Garmin GI-275 Workshop

General Operations

Presentation Outline

- GI-275 Overview
  - Features
  - Interface Basics
    - Vacuum AI vs Digital ADI
    - Dials vs Tapes
- Flight Instruments
  - Attitude Indicator (ADI)
  - Heading Indicator (HSI)
- Miscellaneous
  - CDI/MFD
  - Crew Profiles
  - Abnormal Operation
- Adjusting to Glass
  - Tips & Tricks
  - Do's and Don'ts

Before We Start

- "A wealth of information creates a poverty of attention" – Herbert A. Simon
  - Too much non-relevant information can lead to information paralysis.
  - Don't let the information distract you from aviating, navigating, or communicating!

- Don't feel compelled to use every feature that's available
  - Use the features that work for you in any given situation
    - Just because a feature exists, doesn't mean it has to be used

GI-275 Overview

GI-275 Features

General Features

- Solid-state gyros
  - More reliable
    - Eliminates mechanical failures
    - Eliminates vacuum system failures
  - More accurate
    - Eliminates gyro precession & possibility of tumbling
- Fully Redundant
  - Each unit backs up the other
  - Backup battery ensures at least one unit remains operational in case of a power failure
- Enhanced Situational Awareness

ADI & HSI

- Primary ADI
  1. **AH & synthetic vision,** ASI, TC, Alt, VSI, Heading
  - Only displays this one screen
- "Standby" HSI
  1. **Traditional HSI**
  2. **HSI with map (EHSI)**
  3. Backup ADI
  - Defaults to the traditional HSI page

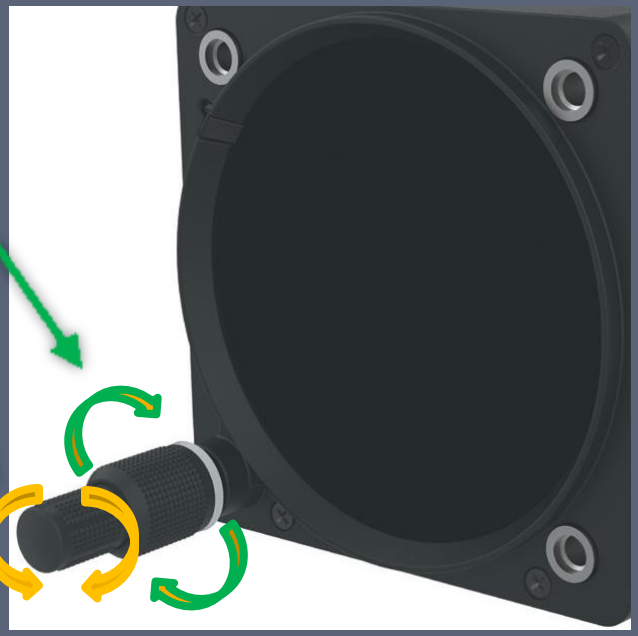
Interface Basics

Change Page,
Scroll Menu Field,
Move Data Field Cursor

Adjust Data Field,
Zoom

(Push) Select Highlighted Field,
Sync Active Field

(Push & Hold) Display Menu



Display Menu

Scroll

Pan

Zoom

Interface functionally similar to the GTN650
Touch + physical dual-concentric knob

Vacuum AI vs Digital ADI

Vacuum AI

- Subject to tumbling in extreme attitudes
- Erroneous indications (due to failure or loss of vacuum) may not be immediately noticeable
- Aircraft symbol needs to be manually adjusted due to parallax
  - Pitch attitude reference can be adjusted for relative value

Digital ADI

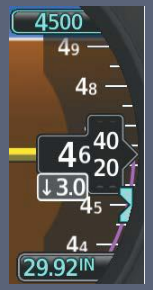
- Virtually eliminates any possibility of tumbling
- Unmistakable indication as soon as accuracy is degraded (big red X)
- Aircraft symbol adjustment not possible
  - Pitch attitude reference is displayed in absolute value
    - Display is calibrated for approximately 0-pitch while in cruise flight

