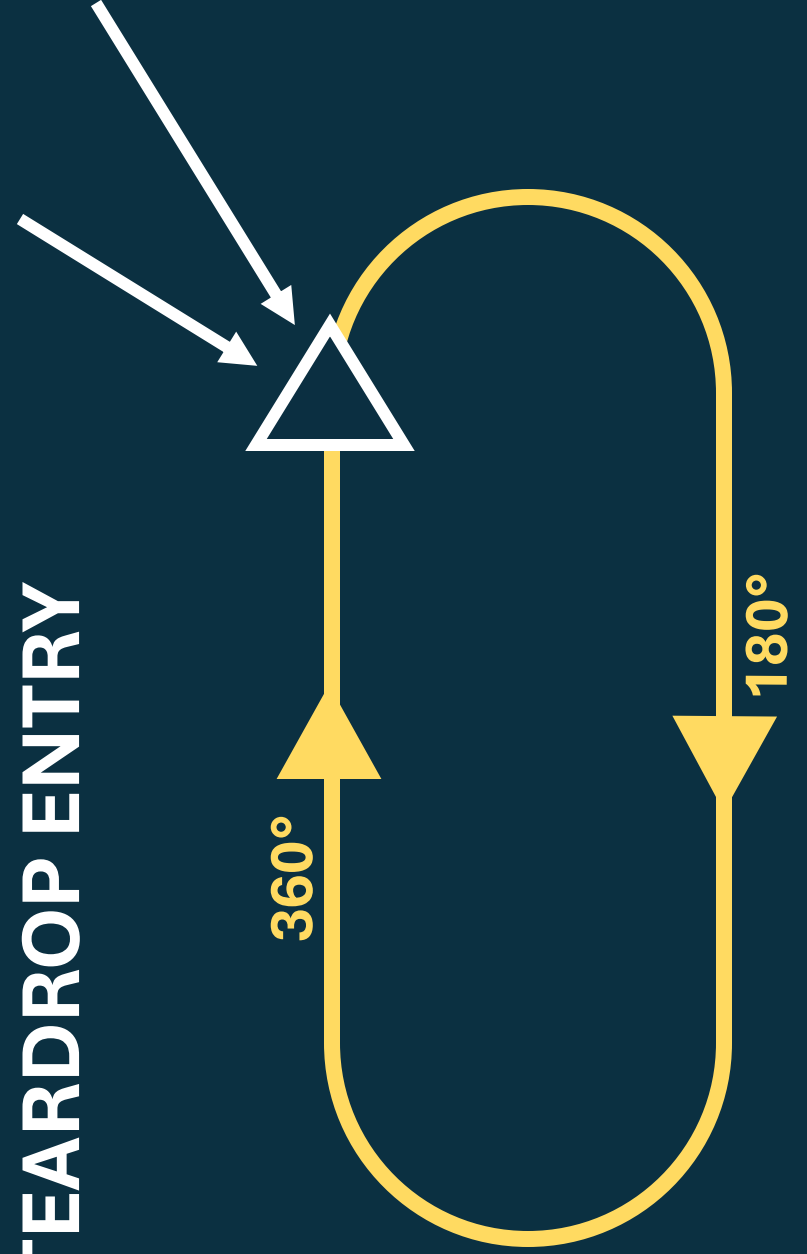
# DIRECT ENTRY



# PARALLEL ENTRY

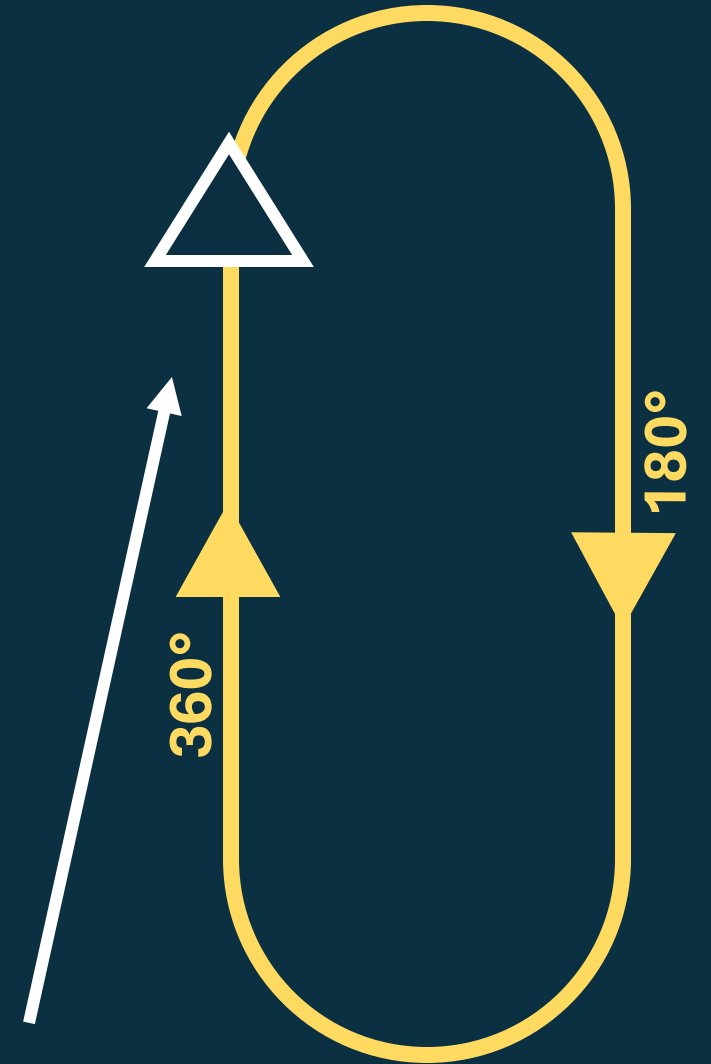


# TEARDROP ENTRY



# Direct Entry (1/2)

- Easiest of hold entries.
- Aircraft is in a position from which you proceed direct to the fix and begin holding.
