



Trio Pro Pilot

Affordable, Digital Co-Pilot for your Cessna

If you've been following my articles, you know one of my repeated mantras is that any aircraft flown in Instrument Flight Rules (IFR) should have an autopilot. Actually, a *basic* autopilot was what I said.

Basic meant the ability to keep the wings level, tracking a VOR, ILS or GPS and tracking a heading is always a plus, especially if you get vectored a lot. Many of the factory-installed autopilots found in legacy Cessnas, if trustworthy, still meet that criterion. In 2015, I wrote an article in this magazine called "Everything You Want to Know About Cessna Legacy Autopilots." It is still No. 1 on Google, so it is still seeing a lot of readership.

The premise of that article was that the Cessna/ARC autopilot that you have in your legacy Cessna can actually fly your aircraft better than many of the aftermarket autopilots available at that time (in 2015), assuming it is healthy. The second premise was that you could totally rebuild that factory installed autopilot for one-third to one-half the cost of a comparable S-TEC or Century upgrade.

In 2017, that premise expired. S-TEC/Genesys, Garmin, TruTrak, and Trio all came to market with a digital autopilot, none of which are anywhere near *basic*.

Beyond Basic Autopilots

The Garmin GFC 500, at about \$26,000 installed with dual G5s and desirable autotrim, seems to be leading the pack. The S-TEC/Genesys 3100 (about \$23,000 installed) — which, frankly, better resembles Garmin's GFC 600 autopilots for higher-performance aircraft — isn't getting quite the same buzz as the Garmin. These are both state-of-the-art GA autopilots for the serious *true* IFR pilot, and the price (and some advanced features) reflect that. If you are flying approaches to minimums and upgrading your autopilot, you should be looking here. Meanwhile, in 2019, the TruTrak Vizion in 2019 became the Bendix King AeroCruze 100.



In this article, we're going to talk about another option — the Trio Pro Pilot.

Straight and Level

Trio's heritage comes from the experimental/light sport market. In this market, technology is able to flourish with less FAA oversight. Trio answers more to its customers than to the FAA. The best example is the infamous straight-and-level button that we see in all four of the autopilots that were new in 2017. A button you can push that takes the aircraft to straight-and-level flight is monstrous! The GFC 500 is Garmin's first autopilot for aftermarket (not factory-installed), and it has The Button. The G1000 autopilot did not. The upgraded G1000 NXi (2017) added it.

S-TEC has certainly owned the aftermarket autopilot business for 25 years, but the 3100 is the first of their autopilots to have The Button. Yet owners of Trio autopilots have had the ability to stabilize the aircraft in pitch and roll by simply engaging the autopilot and could also command it to fly either a left or right controlled 180-degree turn. So, not only has Trio brought this technology to GA, but it has also done it at a price that fits into a reasonable light IFR — and even VFR — legacy panel.



195 Panel iwth Trio.

The Trio Pro Pilot Autopilot

The Trio Pro Pilot is a digital, two-axis autopilot with built-in inertial sensors, and features and benefits typically only found on high-end autopilots. To get basic altitude hold in an S-TEC/Genesys autopilot (the leader in aftermarket autopilots) prior to 2017, you had to spend about \$14,000 on equipment and another \$4,000-plus in labor — \$18k for a System 30 analog autopilot with basic altitude hold.

The Pro Pilot gives you altitude hold, altitude pre-select, plus vertical speed and airspeed control on climb and descent, for under \$10k, fully installed. Most modern autopilots, even the more basic legacy autopilots, have good capability on the horizontal axis; wings level, tracking of a VOR, ILS, or GPS, and (with external input) will track a heading.

The Pro Pilot has GPS-based course track and does not require an external heading source. Where the real benefits come, especially for the IFR pilot, is in the vertical capability. The Trio Pro Pilot puts these features at the fingertips of the light IFR pilot at a price point that even meets the needs and budget of the VFR pilot who wants the added benefit and safety of an autopilot.

Fact is, the Trio Pro Pilot was designed to meet the needs and budget of the light IFR community. Four years ago, if you had no autopilot or an untrustworthy legacy autopilot in your legacy plane and were planning a panel upgrade with an autopilot (with light IFR in mind) in the mix, it was hard to justify and not exceed a reasonable budget. The Trio Pro Pilot makes this possible.