Dials vs Tapes

Dial

- Reads like a clock
  - Easy to determine direction of change
  - Subject to misinterpretation
    - 1340 feet or 340 feet?
- Intuitive to determine rate of change
  - We do this without even realizing it
- Display requires more physical space

Tape



- Displays the exact value
  - Harder to determine direction of change
  - No misinterpretation
    - 4630 feet unmistakable
- With trend vectors, easy to determine rate of change
  - The key is to use the trend vectors
- Compact display

Flight Instruments

ADI and HSI

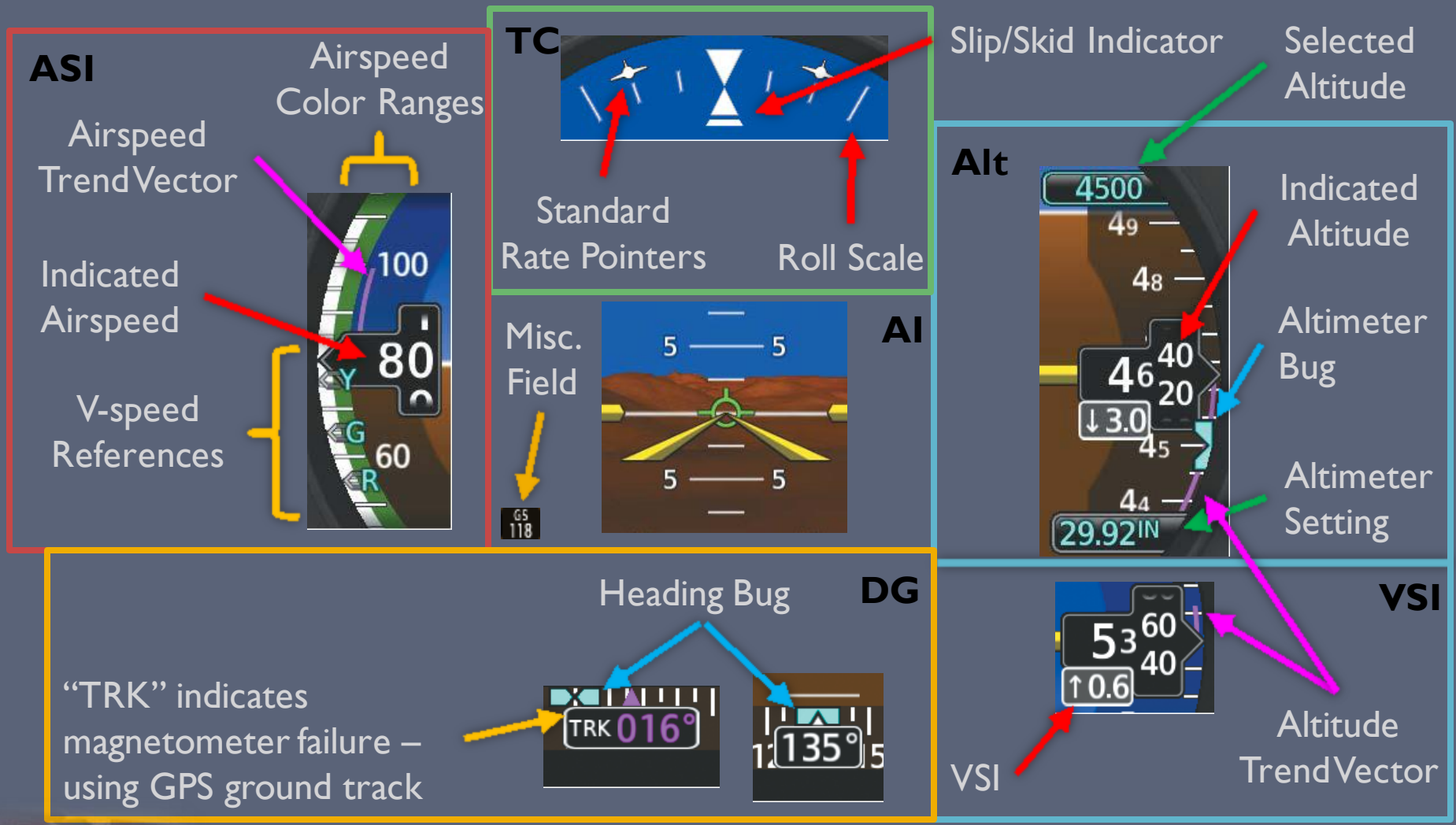
GI-275 Attitude Indicator (ADI)

