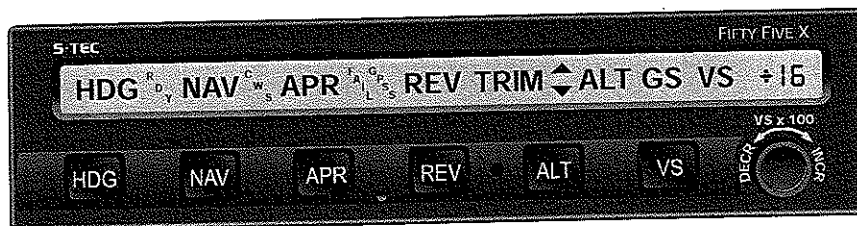


# S-TEC

## Pilot's Operating Handbook System Fifty Five X Autopilot



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## **SECTION 2 PRE-FLIGHT PROCEDURES**

## 2.1 Power-Up Test

Perform the actions shown in Table 2-1. For each action, verify the corresponding response where applicable.

Table 2-1. Power-Up Test

ACTION	RESPONSE
1. Set Yaw Damper Master Switch to OFF position (if installed).	-----
2. Set Trim Master Switch to OFF position (if installed).	-----
3. Set Battery Master Switch to ON position.	-----
4. Set Avionics Master Switch to ON position.	-----
5. Set Autopilot Master Switch to one of the following positions, whichever is applicable:  FD/AP (Flight Director Installed)  AP (No Flight Director)	All annunciations appear on AP display as shown in Fig. 2-1 for 10 seconds, and then extinguish.  For Programmer/Computers with serial number greater than 3001, software revision number briefly appears on AP display between 10 and 20 seconds following power-up, as shown in Fig. 2-2.  RDY annunciation alone re-appears on AP display within 3 minutes, as shown in Fig. 2-3 (Notes 1, 2).

### Notes:

1. Should a Programmer/Computer failure be detected, the FAIL annunciation alone will re-appear on the AP display as shown in Fig. 2-4, and the autopilot will not operate.

2. Should a Turn Coordinator failure be detected, the AP display will remain blank indefinitely as shown in Fig. 2-5, and the autopilot will not operate.

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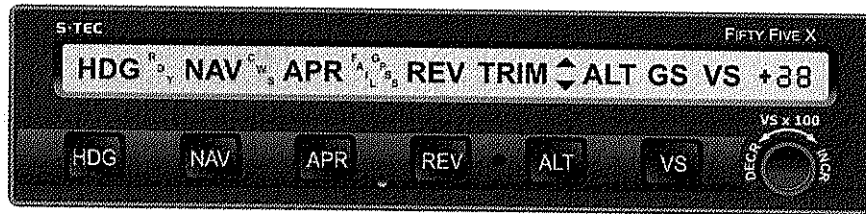


