

Don't chase the needle – 'Step on the Ground Track Indicator'

My KFC 200 A/P has been on the blink lately, so I've had to hand fly my F33 a lot, notably for my IPC. It's been a blessing in disguise, forcing me to improve my piloting skills. Here's what I 're-discovered'

The graphics below are from an Aspen, but the CDI/HSI are equivalent to many other devices
Flying the Approach, on final :

- Rwy 15
- (much) to the left of centerline
- Heavy (gusting, even..) right cross wind, requiring a significant crab,
 - and *varying* amounts of crab correction because of the gusts.

Note: This might not be the symbol on all devices, but the cyan diamond at the 170 deg position below
Is the Ground Track Indicator (GTI) – your actual course over the ground – the crux of this article.

Now, the challenge is to

- Re-center the needle
- Not overshoot
- Not chase the needle-back-and-forth-and-back-and forth, especially with the gusting wind.

I think my instruction was something like

- Pick a Heading (and memorize it)
- Fly that course for 20-30 seconds, and
 - If the deviation gets bigger, increase the Heading
 - (and memorize that new heading)
 - If the deviation starts shrinking 'too fast' decrease the Heading
 - (and memorize that new heading)

Sound familiar?

Maybe 'Just me....' But that has never worked for me.

I can do trigonometry in my head and calculate/interpolate crosswind components for every angle between 0 and 90 in my head, but I can NOT do this 'incremental, rate of closure/expansion' and memorize the last heading while flying the airplane, talking to ATC, configuring the airplane, watching my VDI, etc.

Better pilots can, I can't. I'm like a deer in the headlights – the heading number just goes in one ear and out the other. Embarrassing, but true.

From the "Henry, what do I have to do? Draw you a picture?????" department

My response is "Uh, that would be nice! Can you ???"

To that ends is the GTI (Ground Track Indicator)

Note: If the HSI is centered, the CDI will be centered.

What I do now (and it works great!) is just 'follow the GTI!'

Using just my foot/rudder pedals, I just



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- Yaw the plane until the GTI is about ½ way between the 2 green HSI bars (as shown)
- As that closes the gap between the 2 bars, my rudder similarly moves the GTI 'back to the left' (in this example), keeping the GTI between the 2 bars, until

- All 3 of : Both green HSI bars and the GTI are aligned. – then I keep it there.
 - If the center bar moves to the left, I step more on the left rudder until the GTI is (again) ½ way between to 2 bars, which brings 'everything back into alignment'

In a matter of speaking,

'keeping the needle centered'

is just a matter of

'use your rudder pedals to keep the GTI pointed at the center HSI bar 😊'

(or '1/2 way between...')


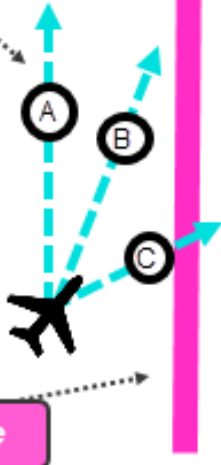


No memorizing headings, no math, no 'rate of closure' calculations in your head, just **'line up the 2 things on your display, with your feet'** – no 'thinking' required. That frees up my brain for other tasks! Centering the CDI is now as simple as 'stepping on the ball' on your turn coordinator to implement a coordinated turn, but now to center the GTI to push the diamond between the 2 HSI bars and stay on course



Now, in pictures:

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In pictures:

Without a GTI, standard Instruments:	What could really be happening:
	<p>Without a Ground Track Indicator, the HSI/CDI would be the same for all 3 of these actual tracks.</p>  <p>Inbound Course Line</p>
	<p>You are to the left of Course, crabbing 'right' into the wind. But depending on how strong that cross wind is, your crab could keep you</p> <ul style="list-style-type: none"> A) parallel to your desired course, B) on a 45-degree intercept, or C) crashing through it.
<p>Only with a GTI would you know which of the A/B/C scenarios you are actually flying:</p> 	<p>And for the mathematicians /engineers in our audience,</p> <p>Simply by keeping the GTI 'in front of' or '1/2 way between' the HSI Deviation Bar (B), your actual ground track will 'asymptotically approach' your desired inbound course, like this→ – completely independent of wind – Even GUSTING/inconsistent wind!</p> <p>So by doing nothing more than 'stepping on the ball GTI', you automatically fly this course</p>  <p>The equation of the asymptotic line is: $D(1-e^{-t})$ - just had to get that out of my system!</p>

(Aspen actually calls it a Ground Track Marker ...)