S-TEC

Pilot's Operating Handbook
Twenty | Thirty | Thirty Alt

COBHAM

List of Effective Pages	* Asterisk indicates pages changed, added, or deleted by current revision.

Record of Revisions	Retain this record in front of handbook. Upon receipt of a revision, insert changes and complete table below.	
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OVERVIEW

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1.1 Document Organization

Section 1 Overview

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1.2 Purpose

This Pilot's Operating Handbook (POH) provides Pre-Flight and In-Flight operating procedures for the S-TEC System Twenty / Thirty / Thirty ALT Autopilot (AP).

Note:

This POH must be carried in the aircraft and made available to the pilot at all times. It can only be used in conjunction with the Federal Aviation Administration (FAA) approved Aircraft Flight Manual (AFM) or Aircraft Flight Manual Supplement (AFMS). Refer to the applicable AFM or AFMS for aircraft specific information, such as unique ground tests, limitations, and emergency procedures.

Note:

The System Twenty / Thirty / Thirty ALT autopilot is a tool provided to aircraft owners, that serves to assist them with cockpit workload management. The ability of the autopilot to provide optimum assistance and performance is directly proportional to the pilot's knowledge of its operating procedures. Therefore, it is highly recommended that the pilot develop a thorough understanding of the autopilot, its modes, and operating procedures in Visual Meteorological Conditions (VMC), prior to using it under Instrument Flight Rules (IFR).

1.3 General Control Theory

The System Twenty / Thirty / Thirty ALT is a rate based autopilot. When in control of the roll axis, the autopilot senses turn rate, along with the non-rate quantities of heading error and course deviation indication. When in control of the pitch axis, the autopilot senses acceleration, along with the non-rate quantity of altitude. These sensed data provide feedback to the autopilot, which processes them in order to control the aircraft through the use of mechanisms coupled to the control system. The roll servo is typically coupled to the ailerons, and the pitch servo is coupled to the elevator.

The System Twenty controls only the roll axis.

The System Thirty controls both the roll axis and pitch axis. Activation of roll axis control must always precede activation of pitch axis control.

The System Thirty ALT controls only the pitch axis.

The optional Yaw Damper senses excessive adverse yaw about the yaw axis, and responds by driving the yaw servo in the proper direction to provide damping. The yaw servo is coupled to the rudder.

1.4 Modes of Operation

1.4.1 Roll Axis Control

Each press/release of the optional MODE SEL Switch typically located on the Control Wheel, or PUSH MODE Switch located on the bezel, successively engages the roll modes below.

Stabilizer (ST) Mode

Used to Hold Wings Level

Heading (HD) Mode

Used to Turn onto a Selected Heading and Hold it

Low Track (LO TRK) Mode

Used to Track a VOR Course

High Track (HI TRK) Mode

Used to Track a LOC Course

Note:

A heading system (HSI or DG) is optional. If the aircraft is equipped with a heading system, then the heading mode can be engaged. Otherwise, the heading mode cannot be engaged (i.e., it will be skipped over).

1.4.2 Pitch Axis Control

Each press of the ALT ENG/DSNG Switch typically located on the Control Wheel (optional for System Thirty ALT only), or ALT HOLD ON/OFF Switch located on the instrument panel (System Thirty ALT only), successively engages and disengages the single pitch mode below.

Altitude Hold (ALT HOLD) Mode

Used to Hold Altitude

1.5 Block Diagrams

The System Twenty Block Diagram is shown in Fig. 1-1.

The System Thirty Block Diagram is shown in Fig. 1-2.

The System Thirty ALT Block Diagram is shown in Fig. 1-3.

The Yaw Damper Block Diagram is shown in Fig. 1-4.

