Radio Instrument Flight Procedures

Instructor Intro
Background
CAIs completed?
Breaks
TTO & DOR in effect
Intercepts
Required Voice Reports
Holding
Approach Procedures
Failed Card

Basic Tenets

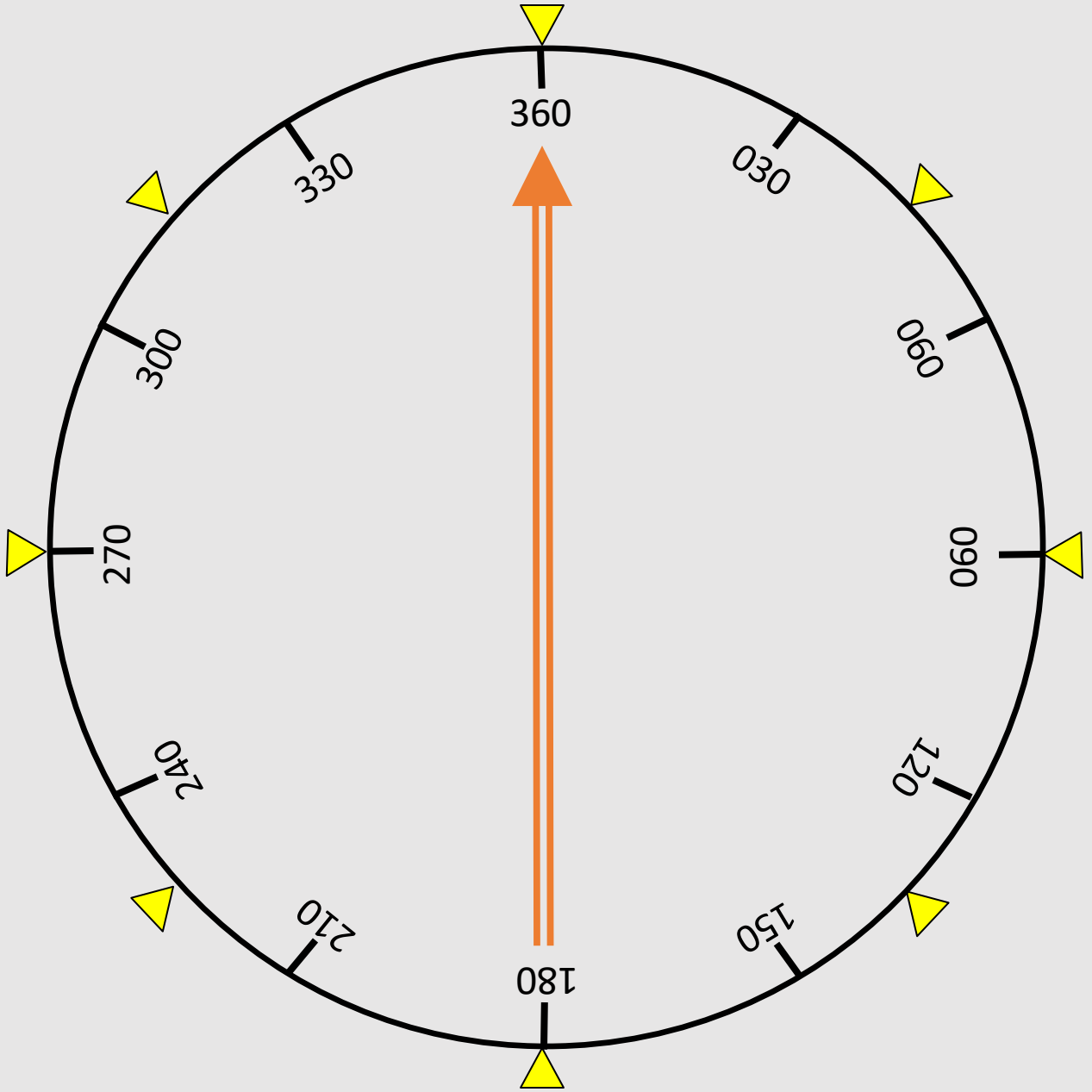
- Station Passage
  - Tacan – Min DME
  - VOR – To/From flag
  - ADF – 90/270
- Tracking vs Homing
  - HSI– wind corrected heading to maintain a designated course over the ground
- Holding Timing Start
  - Abeam or wings level, whichever occurs later
  - Does abeam change with heading correction on outbound leg?

Intercepts

- Inbound/Outbound
  - What radial/bearing currently on: what radial/bearing you want to be on
  - Determine angle of difference
  - TRT – Tail : Radial : Turn
  - Execute (Twist HSI to new heading)
- Inbound
  - <45* - TRT – turn in shortest direction to put the head of the needle on the upper 45, hold heading (hdg bug) until nearing new radial
  - >45* - TRT - wingtip method (arc)
- Outbound
  - <45* - TRT – Turn in shortest direction to put the desired radial on the upper 45, hold heading until nearing new radial
  - >45-120* - TRT= wingtip method (arc)
  - >120 – Over the station – station passage parallel until needle stabilizes, TRT, 15 -30* intercept

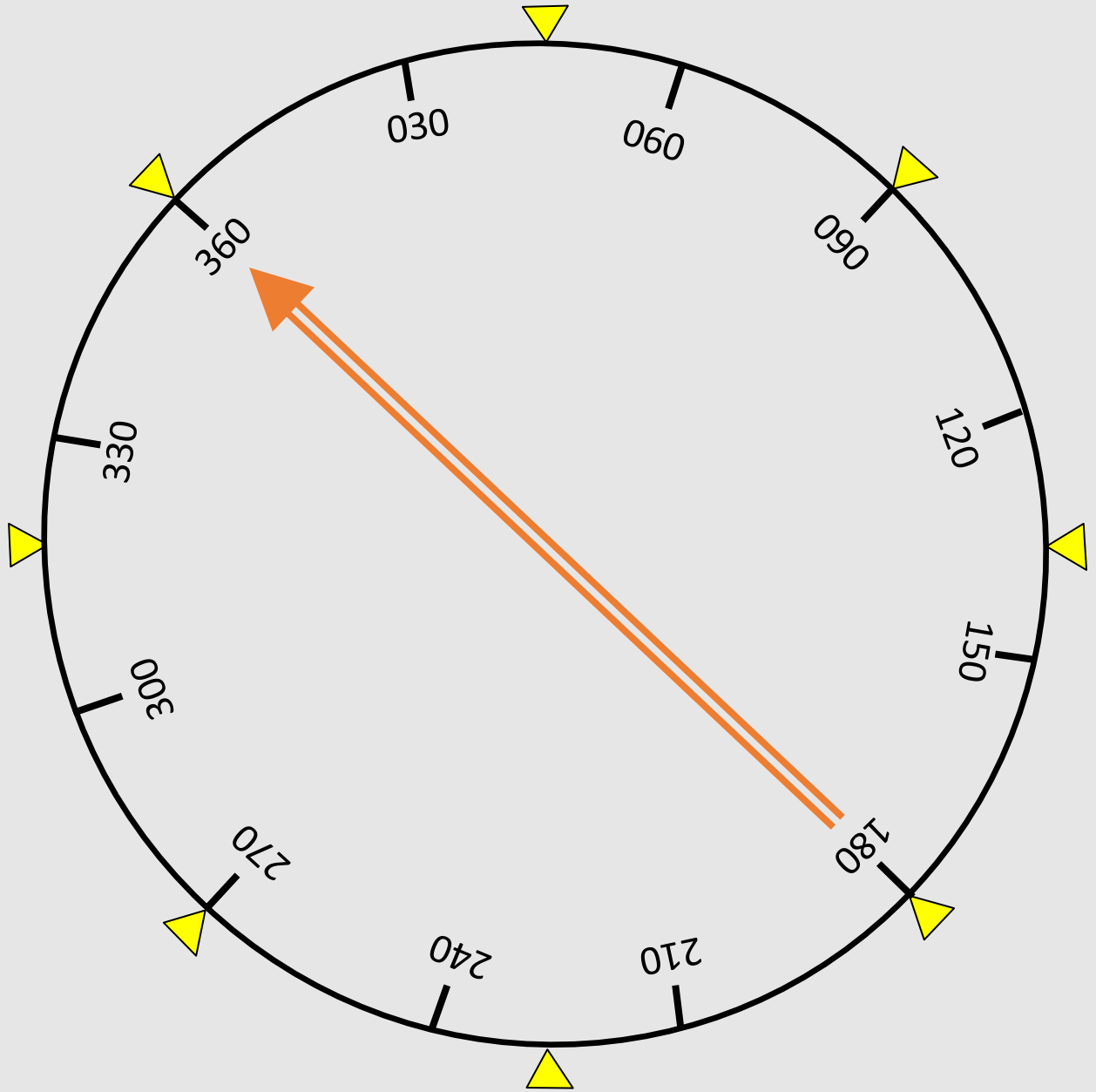
Intercept 150 Radial I/B

Determine angle of difference
TRT
Put “what”, “where”?
Head of the Needle on 1st upper 45 B/M



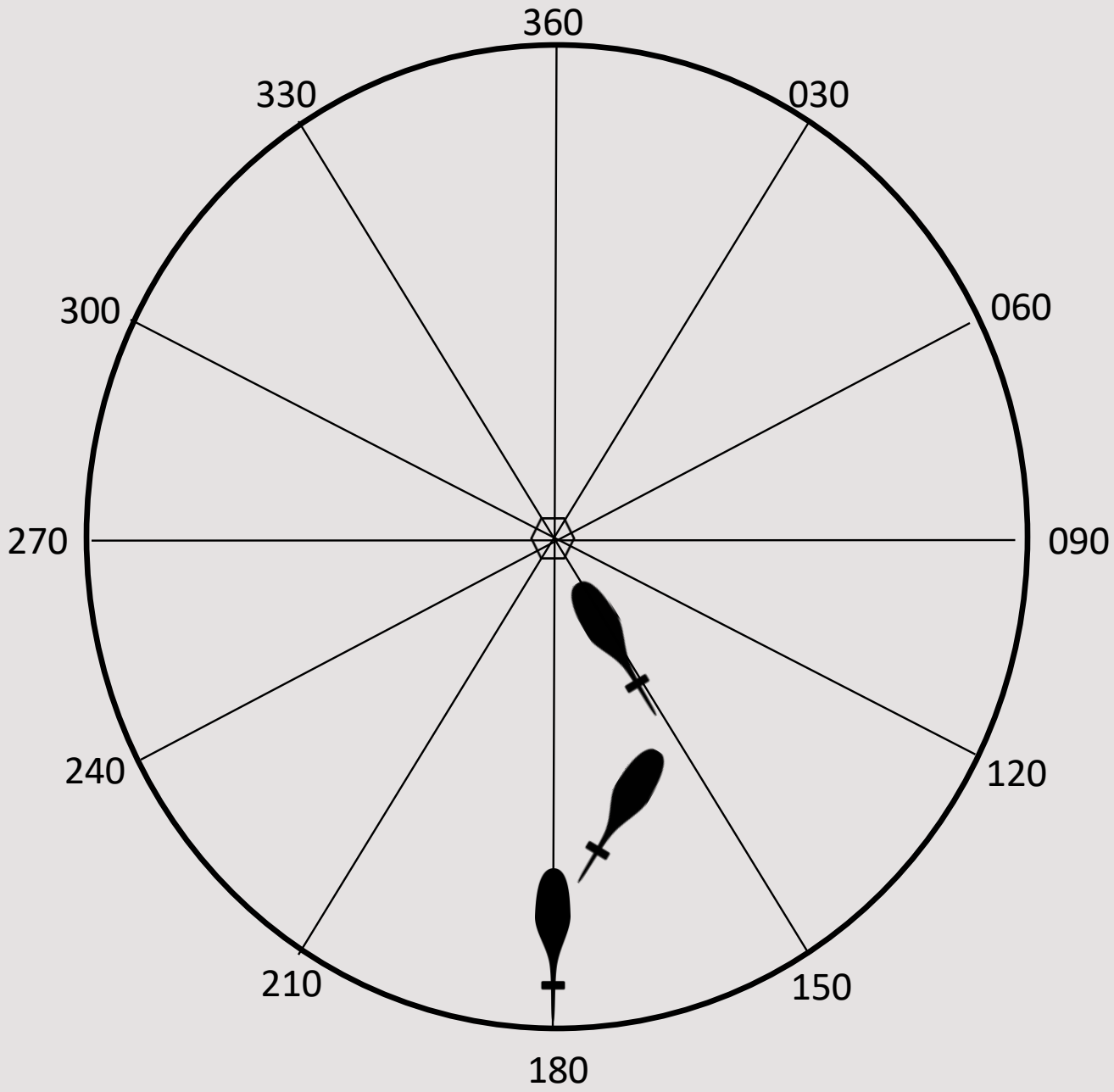
Intercept 150 Radial

Have IP Bug Heading
Twist HSI to Desire Course – Tail on 150
Head ? / Tail ?
Head Falls / Tail Rises



030
060
090
120
150
180
210
240
270
300
330
360

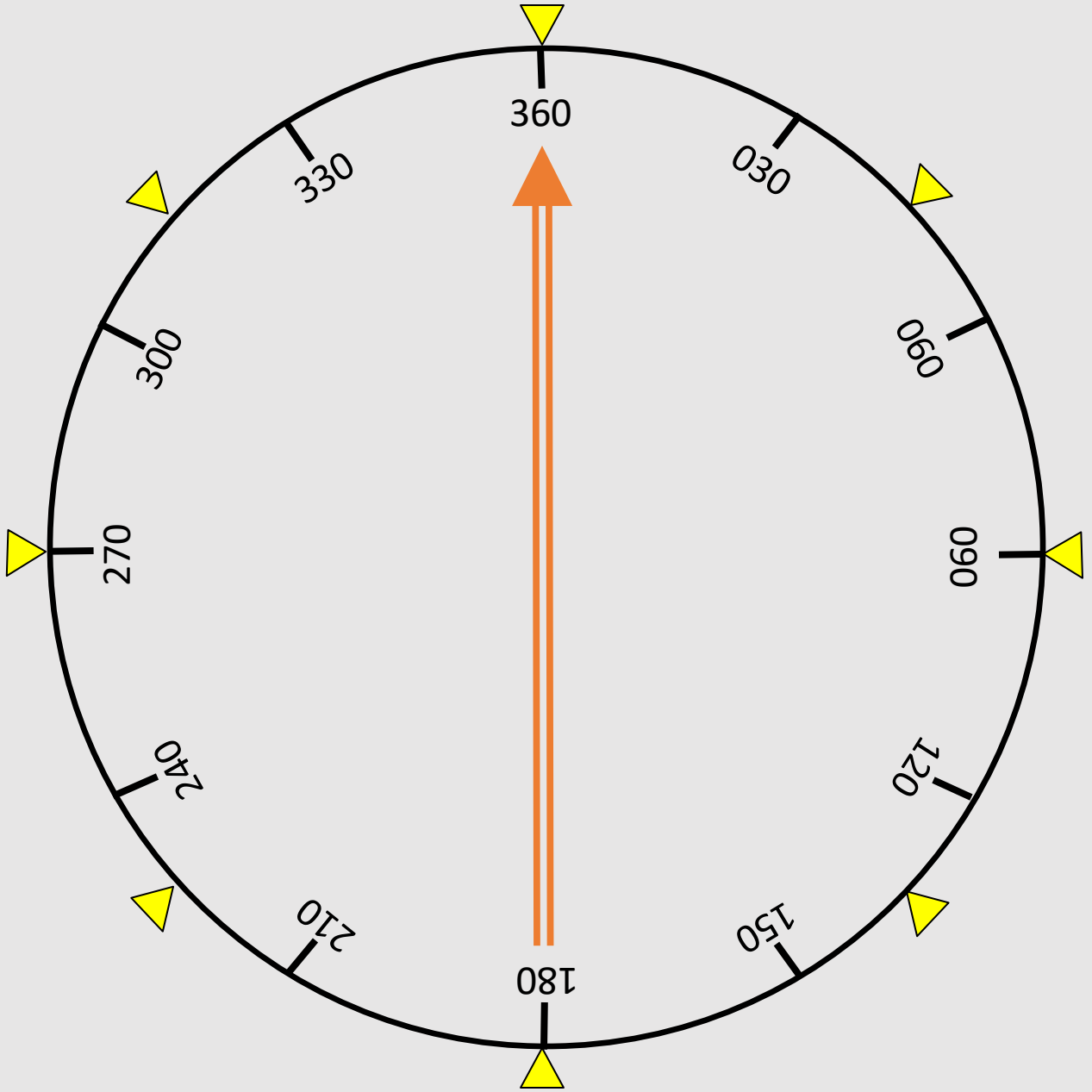
330
360
030
060
090
120
150
180
210
240
270
300



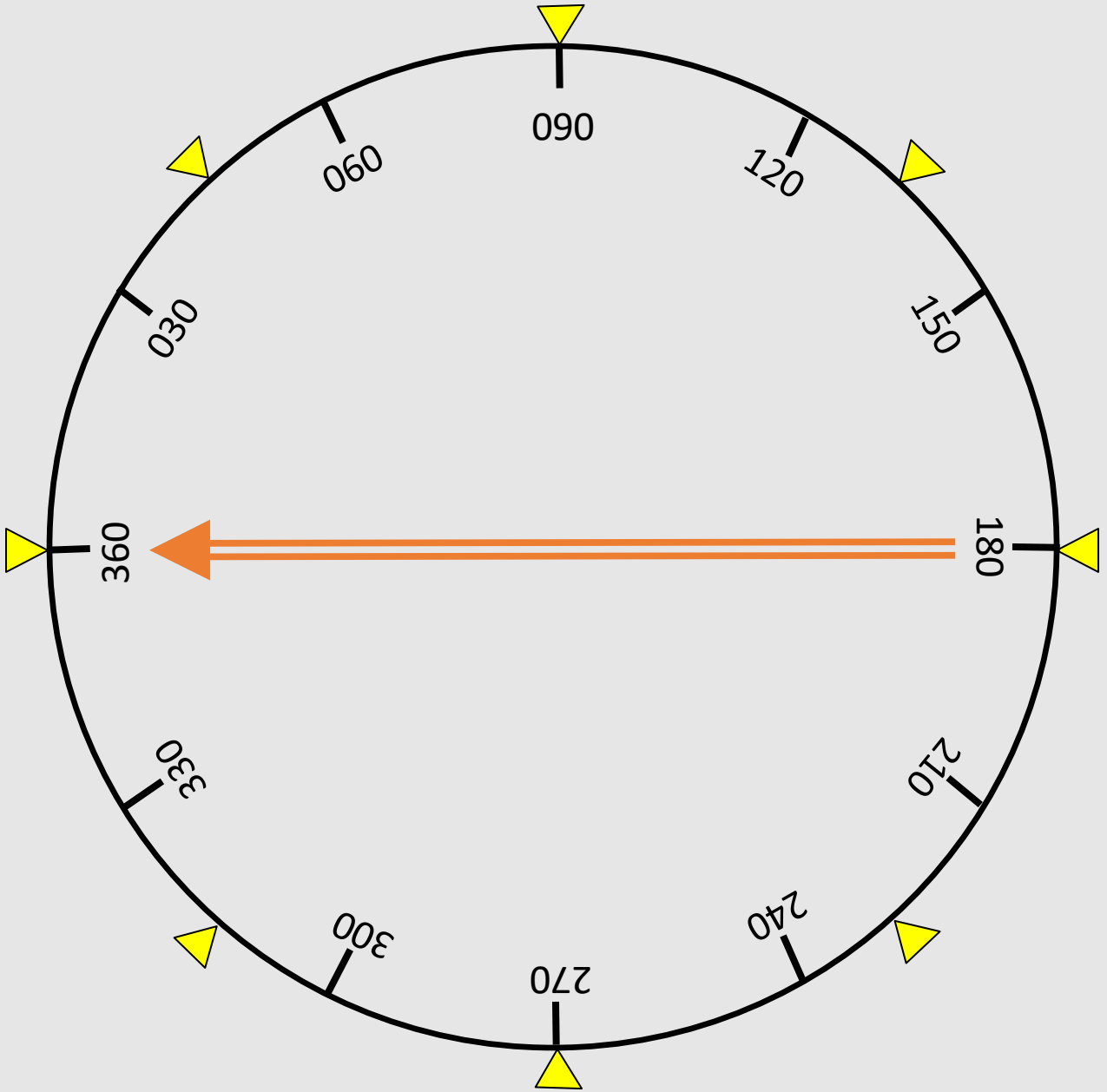
Intercept 150 I/B

Intercept 090 Radial I/B

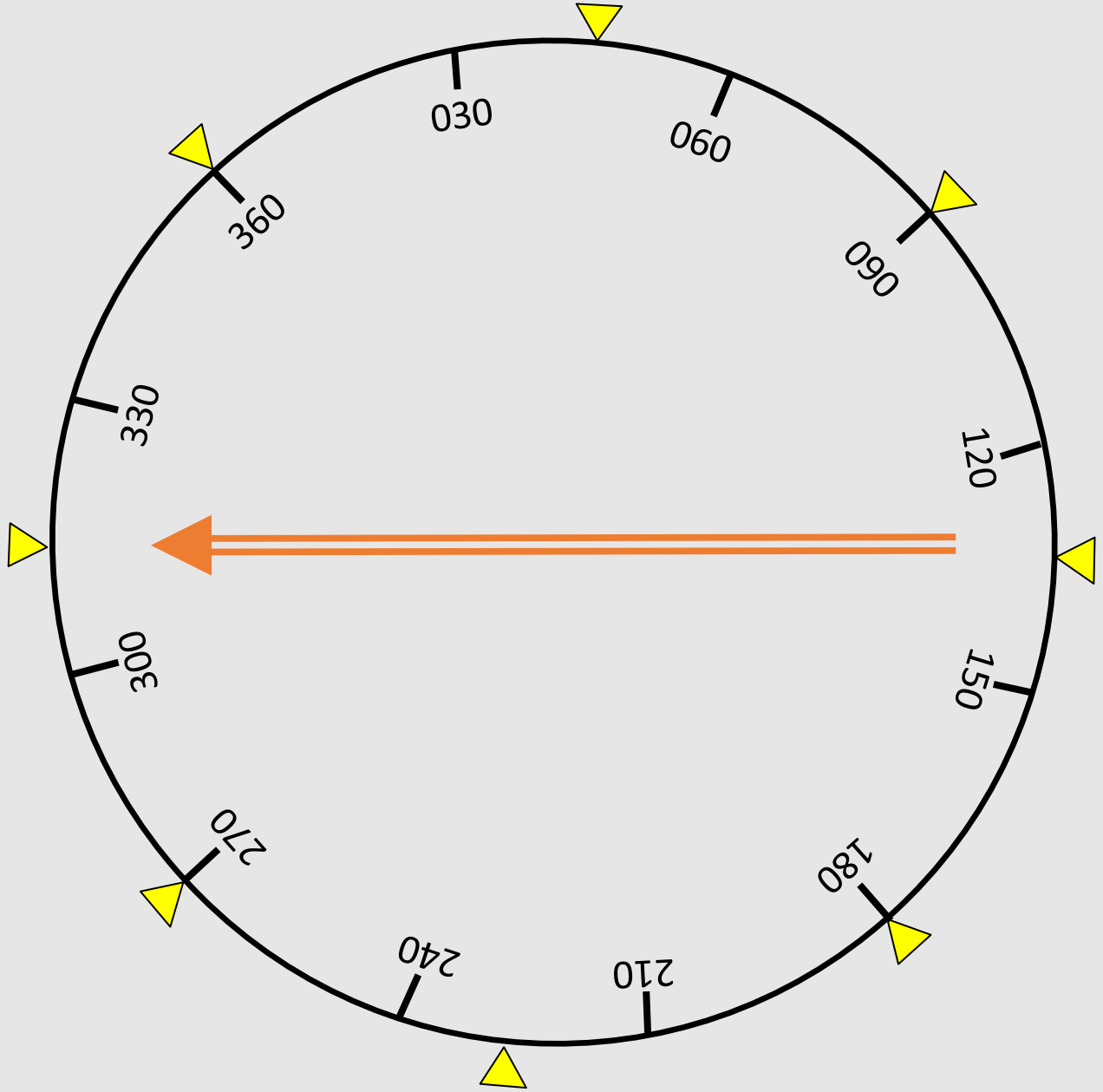
Determine angle of difference
TRT
Put “what”, “where”?
Needle on 90 / 270



