

T-Craft Aero Club Members

G-5/GFC-500 Basics

G-5s:

Over the last several years, we have upgraded the avionics in the T-Craft fleet with Garmin G-5 instruments as the PFDs and the HSI's. These units are not only highly reliable, they have allowed us to remove the high-maintenance vacuum systems from the aircraft.

There are many resources to learn about the G-5. A link to the G-5 operating manual appears on the T-Craft website under each aircraft. The manual seems intimidating at first, but you'll find the meat and potatoes on pages 13-31.

All of the Garmin 430s in our aircraft are linked to both G-5s acting as PFD and HSI.

One feature that is not discussed is how the power up and power down works. The PFDs power up when the aircraft master switch is turned on and power down when it's turned off. With the exception of 375, the HSIs power up and power down with the avionics master. Note: If you fail to turn off the avionics master, both G-5's will power down with the aircraft master. The exception is 375 which does not have an avionics master. In that plane only, both G-5s power up & down with the aircraft master.

The G-5's all have an internal re-chargeable Li-ion battery that provides approximately 4 hours of instrument operation in the event of a power failure in the aircraft. When you turn the avionics or aircraft master switch off, the G-5s will display a 60-second count-down timer. If during that 60 seconds you touch either G-5's power button, both G-5s will stay on until the G-5 power switch is turned off, the G-5 battery runs out, or power comes back on and is subsequently turned off.

This brings me to my "Foot-Stomper":

- **If you inadvertently touch the G-5 power button while it is counting down that 60 seconds, make sure that both G-5 instruments have shut down when you put the bird away! Either re-cycle the aircraft and avionics master switches, or push the G-5 power button(s) again to make sure they have shut down.**
 - **If you only push the power button on one unit to shut it down, the other will stay on.**
 - We have had one instance in which A G-5 was left on and the battery was completely discharged.
 - Fortunately, it only takes about 10 minutes of the aircraft running to sufficiently charge the battery for the G-5 to power up again.
- Occasionally a RS232 communication error will show up when powering up. Normally this clears itself in a few seconds (it has to do with one of the instruments powering up and establishing communication faster than the other). If the error repeats, re-cycle the G-5 power. If it persists, write up a squawk. The G-5s will remain fully functional as will the 430, but the communication link between them may have been compromised due to a loose connector.

- There are many good videos on G-5 operation. **We highly encourage all members to not only read the manual, but also watch the You-Tube videos (a search on YouTube will reveal a number of choices).**
- Garmin Webinar on GFC-500: <https://youtu.be/nQMWC5Aq1JM>

Now for a G-5 quiz:

At what positive and negative pitches does the PFD pitch ladder turn **RED**?

(You will have to dig for this answer!)

GFC-500/G5 AI

As you Class II members know, 89E has a Garmin GFC-500 auto pilot installed. This top of the line instrument's capabilities rival those of many more expensive units. As in the other aircraft, the G-5 and the GFC-500 are linked to the Garmin 430. The GFC-500 manual is part of the G-5 manual, hence its length.

One valuable safety feature of the GFC-500/G5 AI installation is not clearly covered in the instruction manual: The "ESP". ESP is the acronym for the Electronic Stability & Protection.

- **This program/feature is separate from the GFC-500 and is ALWAYS running in the G-5 background REGARDLESS of the auto-pilot being on or off, engaged or not!**

The ESP will engage if the aircraft exceeds the pitch up, pitch down or roll limits programmed into the G-5.

- There are two ways to disable the ESP function:
 - ❖ **Primary:**
 - Push the G-5 knob to see the PFD G-5 menu
 - Scroll to "ESP"
 - Select ESP and push the button. The ESP indicator will toggle from Green to Grey/White.
 - **IF the ESP function is green the ESP function is engaged!**
 - ❖ **Secondary:**
 - Pull the circuit breaker on the auto pilot.
- **We do not recommend the secondary method as some pilots will forget to push the circuit breaker back in.**
- **If there is a need to disable the ESP Safety system function, i.e. training etc., re-enable it, and at a minimum re-enable it prior to putting the plane away.**
- **If the aircraft avionics have been powered down, i.e. when the plane is put away, the ESP function will re-enable when the systems are powered back up.**

Len Erickson



3.3 PFD Page

The G5 PFD Page displays a horizon, airspeed, attitude, altitude, and vertical speed, as well as heading and course deviation information if combined with a G5 HSI.

