ATTACHMENT 2

Test Procedure And Results From Test of N483WN

Thrust Resolver Operation Test Plan

The procedure below is for determining the variation of the Thrust Resolver Angle (TRA) with respect to the reverse thrust interlock latch. This procedure utilizes the FDR as the data collection media for later downloading and analysis.

Insert a blank PCMCIA card in the DFDAU for quick access to Test Data.

Test Setup

1. Complete the Following AMM subtasks
   (Ref AMM Book 2 Chapter 76-11-05 pages 501-505):
   76-11-05-480-001-F00
   76-11-05-700-002-F00
   76-11-05-710-001-F00 steps 4(a) through 4(f) only
   At SWA request we will first perform the procedures without making these adjustments. We then plan to make the adjustments and repeat the tests..
2. Ensure the following circuit breakers are closed on the P18-2 (aft flight deck behind captain's seat):

ID	Nomenclature	Location
C468	FLT REC DC	C10
C109	FLT REC AC	C9

3. Select 5 NM range on Captain's EFIS Control Panel. (To mark data on FDR)
4. Select 5 NM range on F/O's EFIS Control Panel .
5. Pull left (#1) thrust lever aft against the aft idle stop.
6. Position left reverser thrust lever full down position.
7. Pull right (#2) thrust lever aft against the aft idle stop.
8. Position right reverser thrust lever full down position.
9. Position Flight Recorder Test Switch on Aft Overhead Panel to "TEST".
10. Ensure Flight Recorder "OFF" light extinguishes.

Left Interlock Latch Test

11. Ensure left (#1) thrust lever is against the aft stop.
12. Select 10 NM Range on Captain's EFIS Control Panel
13. Push left thrust levers forward approximately 2" (measured along throttle quadrant).
14. Pull up on left reverse thrust lever until contacting mechanical stop (<15^{o} RLA).
15. With the left reverse thrust lever lifted against the mechanical stop, slowly pull the left thrust lever back until the reverse thrust lever can be lifted beyond the mechanical stop. Insert shims and/or a plastic wedge aft of the throttle lever to act as an artificial stop to assist in holding the throttle lever stationary.
16. While keeping the left thrust lever in the same position, move the left reverse thrust lever to the reverse idle (interlock solenoid) position.
17. Select 20 NM Range on Captain's EFIS Control Panel.
18. While keeping the left thrust lever in the same position, move the left reverse thrust levers down to the stowed position (0^{o} RLA).
19. Select 40 NM Range on Captain's EFIS Control Panel.

20. Pull left (#1) thrust lever is against the aft stop.
21. Select 80 NM Range on Captain's EFIS Control Panel.

Right Interlock Latch Test

22. Ensure right (#2) thrust lever is against the aft stop.
23. Select 10 NM Range on F/O's EFIS Control Panel
24. Push right thrust levers forward approximately 2" (measured along throttle quadrant).
25. Pull up on right reverse thrust lever until contacting mechanical stop (<15º RLA).
26. With the right reverse thrust lever lifted against the mechanical stop, slowly pull the right thrust lever back until the reverse thrust lever pawl can be lifted beyond the mechanical stop. Insert shims and/or a plastic wedge aft of the throttle lever to act as an artificial stop to assist in holding the throttle lever stationary.
27. While keeping the left thrust lever in the same position, move the left reverse thrust lever to the reverse idle (interlock solenoid) position.
28. Select 20 NM Range on F/O's EFIS Control Panel.
29. While keeping the right thrust lever in the same position, move the right reverse thrust levers down to the stowed position (0º RLA).
30. Select 40 NM Range on F/O's EFIS Control Panel.
31. Pull right (#2) thrust lever is against the aft stop.
32. Select 80 NM Range on F/O's EFIS Control Panel.

Restoration

33. Position Flight Recorder Test Switch on Aft Overhead Panel to "NORMAL".
34. Ensure Flight Recorder "OFF" light illuminates.
35. Restore airplane as required.

Data Marking Summary

Range	Forward Thrust Lever Position	Reverse Thrust Level Position
5 NM	Aft Mechanical Stop	Down
10 NM	Aft Mechanical Stop	Down
20 NM	Forward limit of travel at which reverse thrust lever can be lifted past interlock latch	Reverse Idle
40 NM	Forward limit of travel at which reverse thrust lever can be lifted interlock latch	Down
80 NM	Aft Mechanical Stop	Down

PROCEDURE 2
Setup per Step 2 above.