Don't panic! It's not that bad.

GI-275 ADI Features

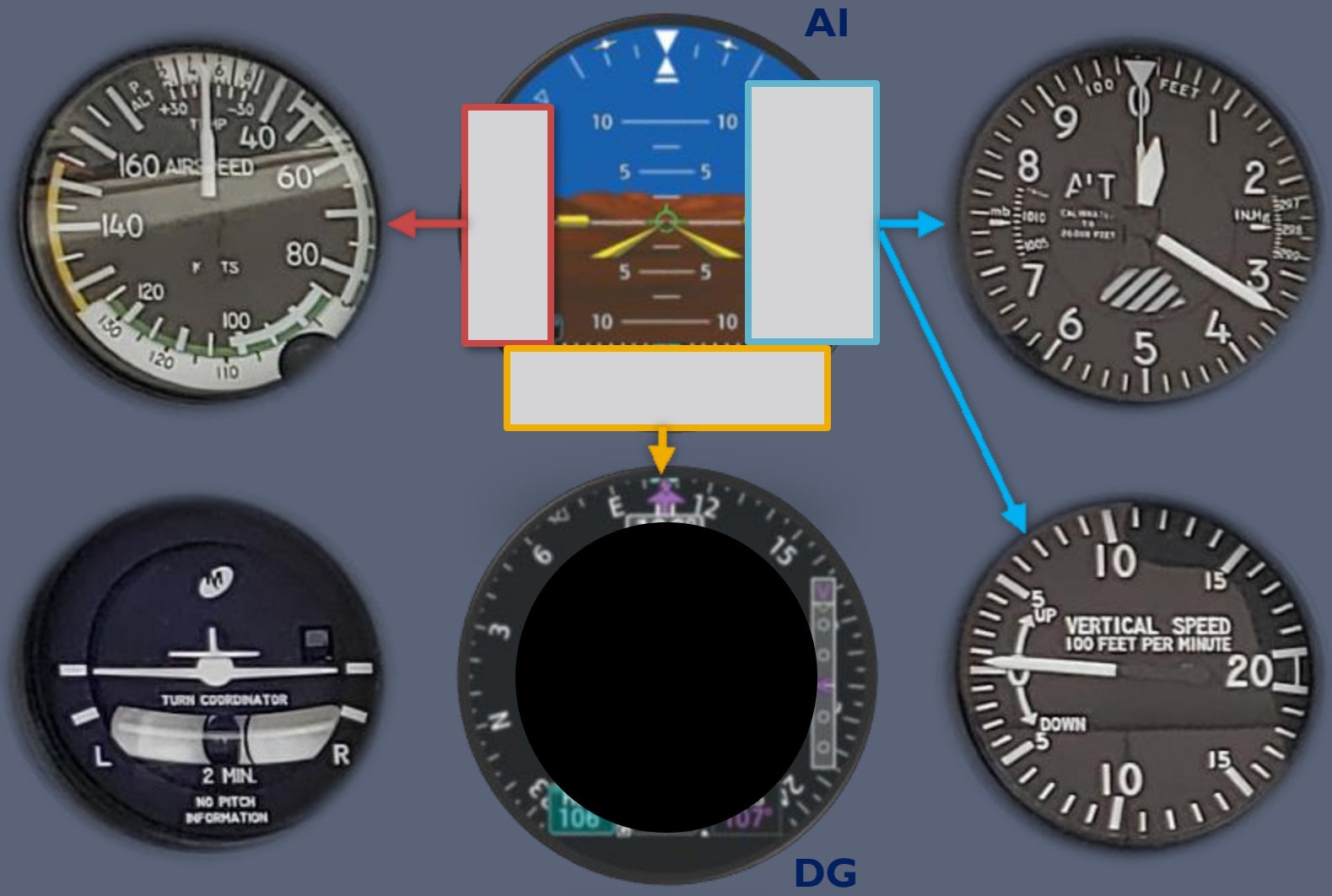
Simplify things by breaking it down into components