Fig. 2-1. AP Display, All Annunciators at Power-Up

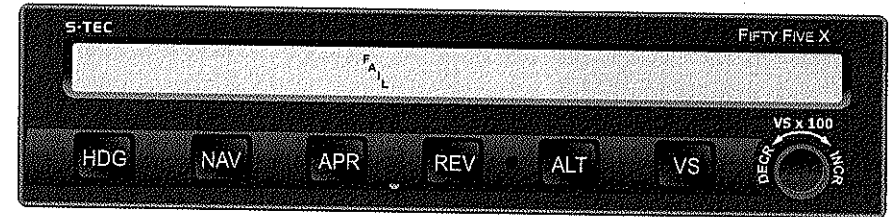


Fig. 2-4. AP Display, Programmer/Computer Failure

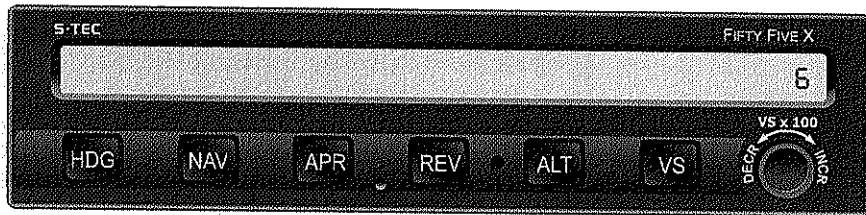


Fig. 2-2. AP Display, Software Revision Number

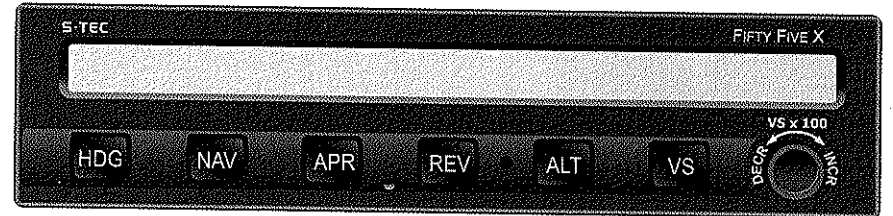


Fig. 2-5. AP Display, Turn Coordinator Failure

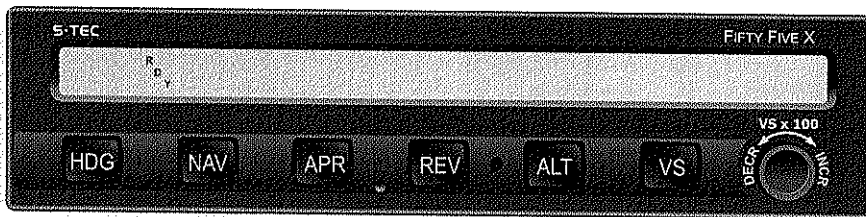


Fig. 2-3. AP Display, Ready for Operation

## 2.2 Pre-Flight Test

Prior to takeoff and with engine running, perform the actions shown in Table 2-2. For each action, verify the corresponding response where applicable. All actions pertaining to mode selector switches apply to the autopilot bezel.

Table 2-2. Pre-Flight Test (continued on page 2-8)

ACTION	RESPONSE
1. Move A/C Control Wheel left and right, to sense its freedom of movement about roll axis.	-----
2. Set Heading Bug under Lubber Line.	-----
3. Press HDG mode selector switch to engage heading mode.	HDG annunciation alone appears on AP display, as shown in Fig. 2-6.
4. Attempt movement of A/C Control Wheel left and right.	A/C Control Wheel's reduced freedom of movement indicates that Roll Servo is engaged.  Roll Servo can be overridden. If not, disconnect autopilot and do not use.
5. Turn Heading Bug to the left side of Lubber Line.	A/C Control Wheel turns to the left.
6. Turn Heading Bug to the right side of Lubber Line.	A/C Control Wheel turns to the right.
7. Set Heading Bug under Lubber Line.	A/C Control Wheel stops.
8. Move A/C Control Wheel forward and aft, to sense its freedom of movement about pitch axis.	-----
9. Press ALT mode selector switch to engage altitude hold mode.	ALT annunciation appears with HDG on AP display, as shown in Fig. 2-7.
10. Attempt movement of A/C Control Wheel forward and aft.	A/C Control Wheel's reduced freedom of movement indicates that Pitch Servo is engaged.  Pitch Servo can be overridden. If not, disconnect autopilot and do not use.

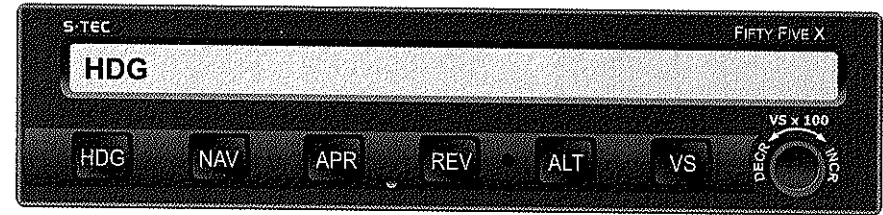


Fig. 2-6. AP Display, HDG Mode Engaged (Pre-Flight)

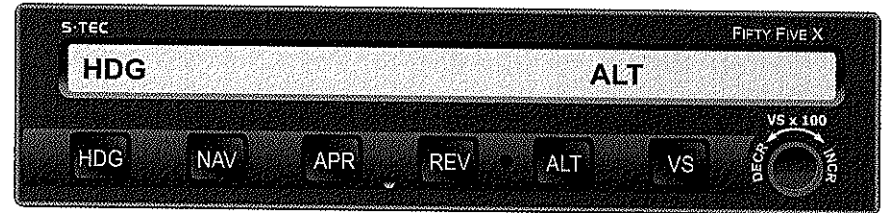


Fig. 2-7. AP Display, HDG and ALT HOLD Modes Engaged (Pre-Flight)