CESSNAOWNER.ORG

Autopilot Basics

The Trio Pro Pilot uses a combination of GPS-derived data and inertial rate sensors for stabilization and navigation. There is no GPS in the Pro Pilot; it requires an interface to an external GPS. When interfaced to an IFR GPS with ARINC 429 interface, the autopilot is legal for WAAS GPS approaches, including the desirable LPV approach with vertical guidance.

VFR pilots can actually install the Pro Pilot and interface it to a portable GPS through a NEMA 0183 interface that is common in portable GPS units. This autopilot does not track a VOR or ILS, but the full menu of GPS approaches is available. There are considerably more GPS approaches than ILS approaches in this country today. You'll fly GPS for all your long-range navigation today, and GPS approaches at small airports, even GPS approaches to Class B airports, will become more common as time goes on.

Here's a shopping list of the features and benefits you get with the Trio Pro Pilot.

In the Horizontal Axis (H NAV):

- Track Mode* (TRK) tracks a GPS-directed flight plan course line.
- Course Mode (CRS) tracks a pilot-directed vector.
- Intercept Mode (INT) flies the airplane back to a previously entered flight plan (magenta line).
 - Note. The Pro Pilot will intercept a track up to 30 degrees.
 - The BK AeroCruze does not have this capability.
- When directed, the Pro Pilot will execute a 180-degree course reversal or a straight ahead RECOVER function.

CESSNA OWNER 17



Pro Pilot in a 182Q (above) and a 172

Note: BK's AeroCruze can also go to straight-and-level flight with a push of a button, but the Pro Pilot can perform a balanced left or right 180-degree turn at the push of a button! This feature will aid a VFR pilot who inadvertently flies into Instrument Meteorological Conditions (IMC).

* The Pro Pilot allows you to offset your track up to 3 miles and run parallel on busy airways. The BK AeroCruze does not have this capability.

In the Vertical Axis (V NAV):

- Altitude hold
- Vertical climb and descent rates, and airspeed capture and control
 - Note: The BK AeroCruze controls vertical speed (FPM). The Pro Pilot allows you to also control airspeed in climb or descent. This capability allows you to address engine cooling on climb or descent when FPM alone may not be doing the job.
- Altitude pre-select, which can be used in conjunction with vertical modes

The Pro Pilot displays both vertical and horizontal nav data on the face of the controller in approach mode. Essentially a backup to your CDI or HSI. The BK AeroCruze does not.

Safety Features

Recover Button: Certainly, the addition of a straight-and-level button on an autopilot is a significant improvement in design and safety. S-TEC (Genesys), the leader in aftermarket autopilots, first added this capability in their 3100, introduced in 2017, but pilots flying behind Trio's experimental autopilots have had the auto 180 capability for years. S-TEC's previous models were devoid of the S&L button.

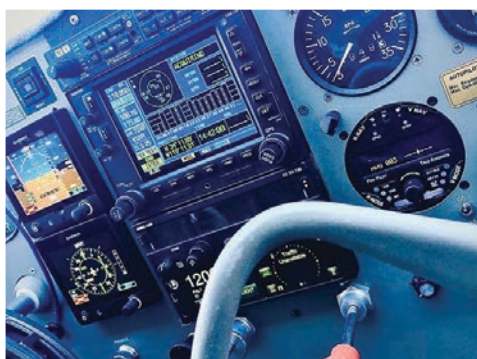
Envelope Protection: The Pro Pilot is customized to the specifics of your aircraft and your personal preferences, including maximum/minimum airspeed and max turn rate. When the autopilot is on, it will take control if these parameters are exceeded. The pilot can override.

Airspeed Envelope Protection: Pro Pilot won't allow the pilot to exceed maximum airspeed.

Roll Envelope Protection: Pro Pilot won't allow the pilot to exceed maximum roll rate.

Pilot Control Steering: Center encoder knob allows in-flight adjustments of preset altitude, v-speed and rate, barometric pressure (etc.), and initiate turns.

Nav Data display: Waypoint or approach data from the GPS is displayed on the Pro Pilot display, with distance and deviation. (The AeroCruze does not do this.)



Track Offset: Allows you to run parallel (up to 3 miles) to busy routes and airways.

Auto 180: Performs an automatic, coordinated 180-degree turn.