GI-275 ADI Features



Simplify things by breaking it down into components

The Six-Pack, Enhanced



Ignore the fancy features and it's the same familiar 6-pack

Standard vs Synthetic Vision (SVT)

Artificial Terrain

Standard Blue/Brown Horizon

Horizon ("Zero-Pitch") Line

Flight Path Marker

The main difference with SVT is the addition of artificial terrain and the flight path marker

GI-275 Heading Indicator (HSI)

Heading Bug

Current Ground Track

Current Heading

To/From Indicator

Navigation Source (GPS/VLOC)

Vertical Deviation Indicator

Course Deviation Markers

Course Deviation Bar

Selected Heading

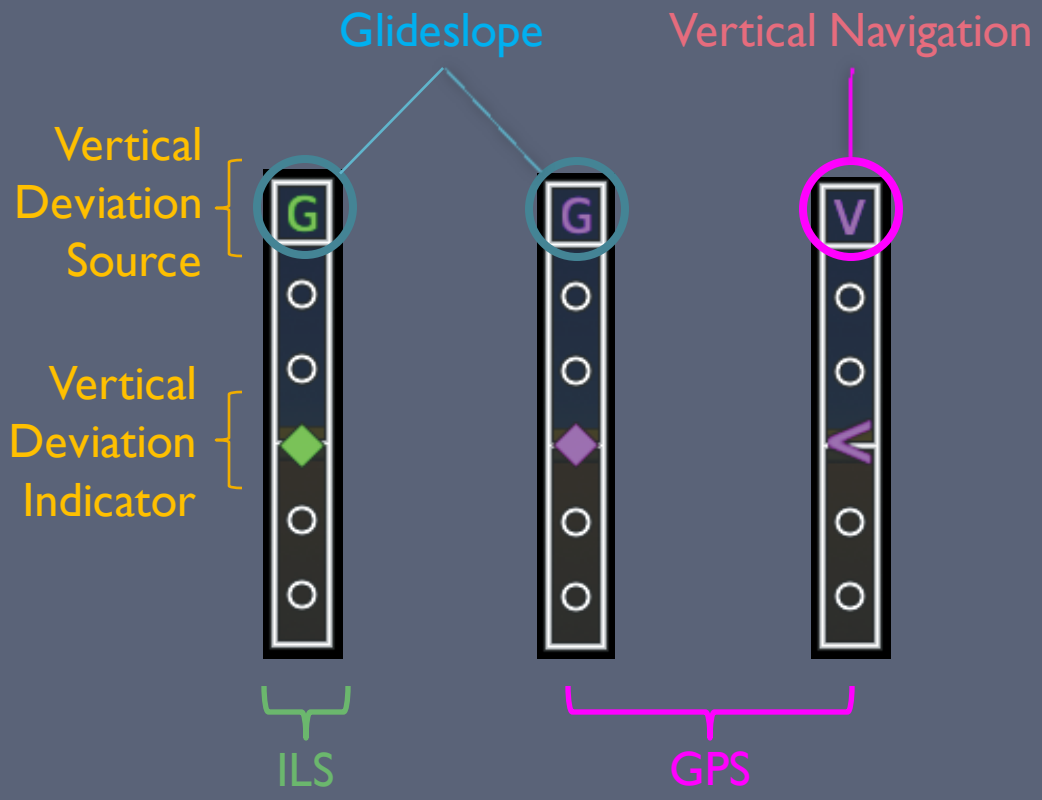
Message Alert

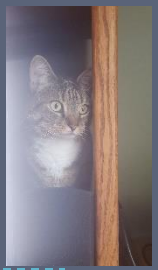
CDI Source Selection

Active Course

Deviation Indicators

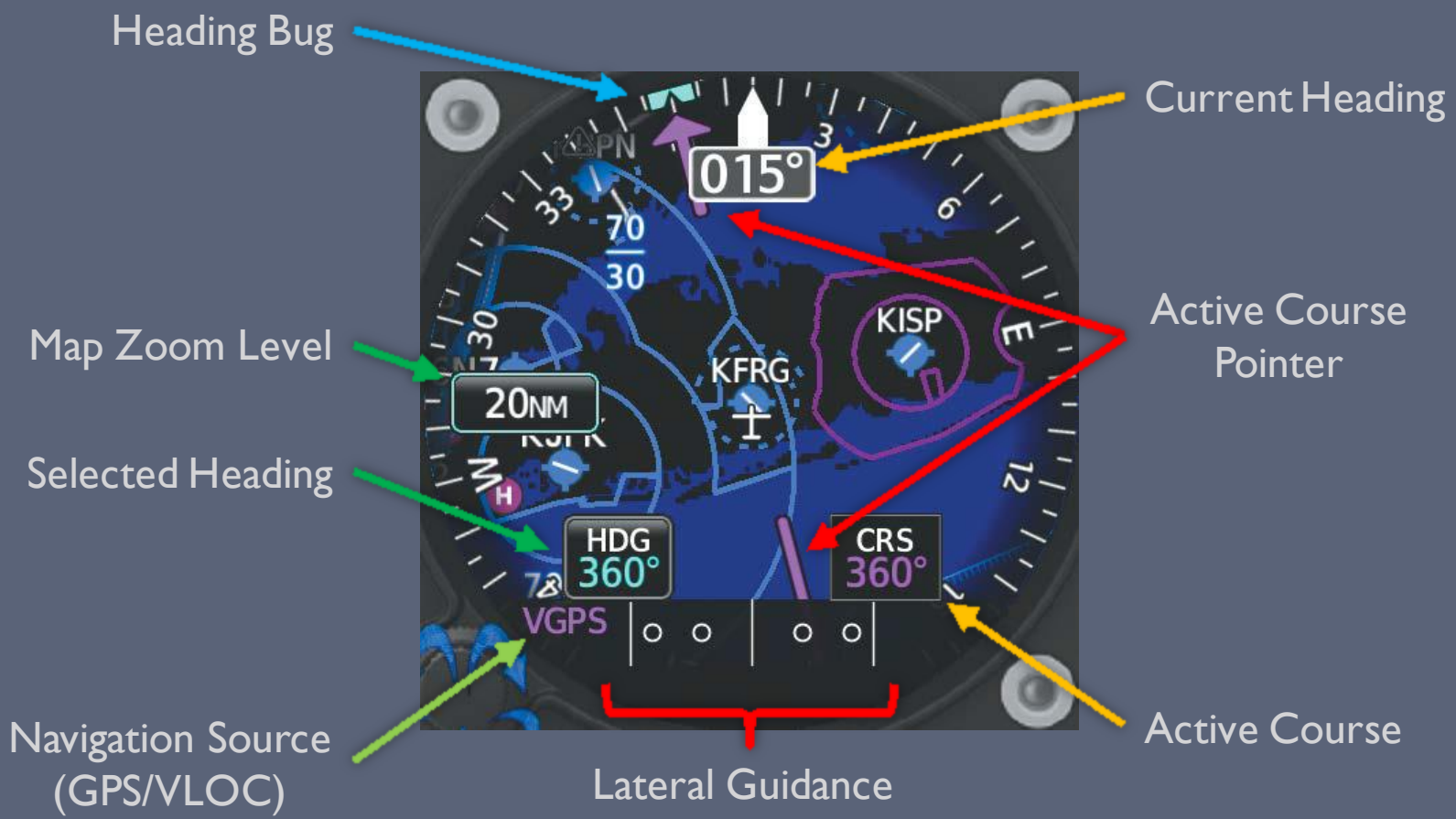
- The color and symbology of the lateral & vertical indicators identifies the type of nav source that is active.