The following flight instruments and supplemental flight data are displayed on the PFD Page:



G5 PFD Flight Instruments

- | | | | |
|---|-----------------------------|---|--|
| ① | Airspeed Indicator | ⑫ | Vertical Speed Indicator |
| ② | Attitude Indicator | ⑬ | Current Altitude |
| ③ | Pitch Scale | ⑭ | VNAV Indicator or Vertical Deviation Indicator |
| ④ | Current Airspeed | ⑮ | Altimeter |
| ⑤ | Aircraft Symbol | ⑯ | Selected Altitude |
| ⑥ | Course Deviation Indicator | ⑰ | Navigation Course |
| ⑦ | Slip/Skid Indicator | ⑱ | Current Heading or Ground Track |
| ⑧ | Ground Speed (GS) | ⑲ | Ground Track |
| ⑨ | Altimeter Barometer Setting | ⑳ | Selected Heading or Ground Track |
| ⑩ | Turn Rate Indicator | ㉑ | Vspeed Reference |
| ⑪ | Selected Altitude Bug | ㉒ | Battery Status Indicator |



3.3.3 Attitude Indicator

Attitude information is displayed over a virtual blue sky and brown ground with a white horizon line. The Attitude Indicator displays the pitch (indicated by the yellow symbolic aircraft on the pitch scale), roll, and slip/skid information.

The horizon line is part of the pitch scale. Pitch markings occur at 2.5° intervals through all pitch ranges. When the aircraft enters an unusual pitch attitude, red extreme pitch warning chevrons pointing toward the horizon are displayed on the Attitude Indicator starting at 60° above and 40° below the horizon line.

The inverted white triangle indicates zero on the roll scale. Major tick marks at 30° and 60° and minor tick marks at 10°, 20°, and 45° are shown to the left and right of the zero. Angle of bank is indicated by the position of the pointer on the roll scale.

Slip/skid is indicated by the location of the ball.

Understanding Garmin Electronic Stability and Protection (ESP)

January 25, 2018

E-S-P. Three simple letters, with an extremely powerful meaning: Electronic Stability & Protection. It's a feature our team designed to keep a watchful eye on an aircraft's flight condition — and lend a helping hand if needed.

What is ESP? ESP is a safeguard created to assist you in maintaining safe, stable flight when hand-flying your aircraft. It monitors the aircraft's flight condition, functioning independently of the autopilot, and it applies a control force toward stable flight whenever pitch or roll deviations exceed recommended limits. ESP can also recognize when underspeed or overspeed conditions are about to occur — such as a stall or too-steep of a descent — and it makes appropriate adjustments to the controls. Plus, if the system detects that ESP has been activated for a specified period of time — such as in the event of pilot incapacitation — the autopilot will engage with the flight director in level mode to bring the aircraft back to level flight. However, if you're training or practicing, ESP can be manually disabled to allow intentional flight maneuvers.

Where is ESP? ESP can be found in many of our most popular integrated flight decks, including a number of G1000 NXi- and G3000-equipped aircraft, along with our new cost-effective [GFC 500 retrofit autopilot](#) for light single-engine aircraft, and [GFC 600 retrofit autopilot](#) for high-performance, more complex aircraft. Experimental/LSA owners and pilots can also take advantage of ESP with our G3X and G3X Touch experimental flight display systems by utilizing compatible G3X autopilot servos.

How can ESP help? Lately, an important discussion within the aviation community has centered around aircraft loss-of-control scenarios—in fact, it's on the NTSB's "Most Wanted" list. ESP is a direct result of these conversations. By helping to avoid the onset of inadvertent stall/spins, steep spirals or other loss-of-control situations, we want to help make the flight environment even better.

