



# Approach

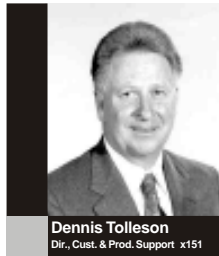
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## Airframe Baselines

**MEGGITT AVIONICS  
S-TEC**

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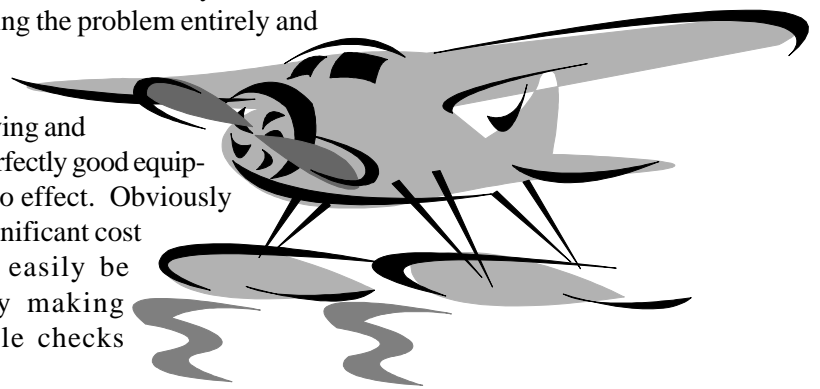
Dennis Tolleson  
Dir., Cust. & Prod. Support x151

There are certain **airframe baselines** such as control system friction, primary cable tensions, and even control surface balance that can have a drastic affect on autopilot performance. When baselines such as these are out of tolerance it is not uncommon for the autopilot to display poor performance in one axis or another. This usually leads to misdiagnosing the problem entirely and spending countless hours removing and replacing perfectly good equipment with no effect. Obviously this adds significant cost that could easily be avoided by making some simple checks upfront.

Primary cable tensions set to the manufacturer's specification are extremely critical to the operation of an autopilot system. Cable tensions should be checked at least once a year to ensure the overall autopilot performance is not compromised because of low cable tensions. If adjustment of the primary cables is required, the servo bridle cable clamps should be loosened prior to making the adjustment and then reattached afterwards.

Control system friction is another factor that needs to be considered when autopilots exhibit poor performance in one

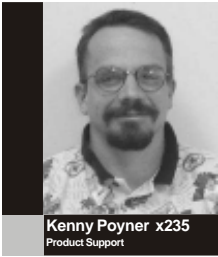
axis or another. Excessive friction in the primary control surface causes the autopilot to work harder and slows its overall response time leaving the pilot and technician to think the problem is in the autopilot system when in fact it is not. Control system friction is something that should be checked any time the flight control system appears to respond slowly in one axis or another. Each aircraft manufacturer has specifications or limitations for friction.



Other factors that can have an affect on autopilot performance are STC modifications to airframes. Some of these STC's effect the aircraft flight envelope such as CG, operating weight, speeds, surface ceilings, STOL kits, engine conversions, extended range fuel tanks (internal and external), floats, skis, wing tip mods, strakes, turbulators, gap seals, root fairings, vortex generators, etc. Autopilot STC's are normally not valid in aircraft that have these STC's installed unless they are specifically listed on the autopilot Supplemental Type Certificate.

## GPSS COMPATIBILITY

### ARINC 429



The S-TEC ST-901 GPSS Converter and S-TEC System Fifty Five X Flight Control Systems are only compatible with GPS receivers that have ARINC 429 outputs available with Low Speed Label 121 (Bank Angle Command) and Low Speed Label 312 (Ground Speed). Not all GPS receivers with ARINC 429

outputs have Low Speed Label 121 or Low Speed Label 312 available.

Below is a list of GPS receivers that, (to our knowledge) are compatible with the S-TEC ST-901 GPSS Converter and System Fifty Five X Flight Control Systems.

#### GARMIN

- 150XL
- GPS 155
- GPS 155XL
- GPS 165
- GNC 250
- GNC 250XL
- GNC 300
- GNC 350XL
- GPS 400
- GNC 420
- GNC 430
- GNC 530



#### BENDIX/KING

- KLN90B (Must have software levels 21/10 and 22/02)

#### RS232

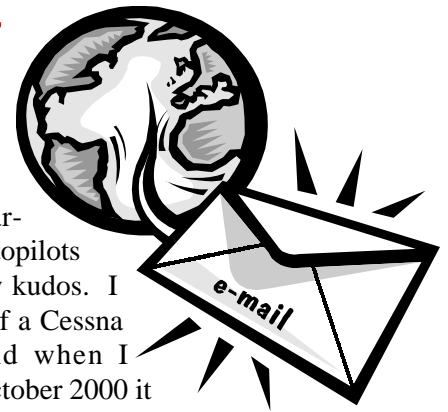
The S-TEC ST-901 GPSS Converter is also compatible with certain GPS receivers that have RS232 outputs.