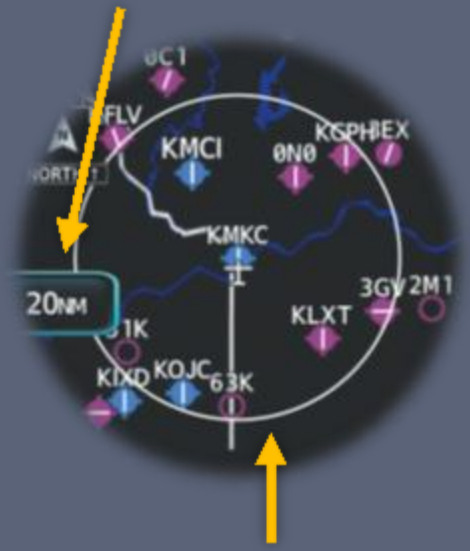
Lateral Deviation Indicator uses the same green/magenta color symbology

GI-275 HSI Map (EHSI)



HSI Map Additional Symbology

Selected Range



Range Ring

Runway Centerline Extensions

Ground Track Vector

HSI vs HSI Map

HSI

- Decluttered presentation
- Navigation overlays
  - Optional bearing pointers
  - Repeats GPS waypoint, distance, and time to fix
- Opinion: Best for precision course guidance

HSI Map

- Great for overall situational awareness
  - Combines terrain, weather, and traffic data with course guidance
- Some limitations
  - No bearing pointers or time/distance readouts
- Opinion: Best for enroute situational awareness

Miscellaneous

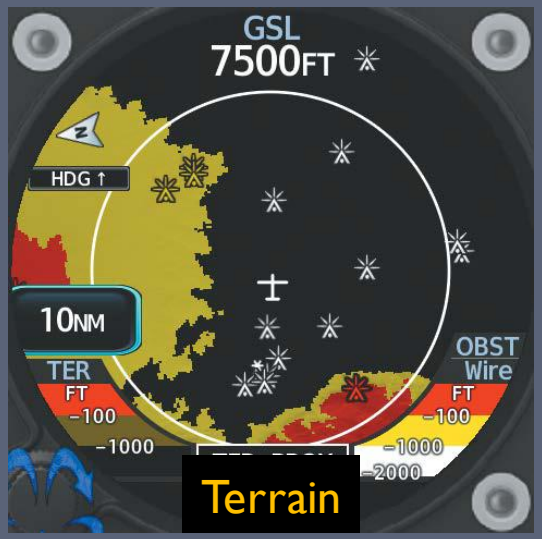
GI-275 CDI/MFD

Traditional CDI

OBS Selector

Source Selector

MFD Data



Terrain

Moving Map

Traffic

NOTE: GI-275 CDI/MFD is powered by the avionics bus

Crew Profiles

- Crew profiles enable various system settings to be saved and quickly loaded
- NOTE: Any changes made to the displays are automatically saved to the current profile!
  - *Don't change any individual settings; instead, load the desired profile*

- Accessing "Crew Profile"
  - **On start-up**: Select the desired profile from the CDI/MFD
  - **From any page**: open the menu (swipe up or push and hold inner knob) and select System->Crew Profile