Intercept 090 Radial I/B

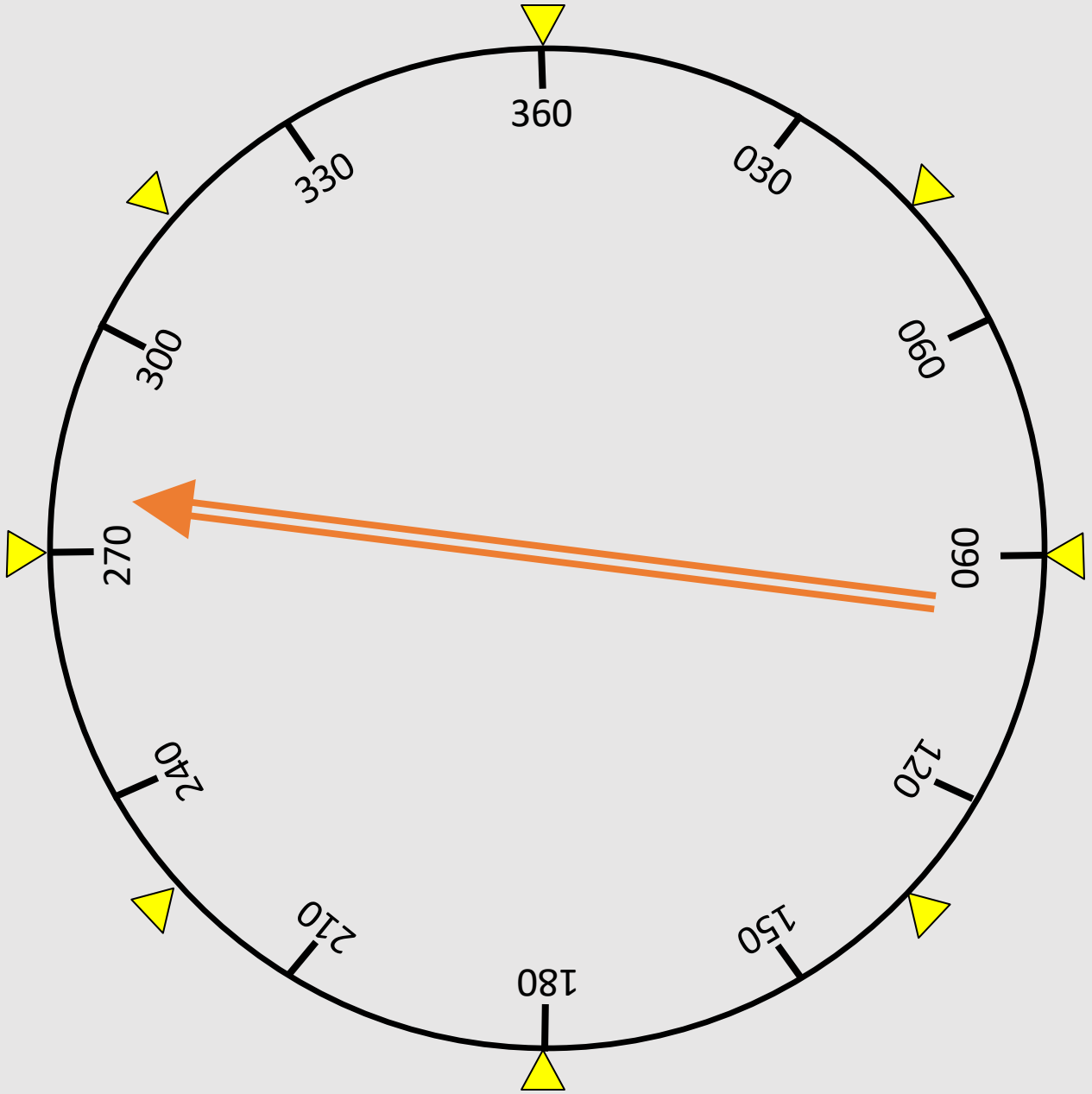


Intercept 090 Radial I/B

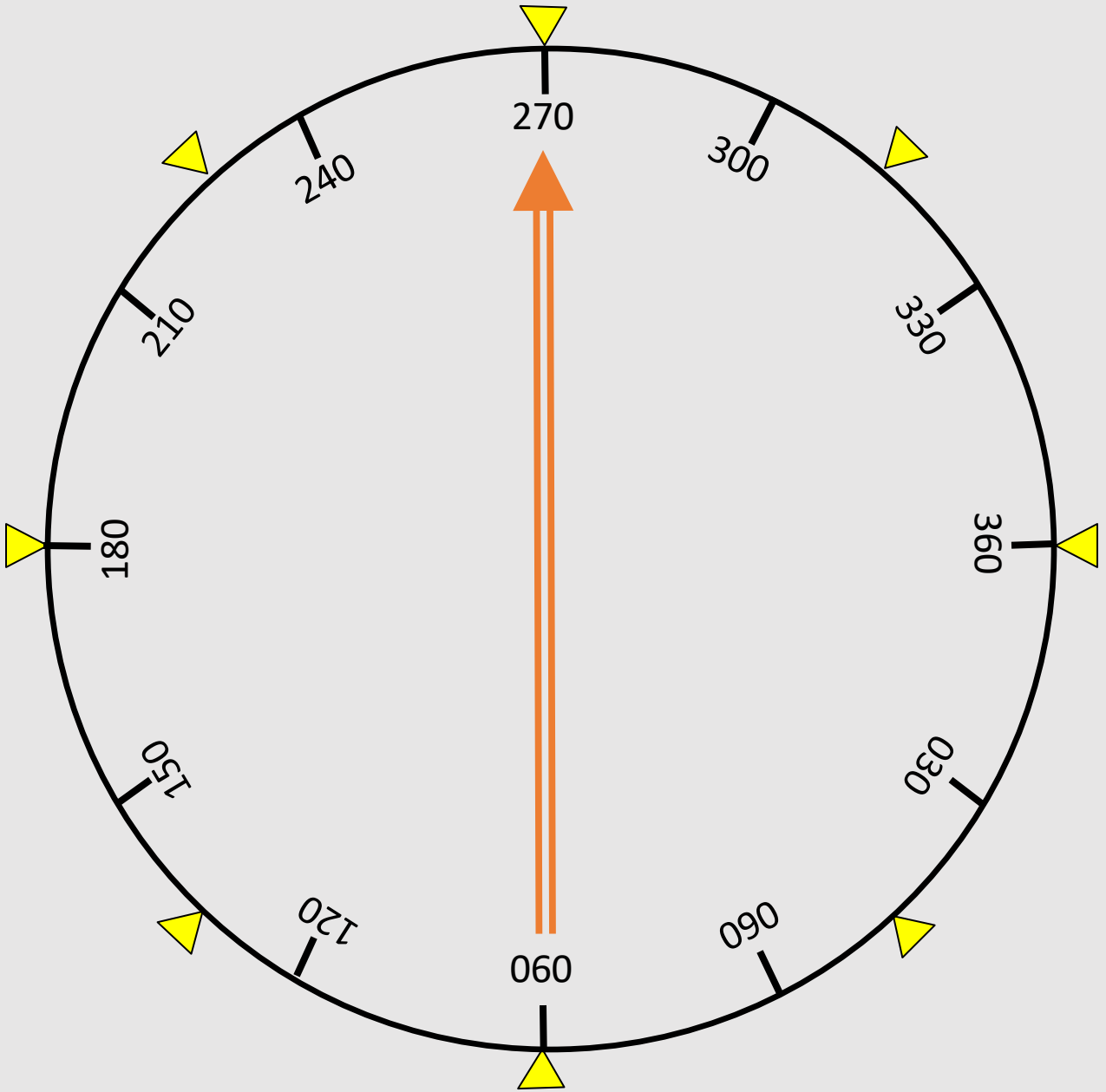


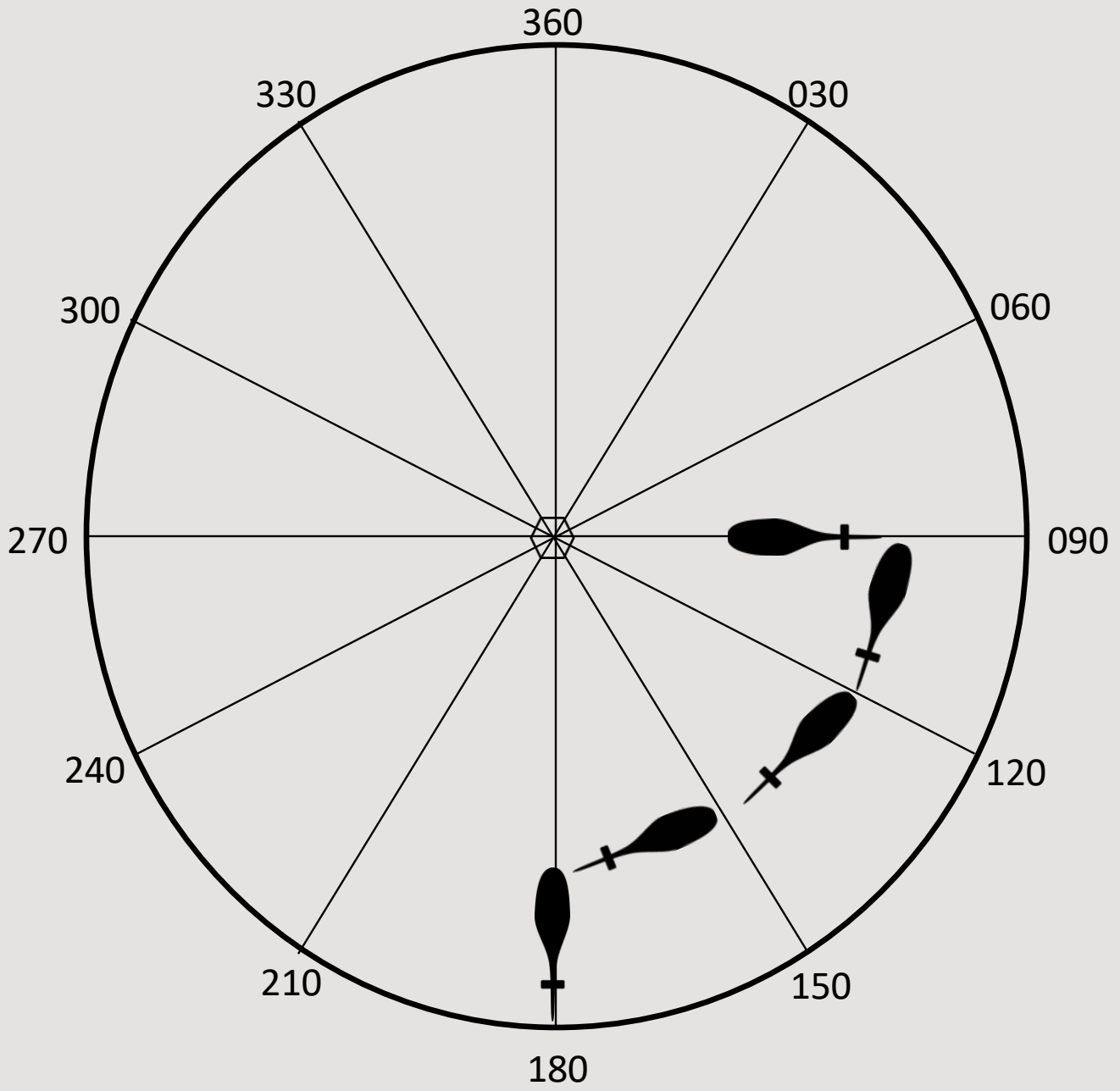
Intercept 090 Radial I/B

Lead arc by how many radials?
30/DME



Intercept 090 Radial I/B



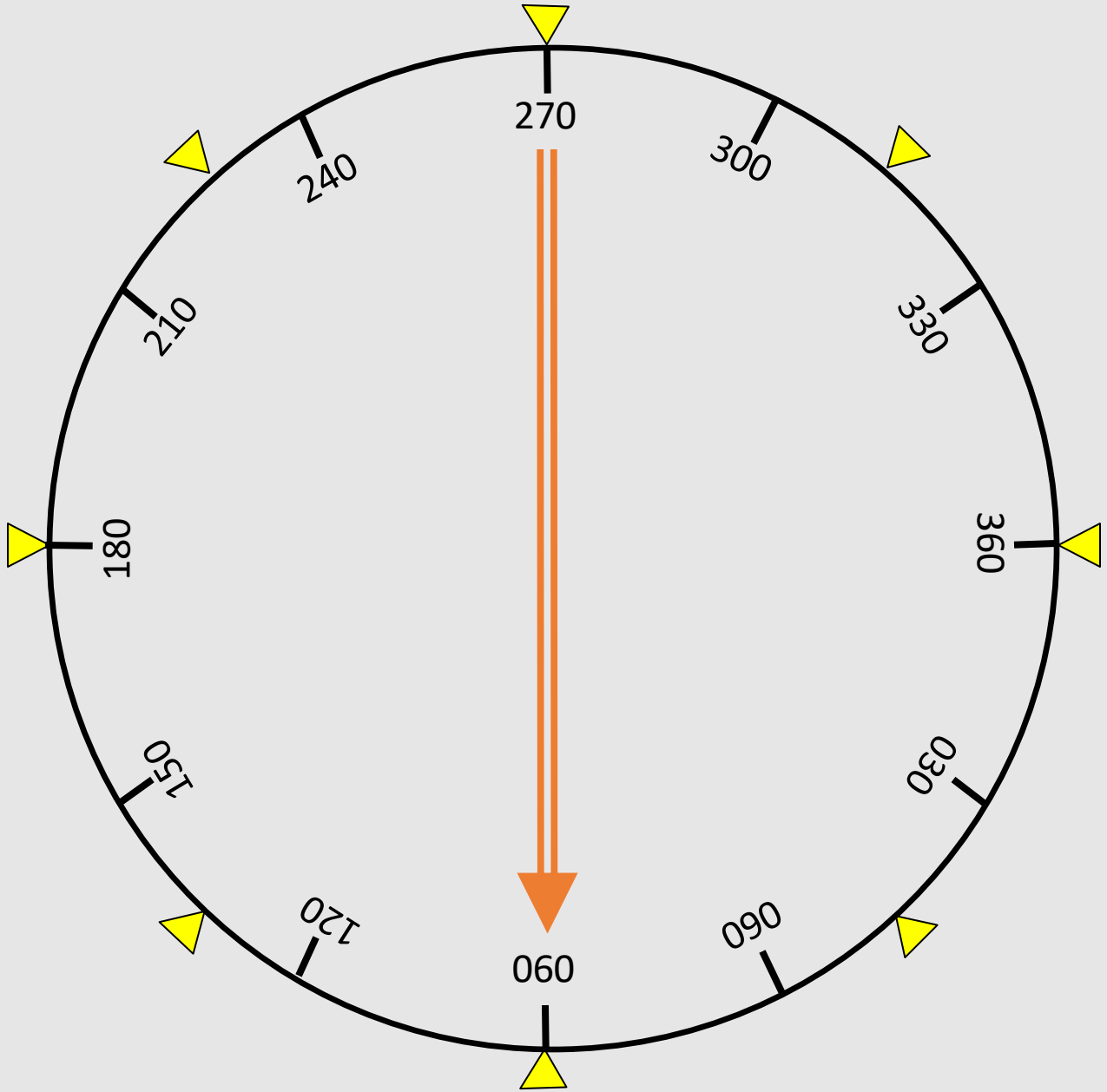


Lead off arc by 30/DME

Intercept 090 I/B

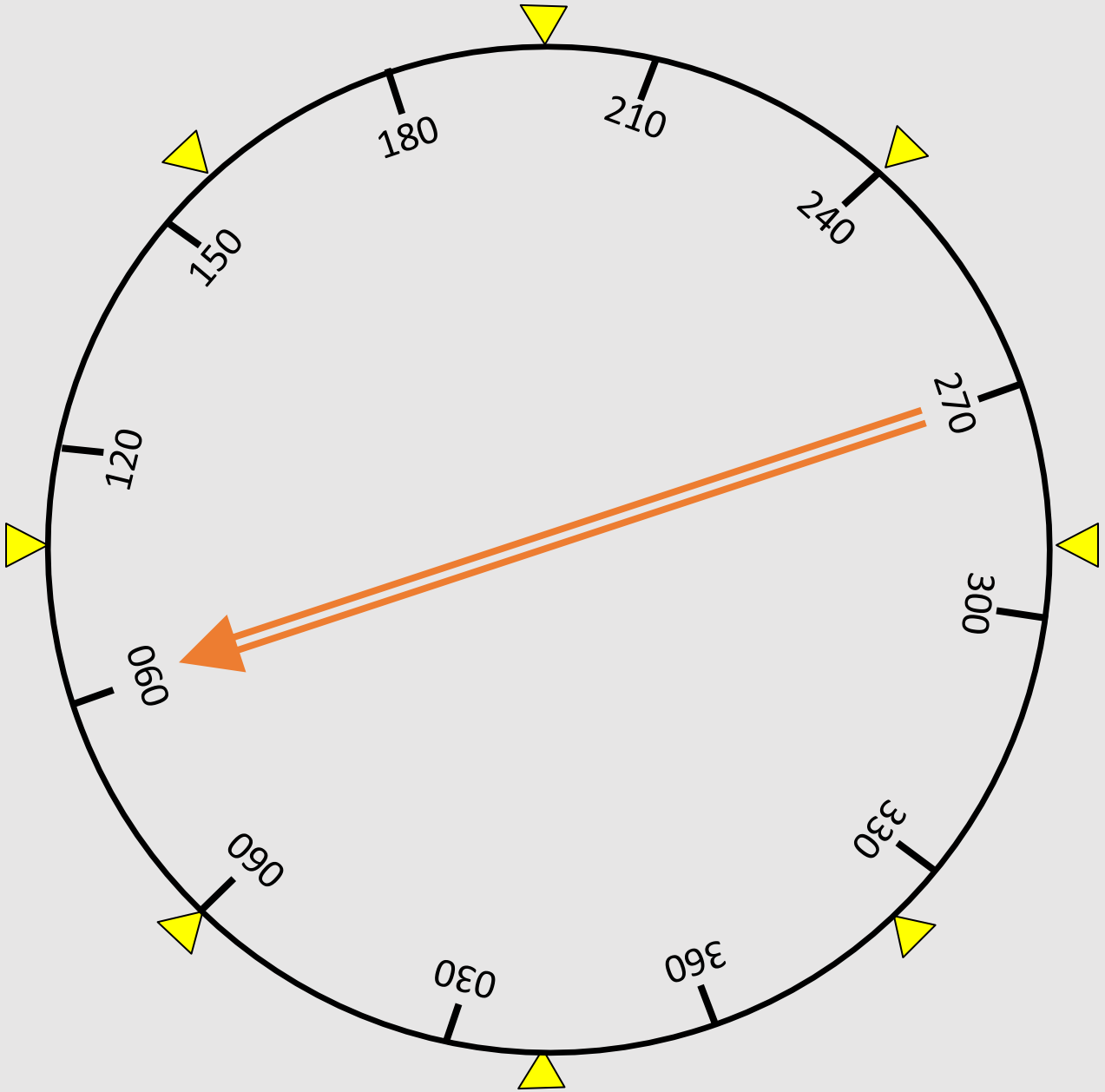
Intercept 240 Radial O/B

Determine angle of difference
TRT
Put “what”, “where”?
Desired radial on the first upper 45 B/M