Table 2-2. Pre-Flight Test (continued from page 2-6)

ACTION	RESPONSE
11. Press/Hold CWS Switch to arm control wheel steering mode.	CWS, VS, and +0 (or $\pm 1$ ) annunciations only appear on AP display, as shown in Fig. 2-8.
12. Move A/C Control Wheel left and right.	A/C Control Wheel's increased freedom of movement indicates that Roll Servo is disengaged.
13. Move A/C Control Wheel forward and aft.	A/C Control Wheel's increased freedom of movement indicates that Pitch Servo is disengaged.
14. Release CWS Switch to engage control wheel steering mode.	-----
15. Attempt movement of A/C Control Wheel left and right.	A/C Control Wheel's reduced freedom of movement indicates that Roll Servo is engaged.
16. Attempt movement of A/C Control Wheel forward and aft.	A/C Control Wheel's reduced freedom of movement indicates that Pitch Servo is engaged.
17. Rotate AP Modifier Knob CW until +5 (500 FPM climbing) is commanded, as shown in Fig. 2-9.	A/C Control Wheel moves in aft direction.
18. Rotate AP Modifier Knob CCW until -5 (500 FPM descending) is commanded, as shown in Fig. 2-10.	A/C Control Wheel moves in forward direction.
19. Rotate AP Modifier Knob CW until +0 (0 FPM) is commanded.	A/C Control Wheel stops.
<i>Note: If it is not possible to select a local VOR frequency on Navigation Receiver, then proceed to step 30. Otherwise, proceed to step 20.</i>	

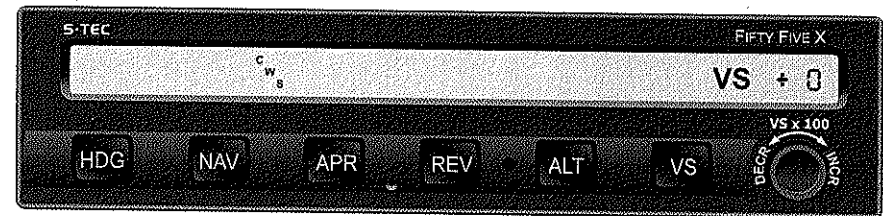


Fig. 2-8. AP Display, CWS Mode Armed or Engaged, 0 FPM (Pre-Flight)

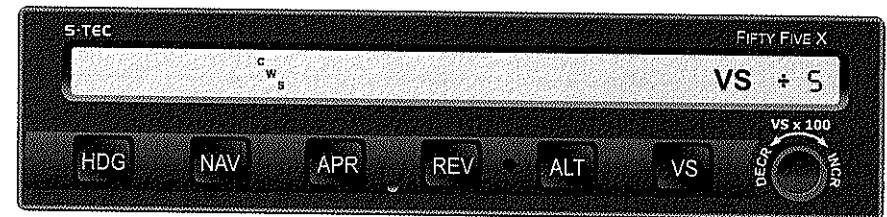


Fig. 2-9. AP Display, CWS Mode Engaged, 500 FPM Climbing (Pre-Flight)

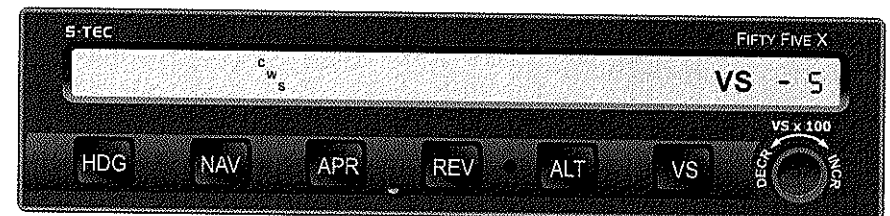


Fig. 2-10. AP Display, CWS Mode Engaged, 500 FPM Descending (Pre-Flight)

Table 2-2. Pre-Flight Test (continued from page 2-8)