** Use the Flt Deck MCDU to view and manually record throttle resolver angles.

Perform the following procedure on thrust lever #1 and repeat for thrust lever #2.

1. Thrust levers at idle stop, reverse levers stowed.
2. Advance thrust lever approximately 2 inches.
3. Set 5NM range on both EFIS control panels.
4. Insert two .063 shims in front of stop (.125 in)
5. Pull thrust lever against shim and hold for 5 seconds **
6. Move left thrust lever to reverse idle (interlock position) if mechanical latch allows.
    a. **IF reverse lever moves to idle position.**
    b. Hold reverse lever at rev idle for 5 seconds.**
    c. Stow the reverse lever and hold for 5 seconds.**
    d. Proceed to step 7.
    e. **IF reverse lever cannot move out of stowed position (mechanical latch engages).**
    f. Hold reverse lever against the latch for 5 seconds** and return to stowed position.
    g. Advance the thrust lever approximately 2 inches.
    h. Remove shims and record thickness.
    i. Return thrust lever to stop and hold for 5 seconds.**
    j. End of test.
7. Advance thrust lever approximately 2 inches.

8. Set 10NM range on both EFIS control panels.
9. Add .063 shim to stack (.188in)
10. Pull thrust lever against shim and hold for 5 seconds
11. Move left thrust lever to reverse idle (interlock position) if mechanical latch allows.
    a. **IF reverse lever moves to idle position.**
    b. Hold reverse lever at rev idle for 5 seconds.**
    c. Stow the reverse lever and hold for 5 seconds.**
    d. Proceed to step 12.
    e. **IF reverse lever cannot move out of stowed position (mechanical latch engages).**
    f. Hold reverse lever against the latch for 5 seconds** and return to stowed position.
    g. Advance the thrust lever approximately 2 inches.
    h. Remove shims and record thickness.
    i. Return thrust lever to stop and hold for 5 seconds.**
    j. End of test.
12. Advance thrust lever approximately 2 inches.

13. Set 20NM range on both EFIS control panels.
14. Add .032 shim to stack (.219in)
15. Pull thrust lever against shim and hold for 5 seconds
16. Move left thrust lever to reverse idle (interlock position) if mechanical latch allows.
    a. **IF reverse lever moves to idle position.**
    b. Hold reverse lever at rev idle for 5 seconds.**
    c. Stow the reverse lever and hold for 5 seconds.**
    d. Proceed to step 17.
    e. **IF reverse lever cannot move out of stowed position (mechanical latch engages).**
    f. Hold reverse lever against the latch for 5 seconds** and return to stowed position.
    g. Advance the thrust lever approximately 2 inches.
    h. Remove shims and record thickness.
    i. Return thrust lever to stop and hold for 5 seconds.**
    j. End of test.
17. Advance thrust lever approximately 2 inches.

18. Set 40NM range on both EFIS control panels.
19. Add .032 shim to stack (.250in)
20. Pull thrust lever against shim and hold for 5 seconds
21. Move left thrust lever to reverse idle (interlock position) if mechanical latch allows.
    a. **IF reverse lever moves to idle position.**
    b. Hold reverse lever at rev idle for 5 seconds.**
    c. Stow the reverse lever and hold for 5 seconds.**
    d. Proceed to step 22.
    e. **IF reverse lever cannot move out of stowed position (mechanical latch engages).**
    f. Hold reverse lever against the latch for 5 seconds** and return to stowed position.
    g. Advance the thrust lever approximately 2 inches.
    h. Remove shims and record thickness.
    i. Return thrust lever to stop and hold for 5 seconds.**
    j. End of test.
22. Advance thrust lever approximately 2 inches.

23. Set 80NM range on both EFIS control panels.
24. Add .032 shim to stack (.281 in)
25. Pull thrust lever against shim and hold for 5 seconds
26. Move left thrust lever to reverse idle (interlock position) if mechanical latch allows.
    a. **IF reverse lever moves to idle position.**
    b. Hold reverse lever at rev idle for 5 seconds.**

c. Stow the reverse lever and hold for 5 seconds.**
d. Proceed to step 27.
e. IF reverse lever cannot move out of stowed position (mechanical latch engages).
f. Hold reverse lever against the latch for 5 seconds** and return to stowed position.
g. Advance the thrust lever approximately 2 inches.
h. Remove shims and record thickness.
i. Return thrust lever to stop and hold for 5 seconds.**
j. End of test.