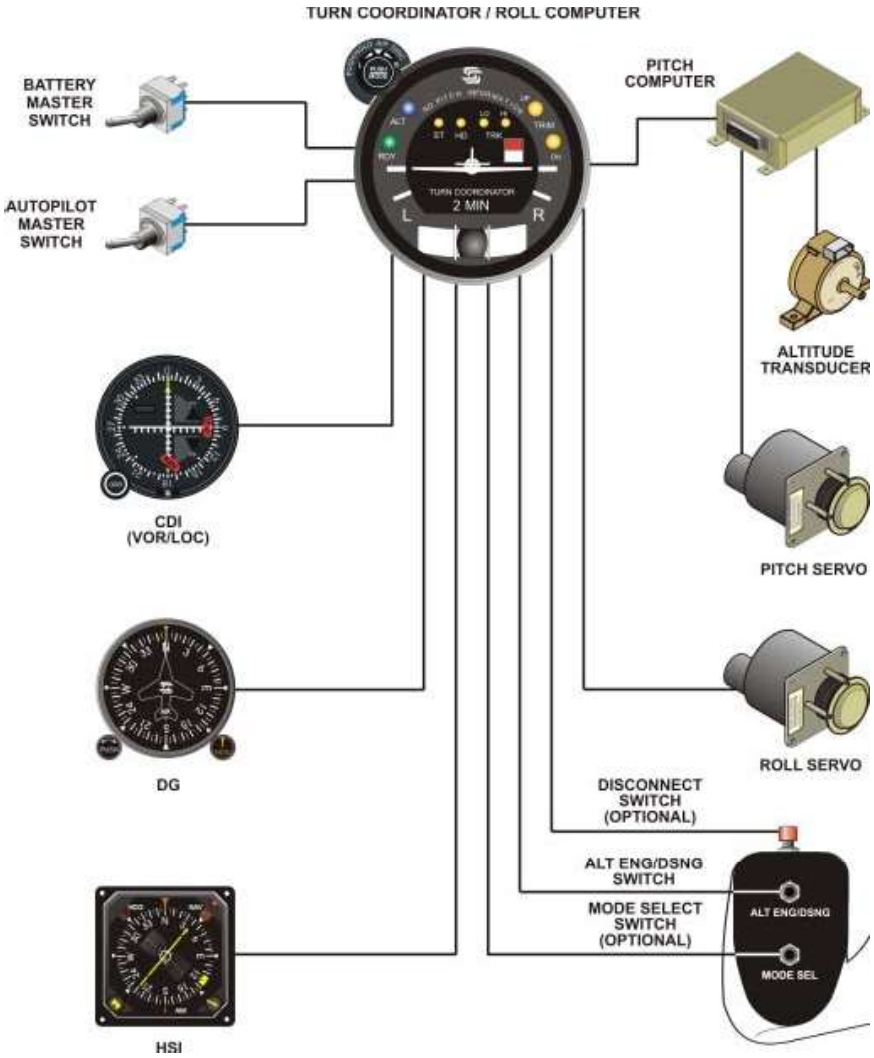

Fig. 1-2. System Thirty Block Diagram

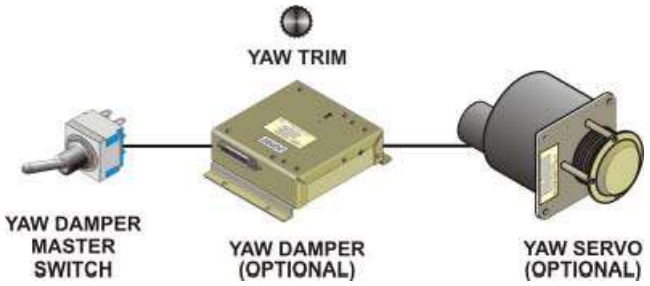

Fig. 1-4. Yaw Damper Block Diagram

SECTION 2
PRE-FLIGHT PROCEDURES

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2.1.2 System Thirty

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

Table 2-2. Power-Up Test, System Thirty

ACTION	RESPONSE
1. Set Yaw Damper Master Switch to OFF position (if installed).	------
2. Set Battery Master Switch to ON position.	------
3. Set Avionics Master Switch to ON position.	------
4. Set Autopilot Master Switch to ON position.	RDY, ALT, ST, HD, LO TRK, HI TRK, TRIM UP, and TRIM DN lamps illuminate on AP display as shown in Fig. 2-6. TRIM UP lamp extinguishes after 2 seconds, as shown in Fig. 2-7. RDY, ST, HD, LO TRK, HI TRK, and TRIM DN lamps extinguish after 7 seconds, as shown in Fig. 2-8. ALT lamp extinguishes after 10 seconds, as shown in Fig. 2-9. RDY lamp alone re-illuminates on AP display within 3 minutes, as shown in Fig. 2-10 *(Note 1)*.

Notes:

1. Should a Turn Coordinator failure be detected, the RDY lamp on the AP display will not re-illuminate as shown in Fig. 2-11, and the autopilot will not operate.

2. Should T&B A+ be 30% below its rated value, the Low Voltage Flag will be in view on the AP display as shown in Fig. 2-12.

Fig. 2-6. AP Display, RDY, ALT, ST, HD, LO TRK, HI TRK, TRIM UP, TRIM DN Lamps Illuminated at Power-Up (System Thirty)

Fig. 2-7. AP Display, TRIM UP Lamp Extinguished (System Thirty)

Fig. 2-8. AP Display, ALT Lamp Only Illuminated (System Thirty)

Fig. 2-9. AP Display, All Lamps Extinguished (System Thirty)

Fig. 2-10. AP Display, RDY for Operation (System Thirty)

Fig. 2-11. AP Display, Turn Coordinator Failure (System Thirty)

Fig. 2-12. AP Display, Low Voltage Flag (System Thirty)

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2.2.2 System Thirty

Prior to takeoff and with engine running, perform the actions shown in Table 2-5. For each action, verify the corresponding response where applicable.