- Fly to the fix (direct) and then turn to the outbound heading and begin holding.
- You are established once you sequence the fix the first time.

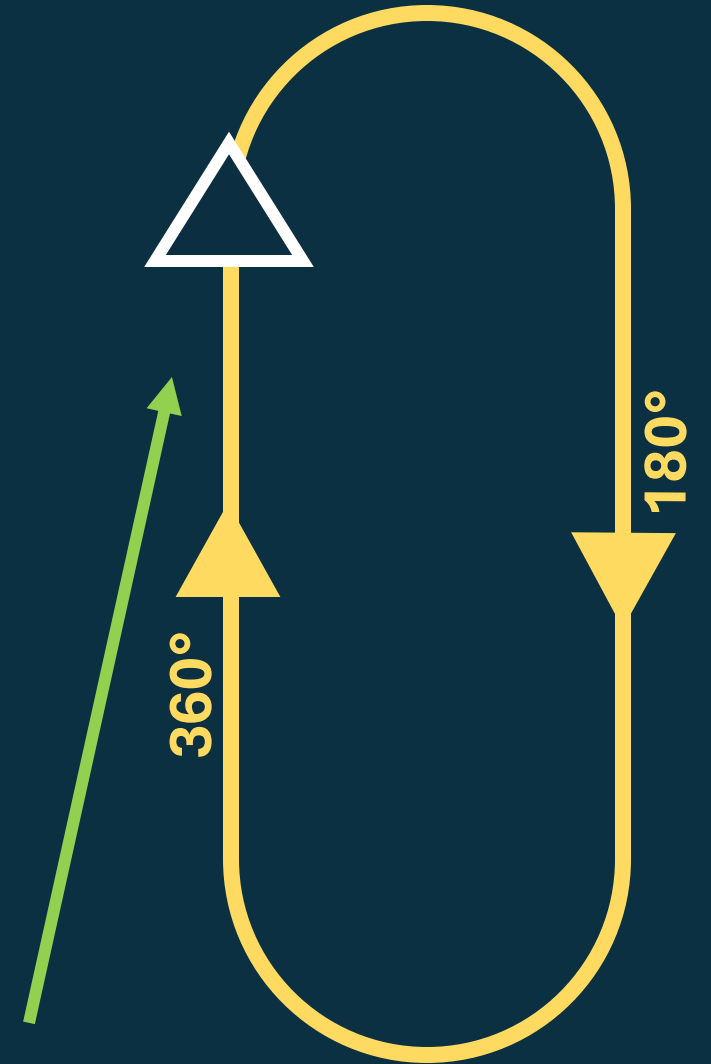


# Direct Entry (2/2)

- Shorthand:
- **D** Direct Entry on course 360
- **R** Right turns heading 180.