Below is a list of GPS receivers with RS232 outputs that are compatible with the S-TEC ST901 GPSS Converter. These GPS receivers must have version 3.4 software or above. These receivers are not compatible with the System Fifty Five X, which accepts only ARINC 429 without the use of an ST-901 GPSS Converter.

#### UPS

- GX50
- GX55
- GX60
- GX65

## We Get E-mail



“I just read your article about S-TEC autopilots and wanted to add my kudos. I am the proud owner of a Cessna 172N, N999AR, and when I bought the plane in October 2000 it already had an S-TEC System 40 autopilot which had been installed in May of 1984. Just last year I was reading in a magazine that I could upgrade my autopilot to a System 50 to add altitude hold function. I was both surprised and excited that I could upgrade for what I thought was a very reasonable price and have altitude hold. In October 2002 the upgrade was completed. I was skeptical because I didn't think that it would be very useful. It was just a 172 and all it took was an occasional tweak on the trim wheel. I could not have been more mistaken. It is worth every penny.



When I took delivery from Tim Mathison Avionics in La Fayette, GA, he told me about another S-TEC upgrade that was available, Global Positioning System Steering (GPSS). With this add the autopilot will fly your GPS course and approaches and will steer the entire course centerline to centerline. It actually calculates your airspeed and rate of turn to roll you out on the centerline.

It's amazing. Now I had heard about these on the S-TEC Fifty FiveX (standard on a Cirrus SR22) but never dreamed that it can be added to any S-TEC autopilot. On January 6, 2003, Tim completed the installation of a Garmin GNS430 GPS, a Garmin GMA340 Audio Panel and the S-TEC GPSS and it exceeds my expectations. It also gives me more time to manage the airplane and monitor the other systems. I'm looking forward to taking my instrument training in the 172.

I also have a partnership in a 1982 Piper Saratoga PA32-301T which has a Century 41 autopilot coupled to a Garmin 530 with altitude hold and altitude pre-select and it is no comparison to the S-TEC. After comparing the two, we are seriously considering a change.

S-TEC is doing a great job of providing General Aviation with the best, affordable, high tech autopilots. Keep up the good work and thanks for the article.”

Don Kuebler

# RMA SYSTEM IMPLEMENTATION



In the near future, Meggitt Avionics/S-TEC will implement an RMA (Return Material Authorization) system for all returns. This will include all components for repair, warranty and non-warranty exchange components, as well as any complete kits or piece parts for restock.

Dealers may obtain an RMA number by calling our Product Support team (warranty exchanges and warranty repairs), Repair Center for all repairs, or Sales for complete kits or piece part returns. The RMA number will need to be conspicuously displayed on the outer shipping container.

Before calling to obtain an RMA number make sure you have the following information available:

- 1) Aircraft make and model number
- 2) Aircraft serial number
- 3) Aircraft registration number
- 4) Registered owner's name
- 5) Component part number and serial number
- 6) Aircraft voltage
- 7) Aircraft heading system type (if applicable)
- 8) Reason for return (in detail)

During the initial implementation, we will continue to accept components that are not identified with an RMA number. This will cause some delays as we call each dealer to process an RMA request. As the system nears full implementation and dealer awareness increases, we expect these occurrences to be minimal with little impact on your schedules.

Dennis Tolleson, Director of Customer Support, will inform the dealer network of the RMA system implementation date, as well as any other pertinent details by way of a sales memo.

Please refer to an earlier S-TEC Approach newsletter article by Scott Howard (Volume 7 Issue 3, July 2002) reprinted in part below for more details about the reasons and advantages of implementing this system.



## A Note from the Customer Service Department

*(Reprinted in part from The Approach, July 2002)*

With the ever increasing number of S-TEC autopilot systems flying in general aviation aircraft throughout the world, as well as all the associated component exchanges, conversions and upgrades, it is becoming difficult for our Customer Service personnel to track warranty and system/component history by unit serial number alone.

The FAA is requiring manufacturers to provide more detailed accounting of their products. Because of this, we are in the process of developing a new database that will more efficiently associate individual components to the exact aircraft in which they are installed. To accomplish this, our service department will require more complete aircraft information to provide warranty exchanges or perform factory repairs.

In cases where the installing agency did not submit a warranty application, the name of that agency and approximate date of installation may also be required.