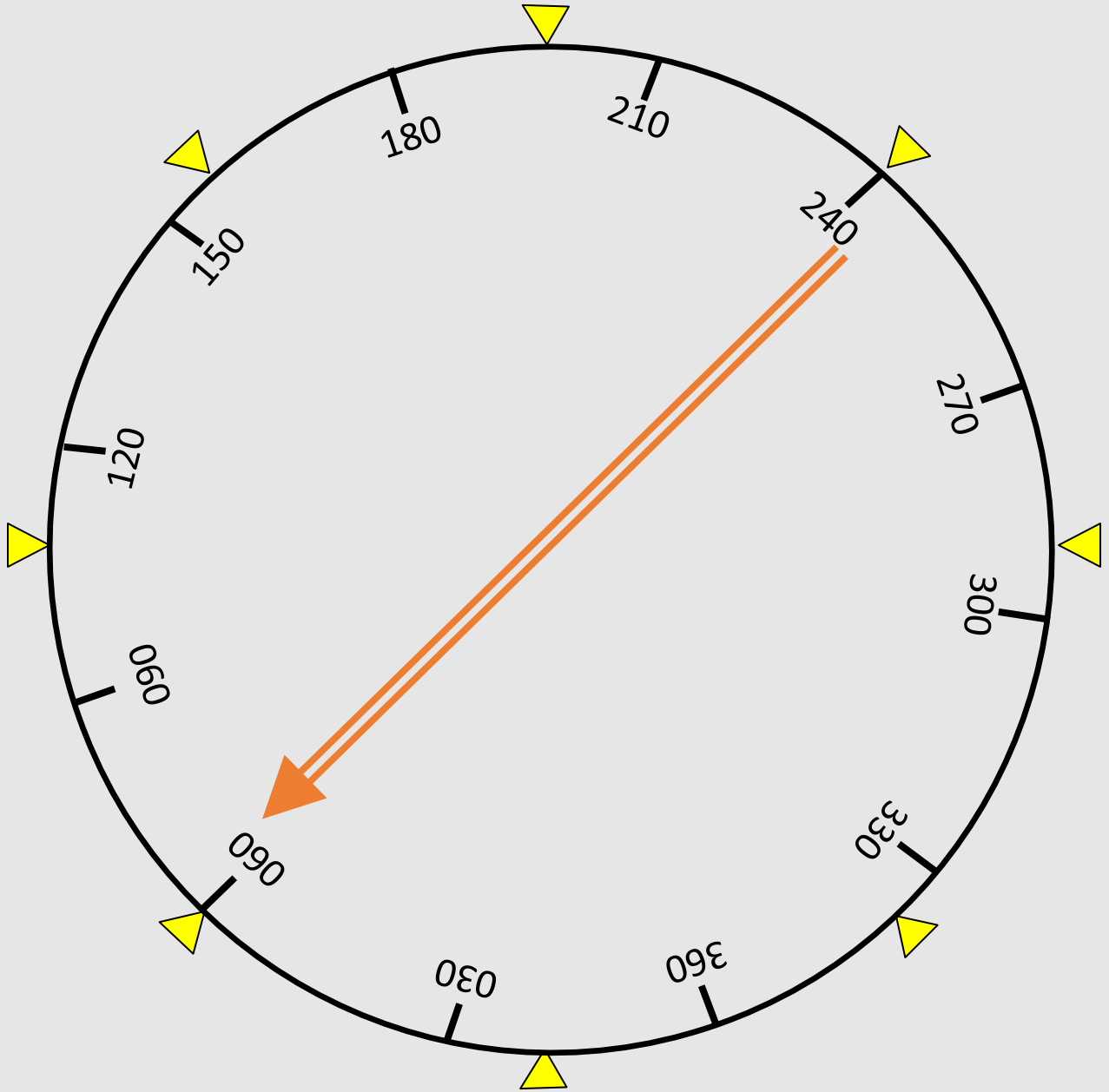


Intercept 240 Radial O/B

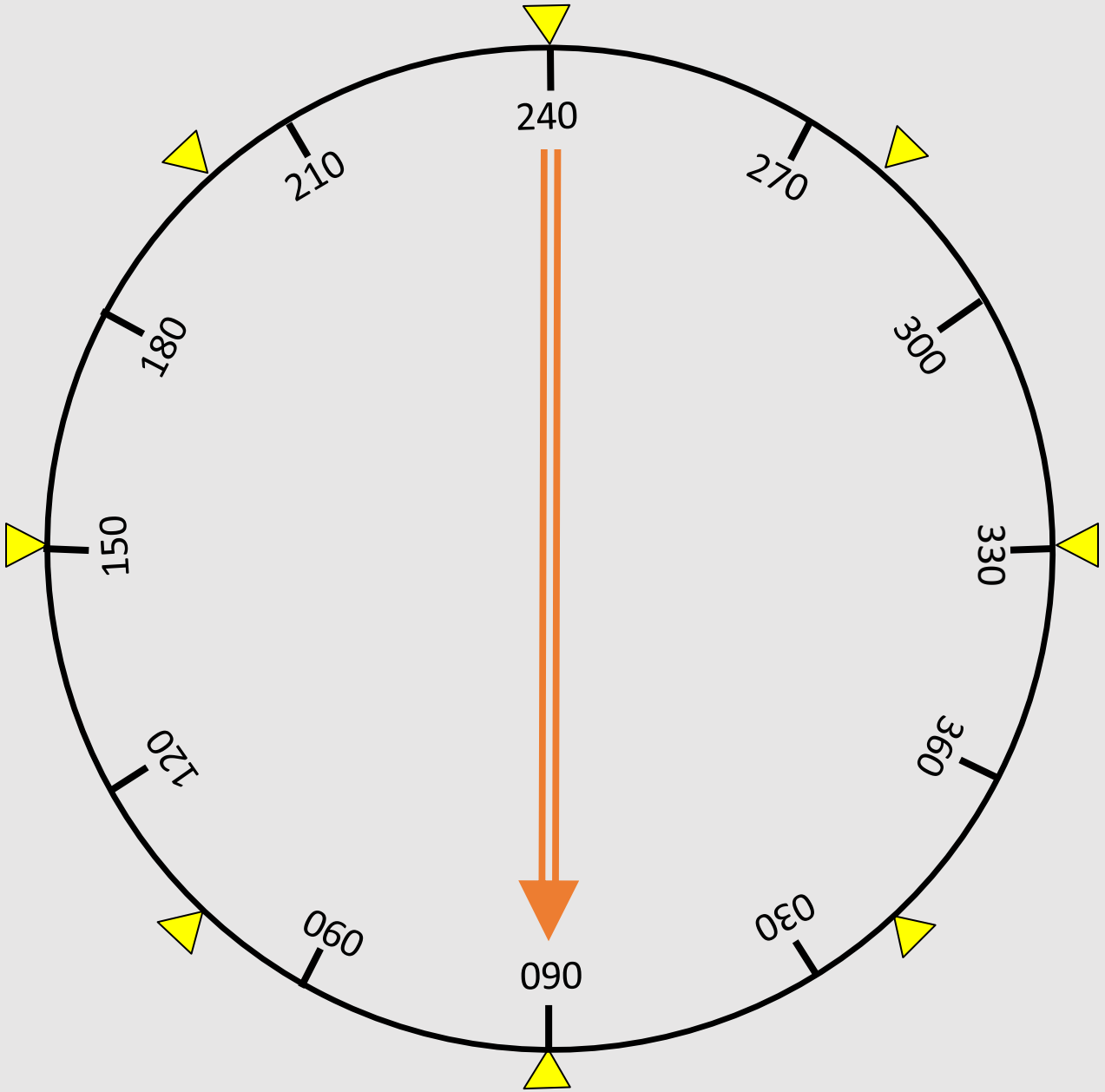
Head ? / Tail ?
Head Falls / Tail Rises

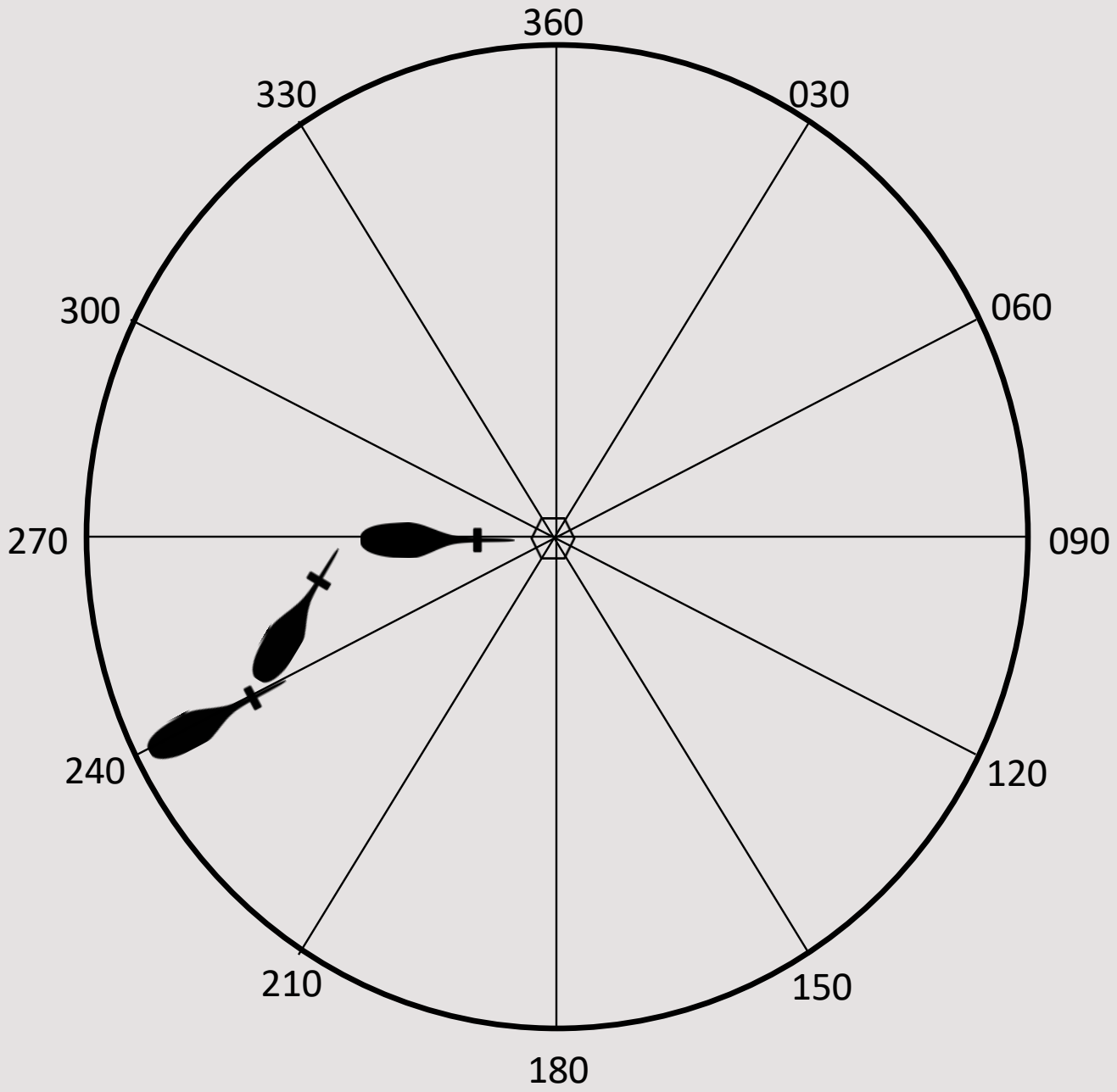


Intercept 240 Radial O/B



Intercept 240 Radial O/B

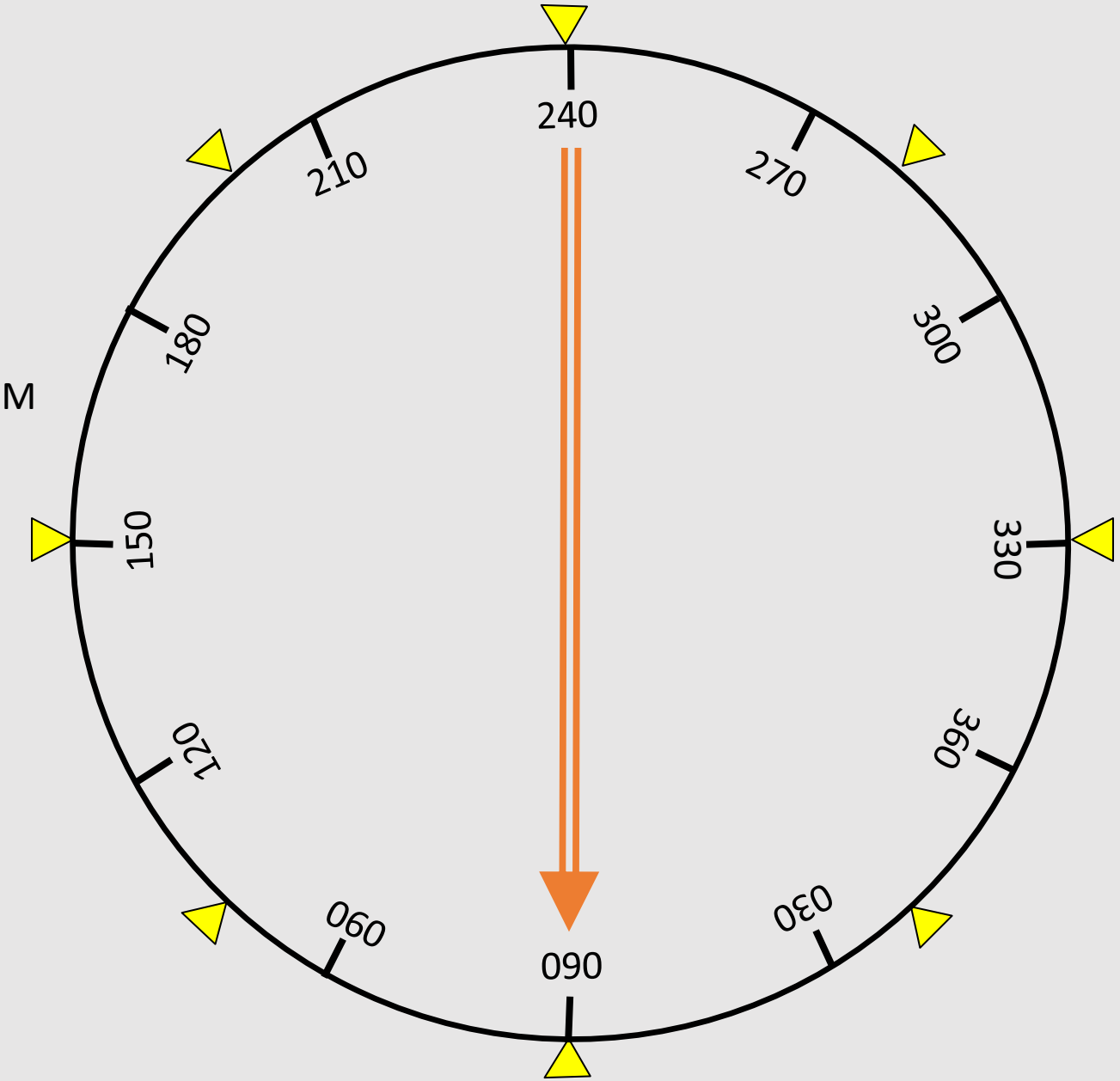




Intercept 240 O/B

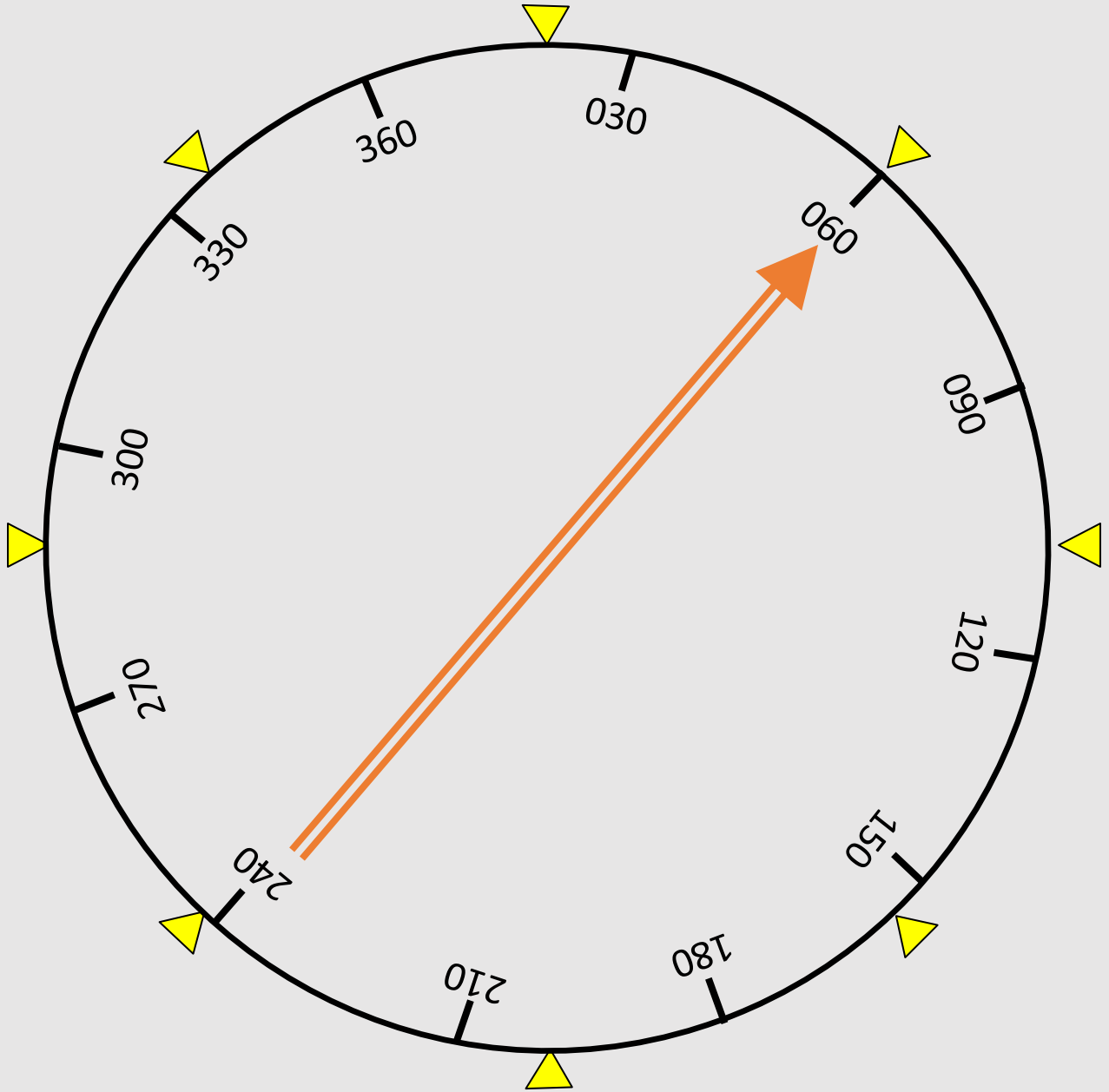
Intercept 270 Radial I/B

Determine angle of difference
TRT
Put “what”, “where”?
Head of the Needle on the first upper 45 B/M

