

United States of America  
Department of Transportation — Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA5386SW-D

*This certificate, issued to* S-TEC Corporation  
Rt. 4, Bldg. 946  
Walters Industrial Complex  
Mineral Wells, Texas 76067

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 23 of the Federal Air Regulations.*

*Original Product — Type Certificate Number:* A16EA  
*Make:* Gulfstream Aerospace (Grumman American)  
*Model:* AA-5, AA-5A and AA-5B

*Description of Type Design Change:*

Installation of S-TEC System 40/50 Single and Two Axis Automatic Flight Guidance Systems, Model ST-280-40/50, according to Bulletin No. 380, Revision 1, dated 4-17-89 and Master Drawing List No. 92317, dated 4-17-89 and/or later FAA Approved revisions of the above data (14 Volt System).

*Limitations and Conditions:*

1. Gulfstream Aerospace (Grumman American) Model AA-5 eligible only on System 40.
2. FAA Approved Supplemental Flight Manual, P/N 89591, dated 4-02-85 is required for Gulfstream Aerospace (Grumman American) Models AA-5, AA-5A and AA-5B for S-TEC System 40 and/or later FAA Approved revisions of the above supplement.

(See Continuation Sheet, Page 2, a part of this STC.)

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application:* 3-20-89

*Date reissued:* 5-12-89, Revision 1

*Date of issuance:* 4-02-85

*Date amended:*



*By direction of the Administrator*

*Harold W. Holdeman*  
(Signature)

Harold W. Holdeman  
DAS Staff Coordinator, DAS 5 SW

(Title)

*Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.*

*This certificate may be transferred in accordance with FAR 21.47.*

United States of America  
Department of Transportation—Federal Aviation Administration  
**Supplemental Type Certificate**  
(Continuation Sheet)

*Number* SA5386SW-D, Revision 1

Limitations and Conditions (con't.)

3. FAA Approved Supplemental Flight Manual, P/N 89591-1, dated 5-12-89 is required for Gulfstream Aerospace (Grumman American) Models AA-5, AA-5A and AA-5B for S-TEC System 40 and/or later FAA Approved revisions of the above supplement.
4. FAA Approved Supplemental Flight Manual, P/N 89592, dated 4-02-85 is required for Gulfstream Aerospace (Grumman American) Models AA-5A and AA-5B for S-TEC System 50 and/or later FAA Approved revisions of the above supplement.
5. FAA Approved Supplemental Flight Manual, P/N 89592-1, dated 5-12-89 is required for Gulfstream Aerospace (Grumman American) Models AA-5A and AA-5B for S-TEC System 50 and/or later FAA Approved revisions of the above supplement.
6. Compatability of this modification with other previously approved modifications must be determined by the installer.

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*Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.*

One S-TEC Way  
Municipal Airport  
Mineral Wells, TX  
76067-9236  
USA  
tel 940/325-9406  
fax 940/325-3904

**Use of Supplemental Type Certificate  
Written Permission Statement**

www.s-tec.com

QUEST AVIONICS may hereby use STC # SA5386SW-D  
to modify one GULFSTREAM AEROSPACE AA5Baircraft, SN 1145 registration # N4529D

Current Owner of Record HOWARD A. DAVIS III  
152 SCRUBBY BLUFF ROAD  
LINGSLAND, GA. 31548  
\_\_\_\_\_  
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S-TEC Corporation

January 21/2002

KAY HALE

**Note:** *This certificate is provided to person(s) who are modifying an aircraft using an S-TEC STC.  
A copy of this certificate should be provided to the owner/operator of the modified aircraft.*

# AUTOPILOT RF INTERFERENCE

Due to the variety and hi-power of radio equipment often found in today's general aviation aircraft, there exists a potential radio transmission interference problem with other equipment in the aircraft. Because of this potential, the autopilot system is designed and constructed with rf shielding to prevent interference, however, installation combinations can occur wherein minor interference is possible.

Rf interference from radio transmissions usually manifest itself in one of two ways, either by interference with the VOR deviation needle display or by causing the autopilot flight path to be displaced during transmissions.

The most common interference causes the VOR deviation needle to jump or swing while the transmitter is being keyed. This type of interference affects the autopilot only in radio coupled modes as the autopilot is coupled to the VOR indicator meter movement and therefore, sees any needle movement as a command. VOR needle interference is sometimes found to be wholly within the NAV-COM set, that is, radiation conduction of transmission energy from the transmitter to the VOR receiver internally. When this is the case, there is little the installation technician can do to overcome the condition other than contact the field representative of the company involved for advice.

A much less common type of interference is one in which radio transmissions affect the roll or pitch axis of the autopilot directly. This occurrence is caused by rf energy being radiated into the autopilot system and there being detected and fed as a signal to one or more of the autopilot command channels. This problem is usually found only in aircraft equipped with high output power transmitters and varies with antenna and mounting locations. The reflected power or standing waves on the antenna cable is probably the greatest single source of this trouble, however, a antenna located so it radiates into the cabin can also cause the problem. The effect of this interference on the aircraft flight path is usually an initial displacement and then resumption of the programmed flight path. The response is similar in both roll and pitch.

Often, due to the wave form of radio frequency energy and the wave length, (frequency) an interference problem will only be found on one or two isolated frequencies. In these cases simply moving the autopilot component suspected or the radio source by a few inches will correct the problem.

Occasionally a new autopilot installation will cause a deterioration in ADF. receiver operation quality. This is reverse of the previous problem wherein "noise" from the autopilot is transmitted to the radio. One source of "noise" in the autopilot is the 5 kHz excitation in the computer. 5 kHz excitation can get into the ADF. system by both induction and radiation. A power buss common to both the autopilot and ADF receiver is a good path for this type of interference. If a separate power source corrects the problem then a filter may be necessary in one or both A+ leads. Radiation from autopilot cable and terminal ends, although very weak, can sometimes interfere with the ADF receiver by radiation into the sense antenna, loop, or both. Cable routing providing additional distance between these items and additional shielding of the autopilot leads is usually best in these cases. Since the autopilot leads are already shielded, the most productive solution is usually re-routing.

An important area, often overlooked, is the ground and ground path. It has been found in many aircraft that a considerable resistance builds up between adjacent sections of skin paneling and structure due to paint, primer, etc. This increases the resistance in the ground path for some equipment, which lowers the equipment tolerance to RFI. Sometimes it is advisable to add a braided ground strap to the equipment to assure a good ground.

Ground loops developed in cable shielding and the aircraft structure due to the existence of a ground potential difference can also cause problems. An effort has been made to eliminate this in the S-TEC systems by providing only one central ground point.

In summary, if an interference between the autopilot system and one or more of the radios is determined to exist, then one or more of the following cures should be tried in an effort to eliminate the interference.

1. Check antenna for proper installation, good ground, etc.
2. Re-route antenna leads.
3. Re-route autopilot leads and cabling.
4. Relocate antenna.
5. Relocate autopilot component - Consult GADO office concerning approval of installation deviation.
6. Add ground straps to affected component(s).
7. Install a filter in one or all involved A+ leads.