Table 2-5. Pre-Flight Test, System Thirty (continued on page 2-26)

ACTION	RESPONSE
1. Move A/C Control Wheel left and right, to sense its freedom of movement about roll axis.	------
2. Set L/R Turn Knob located on bezel under its index.	------
3. Engage stabilizer mode.	ST lamp alone is illuminated on AP display, as shown in Fig. 2-21.
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 L/R Turn Knob to the left side of its index.	A/C Control Wheel turns to the left.
6. Turn L/R Turn Knob to the right side of its index.	A/C Control Wheel turns to the right.
7. Set L/R Turn Knob under its index.	A/C Control Wheel stops.
Note: *If A/C is equipped with a heading system (HSI or DG), then proceed to step 8.* *If A/C is not equipped with a heading system, then proceed to step 13 only if a VOR frequency can be selected. Otherwise, proceed to step 26.*	

Table 2-5. Pre-Flight Test, System Thirty (continued from page 2-25)

ACTION	RESPONSE
8. Set Heading Bug under Lubber Line.	------
9. Engage heading mode.	HD lamp alone is illuminated on AP display, as shown in Fig. 2-22.
10. Turn Heading Bug to the left side of Lubber Line.	A/C Control Wheel turns to the left.
11. Turn Heading Bug to the right side of Lubber Line.	A/C Control Wheel turns to the right.
12. Set Heading Bug under Lubber Line.	A/C Control Wheel stops.
Note: If it is not possible to select a local VOR frequency on Navigation Receiver, then proceed to step 26. Otherwise, proceed to step 13.	
13. Select local VOR frequency on Navigation Receiver.	------
Note: Proceed to either step 14 (HSI) or step 20 (DG).	
14. Turn Course Pointer until CDI needle is centered.	------
15. Engage low track mode.	LO TRK lamp alone is illuminated on AP display, as shown in Fig. 2-23.
16. Engage high track mode.	HI TRK lamp alone is illuminated on AP display, as shown in Fig. 2-24.
17. Turn Course Pointer left until CDI needle deflection is 2 dots right of center.	A/C Control Wheel turns to the right.

Fig. 2-21. AP Display, ST Mode Engaged (System Thirty)

Fig. 2-22. AP Display, HD Mode Engaged (System Thirty)

Table 2-5. Pre-Flight Test, System Thirty (continued from page 2-26)

ACTION	RESPONSE
18. Turn Course Pointer right until CDI needle deflection is 2 dots left of center.	A/C Control Wheel turns to the left.
19. Turn Course Pointer left until CDI needle is centered.	A/C Control Wheel stops.
Note: Proceed to step 28.	
20. Turn OBS until CDI needle is centered.	------
21. Engage low track mode.	LO TRK lamp alone is illuminated on AP display, as shown in Fig. 2-23.
22. Engage high track mode.	HI TRK lamp alone is illuminated on AP display, as shown in Fig. 2-24.
23. Turn OBS until CDI needle deflection is 2 dots right of center.	A/C Control Wheel turns to the right.
24. Turn OBS until CDI needle deflection is 2 dots left of center.	A/C Control Wheel turns to the left.
25. Turn OBS until CDI needle is centered.	A/C Control Wheel stops.
Note: Proceed to step 28.	
26. Engage low track mode.	LO TRK lamp alone is illuminated on AP display, as shown in Fig. 2-23.
27. Engage high track mode.	HI TRK lamp alone is illuminated on AP display, as shown in Fig. 2-24.

Fig. 2-23. AP Display, LO TRK Mode Engaged (System Thirty)

Fig. 2-24. AP Display, HI TRK Mode Engaged (System Thirty)

Table 2-5. Pre-Flight Test, System Thirty (continued from page 2-28)

ACTION	RESPONSE
28. Move A/C Control Wheel forward and aft, to sense its freedom of movement about pitch axis.	------
29. Engage altitude hold mode.	ALT lamp is illuminated on AP display, as shown in Fig. 2-25.
30. 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.
31. Move A/C Control Wheel as far forward as possible.	After 3 seconds, TRIM UP lamp becomes illuminated on AP display as shown in Fig. 2-26, and audible alert sounds a steady tone. After 7 seconds, TRIM UP lamp flashes and audible alert becomes periodic.
32. Move A/C Control Wheel aft until TRIM UP lamp is extinguished.	Audible alert is squelched.
33. Move A/C Control Wheel as far aft as possible.	After 3 seconds, TRIM DN lamp becomes illuminated on AP display as shown in Fig. 2-27, and audible alert sounds a steady tone. After 7 seconds, TRIM DN lamp flashes and audible alert becomes periodic.
34. Move A/C Control Wheel forward until TRIM DN lamp is extinguished.	Audible alert is squelched.