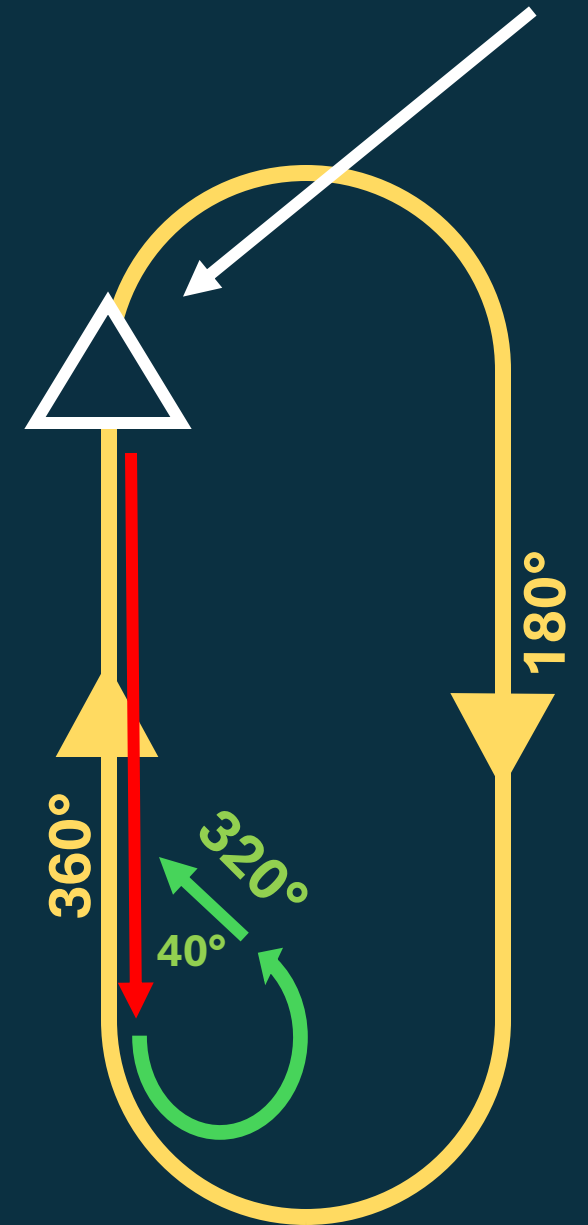
**D** 360°

**R** 180°



# Parallel Entry (1/2)

- Aircraft from the “protected side” or directly opposite the hold inbound course.
- Fly direct to the fix, fly the inbound course “**backwards**” for the hold size. You can fly *reverse needles* or tune the outbound (if it’s a VOR). Up to you.
- Begin a **left turn** (into protected side) and **intercept the inbound at a 40° heading** (320°).
- Join the inbound course, fly to the fix, and begin holding.
- You are established once you sequence the fix the second time.



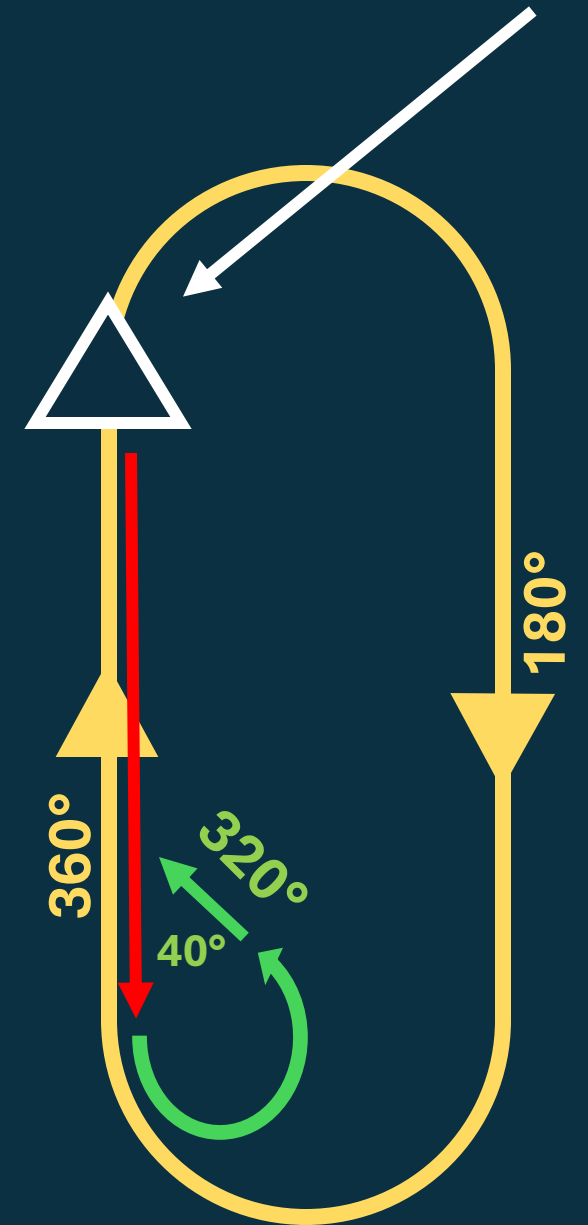
# Parallel Entry (2/2)

- Shorthand:
- **P** Parallel Entry on course 180
- **L** Left turn to heading 320.
- **I** Intercept course 360.

