

S-TEC

S-TEC Corporation

A Cobham Avionics Integrated Systems Company
One S-TEC Way
Mineral Wells, TX 76067

T: (800)872-7832
F: (940)325-3904

Use of Supplemental Type Certificate Written Permission Statement

S-TEC Corporation hereby grants permission GEORGIA AVIONICS INC for use of STC No. SA09295AC-D and the supporting data associated with it, to modify one aircraft, CESSNA 177 serial no. 17700512 registration no. N3212T modification, as described in the attached supporting data, is specific and applicable to only the Product as described on the face of the STC listed above.

Compatibility of this STC modification, as described in the attached supporting data, with other previously approved modifications and/or a Product other than that listed on the face of the STC listed above must be determined by the installer.

Current Owner of Record

Charles H Mount Jr
3504 Morningwood Ct NE
Suwanee, GA 30024

S-TEC Corporation

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 must be provided to the owner/operator of the modified aircraft and included in the permanent aircraft records.

WARRANTY APPLICATION / REGISTRATION

Check One ☐ OEM ☐ Aftermarket ☐ Replacement Unit

DATE: (mm/dd/yyyy) 2 / 21 / 2014

OWNER INFORMATION: (As listed on aircraft registration)

Company: _____
Last Name: Mount First Name: Charles
Address: 3504 Morningwood Ct NE

City: Suwanee State: GA Zip Code: 30024 Country: USA
Telephone: () _____ email: _____

CONTACT INFORMATION: (If different from above)

Company: _____
Last Name: _____ First Name: _____
Address: _____

City: _____ State: _____ Zip Code: _____ Country: _____
Telephone: () _____ email: _____

AIRCRAFT INFORMATION:

Make: Cessna Model: 177 Year: 1967

Registration Number: N3212T Serial Number: 177DD512 Aircraft total time: _____

Airport Base City: _____

PRODUCT INFORMATION:

System Installed: ☐ System 20 ☒ System 30 ☐ System 40 ☐ System 50 ☐ System 60 PSS
Check box ☐ System 60-1 ☐ System 60-2 ☐ System 65 ☐ System Fifty Five X
☐ Yaw Damper ☐ System 30 ALT ☐ Manual Electric Trim
☐ EFIS ☐ HeliSAS® ☐ System 2100

Options Installed: ☐ ST-901 (GPSS) ☐ Autotrim ☐ ST-360 (Altitude Pre-select)
Check box ☐ Remote Annunciator ☐ ST-670 Single Cue FD Interface
☐ SA-200 (Altitude Pre-select) ☐ ST-361 FD Interface

OEM ONLY:

Aircraft Purchase Date: (mm/dd/yyyy) ____/____/____

Original Airworthiness Certificate Issue Date: (mm/dd/yyyy) ____/____/____

AFTERMARKET INSTALLATION ONLY:

Installing Dealer: Georgia Avionics Inc S-TEC Sales Order No: 5743643

Dealer Location: Winder, GA

Installation Approval Date: (mm/dd/yyyy) 2 / 21 / 2014

Place a copy of completed form in aircraft records and fax or mail the original to:

Cobham Avionics Systems Integrated Systems
Attn: Warranty Registration
One S-TEC Way
Mineral Wells, TX 76067 USA
F: (940) 328 0753



U.S. Department
of Transportation
Federal Aviation
Administration

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark N3212T	Serial No. 17700512	
	Make CESSNA	Model 177	Series
2. Owner	Name (As shown on registration certificate) CHARLES H. MOUNT JR.	Address (As shown on registration certificate) 3504 MORNINGWOOD CT NE SUWANEE, GA 30024 USA	

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type _____ Manufacturer _____		

6. Conformity Statement

A. Agency's Name and Address Georgia Avionics Inc. 841B Ronald Wood Road Winder, GA 30680 770-867-0002	B. Kind of Agency <input type="checkbox"/> U. S. Certified Mechanic <input type="checkbox"/> Foreign Certified Mechanic <input checked="" type="checkbox"/> Certified Repair Station <input type="checkbox"/> Certified Maintenance Organization	C. Certificate No. RS #GX4R222M Instrument
--	--	---