Fig. 2-25. AP Display, HI TRK and ALT HOLD Modes Engaged (System Thirty)

Fig. 2-26. AP Display, HI TRK and ALT HOLD Modes Engaged, TRIM UP Required (System Thirty)

Fig. 2-27. AP Display, HI TRK and ALT HOLD Modes Engaged, TRIM DN Required (System Thirty)

Table 2-5. Pre-Flight Test, System Thirty (continued from page 2-30)

ACTION	RESPONSE
35. Disconnect autopilot by any one of the following means: a. Press optional AP DISC Switch typically located on Control Wheel. b. Press/Hold optional MODE SEL Switch typically located on Control Wheel for 3 seconds. c. Press/Hold PUSH MODE Switch located on bezel for 3 seconds.	RDY lamp flashes and audible alert sounds a periodic tone, while all other lamps are extinguished. After 5 seconds, RDY lamp stops flashing but remains illuminated, and audible alert is squelched.
36. Move A/C Control Wheel left and right.	A/C Control Wheel's increased freedom of movement indicates that Roll Servo is disengaged.
37. Move A/C Control Wheel forward and aft.	A/C Control Wheel's increased freedom of movement indicates that Pitch Servo is disengaged.
Note: If a Yaw Damper is installed, then proceed to step 38. Otherwise, proceed to step 47.	
38. Actuate A/C Rudder Pedals alternately in succession, to sense their freedom of movement about yaw axis.	------
39. Set Yaw Damper Master Switch to ON position.	------
40. Turn Yaw Trim Knob until A/C Rudder Pedals stop.	------

Table 2-5. Pre-Flight Test, System Thirty (continued from page 2-33)

ACTION	RESPONSE
41. 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.
42. Turn Yaw Trim Knob fully CCW.	Left A/C Rudder Pedal slowly moves forward.
43. Turn Yaw Trim Knob fully CW.	Right A/C Rudder Pedal slowly moves forward.
44. Turn Yaw Trim Knob CCW until A/C Rudder Pedals stop.	------
45. Set Yaw Damper Master Switch to OFF position.	------
46. Actuate A/C Rudder Pedals alternately in succession.	A/C Rudder Pedals' increased freedom of movement indicates that Yaw Servo is disengaged.
47. Trim A/C for takeoff.	------

SECTION 3
IN-FLIGHT PROCEDURES

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3.1 Normal Operating Procedures

3.1.1 Stabilizer (ST) Mode, System Twenty / Thirty

Set the L/R Turn Knob under its index, and then engage the stabilizer mode. The ST lamp alone will be illuminated as shown in Fig. 3-1, to acknowledge that this mode is engaged. The autopilot will hold the aircraft at wings level.

Turning the L/R Turn Knob to the left or right of its index will cause the aircraft to turn either left or right, respectively. The L/R Turn Knob is active only when the stabilizer mode is engaged.

Fig. 3-1. AP Display, ST Mode Engaged

3.1.2 Heading (HD) Mode, System Twenty / Thirty

Set the Heading Bug to the desired heading on the compass card (HSI or DG), and then engage the heading mode. The HD lamp alone will be illuminated as shown in Fig. 3-2, to acknowledge that this mode is engaged. The autopilot will turn the aircraft onto the selected heading and hold it. A new heading can be subsequently selected by setting the Heading Bug to it.

Fig. 3-2. AP Display, HD Mode Engaged

3.1.3 Low Track (LO TRK) Mode, System Twenty / Thirty

Select the VOR frequency on the Navigation Receiver. Maneuver the aircraft to within ±1 CDI needle width and ±10° heading of the selected course. Engage the low track mode. The LO TRK lamp alone will be illuminated as shown in Fig. 3-3, to acknowledge that this mode is engaged. The autopilot will track the selected course with minimum authority, thereby ignoring short term CDI needle deflections (excursions) to inhibit aircraft scalloping during VOR station passage.

Fig. 3-3. AP Display, LO TRK Mode Engaged

3.1.4 High Track (HI TRK) Mode, System Twenty / Thirty

3.1.4.1 LOC Course Tracking

Select the LOC frequency on the Navigation Receiver. Maneuver the aircraft to within ±1 CDI needle width and ±10° heading of the selected course. Engage the high track mode. The HI TRK lamp alone will be illuminated as shown in Fig. 3-4, to acknowledge that this mode is engaged. The autopilot will track the selected course with maximum authority.

3.1.4.2 GPS Course Tracking

Program a predefined course into the GPS Navigation Receiver, comprised of course segments connected by waypoints. Maneuver the aircraft to within ±1 CDI needle width and ±10° heading of each successive course segment. Engage the high track mode. The HI TRK lamp alone will be illuminated as shown in Fig. 3-4, to acknowledge that this mode is engaged. The autopilot will track the selected course segment with maximum authority.

3.1.4.3 VOR Course Tracking

Select the VOR frequency on the Navigation Receiver. Maneuver the aircraft to within ±1 CDI needle width and ±10° heading of the selected course. Engage the high track mode. The HI TRK lamp alone will be illuminated as shown in Fig. 3-4, to acknowledge that this mode is engaged. The autopilot will track the selected course with maximum authority. As a result, however, the aircraft may exhibit scalloping during VOR station passage.