**P** 180°

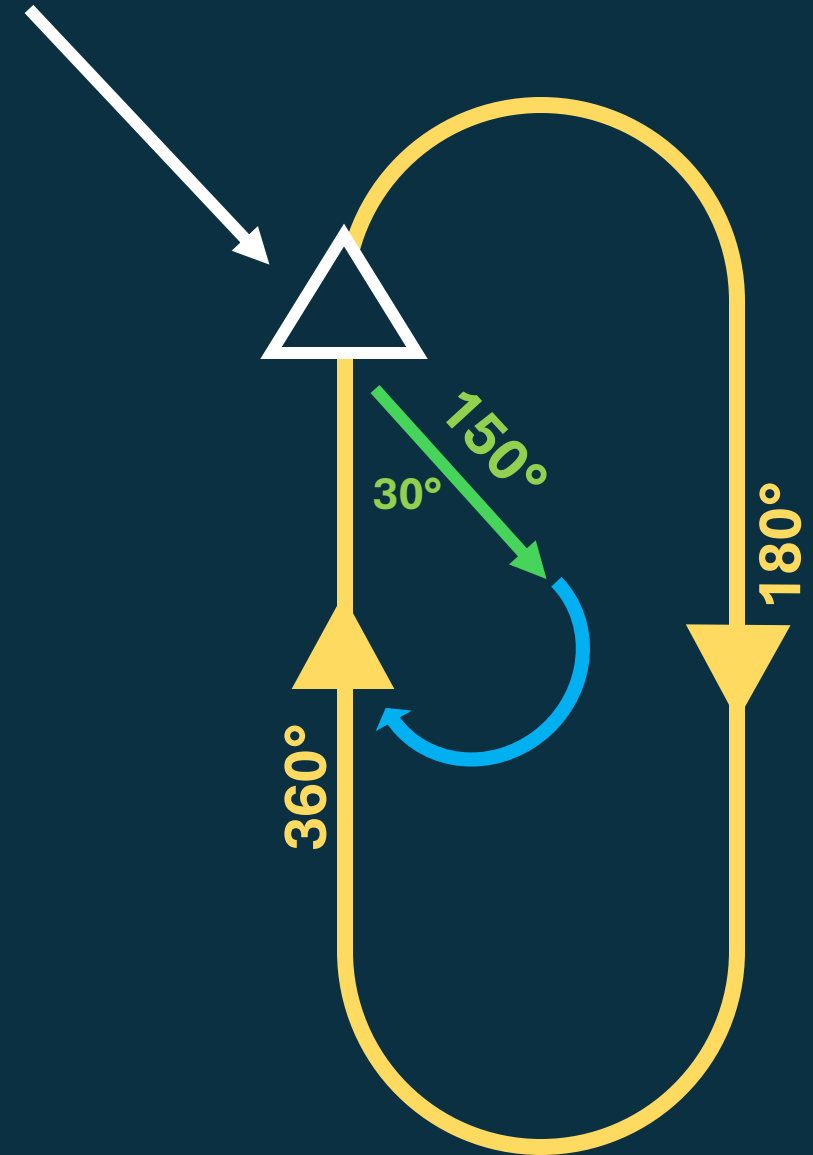
**L** 320°

**I** 360°



# Teardrop Entry (1/2)

- Aircraft from the “unprotected side”.
- Fly direct to the fix, fly into the protected side at a **30° heading** to the outbound (150°) for the hold size.
- Begin a **right turn** into protected side and intercept the inbound course.
- Join the inbound course, fly to the fix, and begin holding.
- You are established once you sequence the fix the second time.