Servo Disconnect on Takeoff: Taking off with the autopilot on is a no-no. The Pro Pilot senses the servos are engaged and disconnects servos on takeoff.

Pause function: A tap of the center encoder knob pauses climb or descent.

Pro Pilot Servos

Trio uses what they call Gold Standard Servos. They are not just motors with capstans or control arms. An internal micro-processor governs operation and automatically disconnects if a fault is detected. Trio uses a DC brushed motor with a servo clutch. Key element is internal fault-sensing and automatic disconnect. The Pro Pilot also offers the option of a remote autopilot disconnect switch, so the pilot has immediate access to disconnect the autopilot at any time.

Cessna Pro Pilot STC and Pricing

Typically includes Trio Pro Pilot Control Head, two servos, complete wire harness, two switches, one circuit breaker, plac-

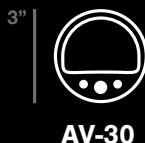


Easy to Install Multi-Function

DISPLAYS THAT DON'T SUCK

Classic Cockpit Look | Maintenance-Free | Customizable

Replace high-maintenance vacuum driven instruments with precise digital displays that add 21st-century tech for safer, more informed flights.



TRY BEFORE YOU BUY!

Download the AV-20-S and AV-30 Windows Simulators



uAvionix.com/DigitalPanel

Nose - PICKER 24 volt

Ph. 480.338.7686
(aircraft-tugs.com)

"One of the most affordable
and innovative Aircraft Tug
manufacturers in the country"

Works for CESSNA:

- 150
- 152
- 172
- 175
- 177
- 182
- 206
- 210
- 336
- 337
- 310
- 303
- Fixed Gear & RG

Aircraft Up To
5,200 LBS

Order
Direct
Online
24.7.365



Variable Speed Control

ard, STC kit hardware, and STC paperwork. Trio offers a 3-inch control head that fits a standard 3 1/8-inch instrument hole (popular with experimental builders), or a 2 1/4 inch by 6 1/4 inch control head that fits a standard radio stack.

Cessna 172 Series Price: \$5,595

STCs: C172, C172A, C172B, C172C, C172D, C172E, C172F (USAF T-41A), C172G, C172H (USAF T-41A), C172I, C172K, C172L, C172M, C172N, C172P, C172Q, C172R*, C172S*, C172RG, P172D, R172E (USAF T-41B-D), R172F (USAF T-41D), R172G (USAF T-41C or D) R172H (USAF T-41D), R172J, R172K

Note: The Cessna 175 comes in at the same price.

Cessna 177 Series Price: \$5,595

STCs: C177, C177A, C177B, and C177RG

Cessna 180 Series Price \$5,995

STCs: C180, C180A, C180B, C180C, C180D, C180E, C180F, C180G, C180H, C180J, and C180K

Cessna 182 Series Price: \$5,595

STCs: C182, C182A, C182B, C182C, C182D, C182E, 182F, C182G, C182H, C182J, C182K, C182L, C182M, C182N, C182P, C182Q, C182R, R182, TR182, 182S, 182T, T182, T182T

Cessna 185 Series Price: \$5,595

STCs: C185, C185A, C185B, C185C, C185D, C185E, and C185F, A185E, A185F

Cessna 190 Series Price: \$6,300

STC: C190

Cessna 195 Series Price: \$6,300

STCs: C195, C195A, C195B

Cessna LC126 Series: \$6,300

STC: LC126 A & B

Installation Hours

The factory estimates about 40 hours, but your installer's first-ever installation, or your specific model, may require a bit more. Complete, installed price *should* be under \$10,000.

Acronyms in this article

VOR: VHF omni-directional range

ILS: Instrument Landing System

WAAS: Wide Area Augmentation System

AGL: Above Ground Level

VFR: Visual Flight Rules

CDI: Course Deviation Indicators

HSI: Horizontal Situation Indicators

AGL Disconnect

"But — the STC says that I have to disconnect the Pro Pilot at 500 feet AGL?"

(The AeroCruze STC requires a 700-foot AGL disconnect!)

So what? I've been writing these articles and independently advising aircraft owners since 2013, the majority of whom define themselves as light IFR. Personal minimums are something we discuss. In those nine years, I have had *maybe* two clients whose light IFR personal minimums were below 500 AGL, most with closer to 1,000 feet personal minimums, before they would consider flying an approach to that airport.