Fig. 3-4. AP Display, HI TRK Mode Engaged

3.1.5 Altitude Hold (ALT HOLD) Mode, System Thirty / Thirty ALT

3.1.5.1 System Thirty

The altitude hold mode can only be engaged if a roll mode (ST, HD, LO TRK, HI TRK) is already engaged. Maneuver the aircraft to the desired altitude. Engage the altitude hold mode. The ALT lamp will be illuminated as shown in Fig. 3-5, to acknowledge that this mode is engaged. The autopilot will hold the aircraft at its current (captured) absolute pressure altitude.

Fig. 3-5. AP Display, ST and ALT HOLD Modes Engaged (System Thirty)

a. TRIM UP Required

b. TRIM DN Required

Fig. 3-7. AP Display, Manual Trim Prompts (System Thirty)

3.2 Approach Procedures

3.2.1 Straight-In LOC Approach

3.2.1.1 Heading System DG

Select the LOC frequency on the Navigation Receiver. Set the Heading Bug to the FRONT INBOUND LOC heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND LOC course. Engage the high track mode. The autopilot will track the FRONT INBOUND LOC course.

A summary pictorial of this procedure is shown in Fig. 3-9.

3.2.1.2 Heading System HSI

Select the LOC frequency on the Navigation Receiver. For reference only, set the Course Pointer to the FRONT INBOUND LOC course. Set the Heading Bug to the FRONT INBOUND LOC heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND LOC course. Engage the high track mode. The autopilot will track the FRONT INBOUND LOC course.

A summary pictorial of this procedure is shown in Fig. 3-10.

3.2.2 Straight-In VOR Approach

3.2.2.1 Heading System DG

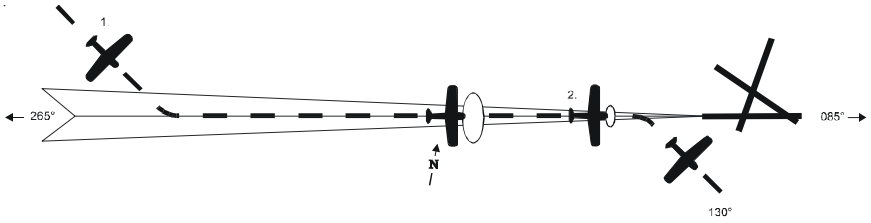
Select the VOR frequency on the Navigation Receiver. Set the OBS to the FRONT INBOUND VOR course. Set the Heading Bug to the FRONT INBOUND VOR heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND VOR course. Engage the high track mode. The autopilot will track the FRONT INBOUND VOR course.

A summary pictorial of this procedure is shown in Fig. 3-11.

3.2.2.2 Heading System HSI

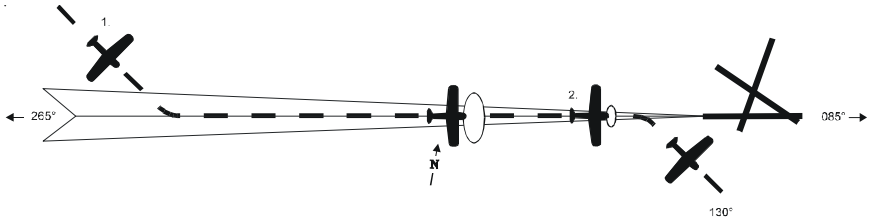
Select the VOR frequency on the Navigation Receiver. Set the Course Pointer to the FRONT INBOUND VOR course. Set the Heading Bug to the FRONT INBOUND VOR heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND VOR course. Engage the high track mode. The autopilot will track the FRONT INBOUND VOR course.

A summary pictorial of this procedure is shown in Fig. 3-12.



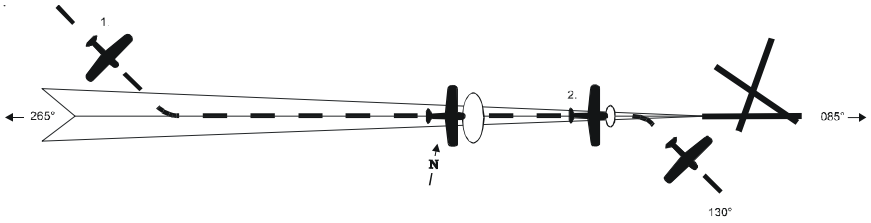
1. a. Select LOC frequency.
   b. Set Heading Bug to FRONT INBOUND LOC heading.
   c. Engage heading mode.
   d. Turn Heading Bug to establish aircraft on FRONT INBOUND LOC course.
   e. Engage high track mode.
   f. Track FRONT INBOUND LOC course.
2. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-9. Straight-In LOC Approach (DG)