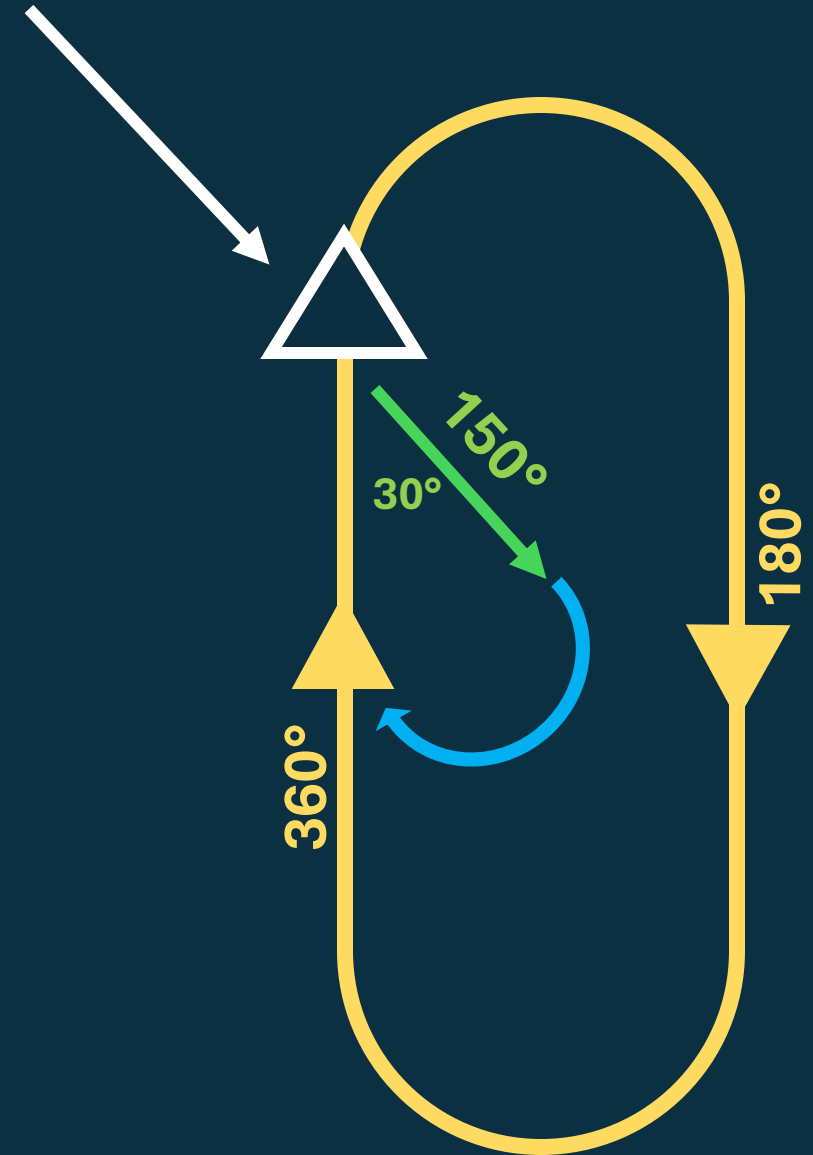


# Teardrop Entry (2/2)

- Shorthand:
- **T** Teardrop Entry on heading 150.
- **R** Right turn to intercept course 360.

**T** 150°

**R** 360°



# Airborne Visualization (1/3)

- This is all easy on paper when you're north up and the hold is due north.
- When you're in the air with advanced avionics (e.g., Garmin GTN), you can program the hold and fly the guidance that is provided. If you have less advanced avionics (e.g., Garmin GNS), you need to do "public math" and figure out the entry "on the fly".

*"Skyhawk 7TW, hold southwest of WABIT on the 260 radial, left turns, 1 min. legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu"*



# Airborne Visualization (2/3)

- You need to be flying direct to the fix.
- Take the radial that ATC gave you and draw it into the center of the HSI (e.g., **hold on radial 260°**).
- Draw the **direction** (e.g., left turn).
- You (airplane) are at the bottom of the HSI (obviously...)
- Visualize the **entry procedure** (e.g., protected side = parallel entry).