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U. S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual HCS H. C. Swindell Jr. 20-February-2014
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7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ Approved ☐ Rejected

FAA Flt. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
BY	FAA Designee <input checked="" type="checkbox"/>	Repair Station	Inspection Authorization
Certificate or Designation No. GX4R222M		Signature/Date of Authorized Individual HCS H. C. Swindell Jr. 20-February-2014	

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N3212T

Feb-20-2014

Nationality and Registration Mark

Date


1. INTRODUCTION: INSTALLATION OF AUTOPILOT IN N3212T
2. DESCRIPTION: THE FOLLOWING ITEM/ITEMS WERE REMOVED FROM THE AIRCRAFT'S AVIONICS EQUIPMENT: TURN COORDINATOR AND DIRECTIONAL GYRO
THE FOLLOWING ITEM/ITEMS WERE ADDED TO THE AIRCRAFT'S AVIONICS EQUIPMENT. S-TEC SYSTEM30
THE ALTERATIONS LISTED, MEET THE FOLLOWING FAR'S: 21.303; 21.305; 23.611; 23.627; 23.1301; 23.1309; 23.1357; 23.1367; 23.1431; 23.1525; 23.1541; 23.1329; 23.1381; 23.689; 23.1331
THE AUTOPILOT SYSTEM WAS INSTALLED PER STC#
3. CONTROL OPERATION INFORMATION: A FAA APPROVED FLIGHT MANUAL SUPPLEMENT WAS ADDED TO THE AIRCRAFT RECORDS. MANUFACTURER'S OPERATIONS GUIDE P/N 8777 WAS PROVIDED.
4. SERVICING INFORMATION: ALL SERVICING OF ITEMS INCLUDED IN THIS INSTALLATION MUST BE ACCOMPLISHED BY APPROVED DEALERS USING MANUFACTURER'S MANUALS.
5. MAINTENANCE INSTRUCTIONS: THE SYSTEM REQUIRES NO OTHER MAINTENANCE. OTHER MAINTENANCE AS DESCRIBED IN FAR PART 43 APPENDIX D (I) 1,2,4.
6. TROUBLESHOOTING INFORMATION: TROUBLESHOOTING THIS EQUIPMENT SHOULD ONLY BE ACCOMPLISHED BY AN AUTHORIZED DEALER WITH THE REQUIRED SERVICE DATA AND TEST EQUIPMENT.
7. REMOVAL AND REPLACEMENT INFORMATION: ALL COMPONENTS CAN BE REMOVED WITH COMMON TOOLS AND PRACTICES. SEE INSTALLATION MANUALS FOR SPECIFICATIONS.
8. DIAGRAMS: INSTALLATION DRAWINGS AND BULLETINS SUPPLIED BY MANUFACTURER ARE ON FILE WITH GEORGIA AVIONICS UNLESS REQUESTED BY AIRCRAFT OWNERS.
9. SPECIAL INSPECTIONS: NOT APPLICABLE
10. APPLICATION OF PROTECTIVE TREATMENTS: COMPONENTS SHOULD NOT BE EXPOSED TO THESE TREATMENTS.
11. DATA: ALL FASTENERS AND HARDWARE PER AC43.13-1B/2B
12. SPECIAL TOOLS: NOT APPLICABLE
- 13A. ELECTRICAL LOADS: POWER IS SUPPLIED THROUGH A CIRCUIT BREAKER IN THE AIRCRAFT/AVIONICS BUSS. THE AIRCRAFT EQUIPMENT HAS BEEN TESTED AND DOES NOT EXCEED 80% OF THE AIRCRAFT'S AVAILABLE ELECTRICAL POWER.
14. RECOMMENDED OVERHAUL PERIODS: "NO ADDITIONAL OVERHAUL TIME LIMITATIONS."
15. AIRWORTHINESS LIMITATIONS: "NO ADDITIONAL AIRWORTHINESS LIMITATIONS"
16. REGARDING REVISIONS: A LETTER WILL BE SUBMITTED TO THE LOCAL FSDO WITH A COPY OF THE REVISED FAA FORM 337.