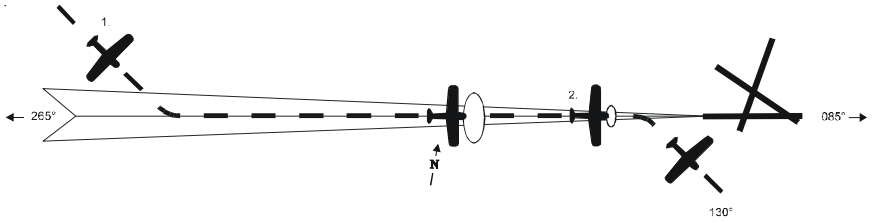
1. a. Select LOC frequency.
   b. Set Course Pointer to FRONT INBOUND LOC course (reference only).
   c. Set Heading Bug to FRONT INBOUND LOC heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT INBOUND LOC course.
   f. Engage high track mode.
   g. Track FRONT INBOUND LOC course.
2. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-10. Straight-In LOC Approach (HSI)



1. a. Select VOR frequency.
   b. Set OBS to FRONT INBOUND VOR course.
   c. Set Heading Bug to FRONT INBOUND VOR heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT INBOUND VOR course.
   f. Engage high track mode.
   g. Track FRONT INBOUND VOR course.
2. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-11. Straight-In VOR Approach (DG)



1. a. Select VOR frequency.
   b. Set Course Pointer to FRONT INBOUND VOR course.
   c. Set Heading Bug to FRONT INBOUND VOR heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT INBOUND VOR course.
   f. Engage high track mode.
   g. Track FRONT INBOUND VOR course.
2. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-12. Straight-In VOR Approach (HSI)

3.2.3 LOC Approach with Procedure Turn

3.2.3.1 Heading System DG

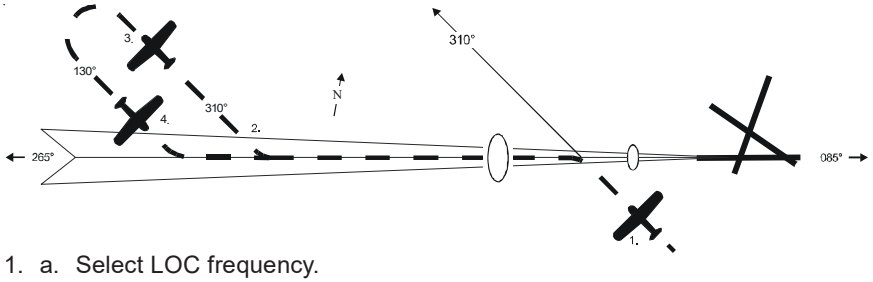
Select the LOC frequency on the Navigation Receiver. Set the Heading Bug to the FRONT OUTBOUND LOC heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT OUTBOUND LOC course. At the appropriate point thereafter, set the Heading Bug to the FRONT OUTBOUND PROCEDURE TURN heading. Hold this heading until the point at which it is time to turn the aircraft again. At that point, turn the Heading Bug in two successive 90° increments, to establish the aircraft on the FRONT INBOUND PROCEDURE TURN heading. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND LOC course. Engage the high track mode. The autopilot will track the FRONT INBOUND LOC course.

A summary pictorial of this procedure is shown in Fig. 3-13.

3.2.3.2 Heading System HSI

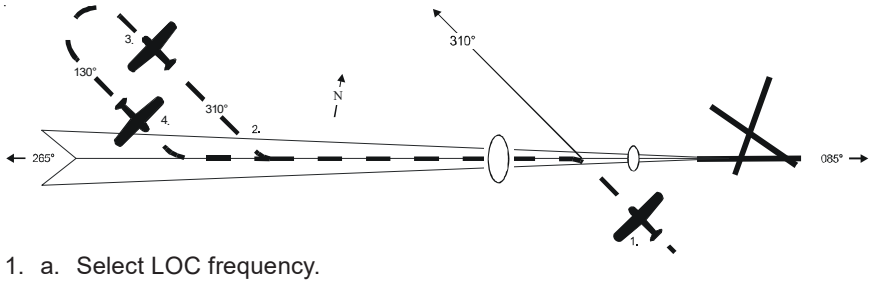
Select the LOC frequency on the Navigation Receiver. For reference only, set the Course Pointer to the FRONT INBOUND LOC course. Set the Heading Bug to the FRONT OUTBOUND LOC heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT OUTBOUND LOC course. At the appropriate point thereafter, set the Heading Bug to the FRONT OUTBOUND PROCEDURE TURN heading. Hold this heading until the point at which it is time to turn the aircraft again. At that point, turn the Heading Bug in two successive 90° increments, to establish the aircraft on the FRONT INBOUND PROCEDURE TURN heading. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND LOC course. Engage the high track mode. The autopilot will track the FRONT INBOUND LOC course.

A summary pictorial of this procedure is shown in Fig. 3-14.