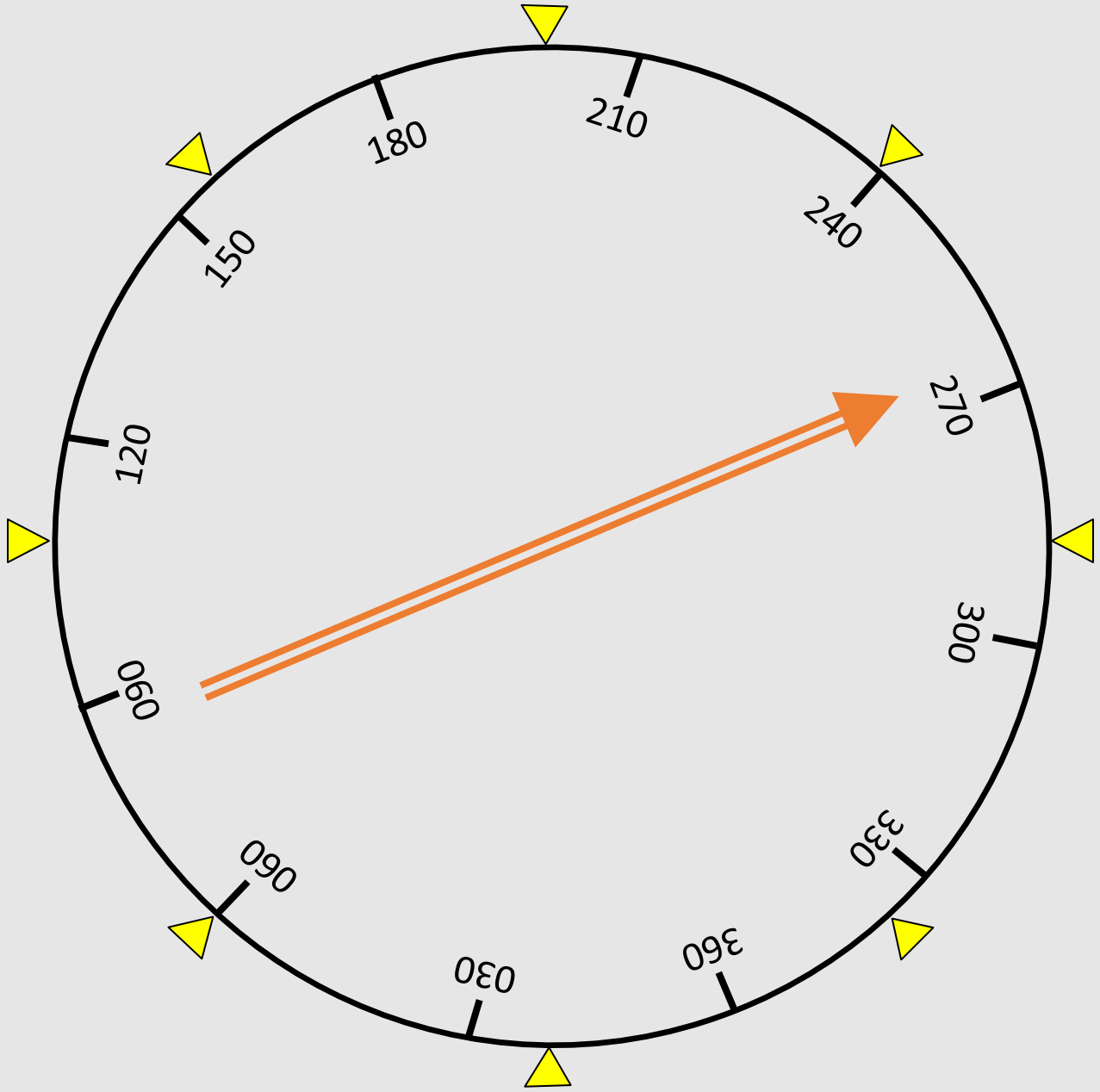


Intercept 270 Radial I/B

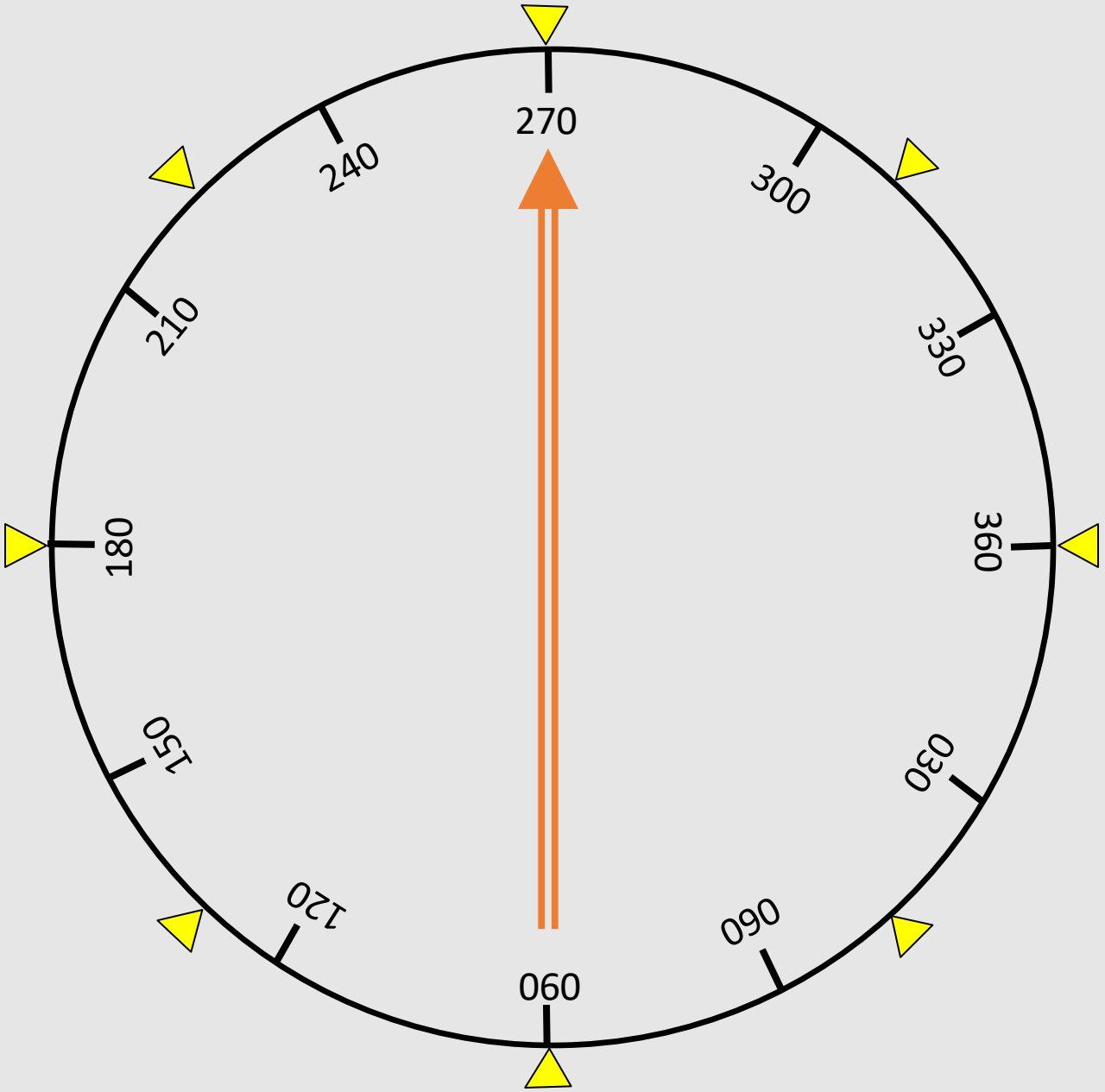
Head ? / Tail ?
Head Falls / Tail Rises

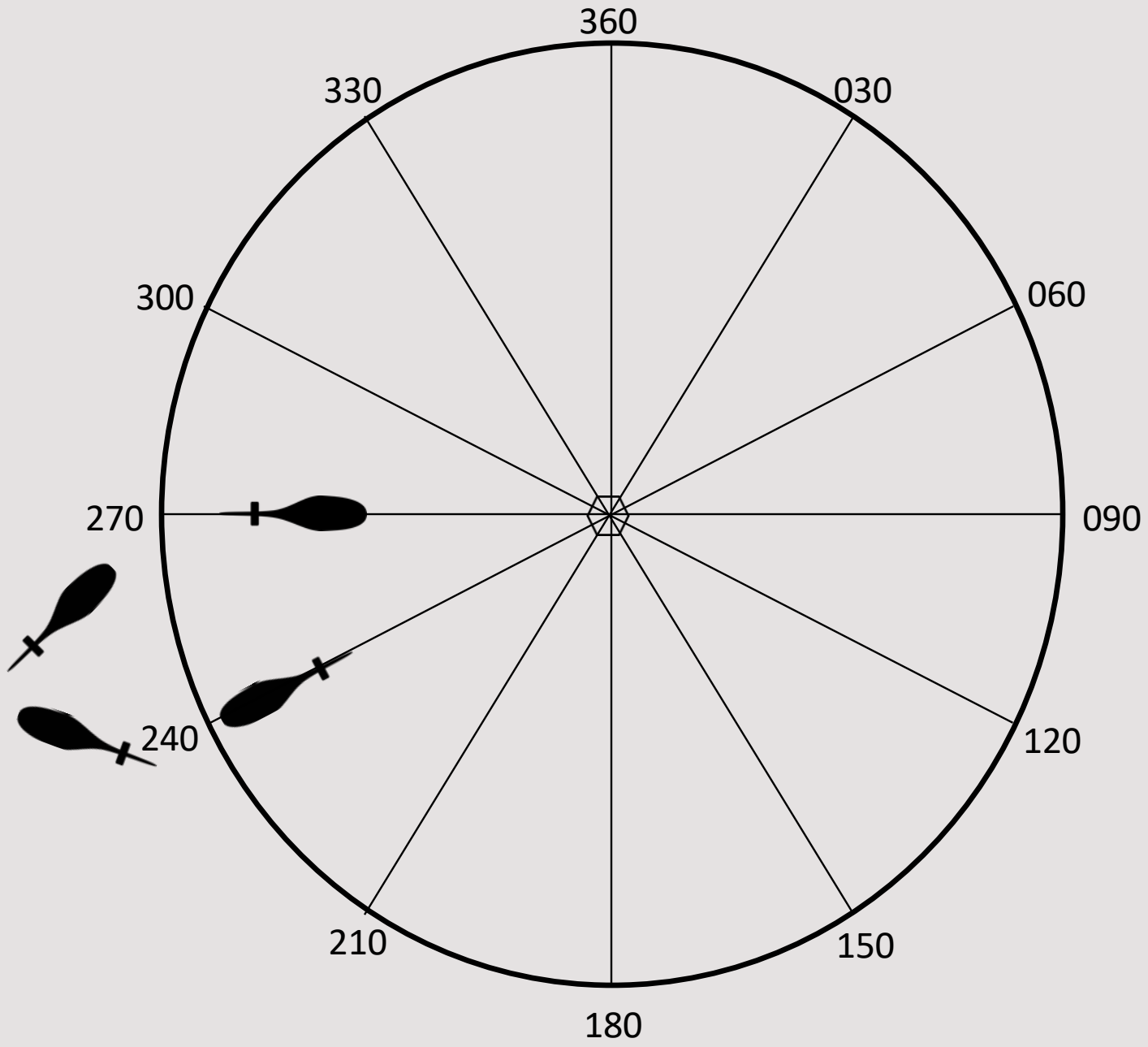


Intercept 270 Radial I/B



Intercept 270 Radial I/B

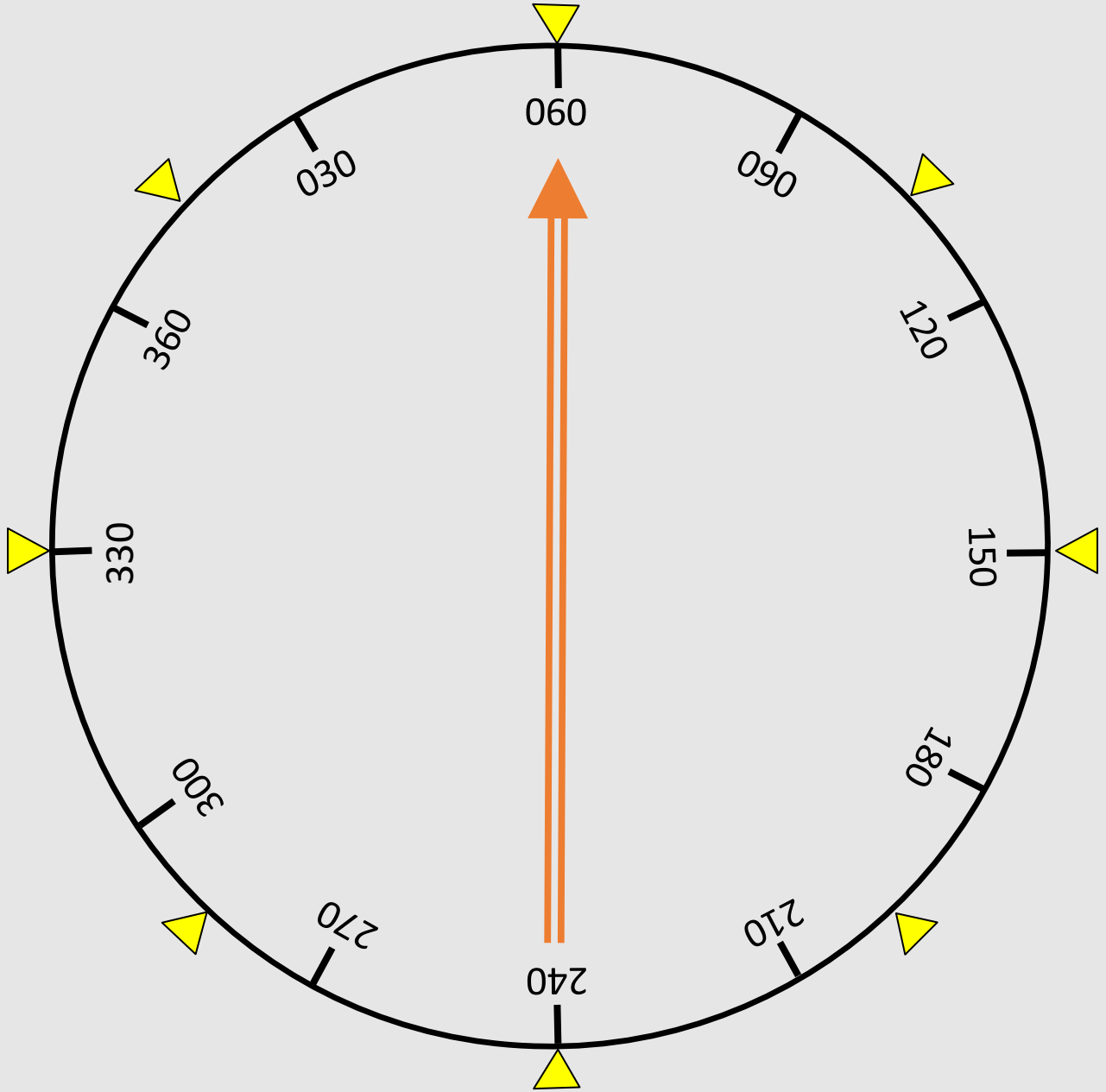




Intercept 270 I/B

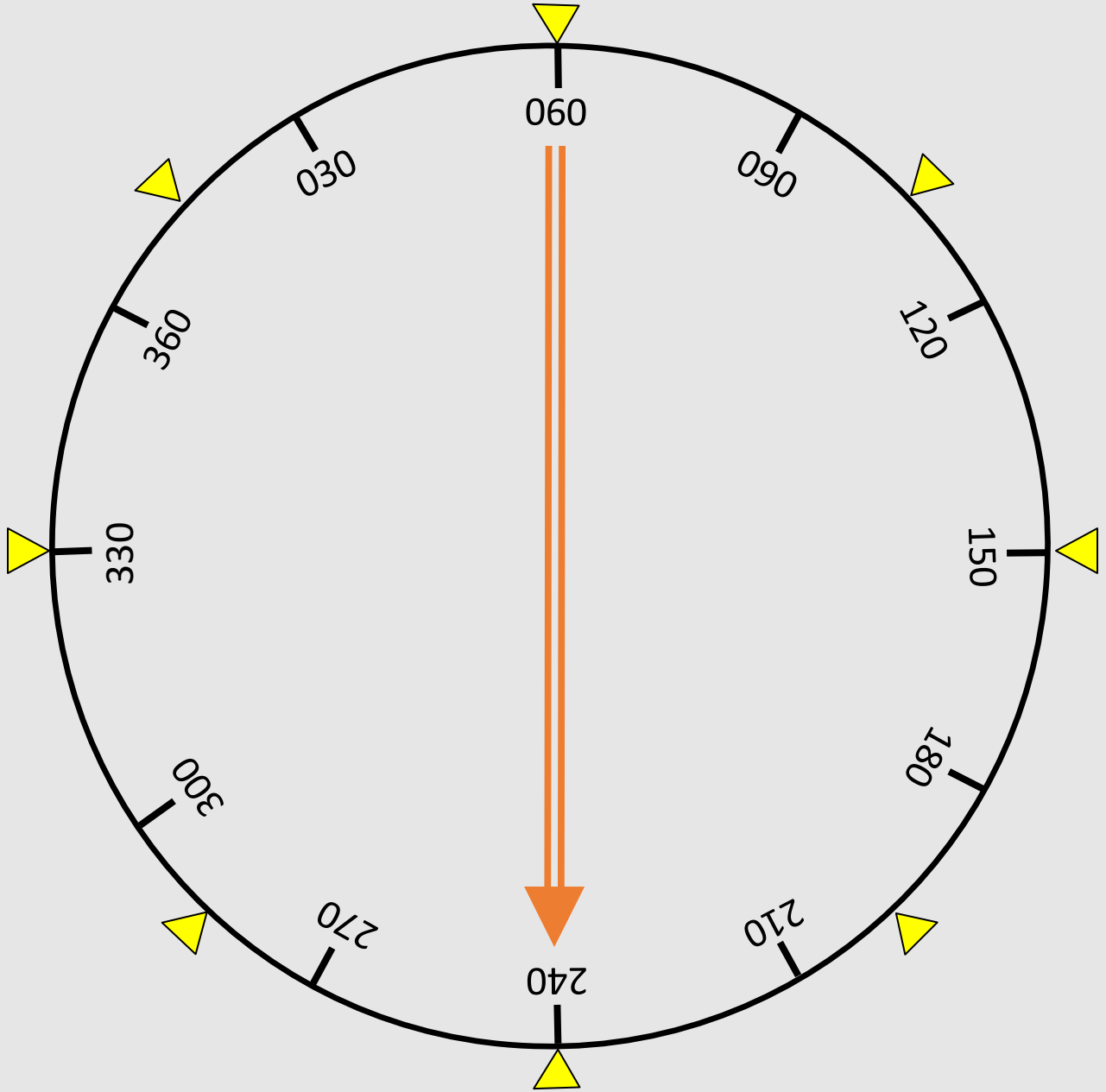
Intercept 030 Radial O/B

Determine angle of difference
Greater than 120 Degrees



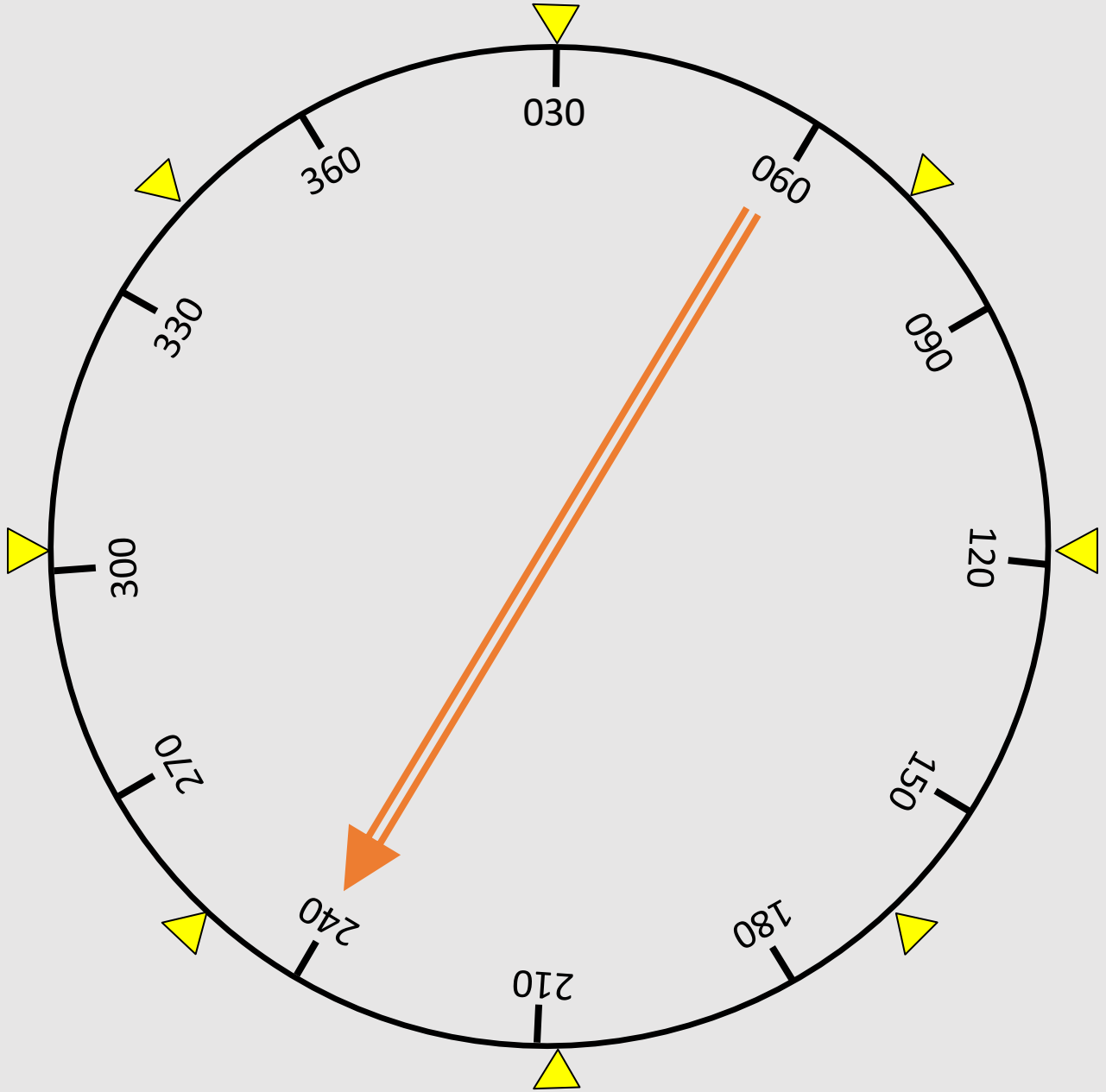
Intercept 030 Radial O/B

Over the Stations – 6Ts
Turn To?



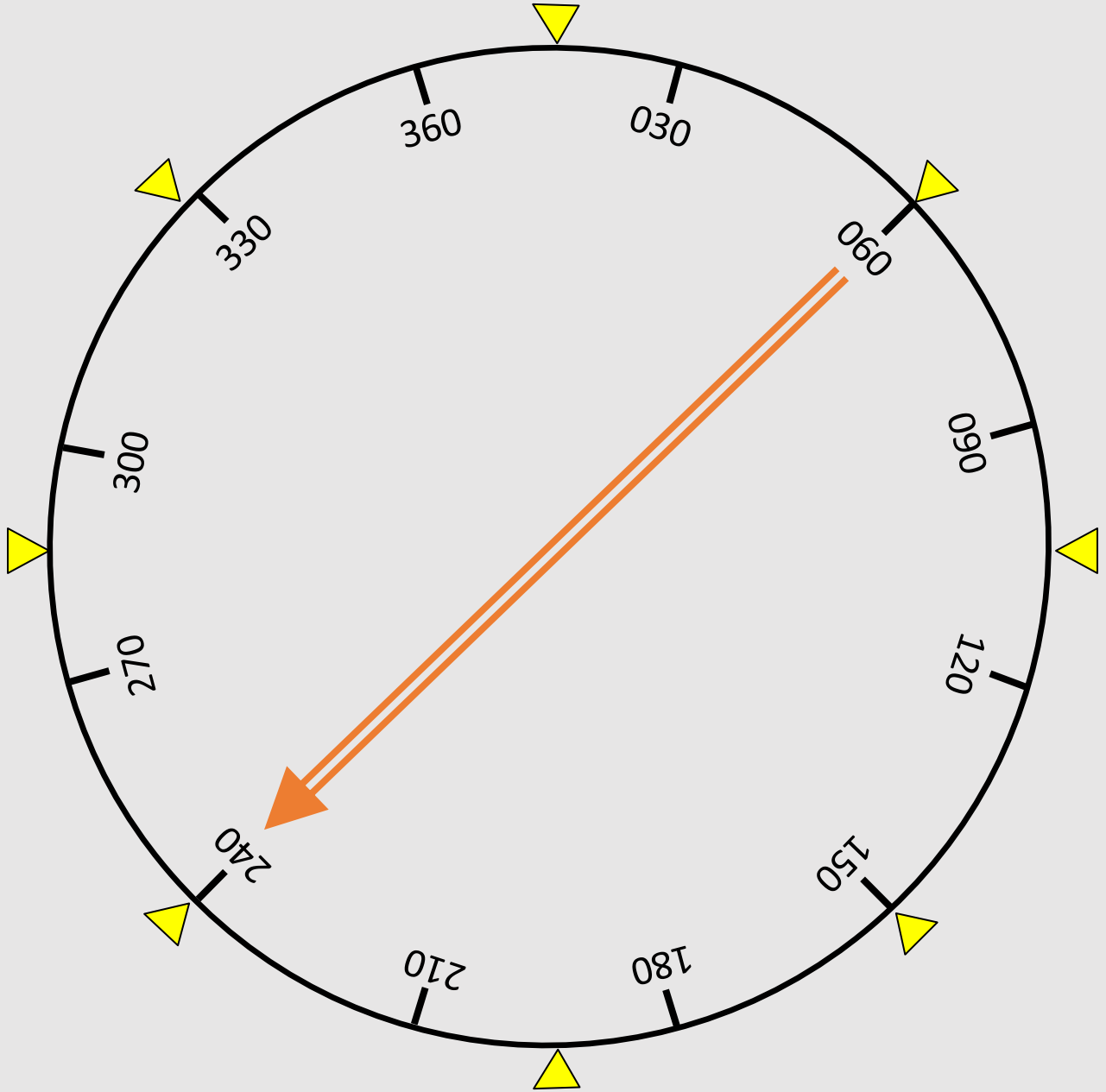
Intercept 030 Radial O/B

Turn to Parallel Radial
Tail – Radial - Turn
Put in 15 to 30 Degree Intercept

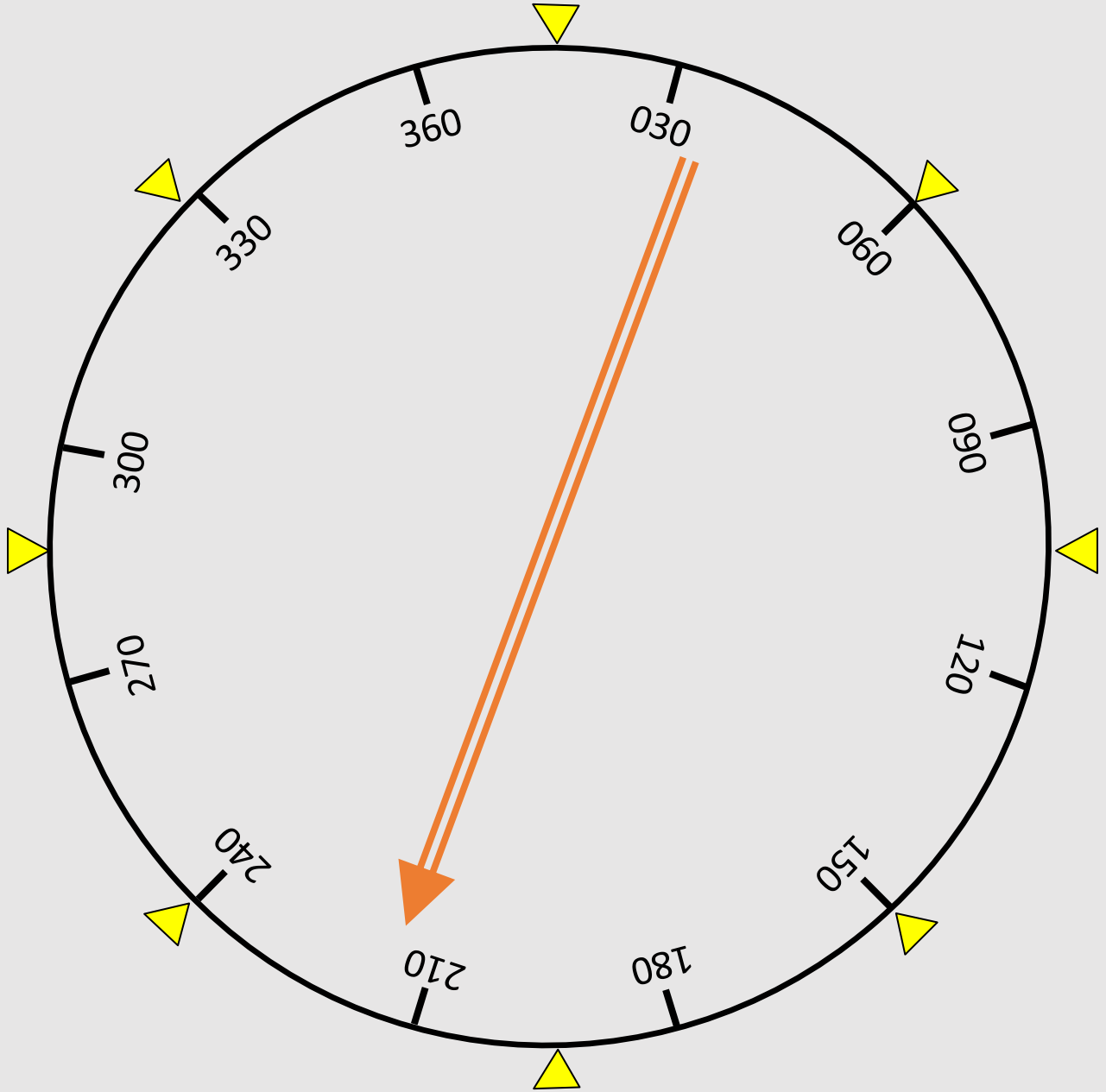


Intercept 030 Radial O/B

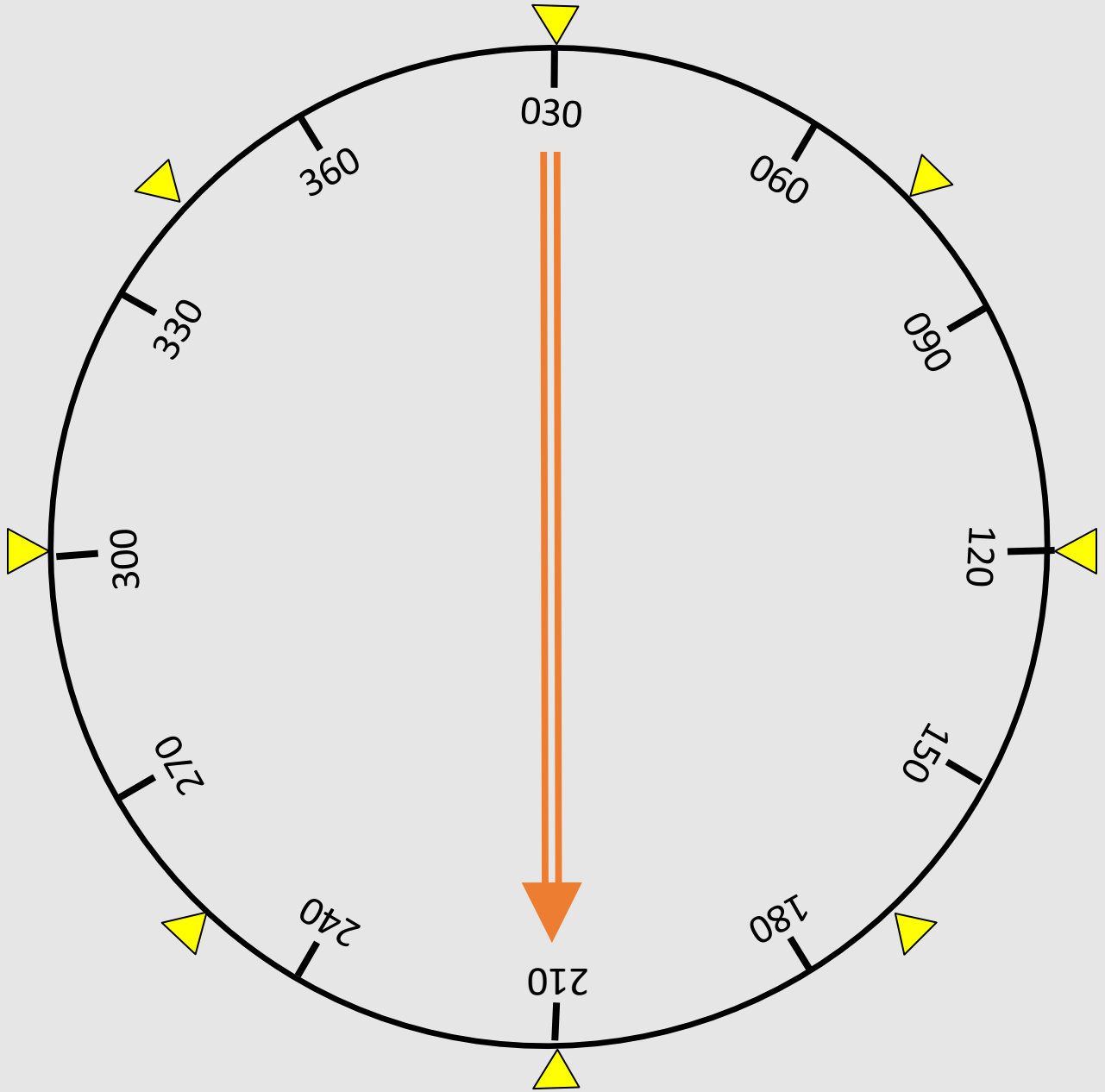
Head Falls – Tail Rises

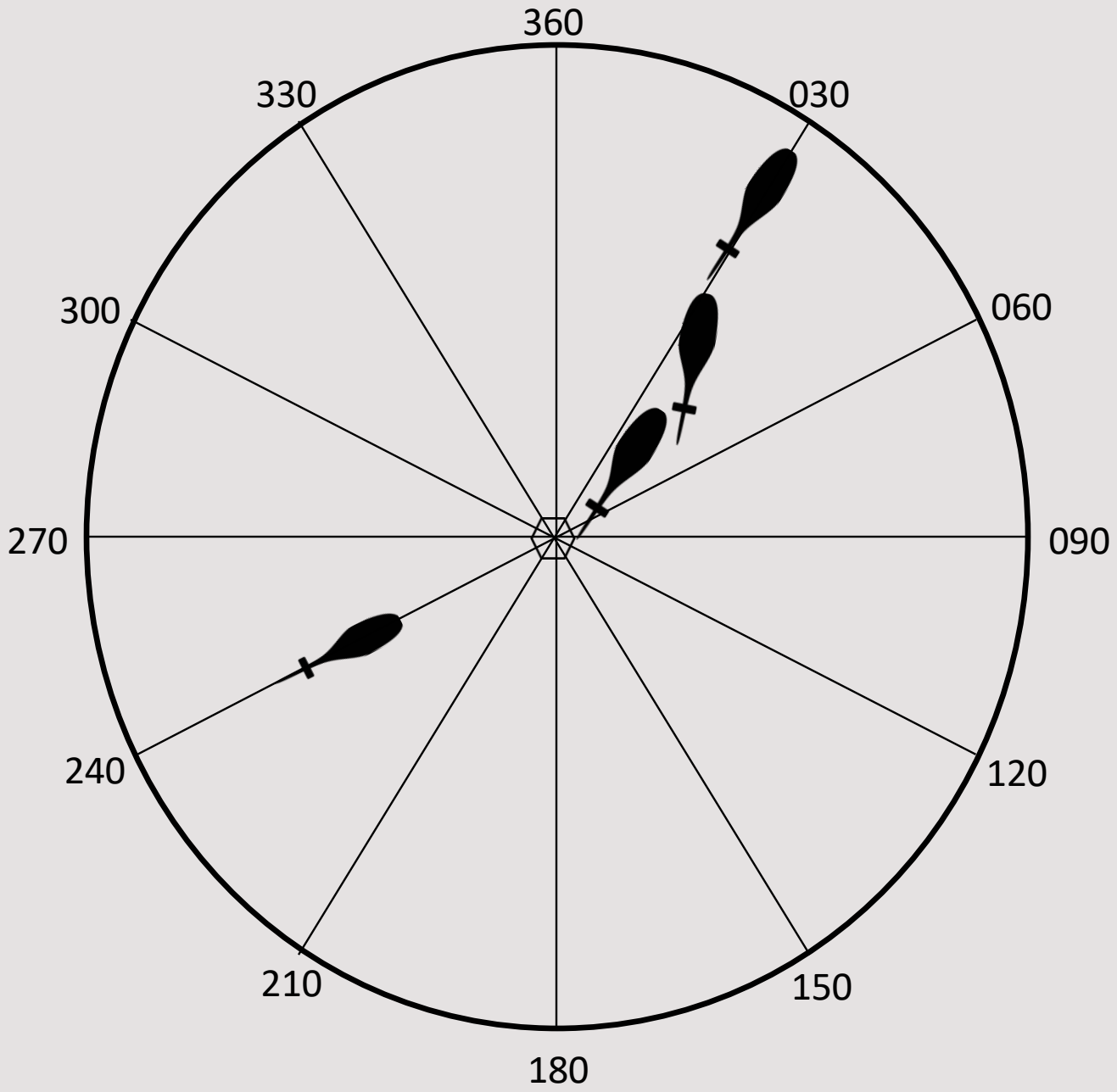


Intercept 030 Radial O/B



Intercept 030 Radial O/B





Intercept 030 O/B

Required Voice Reports

- At All Times: VACATERS FEW
- **V**acating an previously assigned altitude for newly assigned altitude
- **A**ltitude change when VFR on top.
- Unable to **C**limb or descend at least 500 FPM.
- When **A**pproach has been missed (Request clearance for specific action)
- Change in average **T**AS of 5% or 10 knots (whichever is greater)
- PTA arriving at holding fix or point to which cleared. **E**ntering/**E**xiting Holding
- Loss of NAVAIDs or COMM **R**adios.
- Any information related to **S**afety of flight.