AIRCRAFT RECORDS REVISED I/A/W FAR43.5 AND AC43.9B.

DETAILS ARE ON FILE AT THIS REPAIR STATION UNDER WORK ORDER # 22687

***** END *****

☐ ADDITIONAL SHEETS ARE ATTACHED

1. Approving National Aviation Authority/Country: FAA/United States		2. Form Tracking Number: W19961	
<h2 style="text-align: center;">AUTHORIZED RELEASE CERTIFICATE</h2> <p style="text-align: center;">FAA Form 8130-3, AIRWORTHINESS APPROVAL TAG</p>			
3. Organization Name and Address: Georgetown Instrument Services Inc. 210 Airport Rd, Taylor, TX 76574		5. Work Order/Contract/Invoice Number: SHOP/MOUNT	
CRS# GTNR482X			
6. Item:	7. Description:	8. Part Number:	9. Eligibility *
1	DIRECTIONAL GYRO	1U262-003-14	N/A
		10. Quantity:	1
		11. Serial/Batch Number:	T56084K
		12. Status/Work:	OVERHAULED
13. Remarks: Unit was OVERHAULED in accordance with Manual: GIS123 Revision: 0 Revision Date: 09/25/2000. Full details held on work order W19961.			
Certifies work specified in Blocks 12/13 was carried out in accordance with EASA Part-145, and with respect to that work, the component is considered ready for release to service under EASA Part-145 Approval Number EASA145.6157.			
14. Certifies the items identified above were manufactured in conformity to: <input type="checkbox"/> Approved design data and are in a condition for safe operation <input type="checkbox"/> Non-approved design data specified in Block 13		19. <input checked="" type="checkbox"/> 14 CFR 43.9 Return to Service <input checked="" type="checkbox"/> Other Regulation Specified in Block 13 Certifies that unless otherwise specified in Block 13, the work identified in Block 12 and described in Block 13 was accomplished in accordance with Title 14, Code of Federal Regulations, part 43 and in respect to that work, the items are approved for return to service.	
15. Authorized Signature:		20. Authorized Signature: 	
16. Approval/Authorization No.:		21. Approval/Certificate No.: GTNR482X	
17. Name (Typed or Printed):		22. Name (Typed or Printed): GILBERT MARTINEZ	
18. Date (m/d/y):		23. Date (m/d/y): Jan/08/2014	
User/Installer Responsibilities			
<p>It is important to understand that the existence of this Document alone does not automatically constitute authority to install the part/component/assembly.</p> <p>Where the user/installer performs work in accordance with the national regulations of an airworthiness authority different than the airworthiness authority of the country specified in block 1, it is essential that the user/installer ensures that his/her airworthiness authority accepts parts/components/assemblies from the airworthiness authority of the country specified in block 1.</p> <p>Statements in blocks 14 and 19 do not constitute installation certification. In all cases, aircraft maintenance records must contain an installation certification issued in accordance with the national regulations by the user/installer before the aircraft may be flown.</p>			

S-TEC CORPORATION
MINERAL WELLS, TEXAS 76067

FAA/DAS APPROVED
SUPPLEMENTAL FLIGHT MANUAL
FOR
CESSNA MODELS 177, 177A,
AND 177B S/N 17702313 AND BELOW

WITH
S-TEC SYSTEM 30 TWO AXIS
AUTOMATIC FLIGHT GUIDANCE SYSTEM
(14 VOLT SYSTEM)

REG. NO. N3212T

SER. NO. 17700512

The information in this manual is FAA Approved material which along with other approved documents is applicable to the operation of the airplane when modified by the installation of S-TEC System 30 Autopilot Model ST-741-30 installed in accordance with STC SA09295AC-D

SECTION I

GENERAL

This manual is to acquaint the pilot with the features and functions of the System 30 Two Axis Autopilot and to provide operating instructions for the system when installed in the listed aircraft model(s). The aircraft must be operated within the limitations herein provided when the autopilot is in use.