1. a. Select LOC frequency.
   b. Set Heading Bug to FRONT OUTBOUND LOC heading.
   c. Engage heading mode.
   d. Turn Heading Bug to establish aircraft on FRONT OUTBOUND LOC course.
2. a. Set Heading Bug to FRONT OUTBOUND PROCEDURE TURN heading.
3. a. Turn Heading Bug in two successive 90° increments, to establish aircraft on FRONT INBOUND PROCEDURE TURN heading.
4. a. Turn Heading Bug to establish aircraft on FRONT INBOUND LOC course.
   b. Engage high track mode.
   c. Track FRONT INBOUND LOC course.
5. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-13. LOC Approach with Procedure Turn (DG)



1. a. Select LOC frequency.
   b. Set Course Pointer to FRONT INBOUND LOC course (reference only).
   c. Set Heading Bug to FRONT OUTBOUND LOC heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT OUTBOUND LOC course.
2. a. Set Heading Bug to FRONT OUTBOUND PROCEDURE TURN heading.
3. a. Turn Heading Bug in two successive 90° increments, to establish aircraft on FRONT INBOUND PROCEDURE TURN heading.
4. a. Turn Heading Bug to establish aircraft on FRONT INBOUND LOC course.
   b. Engage high track mode.
   c. Track FRONT INBOUND LOC course.
5. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-14. LOC Approach with Procedure Turn (HSI)

3.2.4 VOR Approach with Procedure Turn

3.2.4.1 Heading System DG

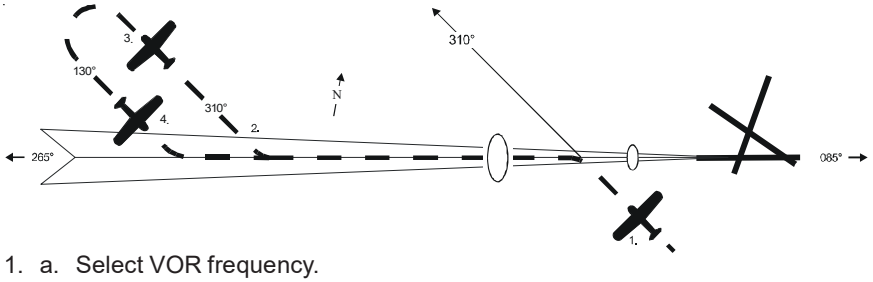
Select the VOR frequency on the Navigation Receiver. Set the OBS to the FRONT INBOUND VOR course. Set the Heading Bug to the FRONT OUTBOUND VOR heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT OUTBOUND VOR course. At the appropriate point thereafter, set the Heading Bug to the FRONT OUTBOUND PROCEDURE TURN heading. Hold this heading until the point at which it is time to turn the aircraft again. At that point, turn the Heading Bug in two successive 90° increments, to establish the aircraft on the FRONT INBOUND PROCEDURE TURN heading. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND VOR course. Engage the high track mode. The autopilot will track the FRONT INBOUND VOR course.

A summary pictorial of this procedure is shown in Fig. 3-15.

3.2.4.2 Heading System HSI

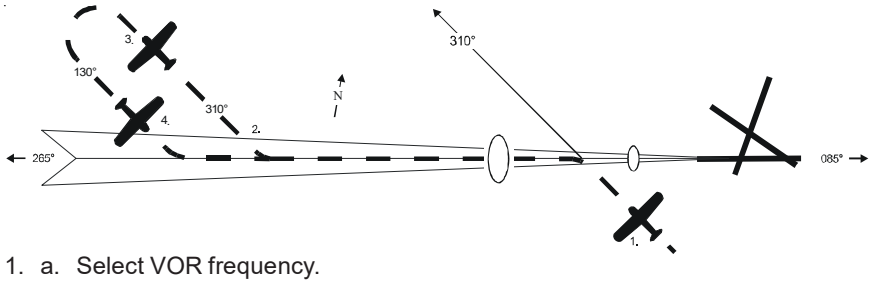
Select the VOR frequency on the Navigation Receiver. Set the Course Pointer to the FRONT INBOUND VOR course. Set the Heading Bug to the FRONT OUTBOUND VOR heading, and then engage the heading mode. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT OUTBOUND VOR course. At the appropriate point thereafter, set the Heading Bug to the FRONT OUTBOUND PROCEDURE TURN heading. Hold this heading until the point at which it is time to turn the aircraft again. At that point, turn the Heading Bug in two successive 90° increments, to establish the aircraft on the FRONT INBOUND PROCEDURE TURN heading. At the appropriate point, turn the Heading Bug to establish the aircraft on the FRONT INBOUND VOR course. Engage the high track mode. The autopilot will track the FRONT INBOUND VOR course.

A summary pictorial of this procedure is shown in Fig. 3-16.