Required Voice Reports

- Non-radar (radar contact lost or radar services terminated)
  - **F**AF (non-precision) or outer marker / GS intercept (precision)
  - Time **E**stimate error greater than 2 minutes; North Atlantic flights greater than 3 minutes.
  - Encountering **W**eather not forecast
  - Position reports at compulsory reporting points

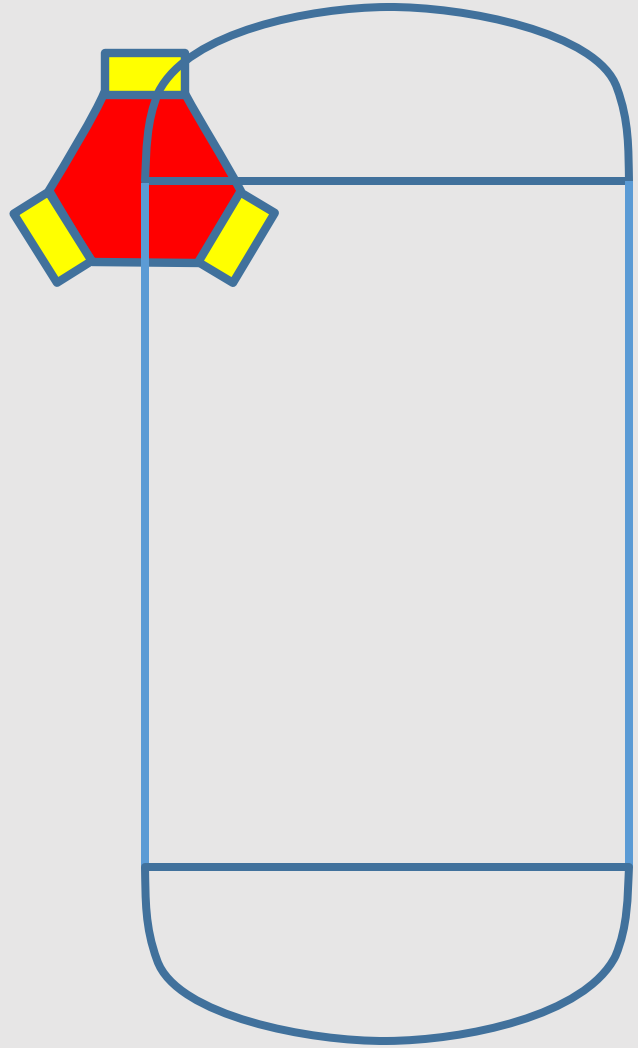
Position Reporting Points

- Non-radar environment
  - Initial PAT – “Navy 7E130, south of NAVIE, level 3000, estimating BFE at 45”.
  - After Initial – complete PTAPTP
- Radar contact lost
- PTAPTP
  - Identification
  - Position
  - Time
  - Altitude
  - Type of flight plan (not required in IFR)
  - Next reporting point and ETA
  - Name only of next succeeding reporting point along route of flight.

Holding

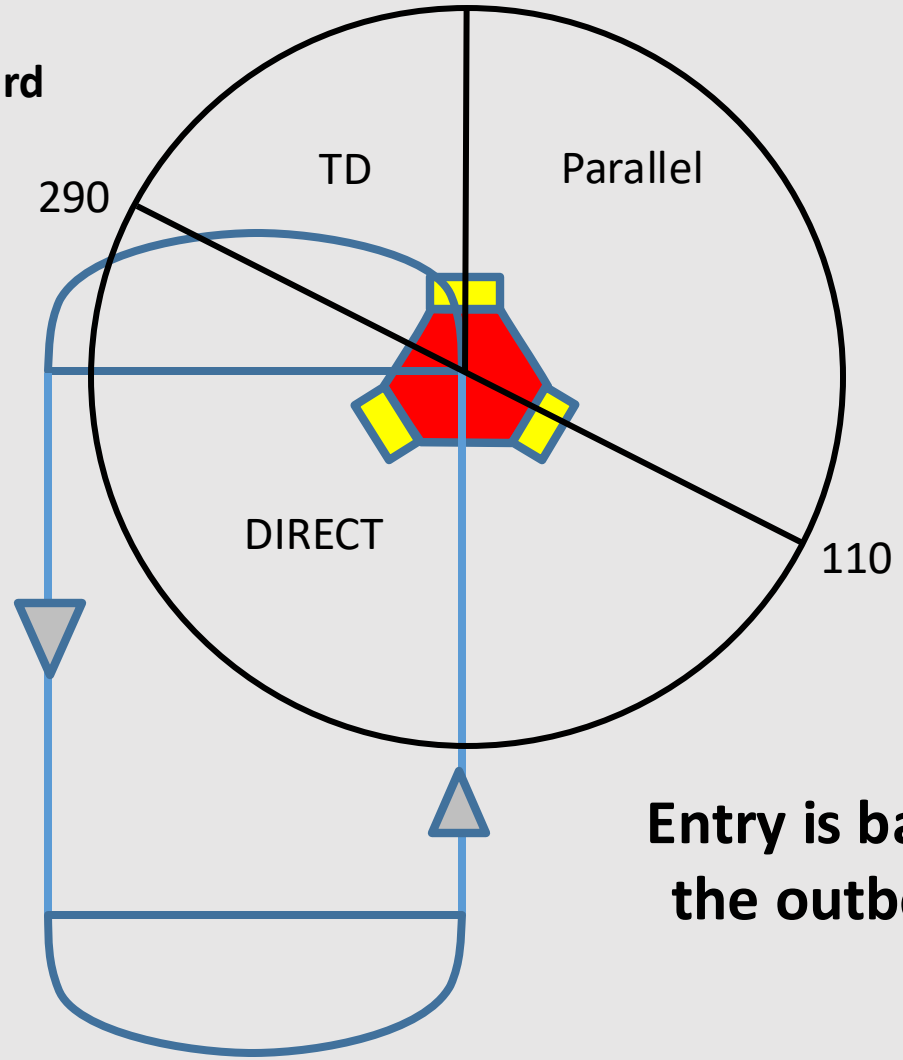
- ATC Provided Info
  - Holding Fix
  - Direction of holding from the fix in terms of eight cardinal compass points (N, NE, E, SE, etc)
  - Radial, course, bearing, airway or route on which a/c is to hold
  - Leg Length in miles if DME or RNAV is to be used. (If non-standard otherwise 1 minute)
  - Turn Direction (If non-standard otherwise right turn)
  - EFC

- Navy 7E130 hold south on the 180 radial off of CEW, EFC 1500.

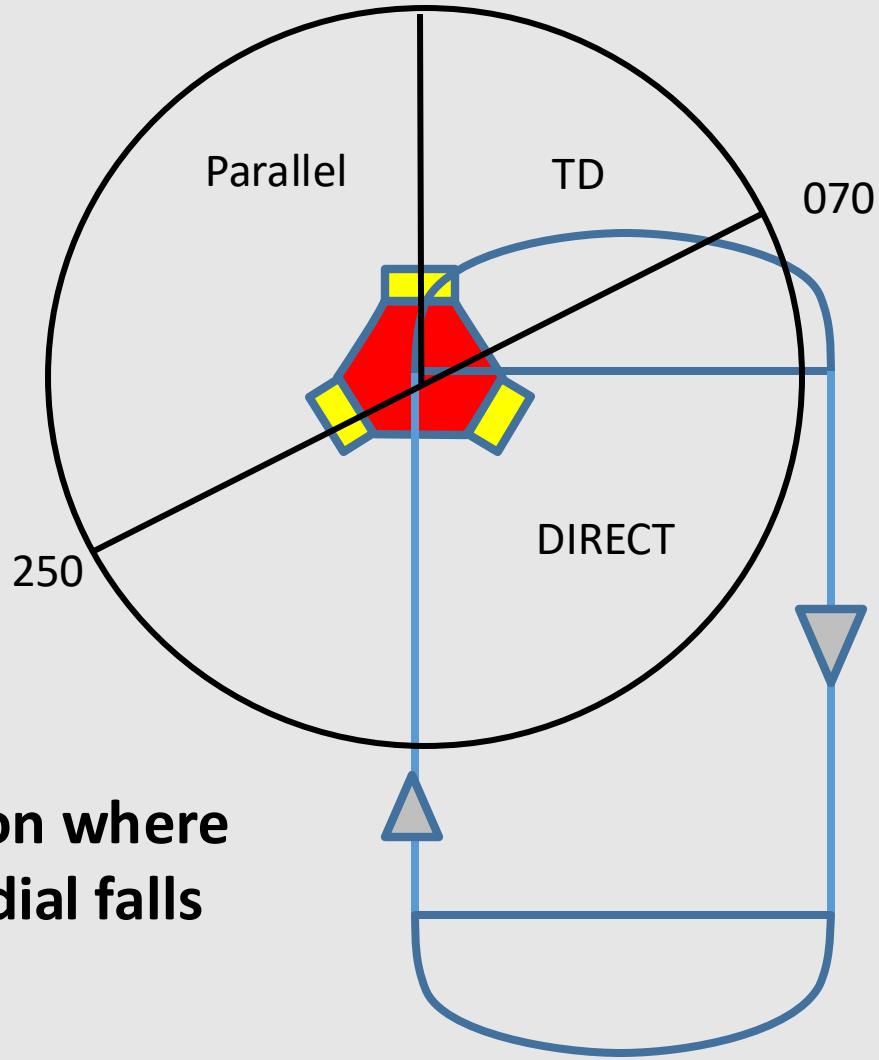


Holding Entry

Non-Standard



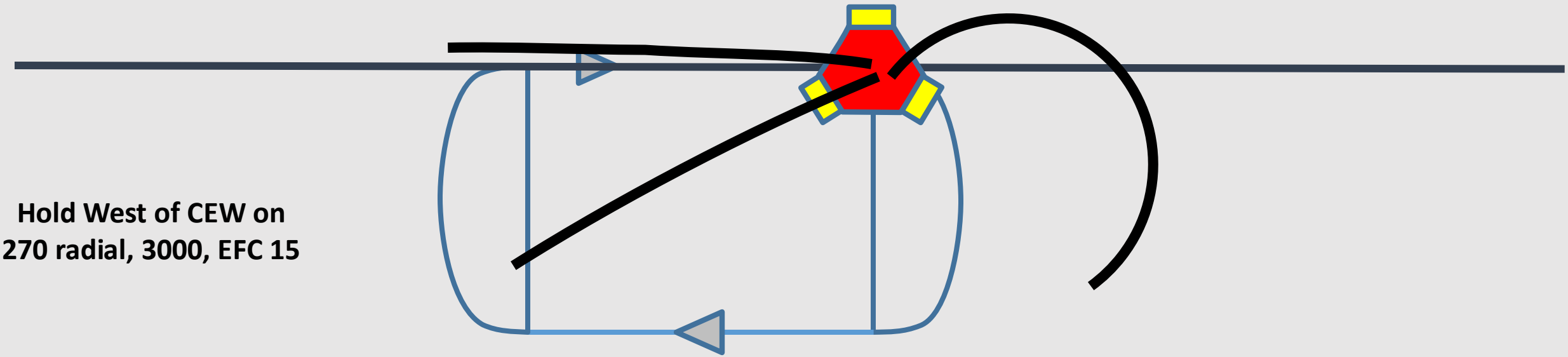
Standard



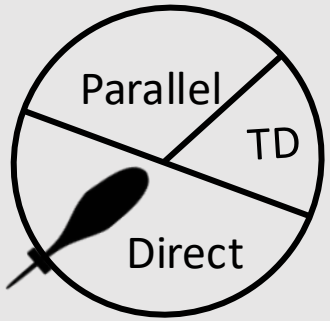
Entry is based upon where the outbound radial falls

Holding Entry

Entry is based upon where the outbound radial falls



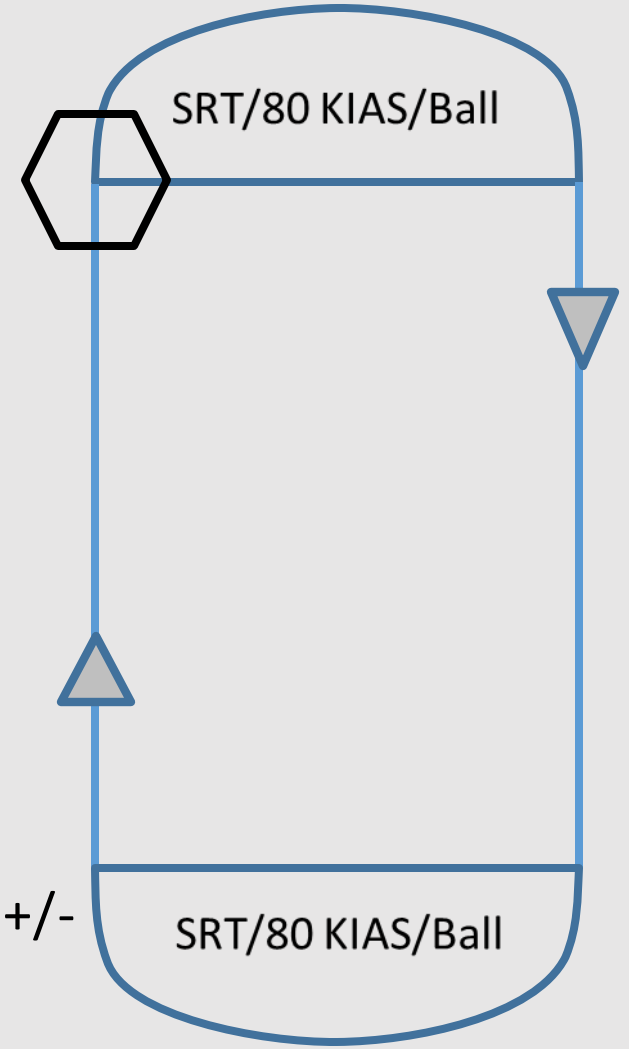
Hold West of CEW on 270 radial, 3000, EFC 15



How many degrees for Tear Drop Entry?

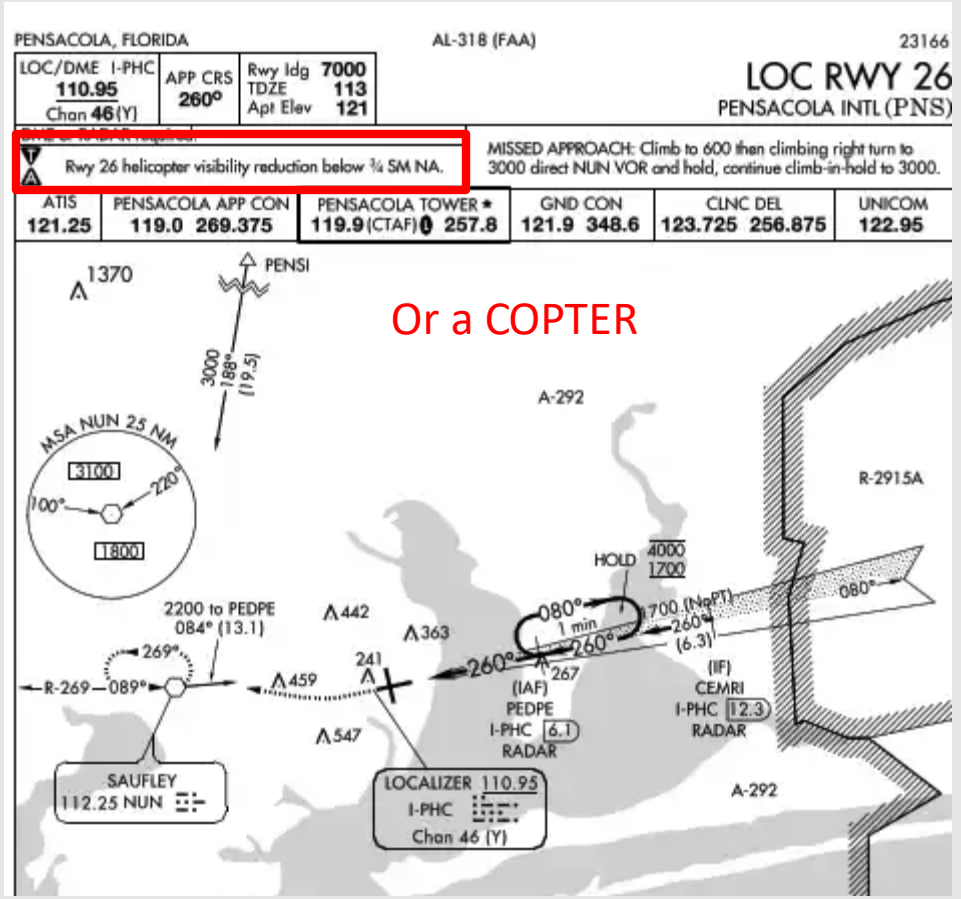
Holding Procedures

- 6 Ts
  - Time – Note
  - Turn – SRT/80KIAS/Ball
  - Time – Start (Abeam or wings level, whichever occurs later)
  - Transition – 80 KIAS – (IAF - Go Down, Slow Down, Landing Checks)
  - Twist – Inbound Course
  - Talk – PTA (When not required)
    - FIH B-6 May be omitted by pilots of a/c involved in Instrument training at Military Terminal area facilities when radar service is being provided.
- Turns
  - Entry – Get established
  - No Wind – Determine crab angle to track inbound
  - Corrected – Inbound crab angle x 2 on outbound/ Inbound: Timing +/- difference x 2 on outbound



Approach Procedures

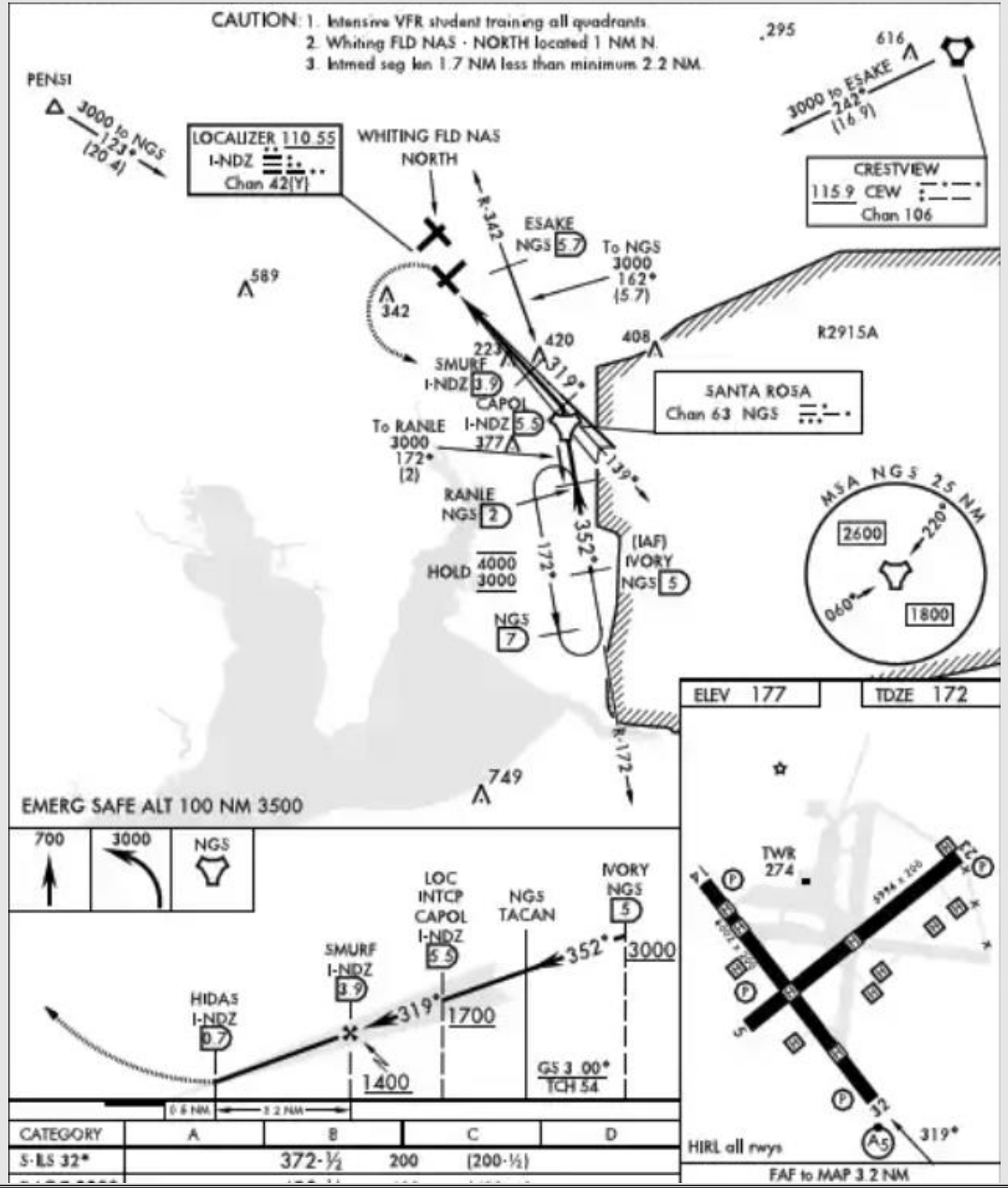
- Wx – WAR at minimum
- Request: Pcola approach, 7E130, 3000, Inform
- NAVAIDS
  - Tune
  - ID
  - Needles
  - Twist
  - Select
- Timing
- Brief
  - Approach
  - Wx Mins (reduce vis by ½, no less than ¼) compare
  - FAF and Timing
  - MDA/DH
  - MAP
  - Terminal Procedures to include Approach Lighting – how to maneuver a/c to land



Approach Procedures

- IAF – 6 Ts = Go down, slow down, landing checks.
- FAF - 6 Ts = Confirm landing checks complete
- Lead arc by .5 nm
- Turn off arc by 30 / DME
- Task co-pilot
- Confirming statement – Turning left for the arc, descending down to 1600.
- PASTTGas
  - Power
  - Attitude
  - Searchlight/landing light
  - Turn
  - Talk
  - Gas and Gauges

ILS Y RWY 32 KNDZ



- What navaid needs to be tuned in?
- What course needs to be twisted in?
- What can you task/delegate to your IP?