27. If the reverse lever has not latched by now, repeat the routine while reducing range on the EFIS control panels between steps.

Data Marking Summary

Range	Shim thickness
5 NM	1/8 (.125)
10 NM	3/16 (.188)
20 NM	7/32 (.219)
40 NM	¼ (.250)
80 NM	9/32 (.281)
160NM	5/15 (.312) if required, etc.

Notes:

A. Hold levers to fixed positions for 5 seconds to ensure multiple FDR data points.
B. We plan to use .063 and .032 alum stock (1/4 by 2 inches) for shims, bent into an L shape as required to fit behind the thrust lever.

Test results SWA 737-700 N83WN

Procedure 1
We were not able to complete this procedure. We could not place our shims behind the thrust lever while holding it in place near the stop. Without shims the lever jumped as a result of moving the reverse lever.

Procedure 2
Thrust Lever #1

Step	Test condition	Throttle resolver angle (degrees)	EFIS range	Notes
1	Thrust lever at stop, reverse lever stow	36.26		
4	1/8 shim thrust lever at shim	37.37	5NM	Into reverse
6.b	Reverse lever at idle	27.60		
6.c	Reverse lever stow	37.25		
10	3/16 shim, lever at shim	37.98	10NM	No reverse
11.f	Reverse lever against latch	37.95		
11.i	Thrust lever against stop (no shims)	36.20		
15	5/32 shim, thrust lever at shim	37.75	20NM	Into reverse
16.b	Reverse lever at idle	27.25		
16.c	Reverse lever stow	37.57		
20	.161 shim, thrust lever at shim	37.68	40NM	Added feeler gage Into reverse
21.b	Reverse lever at idle	25.82		
21.c	Reverse lever stow	37.60		
26	.165 shim, thrust lever at shim	37.74	80NM	Added feeler gage Into reverse
27.b	Reverse lever at idle	27.47		
27.c	Reverse lever stow	37.64		
2x	.168 shim, thrust lever at shim	37.39	160NM	Added feeler gage Into reverse
21.b	Reverse lever at idle	25.78		
21.c	Reverse lever stow	37.62		

Thrust Lever #2

Step	Test condition	Throttle resolver angle (degrees)	EFIS range	Notes
1	Thrust lever at stop, reverse lever stow	36.26		
4	1/8 shim thrust lever at shim	37.50	5NM	Into reverse

6.b	Reverse lever at idle	25.57		
6.c	Reverse lever stow	37.15		
10	3/16 shim, lever at shim	38.03	10NM	Into reverse, difficult
11.b	Reverse lever at idle	25.60		
11.c	Reverse lever stow	37.78		
15	7/32 shim, thrust lever at shim	38.31	20NM	No reverse
16.f	Reverse lever against latch	37.67		Shim = 8/32
16.i	Thrust lever against stop (no shims)	36.26		

Thrust lever #1 second pass

Step	Test condition	Throttle resolver angle (degrees)	EFIS range	Notes
1	Thrust lever at stop, reverse lever stow	36.32		
4	1/8 shim thrust lever at shim	37.39	5NM	Into reverse
6.b	Reverse lever at idle	27.18		
6.c	Reverse lever stow	37.21		
10	3/16 shim, lever at shim	37.86	10NM	Into reverse, some resistance
11.b	Reverse lever at idle	25.71		
11.c	Reverse lever stow	37.75		
15	7/32 shim, thrust lever at shim	38.18	20NM	No reverse
16.f	Reverse lever against latch	37.54		Shim = between 7/32 and 8/32
16.i	Thrust lever against stop (no shims)	36.10		

Note: levers held with slight pressure against stops in this test.

Thrust lever #2 second pass

Step	Test condition	Throttle resolver angle (degrees)	EFIS range	Notes
1	Thrust lever at stop, reverse lever stow	36.28		
4	1/8 shim thrust lever at shim	37.54	5NM	Into reverse
6.b	Reverse lever at idle	25.65		
6.c	Reverse lever stow	37.28		
10	3/16 shim, lever at shim	38.14	10NM	No reverse
11.f	Reverse lever against latch	37.53		
11.i	Thrust lever against stop (no shims)	36.32		
15	5/32 shim, thrust lever at shim	37.78	20NM	Into reverse

16.b	Reverse lever at idle	27.40		Shim = between 7/32 and 8/32
16.c	Reverse lever stow,	37.57		
	Thrust lever against stop, no shims	36.24		

Note: Hands off levers during measurements.