Fact is, light IFR pilots have no interest in flying approaches to minimums, although many Trio owners have flown their Pro Pilots down to the deck in VFR conditions just to prove the point.

Bottom line: The Trio Pro Pilot is an autopilot designed to meet the needs of VFR or light IFR pilots and is priced accordingly. If you plan to fly deeper into IFR than a 500-foot ceiling, then you should be looking at an autopilot designed for true IFR, and you'll need about \$23,000 to \$26,000 to do this.


Conclusion

For my light IFR clients who are planning an avionics upgrade that includes an addition or upgrade to their autopilots, I recommend the Trio Pro Pilot. The performance, features, and price of the Trio Pro Pilot allow aircraft owners who previously could not justify the expense of including an autopilot in their upgrade budget.

Light IFR calls for, at minimum, a basic autopilot. The Trio Pro Pilot gives you a modern, digital co-pilot that approaches the capability that we only saw in the best autopilots prior to 2016.

Note that Trio makes the autopilots and the STC Group handles STCs, kit engineering, marketing, and sales for Trio. What you can expect from both is excellent customer support. Trio has been manufacturing excellent autopilots for over 20 years, the majority of which went to hands-on, experimental builders who depend on a hands-on supplier with a culture of customer support.

For the last four years Trio has brought this culture to the light IFR pilot who is flying an affordable, legacy, certified aircraft. Looking to upgrade an autopilot in your legacy Cessna? I think you need to take a serious look at the Trio Pro Pilot.

Thanks for Reading! Until next time — Safe and Happy Flying! 



Bob Hart purchased his first airplane in 1971 at age 21. He's owned five others since. As a Senior Avionics Consultant at Eastern Avionics, Bob has personally sold over \$20 million in Avionics. Bob now offers avionics advice through many online forums and consults avionics clients through his website www.AvionixHelp.com. He is semi-retired. After living in Colombia, South America, for a few years, he is now back in sunny Florida.

Editor's Note: Bob Hart is a regular participant on the Cessna Owner Organization's forums and is available to answer your avionics-related questions. To contact him, visit www.CessnaOwner.org, click the Forums tab, and scroll down to the "Avionics" forum. COO membership is required.



Specializing In Fiberglass Aircraft Parts

- All Products FAA Approved
- Interior Panels and Glare shields for Cessna 170, 170A, B, 175, 180, 185, 172 & early 182 & 206 T and U models
- Nose bowls for Cessna 180, 185, 1956-1972 Cessna 182 and 1960-64 Cessna 210
- Extended Baggage Kits for all Cessna 180, 185, 1956-1980 C 182, 170B, 172, 175, and 206/207 models.
- Vinyl I& Wool Headliners
- Rubber soundproof kits
- Composite Cowls Available for All C180, C185 & 1956-1961 C182
- Piper PA18 Cub cowlings available on field approval basis for certified aircraft
- PMA 207 Interior Kit

Repair Station No. LOGR640X
Email: selkirkav@selkirk-aviation.com
www.selkirk-aviation.com
(208) 664-9589

OSBORNE™ TIP TANKS BY GAMI



General Aviation Modifications, Inc.
Ada, Oklahoma comments@gami.com

888-359-4264 30 Gal Total

HANGARS!

52 Years of Manufacturing Excellence

Buy Factory Direct !

- T-Hangars
- Individual Hangars
- Maintenance Hangars
- Electric Bi-Fold Doors
- Corporate Hangars
- Hangar Homes



Photo by Bruce Selyem

R & M STEEL COMPANY



R & M Steel Co.

Call Today !

Phone 1-208-454-1800 • Fax 1-208-454-1801

www.aviationbuildingsystem.com

email: sales.rmsteel@gmail.com



**NEW
EXPANDED
PRODUCT
LINE**

**NUMBER ONE SOURCE
Composite
CESSNA PARTS**

WHEEL PANTS, WINGTIPS,
STRUT CUFFS, ELEVATOR
TIPS, RUDDER TOPS,
BRAKE FAIRINGS, GEAR
LEG FAIRINGS, DORSAL
TIPS and MORE...

CALL TODAY FOR A FREE CATALOG
800.597.1911

STENEAVIATION.COM

FAA STC/PMA APPROVED