ACTION	RESPONSE
20. Select local VOR frequency on Navigation Receiver.	-----
<i>Note: Proceed to either step 21 (HSI) or step 26 (DG).</i>	
21. Turn Course Pointer until CDI needle is centered.	-----
22. Press NAV mode selector switch to engage navigation mode.	NAV, VS, and +0 annunciations only appear on AP display, as shown in Fig. 2-11.
23. Turn Course Pointer left until CDI needle deflection is 2 dots right of center.	A/C Control Wheel turns to the right.
24. Turn Course Pointer right until CDI needle deflection is 2 dots left of center.	A/C Control Wheel turns to the left.
25. Turn Course Pointer left until CDI needle is centered.	A/C Control Wheel stops.
<i>Note: Proceed to step 30.</i>	
26. Press NAV mode selector switch to engage navigation mode.	NAV, VS, and +0 annunciations only appear on AP display, as shown in Fig. 2-11.
27. Turn OBS until CDI needle deflection is 2 dots right of center.	A/C Control Wheel turns to the right.
28. Turn OBS until CDI needle deflection is 2 dots to left of center.	A/C Control Wheel turns to the left.

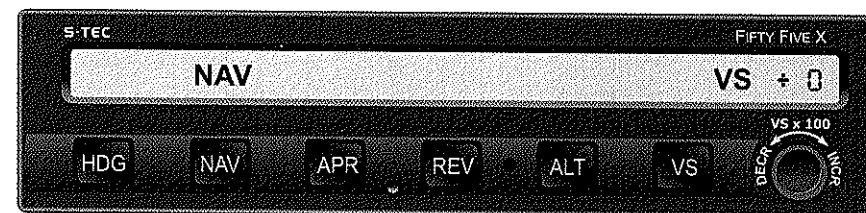
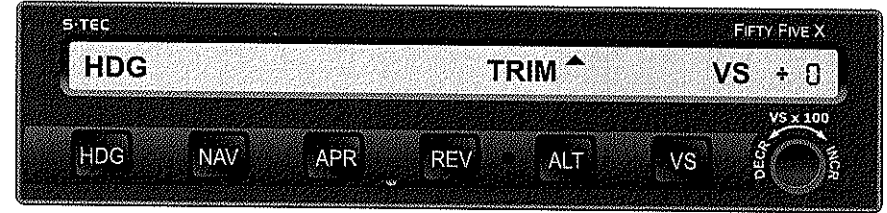


Fig. 2-11. AP Display, NAV and VS Modes Engaged, 0 FPM (Pre-Flight)

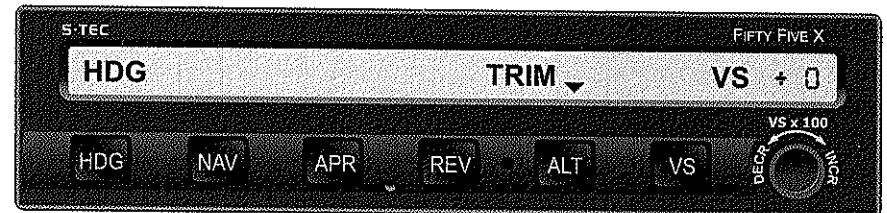


Table 2-2. Pre-Flight Test (continued from page 2-10)

ACTION	RESPONSE
29. Turn OBS until CDI needle is centered.	A/C Control Wheel stops.
30. Press HDG mode selector switch to engage heading mode.	HDG, VS, and +0 annunciations only appear on AP display.
31. Move A/C Control Wheel as far forward as possible.	After 3 seconds, TRIM ^ annunciation appears on AP display, as shown in Fig. 2-12a. After 7 seconds, TRIM ^ annunciation flashes.
32. Move A/C Control Wheel as far aft as possible.	After 3 seconds, TRIM v annunciation appears on AP display, as shown in Fig. 2-12b. After 7 seconds, TRIM v annunciation flashes.
33. Move A/C Control Wheel forward until TRIM v is extinguished.	HDG, VS, and +0 annunciations only appear on AP display.
<p><i>Note: If autopilot is equipped with autotrim, then proceed to step 34. Otherwise, proceed to step 38 only if autopilot is equipped with a Remote Annunciator, and A/C is equipped with a Flight Director. If this is not the case, then proceed to step 60.</i></p>	
34. Set Trim Master Switch to ON position.	-----



a. HDG and VS Modes Engaged, 0 FPM, TRIM UP Required



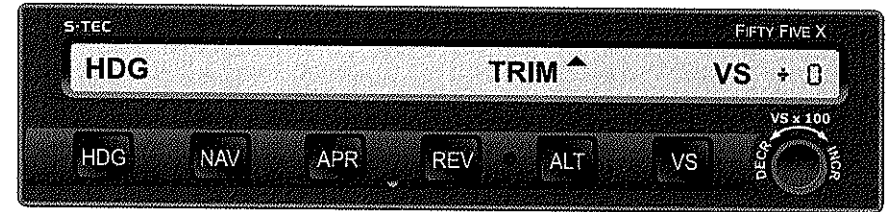
b. HDG and VS Modes Engaged, 0 FPM, TRIM DN Required