FAA/DAS APPROVED



Walter F. Davis

S-TEC CORPORATION
DAS 5 SW
P/N: 891574
DATE: 11-07-97

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SUPPLEMENTAL FLIGHT MANUAL
FOR
CESSNA MODELS 177, 177A,
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[illegible]

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SECTION II

OPERATING LIMITATIONS

1. Autopilot operation prohibited above 165 MPH CAS (V_{mo}).
2. Autopilot must be "OFF" during take-off and landing.
3. Flap extensions greater than 20° down not authorized during operations in altitude hold mode.

SECTION III

EMERGENCY OPERATING PROCEDURES

In the event of an autopilot malfunction, or any time the autopilot is not performing as expected or commanded, do not attempt to identify the system problem. Immediately regain control of the aircraft by overpowering the autopilot as necessary and then disconnect the autopilot. Do not reengage the autopilot until the problem has been identified and corrected.

1. Autopilot may be disconnected by:
 - a. Depressing the "AP Disconnect" Switch on the left horn of the pilot's control wheel (if installed).
 - b. Press and hold the mode selector knob for approximately 2 seconds.
 - c. Moving the autopilot master switch to "OFF" position.
 - d. Pulling the autopilot circuit breaker.
2. Altitude loss during a malfunction and recovery.
 - a. The following altitude losses and bank angles were recorded after a malfunction with a 3 second recovery delay:

<u>Configuration</u>	<u>Bank Angle/Altitude Loss</u>
Climb	60°/-50'
Cruise	60°/-250'
Descent	60°/-260'
 - b. The following altitude losses and bank angles were recorded after a malfunction with a 1 second recovery delay:

<u>Configuration</u>	<u>Bank Angle/Altitude Loss</u>
Maneuvering	25°/-40'
Approach (coupled or uncoupled)	20°/-20'

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The above values are the worst case for all the models covered by this document.

SECTION IV

NORMAL OPERATING PROCEDURES

4-1 SYSTEM DESCRIPTION

The System 30 is a pure rate autopilot which uses an inclined rate gyro in the Turn Coordinator instrument as the primary roll and turn rate sensor and an accelerometer and an absolute pressure transducer as pitch rate sensors. The turn coordinator includes an autopilot pick-off, a gyro RPM detector and an instrument power monitor. Low electrical power will cause the instrument "flag" to appear while low RPM will cause the autopilot to disconnect. The autopilot includes an automatic pre-flight test feature that allows a visual check of all the annunciator lamps and checks critical elements of the accelerometer system. The test feature will not enable autopilot function unless the automatic test sequence is satisfactorily completed.

When the pre-flight test is satisfactorily completed and when the rate gyro RPM is correct, the green "RDY" light will illuminate indicating the autopilot is ready for the functional check and operation. The autopilot cannot be engaged unless the "RDY" light is illuminated. When the system is equipped with the optional 3" Air Driven Directional Gyro (D.G.) or a compass system, directional information is provided to the autopilot by a heading bug in the instrument.

Pitch axis control is provided for the altitude hold function by use of the accelerometer and the pressure transducer. When the altitude hold mode is engaged an elevator trim sensor in the pitch servo will detect the elevator trim condition. When elevator trim is necessary to re-establish a trimmed condition, trim indicator lights on the programmer unit will illuminate to indicate the direction to trim to restore a trimmed condition.