1. a. Select VOR frequency.
   b. Set OBS to FRONT INBOUND VOR course.
   c. Set Heading Bug to FRONT OUTBOUND VOR heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT OUTBOUND VOR course.
2. a. Set Heading Bug to FRONT OUTBOUND PROCEDURE TURN heading.
3. a. Turn Heading Bug in two successive 90° increments, to establish aircraft on FRONT INBOUND PROCEDURE TURN heading.
4. a. Turn Heading Bug to establish aircraft on FRONT INBOUND VOR course.
   b. Engage high track mode.
   c. Track FRONT INBOUND VOR course.
5. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-15. VOR Approach with Procedure Turn (DG)



1. a. Select VOR frequency.
   b. Set Course Pointer to FRONT INBOUND VOR course.
   c. Set Heading Bug to FRONT OUTBOUND VOR heading.
   d. Engage heading mode.
   e. Turn Heading Bug to establish aircraft on FRONT OUTBOUND VOR course.
2. a. Set Heading Bug to FRONT OUTBOUND PROCEDURE TURN heading.
3. a. Turn Heading Bug in two successive 90° increments, to establish aircraft on FRONT INBOUND PROCEDURE TURN heading.
4. a. Turn Heading Bug to establish aircraft on FRONT INBOUND VOR course.
   b. Engage high track mode.
   c. Track FRONT INBOUND VOR course.
5. a. At middle marker, if missed approach is declared, disconnect autopilot.
   b. Stabilize aircraft.
   c. Set Heading Bug to missed approach heading.
   d. Engage heading mode.

Fig. 3-16. VOR Approach with Procedure Turn (HSI)

3.3 Yaw Damper Operation

The optional Yaw Damper serves to dampen excessive adverse yaw. It operates in either the AUTO mode or ON mode, depending upon the position of the Yaw Damper Master Switch shown in Fig. 3-17.

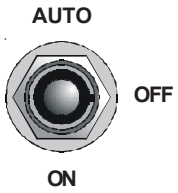


Fig. 3-17. Yaw Damper Master Switch

The Yaw Trim Knob, shown in Fig. 3-18, is used to center the slip/skid ball when the yaw servo is engaged.

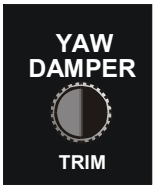


Fig. 3-18. Yaw Trim Knob

3.3.1 AUTO Mode

With the Yaw Damper Master Switch in the AUTO position, the yaw servo will become automatically engaged whenever a roll mode (ST, HD, LO TRK, HI TRK) is engaged.

3.3.2 ON Mode

With the Yaw Damper Master Switch in the ON position, the yaw servo will be engaged at all times, entirely independent of autopilot operation.

3.3.3 Yaw Damper Trim

With the yaw servo engaged, rotate the Yaw Trim Knob to center the slip/skid ball.

3.4 Autopilot Disconnect

3.4.1 System Twenty / Thirty

The autopilot can be disconnected by any of the following means:

1. Press optional AP DISC Switch typically located on Control Wheel.
2. Press/Hold optional MODE SEL Switch typically located on Control Wheel for 3 seconds.
3. Press/Hold PUSH MODE Switch located on bezel for 3 seconds.
4. Set Autopilot Master Switch to OFF position.
5. Pull Autopilot Circuit Breaker.

3.4.2 System Thirty ALT

The autopilot can be disconnected by any of the following means:

1. Press optional ALT ENG/DSNG Switch typically located on Control Wheel.
2. Press ALT HOLD ON/OFF Switch located on instrument panel.
3. Set ALT HOLD Master Switch to OFF position.
4. Pull ALT HOLD Circuit Breaker.

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SECTION 4
OPERATING PARAMETERS

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4.1 Roll Axis Limits

Turn Rate

Piston A/C:

90% Standard Rate Turn

Turboprop A/C:

75% Standard Rate Turn

4.2 Pitch Axis Limits

Altitude

32,000 FT

Vertical Force Due to Acceleration

0.60 g

Modes

For the System Thirty, the pitch mode (ALT HOLD) can only be engaged after a roll mode (ST, HD, LO TRK, HI TRK) has been engaged.

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SECTION 5
GLOSSARY

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Term	Meaning
A/C	Aircraft
ALT	Altitude
AP	Autopilot
CDI	Course Deviation Indication
CW	Clockwise
CCW	Counter–Clockwise
DG	Directional Gyro
DISC	Disconnect
DN	Down
DSNG	Disengage
ENG	Engage
FAA	Federal Aviation Administration
FT	Feet
GPS	Global Positioning System
HD	Heading
HI TRK	High Track
HSI	Horizontal Situation Indicator
IFR	Instrument Flight Rules
LO TRK	Low Track
LOC	Localizer
MAP	Missed Approach Point
OBS	Omnibearing Selector
PN	Part Number
POH	Pilot's Operating Handbook
RDY	Ready
ST	Stabilizer
UP	Up
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omnidirectional Radio Range

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S-TEC

Notice:
Contact S-TEC Customer Support at 800-872-7832 for a Return Material Authorization (RMA) number prior to the return of any component for any reason.

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