# Airborne Visualization (3/3)

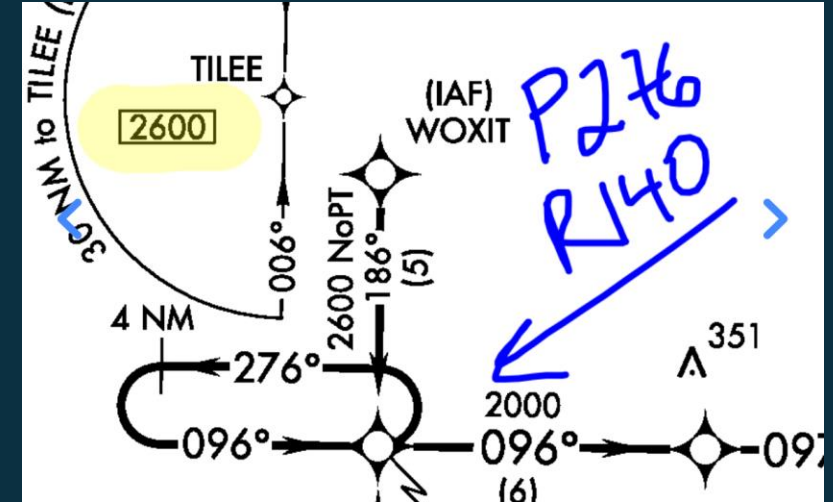
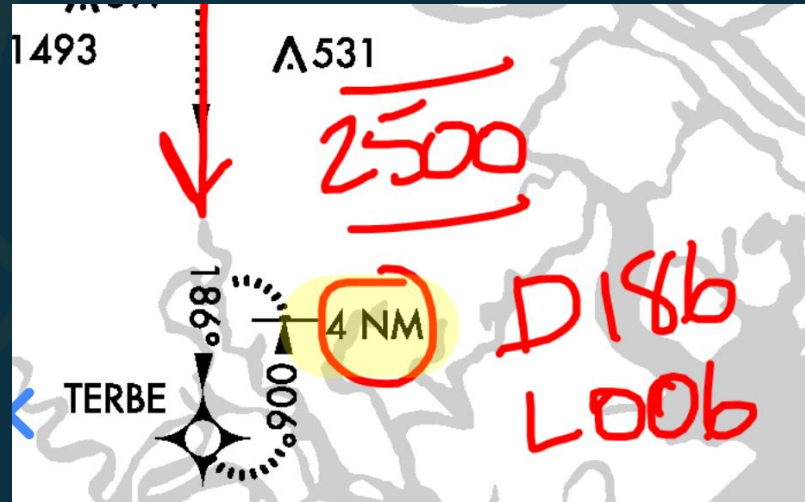
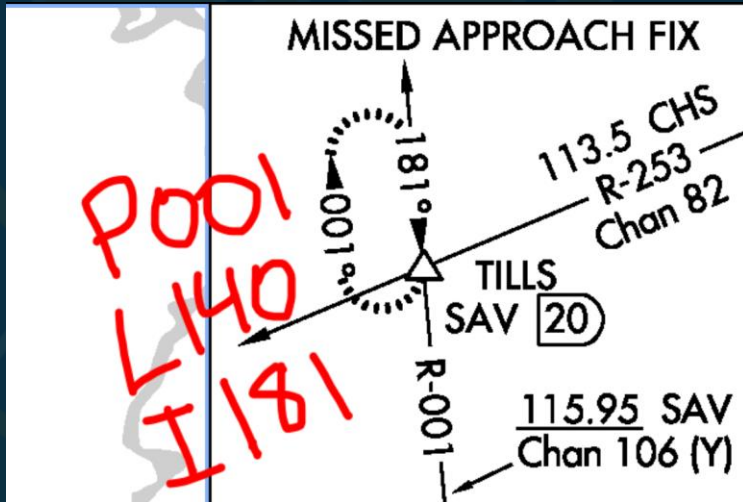
“Skyhawk 7TW, hold southwest of WABIT on the 260 radial, left turns, 1 min. legs, expect further clearance at 22:30 Zulu, currently 22:15 Zulu”

**P** 260°  
**R** 040°  
**I** 080°



# Chart Annotations

- I highly recommend you annotate your charts when holds or holds in lieu of a procedure turn are required.
- Use the shorthand to help minimize brainpower. Remember, your IQ is cut in half once airborne.



# Practice, practice, practice.

- This is **not easy**.
- There is a strategy, based on your avionics, on how to fly these. For example, if you have a ground track (diamond), then you can fly the inbound course backwards by positioning the diamond on the tail of the course, ignoring headings.
- If you have an advanced GPS, it will provide you with tracks to fly. At that point your IQ doesn't need to be high. But you still need to monitor the system.
- Practice, practice, practice!
- In 1700 flight hours, I received 7 holds. 2 were unpublished, 5 were published. So... you still need to be ready.

# HOLDING PATTERNS

[Read the associated article on courses and headings on FlyWithTizi.com](#)

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