Fig. 2-12. AP Display, Manual Trim Prompts (Pre-Flight)



Table 2-2. Pre-Flight Test (continued from page 2-12)

ACTION	RESPONSE
35. Move A/C Control Wheel as far forward as possible.	After 3 seconds, TRIM ^ annunciation appears on AP display as shown in Fig. 2-13a, and Elevator Trim Wheel begins to run nose up with increasing speed.  After 7 seconds, TRIM ^ annunciation flashes.
36. Move A/C Control Wheel as far aft as possible.	After 3 seconds, TRIM v annunciation appears on AP display as shown in Fig. 2-13b, and Elevator Trim Wheel begins to run nose down with increasing speed.  After 7 seconds, TRIM v annunciation flashes.
37. Move A/C Control Wheel forward until TRIM v is extinguished.	HDG, VS, and +0 annunciations only appear on AP display.
<i>Note: If autopilot is equipped with a Remote Annunciator, and A/C is equipped with a Flight Director, then proceed to step 38. Otherwise, proceed to step 50.</i>	
38. Set Autopilot Master Switch to FD position.	Audible Alert sounds a periodic tone.  FD annunciation appears on Remote Annunciator, along with HDG and VS, as shown in Fig. 2.14.
39. Move A/C Control Wheel left and right.	A/C Control Wheel's increased freedom of movement indicates that Roll Servo is disengaged.
40. Move A/C Control Wheel forward and aft.	A/C Control Wheel's increased freedom of movement indicates that Pitch Servo is disengaged.



a. HDG and VS Modes Engaged, 0 FPM, TRIM UP in Progress



b. HDG and VS Modes Engaged, 0 FPM, TRIM DN in Progress

Fig. 2-13. AP Display, Automatic Trim Advisements (Pre-Flight)

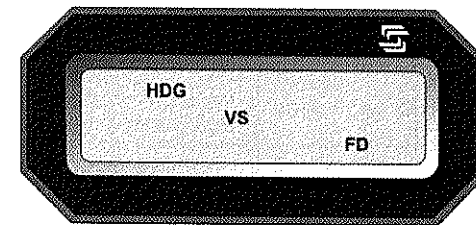


Fig. 2-14. Remote Annunciator Display, HDG, VS, and FD Modes Engaged (Pre-Flight)

Table 2-2. Pre-Flight Test (continued from page 2-14)

ACTION	RESPONSE
<i>Note: If autopilot is equipped with autotrim, then proceed to step 41. Otherwise, proceed to step 42.</i>	
41. Move A/C Control Wheel as far forward or aft as possible.	After 3 seconds, A/C Trim Wheel does not begin to run, indicating that Trim Servo is disengaged.
42. Turn Heading Bug to 45° left of Lubber Line, to command a left turn.	FD Steering Command Bars slowly move to a left bank position.
43. Turn Heading Bug to 45° right of Lubber Line, to command a right turn.	FD Steering Command Bars slowly move to a right bank position.
44. Rotate AP Modifier Knob CW until +15 (1500 FPM climbing) is commanded.	FD Steering Command Bars slowly move to a pitch up position.
45. Rotate AP Modifier Knob CCW until -15 (1500 FPM descending) is commanded.	FD Steering Command Bars slowly move to a pitch down position.
46. Set AP Master Switch to FD/AP position.	FD annunciation is extinguished on Remote Annunciator.
47. Attempt movement of A/C Control Wheel left and right.	A/C Control Wheel's reduced freedom of movement indicates that Roll Servo is engaged.
48. Attempt movement of A/C Control Wheel forward and aft.	A/C Control Wheel's reduced freedom of movement indicates that Pitch Servo is engaged.
<i>Note: If autopilot is equipped with autotrim, then proceed to step 49. Otherwise, proceed to step 60.</i>	

Table 2-2. Pre-Flight Test (continued from page 2-16)