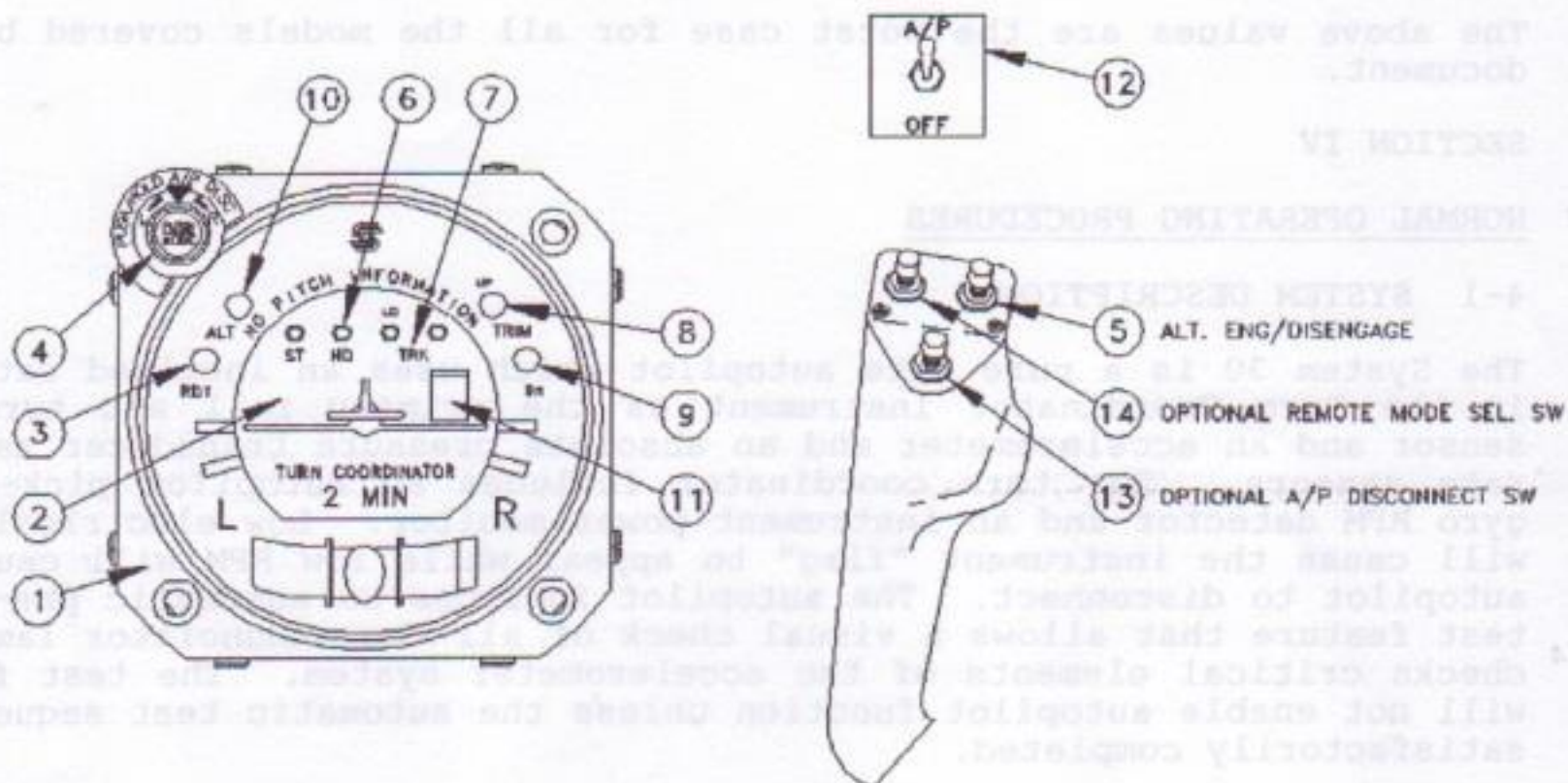
If the pilot ignores a trim light for more than five seconds the light will begin to flash to get the pilot's attention.

The indicator and annunciator lamp brilliance is controlled through the aircraft instrument light rheostat, except for the "trim" indicators which always illuminate at full intensity.

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1. Turn Coordinator, Mode Programmer and Annunciator Unit - Provides basic flight information, autopilot mode switching and annunciation.
2. Mode Annunciation Window - Displays mode in use.
3. Green Ready (RDY) Light - Illuminates when autopilot is ready for engagement. When autopilot is disconnected "RDY" will flash for five seconds accompanied by beeping audio tone.
4. Mode Select/Disconnect Switch - Each momentary push of this knob will select an autopilot mode, left to right, beginning with ST (Stabilizer) mode and ending with (Hi) TRK mode. Holding the knob in for more than 2 seconds will disconnect the autopilot. Turning the knob left or right in the stabilizer mode will provide left/right commands to the autopilot proportional to knob displacement up to a standard rate turn.
5. Altitude Hold Engage/Disengage Switch - This control wheel mounted switch will engage or disengage the Altitude Hold Mode as desired. The blue (ALT) light on the annunciator panel will illuminate when ALT. mode is engaged.