- Switching Crew Profiles
  - Access the "Crew Profile" screen
  - Select the desired profile
  - Select the "Activate" button

Flying 20 Club Crew Profiles

- Use the crew profile that you feel most comfortable with
  - Think of the crew profiles as a "declutter" feature

Profile Name	SVT?	Description
SIMPLE	No	The most basic display possible.
ADVANCED	No	SIMPLE + additional navigation data (e.g. bearing pointer).
FULL	No	All optional features (except SVT) enabled.
SVTSIMP	Yes	SIMPLE + basic SVT.
SVTADV	Yes	ADVANCED + basic SVT (including “airport signs”).
SVTFULL	Yes	All optional features (including “horizon headings”) enabled.

Abnormal Operations

- Electrical system failure
  - Backup battery provides 60+ minutes of power
- Failure of primary ADI
  - HSI automatically reverts to ADI display
- AHRS/ADC failure
  - Failed unit can receive data from the remaining unit
  - AHRS can be reinitialized and realigned in flight
- Magnetometer failure
  - GPS ground track used as a backup
- GPS failure
  - GPS position not required for attitude information
    - But synthetic vision (SVT) will be disabled
    - GI-275 will provide AHRS info to GTN for more reliable "DR" mode

Adjusting to Glass

Tips & Tricks

- *Avoid fixating on the moving numbers!*
- Always keep the analog altimeter baro setting synchronized with the GI-275 baro setting!
- *Always* use the bugs (heading & altitude)
- To quickly set the heading or altitude bug to your current heading/altitude
  1. Select the appropriate data field
  2. Press the inner knob *once*

Tips & Tricks

- *Don't be afraid to use both the digital and analog gauges*
  - Use whatever is *most intuitive* for you in the current situation

- **If you get overwhelmed by the information being displayed…**
  1. Use the ADI for *attitude only* and the HSI for *heading only*
  2. Use the analog gauges (ASI, Alt, VSI, TC) for everything else
  3. Switch to a more basic crew profile to declutter the screens ★
     - Did you notice the cat images on the previous slides, or were you distracted by all of the information that was being presented?

★

Tips & Tricks

- Use the tapes and trend vectors *in conjunction with* the digital readouts to hold altitude, rate of climb/descent, and heading
  1. Observe the tapes for their relative movement
  2. Observe the trend vector for your rate of change
  3. Stabilize the aircraft when you are within 50 feet altitude / 100 fpm climb / 10 degrees heading / 5 knots of airspeed
  4. Once stabilized, make small adjustments to fine-tune the aircraft attitude, heading, and/or airspeed
     - This is how you would control the aircraft if you were using analog instrumentation

Tips & Tricks

- Use the flight path marker (FPM) to visualize where the aircraft will be in the near future
  - *Reference* the FPM to help control the aircraft more precisely
  - "Put the thing on the thing"
    - Maneuver the aircraft so the FPM ("the thing") is over the location you want the aircraft to go ("the [other] thing")
  - Remember: The FPM shows you where the aircraft will be at some point in the future, but not the attitude it will be in
    - *Don't blindly follow its guidance without respect to your current and future pitch/roll attitude and vertical/lateral position.*

Do's and Don'ts

DO…

- **…Practice in VFR *before* attempting flight in IMC!**
- …Practice with a safety pilot
- …Select a Crew Profile that fits your needs
- …Use the trend vectors and observe the relative movement of the tapes
- …Use the analog instruments if you are more comfortable with them

DON'T…

- **…Chase the digital numbers or FPM!**
- …Fixate on the fancy display
- …Forget to look outside
- …Omit practicing partial panel skills
  - DO assume that the technology *can* still fail
- …Forget to cross-check the instruments

More Information

- Garmin Website – http://www.garmin.com
  - GI-275 manual

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Another Steam vs Digital Comparison

It's just a new way of presenting the familiar steam gauges