ACTION	RESPONSE
49. Move A/C Control Wheel as far forward or aft as possible.	After 3 seconds, Elevator Trim Wheel begins to run, indicating that Trim Servo is engaged.
50. Press either forward or aft on both segments of Manual Electric Trim Switch.	Autopilot disconnects as follows: RDY annunciation flashes and Audible Alert sounds a periodic tone, while all other annunciations are extinguished.  After 5 seconds, RDY annunciation stops flashing but remains, and Audible Alert is squelched.
51. Press/Hold either forward or aft on only one segment of Manual Electric Trim Switch, but not both.	After 3 seconds, Elevator Trim Wheel does not begin to run.
52. Press/Hold forward on both segments of Manual Electric Trim Switch.	Elevator Trim Wheel runs nose down at full speed, and TRIM annunciation appears flashing as shown in Fig. 2-15.
53. Press/Hold AP DISC / TRIM INTR Switch.	Elevator Trim Wheel stops.
54. Release AP DISC / TRIM INTR Switch.	Elevator Trim Wheel resumes running nose down at full speed.
55. Release Manual Electric Trim Switch.	Elevator Trim Wheel stops. TRIM annunciation is extinguished.
56. Press/Hold aft on both segments of Manual Electric Trim Switch.	Elevator Trim Wheel runs nose up at full speed, and TRIM annunciation appears flashing as shown in Fig. 2-15.

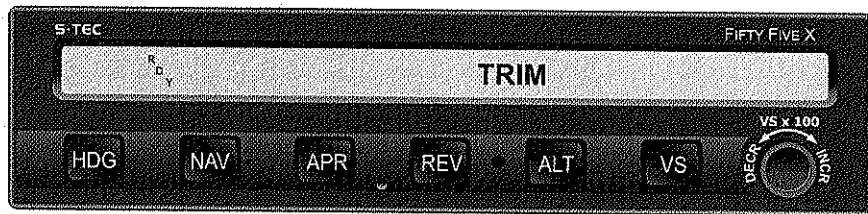


Fig. 2-15. AP Display, Manual Electric Trim in Progress (Pre-Flight)

Table 2-2. Pre-Flight Test (continued from page 2-17)

ACTION	RESPONSE
57. Press/Hold AP DISC / TRIM INTR Switch.	Elevator Trim Wheel stops.
58. Release AP DISC / TRIM INTR Switch.	Elevator Trim Wheel resumes running nose up at full speed.
59. Release Manual Electric Trim Switch.	Elevator Trim Wheel stops. TRIM annunciation is extinguished.
<p><i>Note: If autopilot is equipped with a Yaw Damper, then proceed to step 61. Otherwise, proceed to step 70.</i></p>	
60. Press AP DISC / TRIM INTR Switch.	Autopilot disconnects as follows: RDY annunciation flashes and Audible Alert sounds a periodic tone, while all other annunciations are extinguished. After 5 seconds, RDY annunciation stops flashing but remains, and Audible Alert is squelched.
<p><b>Note:</b> <i>Press/Hold AP DISC / TRIM INTR Switch to limit Audible Alert to a single "beep".</i></p>	
<p><i>Note: If autopilot is equipped with a Yaw Damper, then proceed to step 61. Otherwise, proceed to step 70.</i></p>	
61. Actuate A/C Rudder Pedals alternately in succession, to sense their freedom of movement about yaw axis.	-----
62. Set Yaw Damper Master Switch to ON position.	-----
63. Turn Yaw Trim Knob until A/C Rudder Pedals stop.	-----

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Table 2-2. Pre-Flight Test (continued from page 2-19)

ACTION	RESPONSE
64. Attempt actuation of A/C Rudder Pedals alternately in succession.	A/C Rudder Pedals' reduced freedom of movement indicates that Yaw Servo is engaged.  Yaw Servo can be overridden. If not, set Yaw Damper Master Switch to OFF position, and do not use.
65. Turn Yaw Trim Knob fully CCW.	Left A/C Rudder Pedal slowly moves forward.
66. Turn Yaw Trim Knob fully CW.	Right A/C Rudder Pedal slowly moves forward.
67. Turn Yaw Trim Knob CCW until A/C Rudder Pedals stop.	-----
68. Set Yaw Damper Master Switch to OFF position.	-----
69. Actuate A/C Rudder Pedals alternately in succession.	A/C Rudder Pedals' increased freedom of movement indicates that Yaw Servo is disengaged.
70. Trim A/C for takeoff.	----