Failed Card

- Transition to wet compass scan
- Troubleshoot (Check HSI circuit breaker)
- LAPD
  - Lights
  - A/c
  - Pitot Head
  - Defog Blower
- Call ATC – Inform them of loss of heading gyro and request no-gyro radar vectors for no-gyro PAR
- HSI still works for Tacan/VOR
- Tacan/VOR – needle and digital radial/DME reads correct
- Check wet compass heading before making any turns

How many seconds to turn

10* - 6 sec ½ SRT

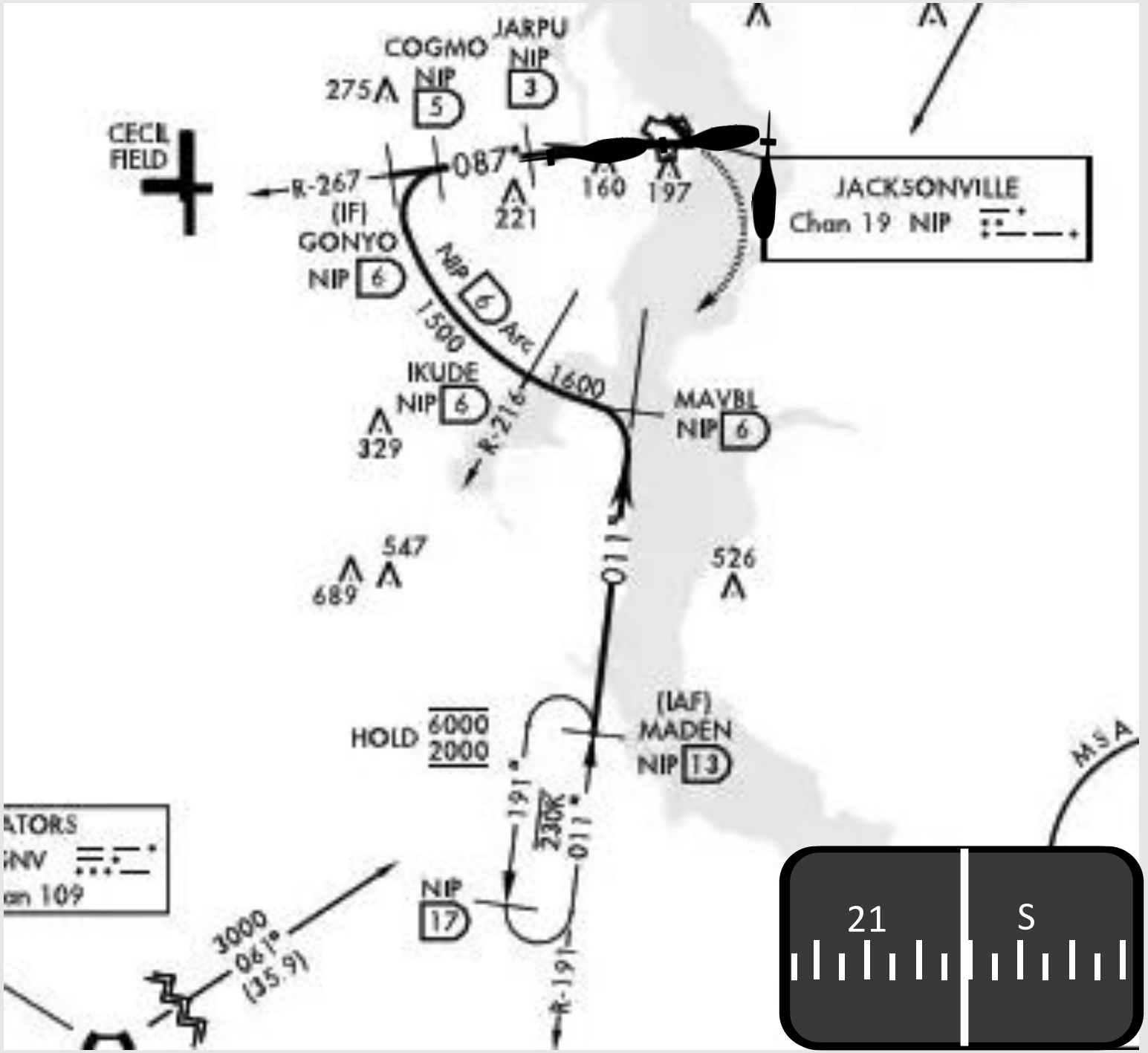
15* - 10 sec ½ SRT

30* - 10 sec SRT

45* - 15 sec SRT

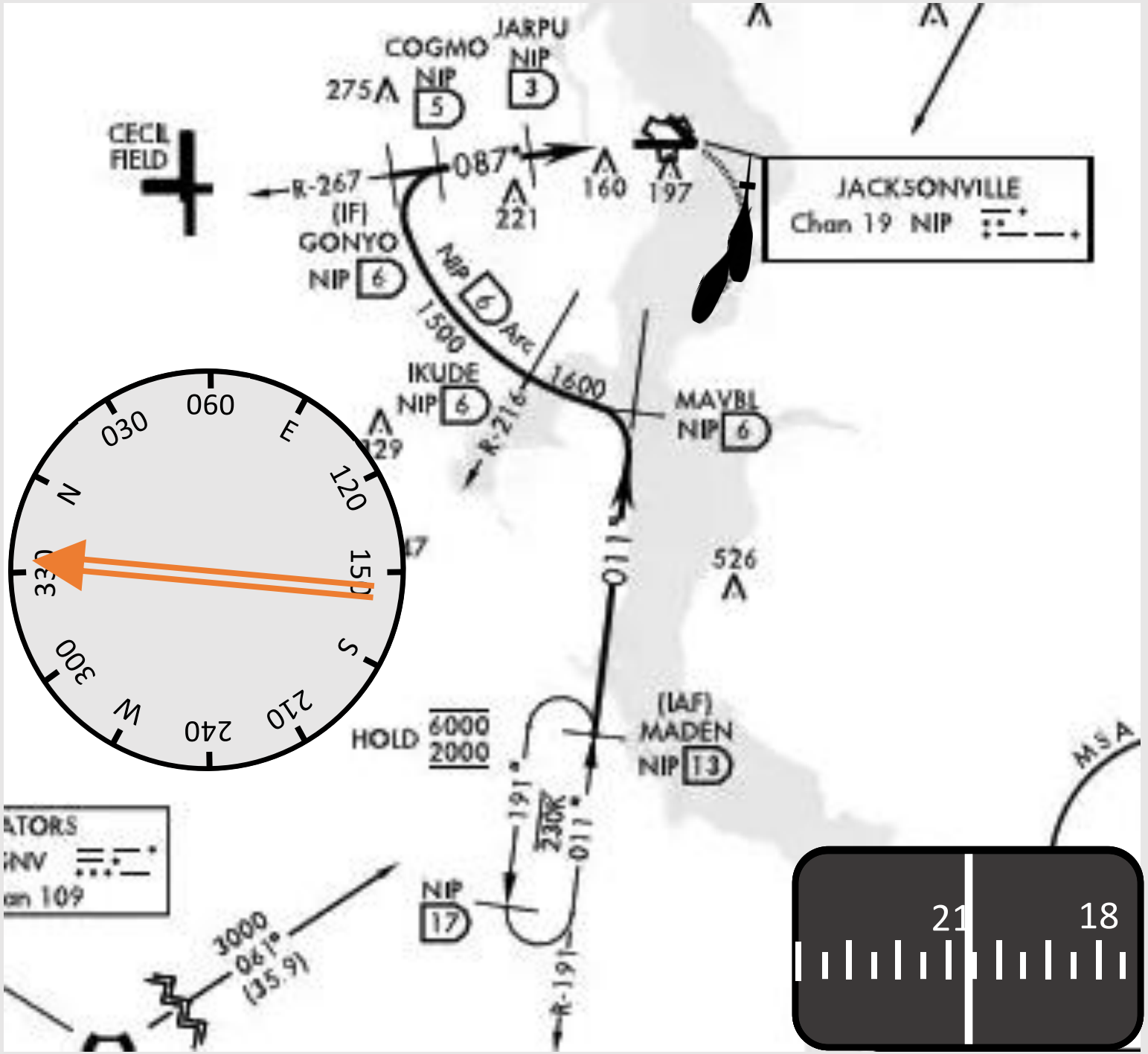
90* - 30 sec SRT

180* - 1 min SRT



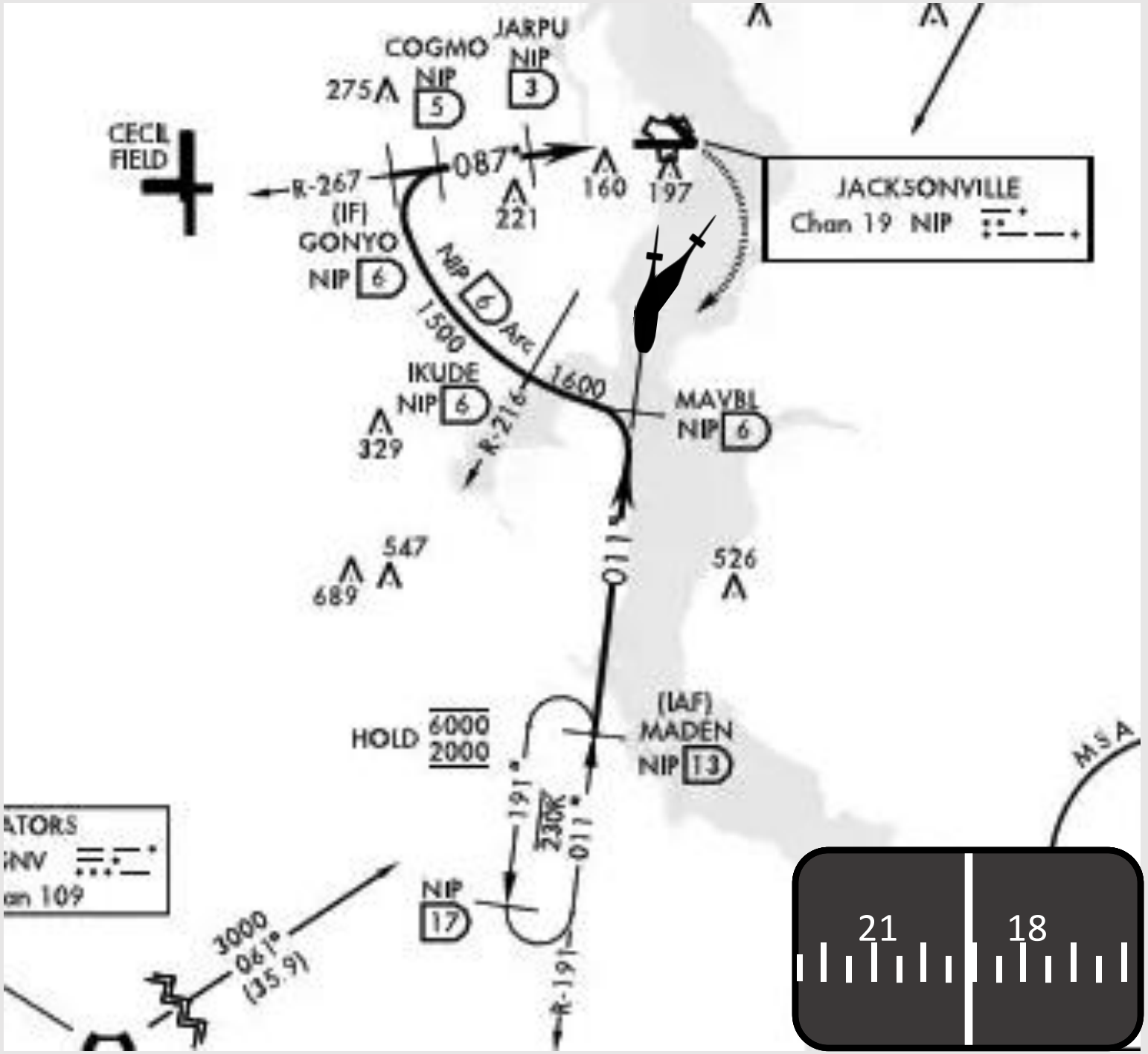
0.5 MI	100 RAD

- MAP: PASTTGas
- Missed Approach Instructions:
  - Climb 2000, direct to NIP TACAN and turn right outbound R-191 to MADEN and hold.
- Min DME: 6Ts
  - Time: N/R
  - Turn: To What heading and how
    - How many degrees to R-191 & time
    - 104/37 sec OR
    - Kneeboard RH Turn to?
    - Rollout 211
    - Time
    - Transition
    - Twist
    - Talk



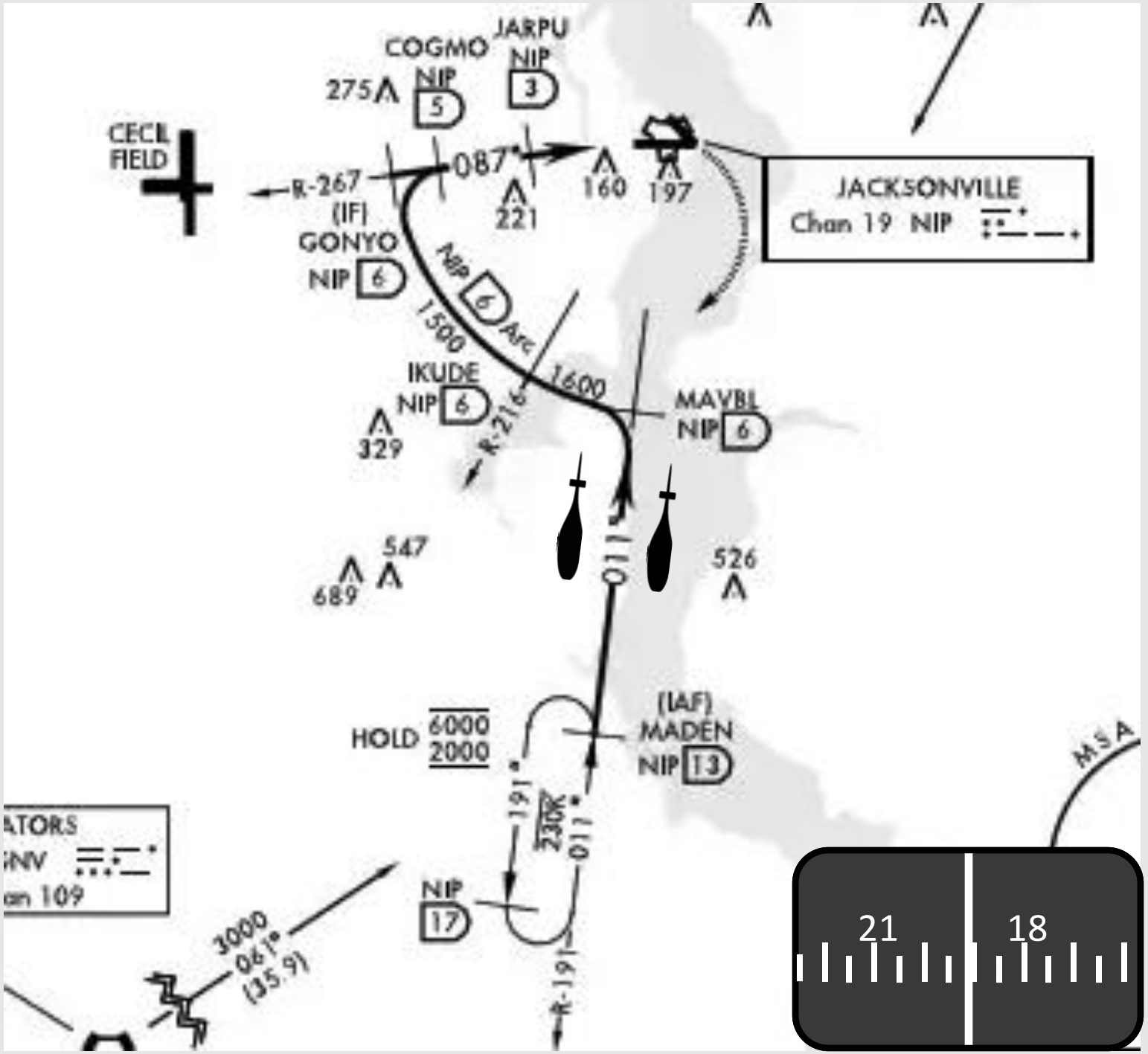
1.5 MI **160** RAD

- What type of intercept do we need after over-the-station?
  - 15-30 degrees
  - How many seconds for 15*?
    - 10 sec – ½ SRT
  - What is the new heading?
    - 206*



3.0 MI **191** RAD

- If you held 206* heading, how many seconds to turn to 191 heading to track outbound on the radial
  - 10 sec ½ SRT

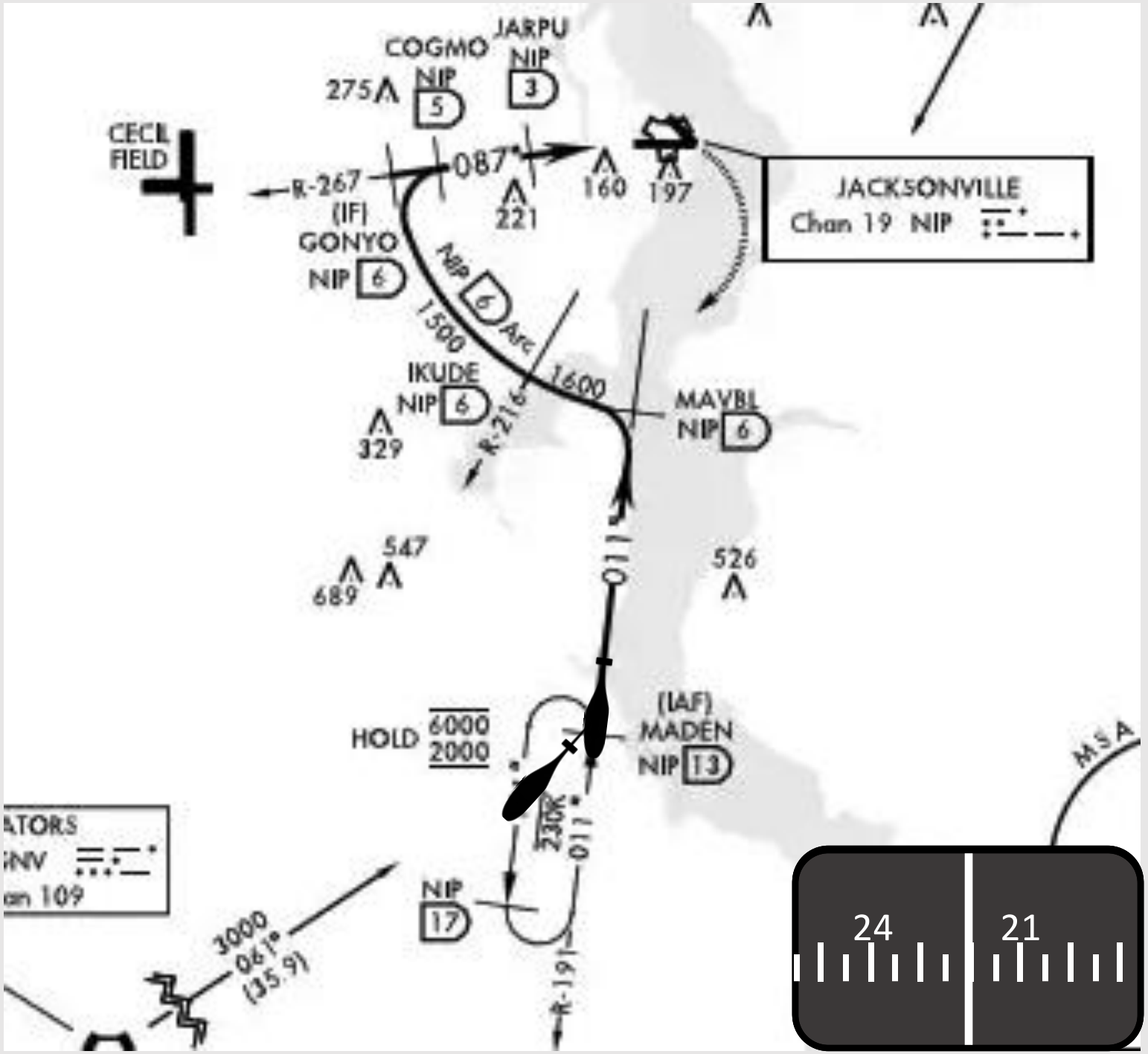


8.0 MI **185** RAD

If your are see this on the digital display….

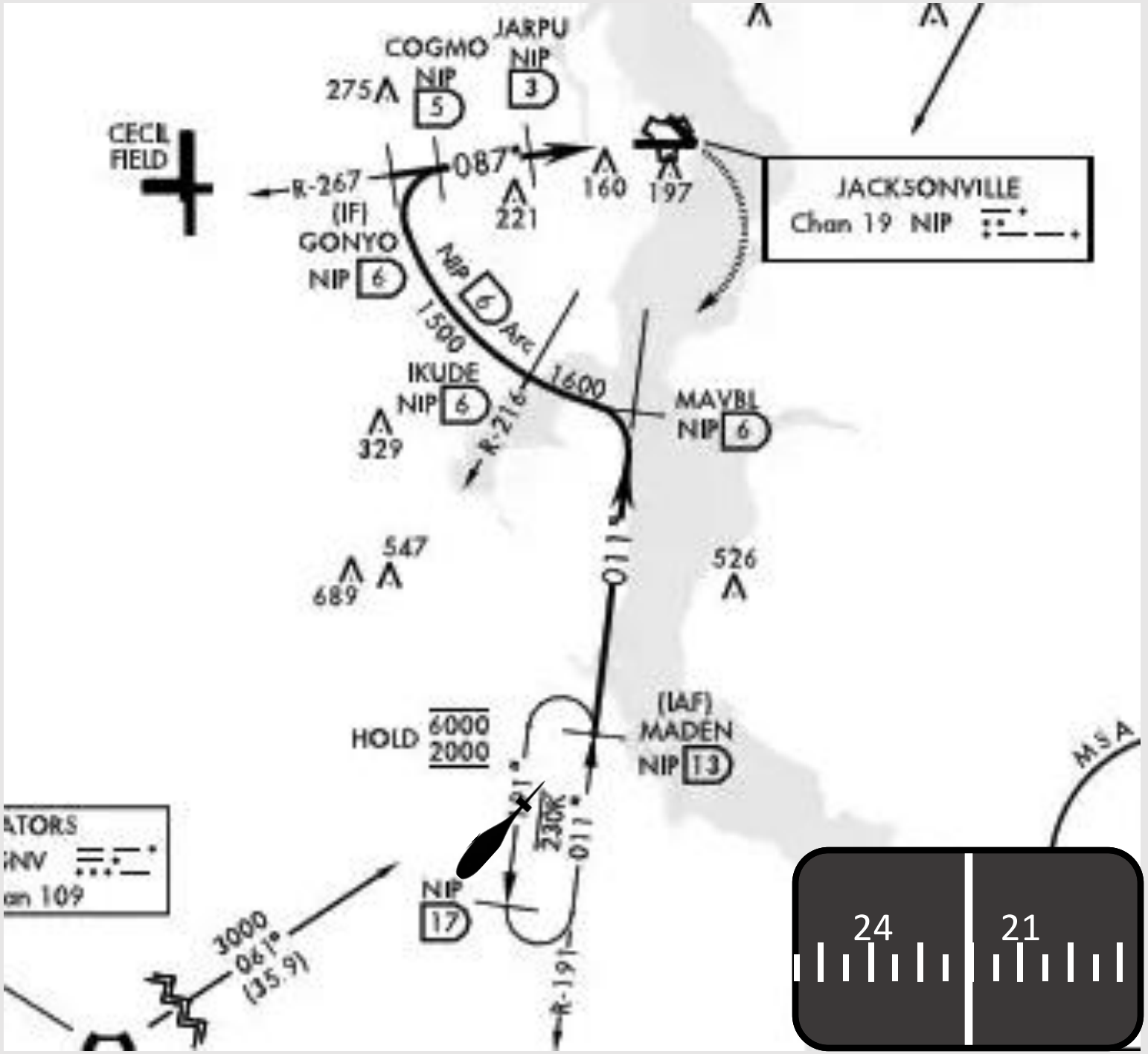
- Which side of 191-R are we on?