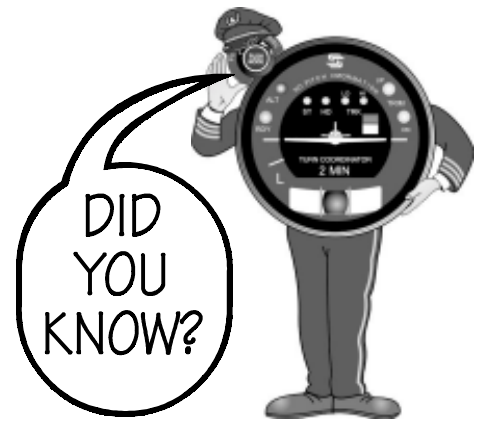
For quality control purposes, we will also request that it be stated if failure was "Out of Box". The definition of "Out of box failure" is a component that failed during or after installation, but before aircraft was returned to service and warranty activated.

As our new system evolves, a return authorization number will be required for units returned to the factory for either repair or exchange and the detailed information may be conveyed by phone at that time. This will take a little getting use to by both S-TEC Customer Service Reps and S-TEC dealers. Initially it sounds like a lot of extra red tape, but the benefits will be apparent by improved service to our dealer network and customers, as well as improved quality of our products. Thank you for your patience and cooperation.

# STC UPDATE

## APPROVALS SINCE LAST NEWSLETTER

SYSTEM	AIRCRAFT
20/30	(14V) Cessna 182P and 182Q when modified per STC SA1382WE (Robertson STOL) and Reims Aviation S.A. Cessna models F182P and F182Q when modified per STC SA1382WE (Robertson STOL)
20/30	(14V) Cessna models 206, P206, U206, P206A, TP206A, U206A, TU206A, P206B, TP206B, U206B, TU206B, P206C, TP206C, U206C, TU206C, P206D, TP206D, U206D, TU206D, P206E, TP206E, U206E, TU206E, U206F, TU206F; and U206G AND TU206G (landplane, floatplane or amphibian configuration) and models U206G AND TU206G (landplane, floatplane or amphibian configuration) when modified by any of the following STCS: STC SA1513WE (Robertson STOL) or STC SA2353NM (Soloy engine conversion) and/or STC SA3634SW (extended range fuel tanks) and/or STC SA914NE (wing tip extensions)
40/50	(14V) Reims Aviation S.A. Cessna models F182P and F182Q Cessna models 182P and 182Q; Reims Aviation S.A. Cessna models F182P and F182Q when modified by: <ol style="list-style-type: none"> <li>1. STC SA485SW (Wren conversion) and STC SA3825SW or</li> <li>2. STC SA950CE (Horton STOL) and/or STC SA2285CE (Horton flap gap seals) and STC SA3825SW (260 H.P. engine conversion) or</li> <li>3. STC SA1382WE (Robertson STOL) and STC SA3825SW (260 H.P. engine conversion)</li> </ol>
40/50	(14V) Cessna models 210G, T210G, 210H, T210H, 210J, and T210J and models T210G, T210H and T210J when modified per STC SA2689SW (RAM modification)
55/55X	(14V) Piper models PA-28-140, PA-28-150, PA-28-160, PA-28-180; and PA-28-235, S/N 28-10003 through S/N 28-11393 and S/N 28-7110001 through S/N 28-7210023
55/55X	(28V) Cessna models R182 and TR182 and the above models when modified per STC SA950CE (Horton STOL) and/or STC SA2285CE (Horton flap gap seals); Reims-Cessna model FR182 and the above model when modified per STC SA2422CE (Horton STOL)
60-2	(28V) Cessna models 320, 320-1, 320A
60-2	(28V) Twin Commander models 560-A and 560-E; 680E
60-2	(14V) Cessna models 210G, T210G, 210H, T210H, 210J, and T210J and models T210G, T210H and T210J when modified per STC SA2689SW (RAM modification)
60-2 w/o trim	(28V) Rockwell International North American models AT-6A (SNJ-3), AT-6B, AT-6C(SNJ-4), AT-6D(SNJ-5), AT-6F(SNJ-6), SNJ-7, and T-6G



We routinely receive requests from dealers for the latest publication index. Sometimes the FAA is in their shop and they want proof that the dealer's technical manuals are current. It became apparent that these documents should be readily available to our dealers at a moments notice. We have converted these documents to Adobe Acrobat (PDF) format for printing or downloading.

The following indexes are available in PDF format on [www.s-tec.com/pubs](http://www.s-tec.com/pubs).

- Flight Control Systems Publications Index
- TEC Line Avionics Publications Index
- Flight Control Systems Service Bulletins, Letters and Memos Index
- TEC Line Avionics Service Bulletins, Letters and Memos Index

These files are continually updated and should reflect the latest changes.

 **Approach**

Published and copyrighted by Meggitt Avionics / S-TEC, the *Approach* is intended to provide S-TEC dealers with information valuable in the everyday selling and servicing of S-TEC electronic instruments and autopilots.

Comments and suggestions are encouraged and welcomed. For additional copies of the *Approach* for others in your organization or for distribution to your own mailing list, contact:

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