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6. Heading Mode - If the system is equipped with a D.G. this mode will permit preselected left/right turns using the D.G. heading bug.
7. TRK (Track) - using the (Lo) mode of the tracking feature will provide low system gain for comfortable cross country tracking of VOR or GPS signals. Using the (Hi) mode of the tracking feature will provide a higher level of system gain for more active tracking of VOR, GPS or Localizer front course signals.
8. Trim UP Light - Illuminates to indicate the need for nose UP trim.
9. Trim DOWN Light - Illuminates to indicate the need for nose DOWN trim. When both lights are out, the aircraft is in trim longitudinally.
10. Blue (ALT) light illuminates when altitude mode is engaged.
11. Flag Window - Red flag visible indicates lack of power (12/24 Volt) to primary turn coordinator unit.
12. Autopilot Master ON-OFF Switch - Refer to pre-flight procedures for operating details.
13. Optional remote AP disconnect switch.
14. Optional Remote Mode Selector Switch - Allows mode selection from the control wheel. Also disconnects autopilot when depressed for approximately two seconds.

4-2 PRE-FLIGHT PROCEDURES

NOTE: During system functional checks the system must be provided adequate DC voltage (12 or 24 VDC minimum as appropriate).

MANDATORY PRE-FLIGHT TEST

1. AP Master Switch - Move to A/P (on) position.
 - A. Observe all lights and annunciators illuminate.

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B. Observe the following light sequence of the trim indicators:
(Sequence requires 9 seconds.)

1. Initially both trim UP & DN lights are illuminated.
2. UP light extinguishes and remains off.
3. DN light then extinguishes and remains off.
4. All lights extinguish except for "RDY" light.

2. The autopilot can be engaged and disengaged repeatedly using the remote A/P disconnect switch or the mode selector knob but once the A/P master is switched off the test must be reconducted to get a ready indication. If the ready light does not illuminate after the test a failure to pass the test is indicated and the system will require service. NOTE: ALTITUDE MODE CANNOT BE ENGAGED UNLESS POWER IS ON FOR MORE THAN 15 SECONDS.

SYSTEM FUNCTIONAL TEST

3. Push Mode Switch - STB Annunciator illuminates. Rotate turn knob left and right, observe control wheel moves in corresponding direction. Center turn knob.
4. Set D.G. and place bug under lubber line (if installed) push turn knob to engage HDG mode. Observe HDG annunciator. Move HDG bug left and right observe proper control wheel motion.
5. Overpower Test - Grasp control wheel and overpower roll servo left and right, overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.
6. Radio Check - A. Turn on NAV Radio, with valid NAV signal, engage Lo TRK Mode and move VOR OBS so that VOR needle moves left and right - control wheel should follow the direction of needle movement.
B. Select Hi TRK Mode - the control wheel should again follow radio needle movement and with more authority than produced by Lo TRK Mode.

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7. Move control wheel to level flight position - Engage ALT Mode. Move control wheel fore and aft to overpower pitch servo clutch. Overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.
8. Trim Check - Manually apply back pressure to control wheel for 2-3 seconds - observe the DN trim light illuminates. Apply forward pressure to the control wheel for 2-3 seconds, observe the UP trim light illuminates. Move the control wheel to center - observe both UP/DN lights extinguish.
9. Hold control wheel and push mode knob for 2 seconds - note that roll and pitch servos release. Move control wheel to confirm roll and pitch motions are free, with no control restriction or binding. If the optional disconnect switch is installed it may be used to effect the disconnect for this check.

4-3 IN-FLIGHT PROCEDURES

NOTE: The required pre-flight test can be conducted in flight if necessary. It should be noted, however, that when the UP/DN lights are flashing the pitch servo will momentarily engage and disengage. This alternate engage-disengage sequence is part of the test function. Because of the engage-disengage sequence the test should not be conducted while maneuvering.