- Which side of 191-R are we on?



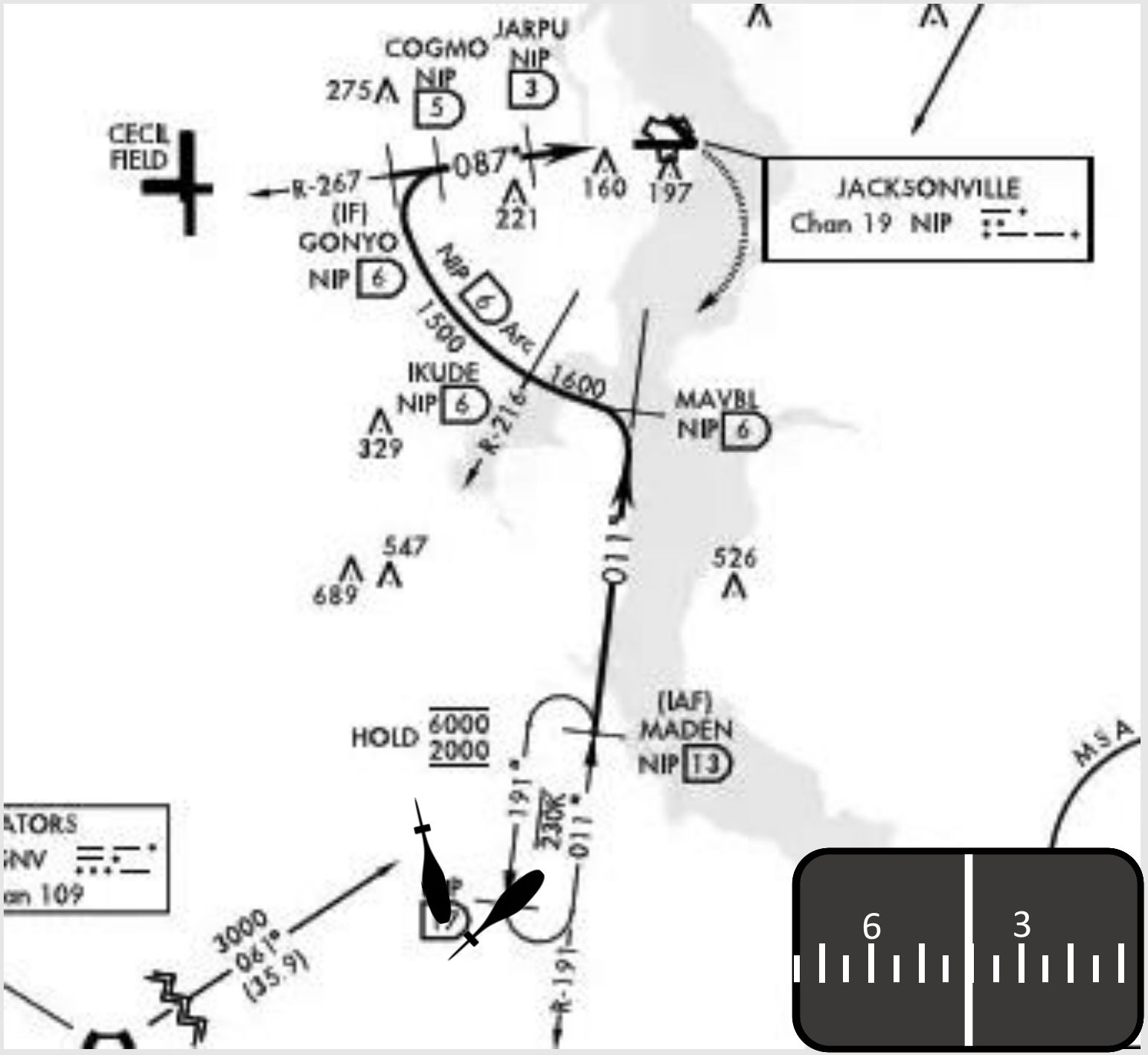
15.0 MI **193** RAD

- 6 Ts
  - Time
  - Turn – how many degrees and to what heading
    - 30 deg / 221
    - How many seconds / WC hdg
    - 10 sec SRT / 231
  - Time
  - Transition
  - Twist
  - Talk



15.5 MI **196** RAD

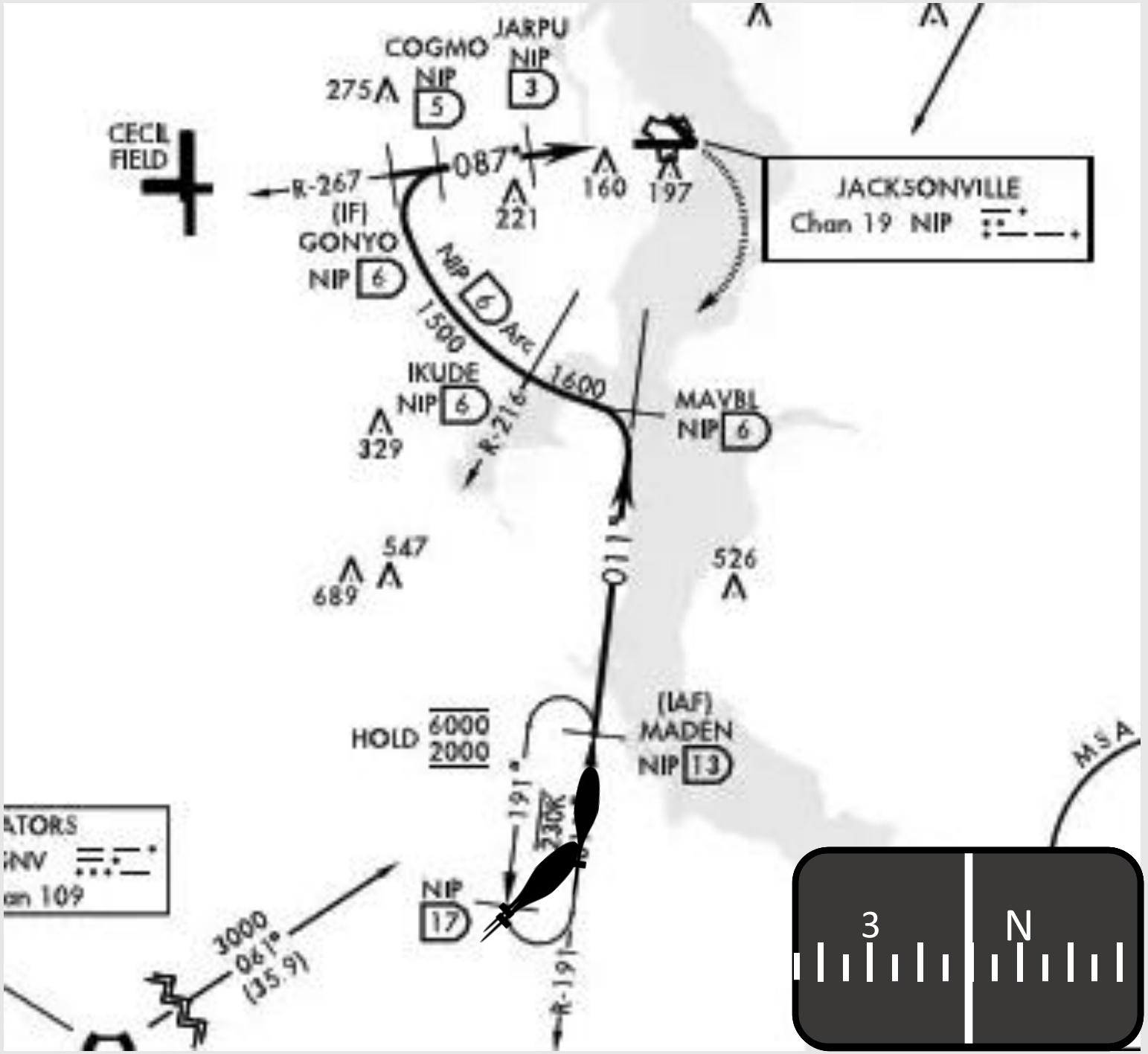
- 6 Ts
  - Turn – how many degrees and to what heading
    - 180 deg / 041
    - How many seconds / WC Hdg
    - 1 min / 059 WC



16.0 MI **193** RAD

Turn – how many degrees and to what heading

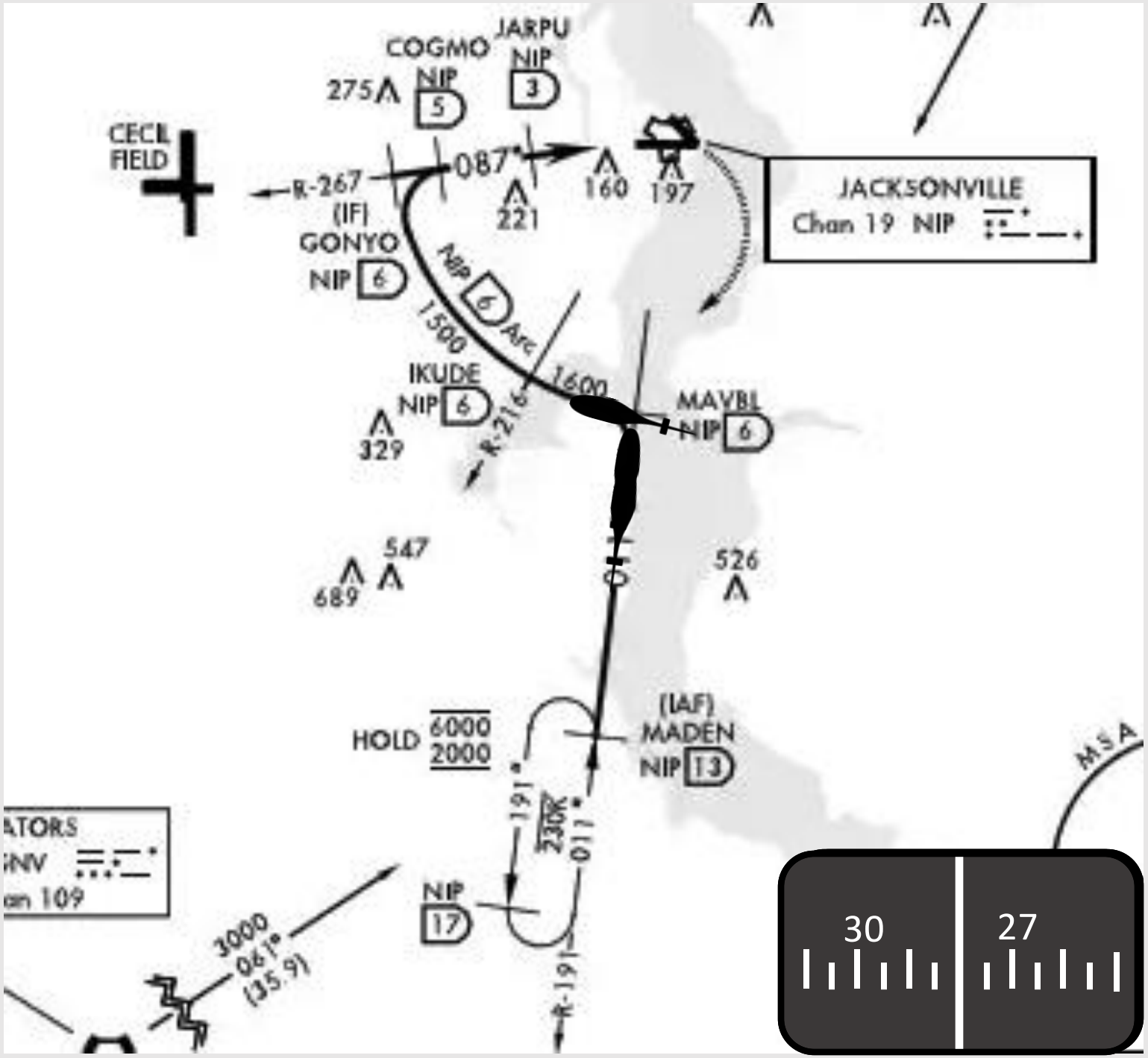
- 180 deg / 041
- How many seconds / WC Hdg
- 1 min / 059 WC



14.0$_{MI}$ **191**$_{RAD}$

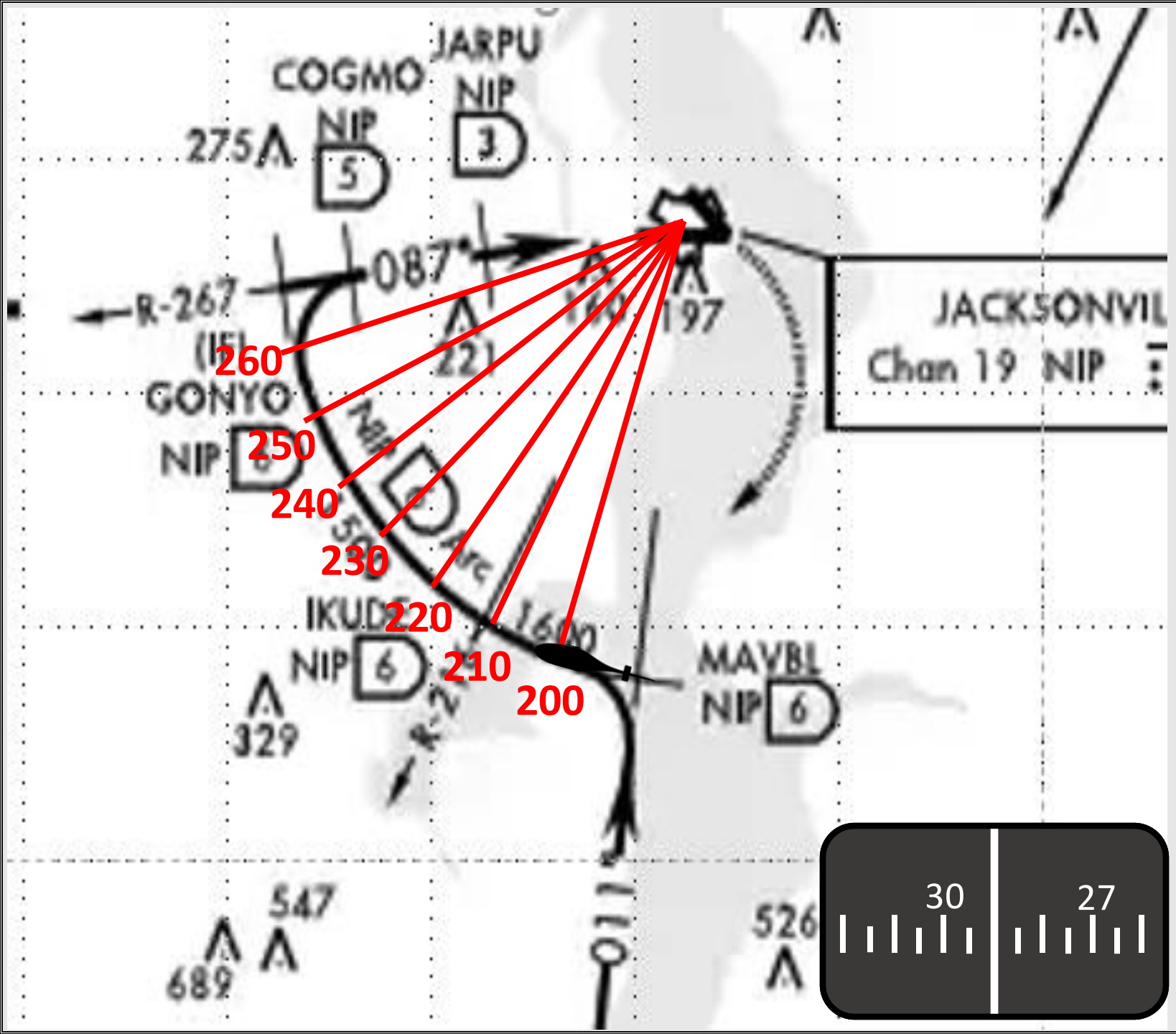
Turn – how many degrees and to what heading

- 30 deg / 011
- How many seconds/WC Hdg
- 10 sec / 041 WC



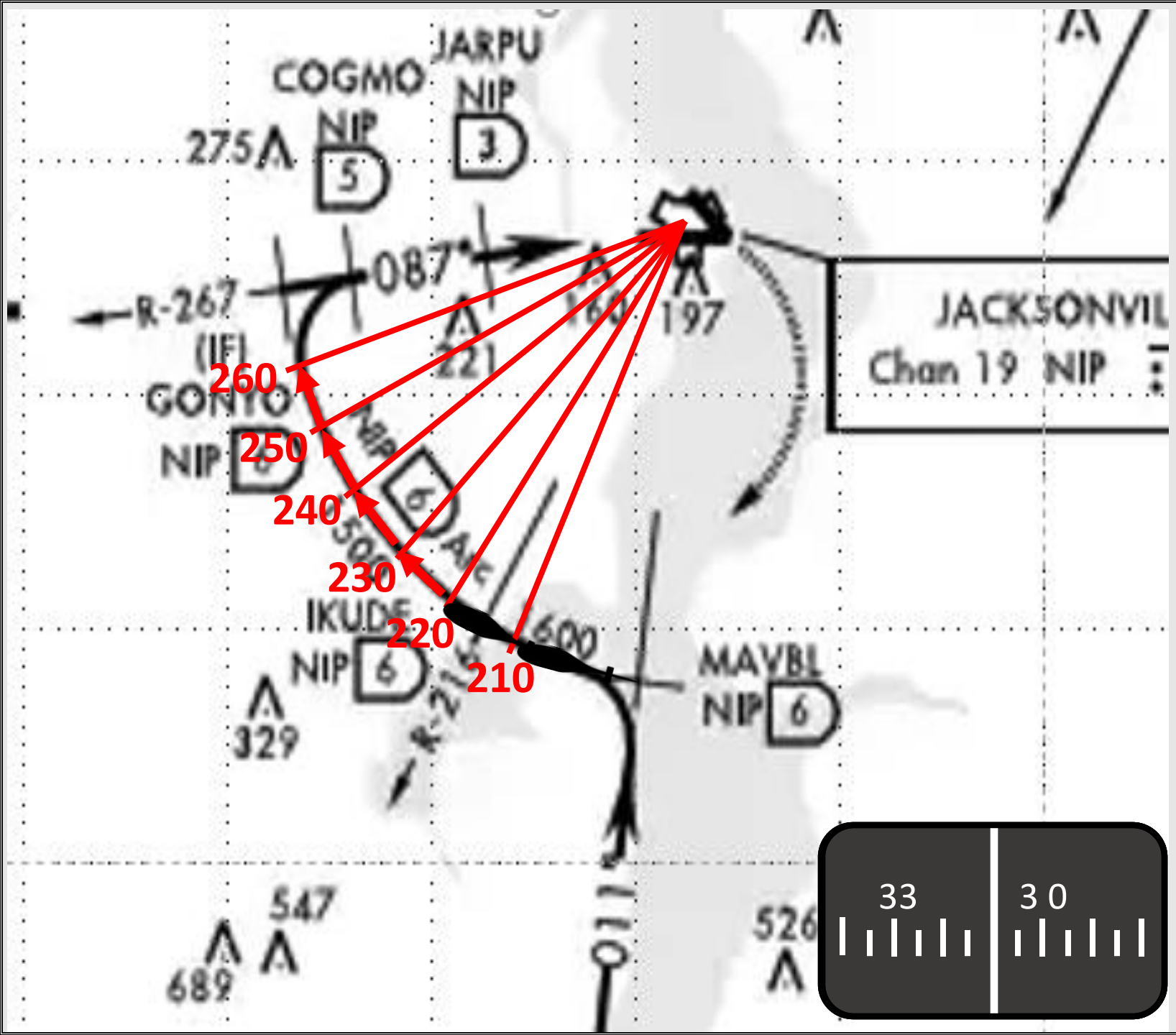
6.0 MI **195** RAD

- When do you want your CP to give you heads up?
- What DME do you start the turn for the arc.
- 6 Ts
  - Turn – how many degrees and to what heading
    - 90 deg / 280
    - How many seconds/WC Hdg
    - 30 sec / 288 WC



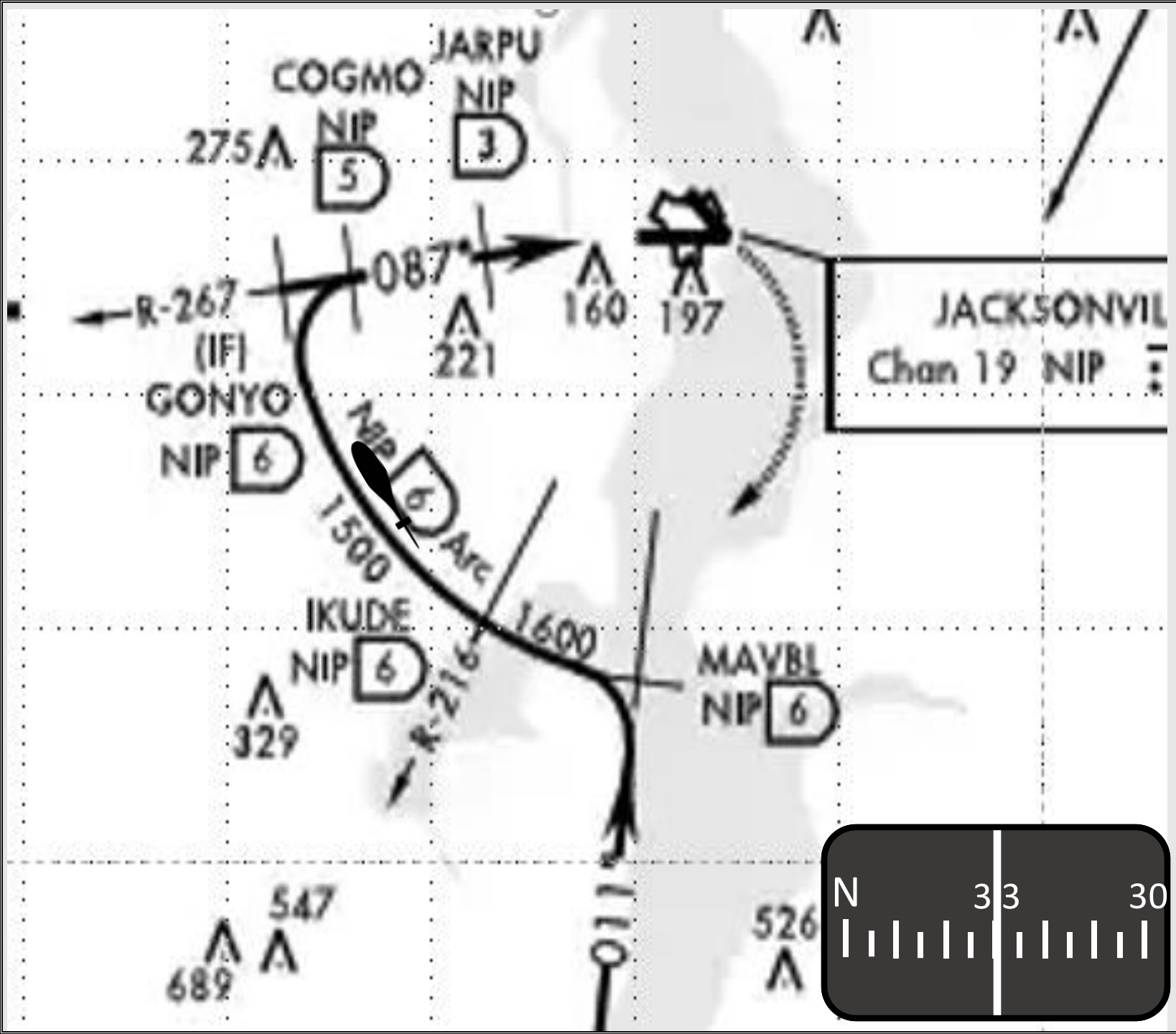
6.0 MI **195** RAD

- How do we know what heading we need to be on?
- Radial we are on, add 90 degrees
  - Army math : Radial + 100 - 10
- 200 radial + 100 = 300 – 10 = 290