1. Check - RDY light on.
2. Trim aircraft for existing flight condition. Maintain Yaw Trim during all Autopilot operations.
3. Center turn-knob - Press turn knob to select stabilizer mode.
4. Set turn knob to level or turning flight, as desired.
5. Set HDG bug to desired heading (if installed) and press knob to engage heading mode, select headings as desired.
6. At desired altitude, press ALT Mode Switch on control wheel. Trim aircraft as necessary to establish cruise condition - disengage ALT Mode to climb or descend.

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VOR TRACKING AND VOR-LOC APPROACH

1. Tune NAV receiver and select radial.
2. Maneuver aircraft to selected radial (or localizer) within +/- 1 needle width and within 10 degrees of the course heading.
3. Engage Lo TRK Mode for VOR tracking.
4. Engage Hi TRK Mode for VOR or LOC approach.

Hi TRK Mode may be used to track VOR radials cross country if desired. Use of Hi TRK Mode for cross country tracking may result in some course scalloping if the VOR signal is weak or otherwise "noisy". In areas of poor signal quality Lo TRK Mode may provide more accurate tracking even with reduced gain.

GPS TRACKING AND GPS APPROACH

1. Begin track with a reliable GPS signal and CDI needle centered, with aircraft on the suggested heading to the waypoint.
2. Select the Hi track mode for GPS tracking or GPS approach.

SECTION V

OPERATIONAL DATA

Text of this Section not affected by installation of this equipment.

SECTION VI

REQUIRED OPERATING EQUIPMENT

Text of this Section not affected by installation of this equipment.

SECTION VII

WEIGHT AND BALANCE

Text of this Section not affected by installation of this equipment.

FAA/DAS APPROVED
P/N: 891574
DATE: 11-07-97

Supplemental Type Certificate

Number SA09295AC-D

This Certificate issued to

S-TEC Corporation
One S-TEC Way
Mineral Wells Municipal Airport
Mineral Wells, TX 76067-9236

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

Original Product Type Certificate Number:

A13CE

Make:

Cessna

Model:

177, 177A, and 177B

Description of Type Design Change:

Installation of S-TEC System 20/30 Single and Two Axis Automatic Flight Guidance Systems, Model ST-741-20/30, according to Bulletin No. 841, dated 11-03-97 and Master Drawing List No. 921040, dated 11-03-97 or later FAA Approved revisions of the above data (14 Volt System).

Limitations and Conditions:

1. FAA/DAS Approved Supplemental Flight Manual, P/N 891569, dated 11-07-97 is required for S-TEC System 20 for Cessna Models 177, 177A, and 177B, S/N 17702313 and Below 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: 11-05-97

Date received:

Date of issuance: 11-07-97

Date amended:

By direction of the Administrator



William J. Thomas
(Signature)

William J. Thomas
DAS Staff Coordinator, DAS 5 SW

(Title)

Supplemental Type Certificate

(Continuation Sheet)

Number SA09295AC-D

Limitations and Conditions (con't.)

2. FAA/DAS Approved Pilot's Operating Handbook and/or Airplane Flight Manual Supplement, P/N 891570, dated 11-07-97 is required for S-TEC System 20 for Cessna Model 177B, S/N 17702314 through S/N 17702672 or later FAA Approved revisions of the above supplement.
3. FAA/DAS Approved Supplemental Flight Manual, P/N 891574, dated 11-07-97 is required for S-TEC System 30 for Cessna Models 177, 177A, and 177B, S/N 17702313 and Below or later FAA Approved revisions of the above supplement.
4. FAA/DAS Approved Pilot's Operating Handbook and/or Airplane Flight Manual Supplement, P/N 891575, dated 11-07-97 is required for S-TEC System 30 for Cessna Model 177B, S/N 17702314 through S/N 17702672 or later FAA Approved revisions of the above supplement.
5. Compatibility of this modification with other previously approved modifications must be determined by the installer.



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

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 displayed during transmissions.

The most common interference causes the VOR deviation needle of 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 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 transmission affect the roll and pitch axis of the autopilot directly. This occurrence is caused by rf energy 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 case 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 quality. This is reverse of the previous 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 on 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 important 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.