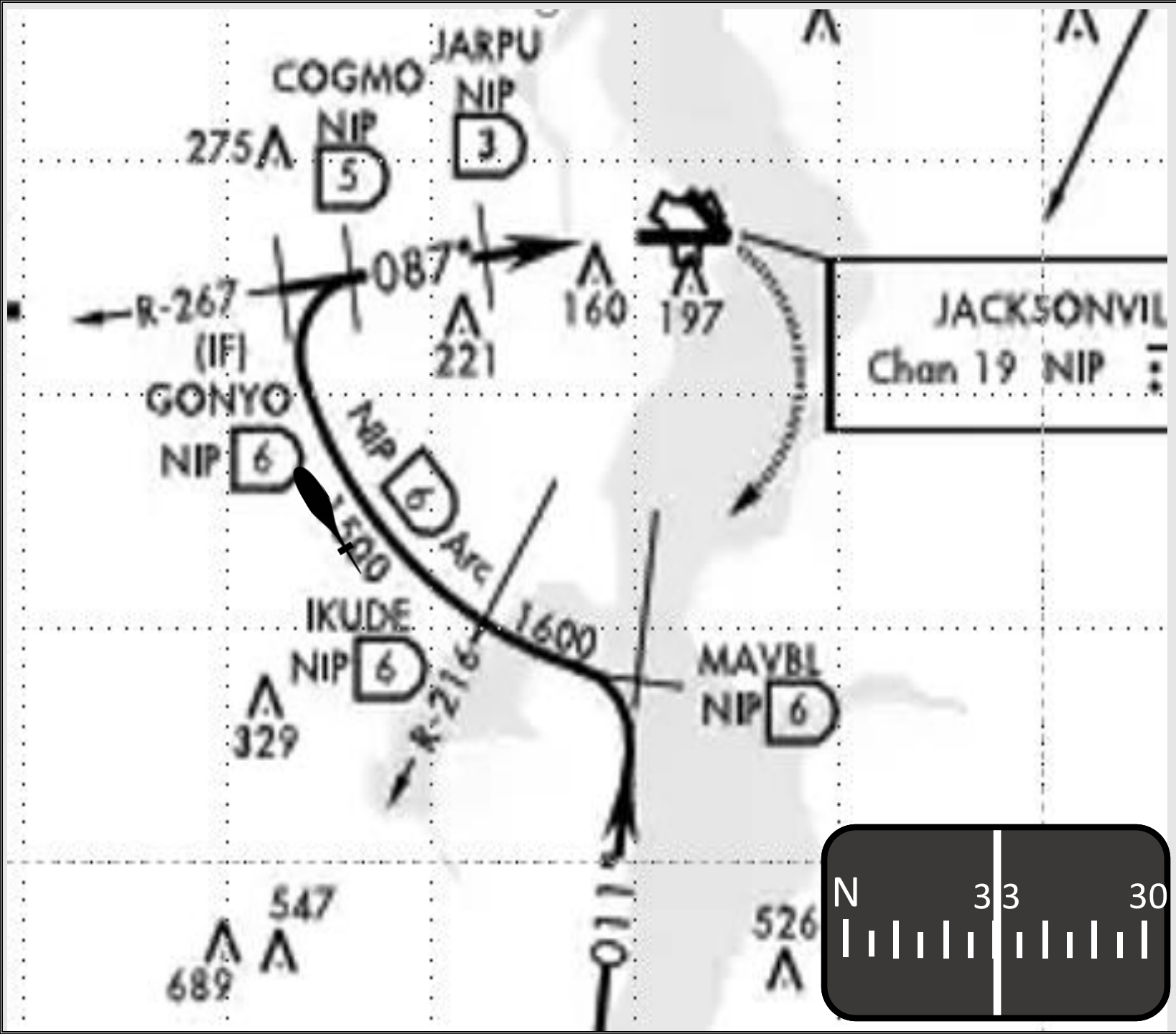
6.0 MI **215** RAD

- What heading should we be on at 210?
- 210 radial + 100 = 310 – 10 = 300
- What heading should we be on at 220?
- 220 radial + 100 = 320 – 10 = 310
- Every 10 radials, turn 10 degrees; 6 sec ½ SRT



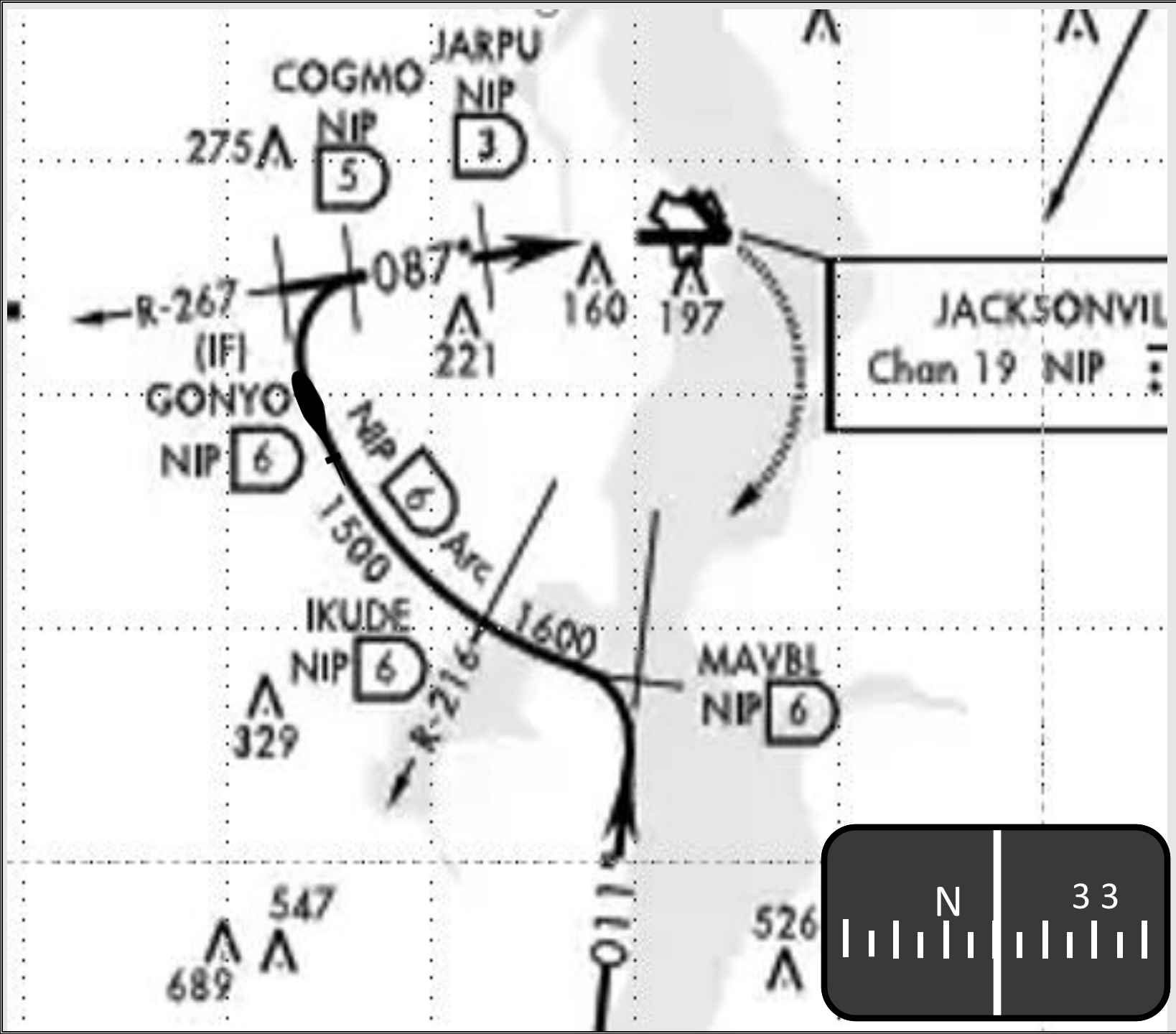
5.8 MI **240** RAD

- Where are we?
- What do you need to do to get back to DME?
- Make sure your on the right heading and hold that hdg and fly to your DME. Don't let the heading get more than 10 deg off where you are suppose to be.



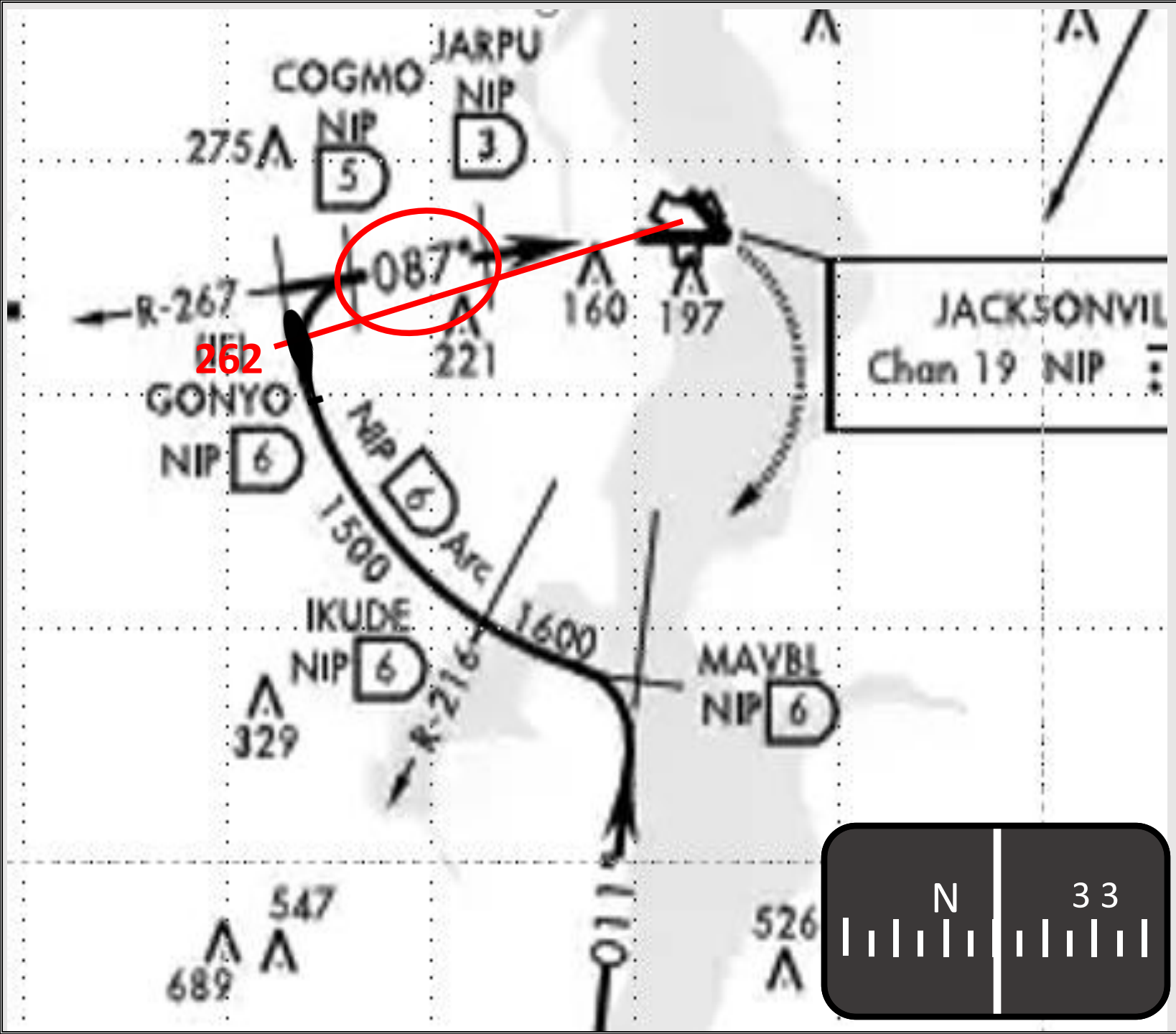
6.2 MI **240** RAD

- Where are we?
- What do you need to do to get back to DME?
- Make sure your on the right heading turn right for 6 sec ½ SRT and put at least a 10 deg intercept.
- If winds are keeping you off DME, you might need to put in a little more
- Still will need to turn 6 sec ½ SRT every 10 radials.



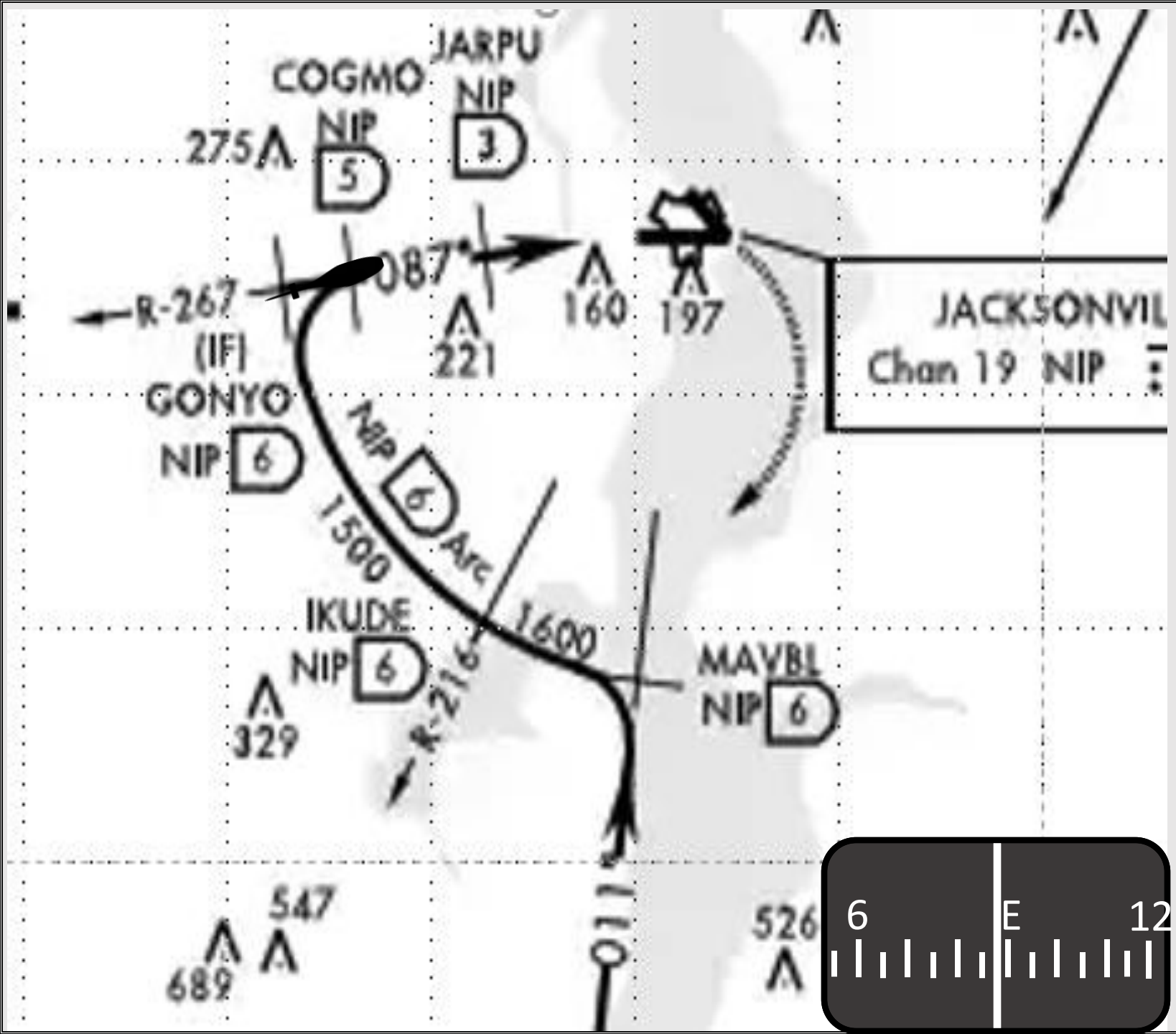
5.8 MI **260** RAD

- When do you need to turn to final
- 30/DME – 30/6 = 5 radials prior - 262
- When do you want your IP to give to a heads up for the turn?
- Up to you – 2 radial lead - 260



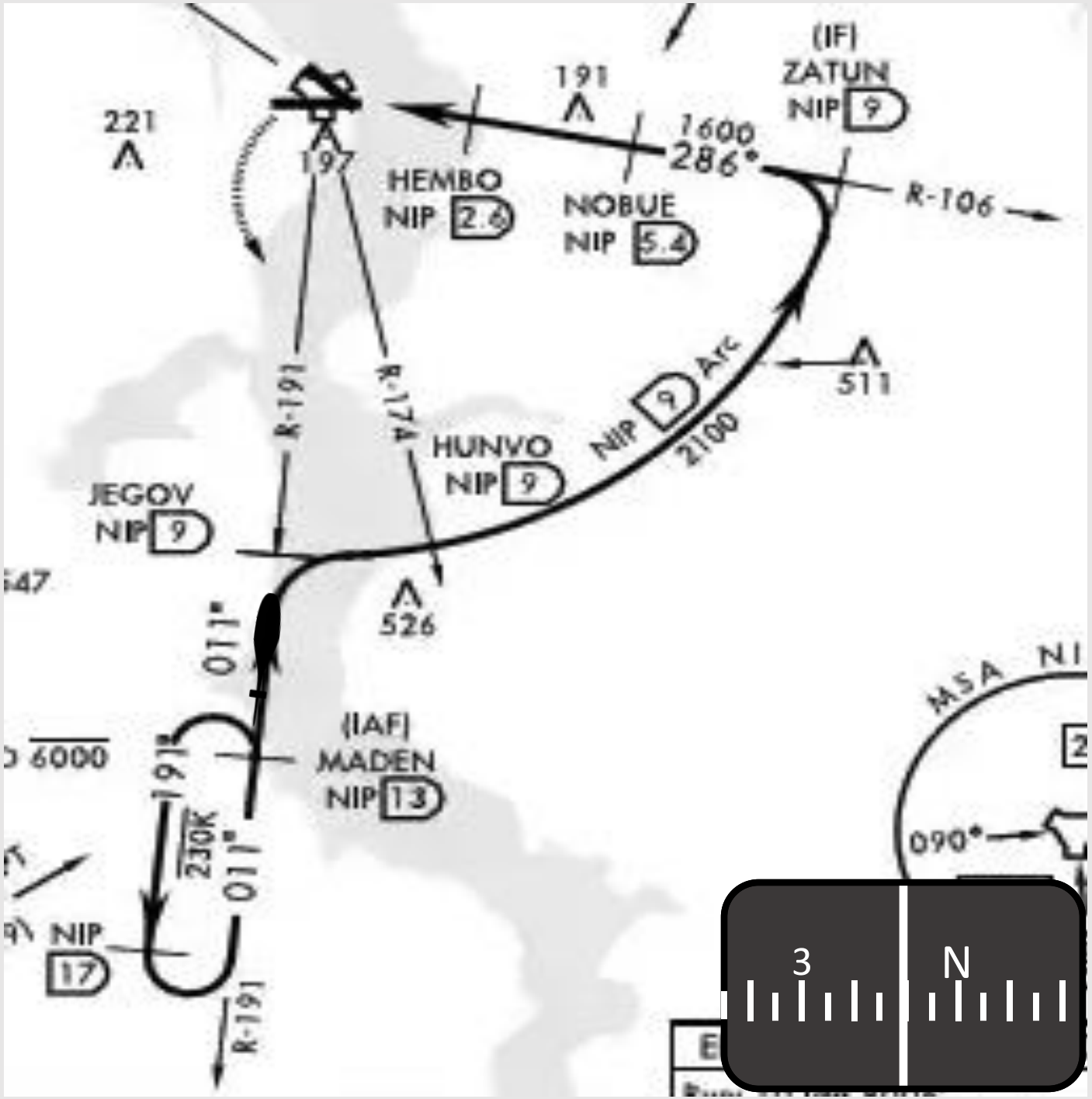
6.0 MI **262** RAD

- Turn – how many degrees and to what heading
  - 90 deg / 087
- What is 087 remarkable close to?
- What is lead for 090 Hdg?
- How many seconds/WC Hdg?
- 30 sec / 083 WC



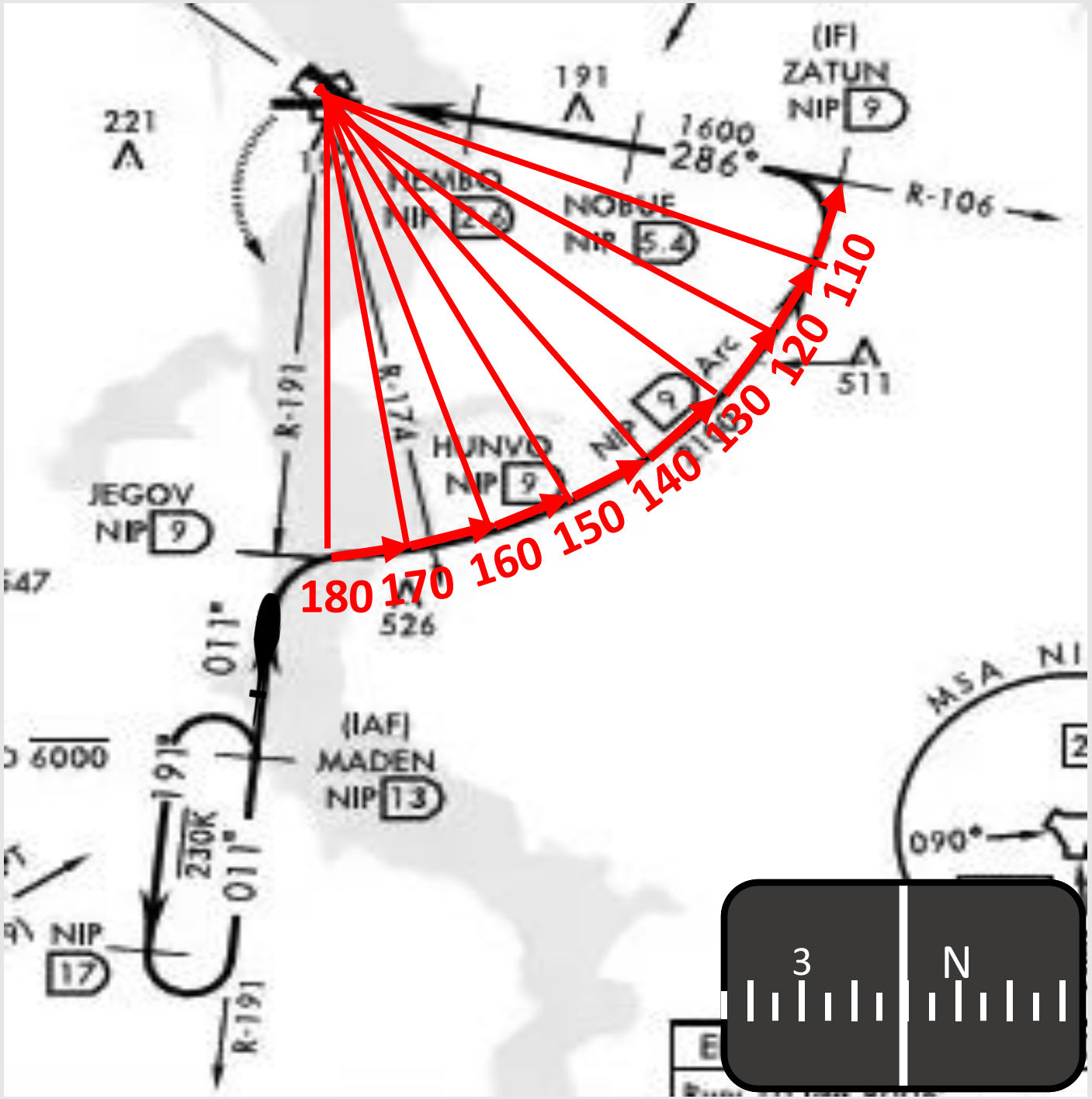
5.0 MI **267** RAD

- FAF – 6Ts
  - Unless you are way off heading, do not turn more than 6 sec ½ SRT
  - What is happening to radials as you get closer to the TACAN?
  - Make 3 sec ½ SRT when your about 3 DME from TACAN



9.5 MI **191** RAD

- How do we know what heading we need to be on?
- Radial we are on, subtract 90 degrees
  - Army math : Radial - 100 + 10
- 191 radial - 100 = 90 + 10 = 100
- Every 10 radials, turn left 6 sec ½ SRT



9.5 MI **191** RAD

- How do we know what heading we need to be on?
- Radial we are on, subtract 90 degrees
  - Army math : Radial - 100 + 10
- 191 radial - 100 = 90 + 10 = 100
- Every 10 radials, turn left 6 sec ½ SRT