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OPSB 0166-17R1

Date: October 23, 2017

To: Operators of Rockwell Collins Flight Management Systems Pro Line 4 and Pro Line 21 FMS 3.3.x through FMS 4.x

From: Commercial Systems Customer Support

Subject: The FMS may turn in the wrong direction after sequencing a "Climb to" altitude that was manually edited or Temperature Compensated

Revision History:
R1 made the following changes:
- Provides the cycle in which approaches will be removed
- Provides a link to removed procedures

Overview:
If the crew manually edits or temperature compensates a "Climb to" altitude, the FMS will remove the database turn direction (if any) on the immediately following leg. The FMS will turn in the wrong direction after sequencing the "Climb to" leg if the shortest turn direction is different than the required turn direction onto the next leg.

Details:

This issue can occur in departures and missed approaches if the crew edits the "Climb to" altitude field (in Figures 1a and 1b) for the susceptible leg sequence which is

- **"Climb to" altitude** shown in parentheses, such as **(**5500**)** and **(**16410**)**, then
- **Turn direction** specified for Course-to Fix or Direct-to-Fix such as, respectively
  - **L**231° where "L" represent a Left Turn to 231° Course to a Fix (Figure 1a)
  - **R**(DIR) where "R" represents a Right Turn Direct-to a Fix (Figure 1b)

Figure 1a. "Climb to" 5500 feet then Left turn to 231° Course to Fix. (Fix is not shown.)
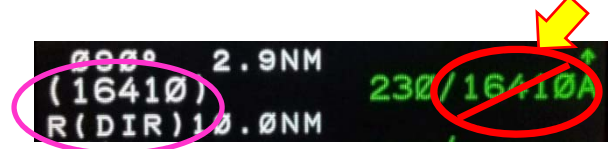
Figure 1b. "Climb to" 16410 feet then Right turn to Direct-to to Fix. (Fix is not shown.)

The overviewed condition occurs in versions FMS 3.3 through FMS 4.2 if the crew modifies the altitude by either

1) Activating Temperature Compensation, in which case
   - In Dual and Triple FMS installations: The turn direction is removed initially on the non-edit side FMS and subsequently on both active FMSs when the next waypoint sequences or if the same approach is reselected,
   - In Single FMS installations: The turn direction is removed if and when the same approach is later reselected
2) Manually entering the altitude, in which case the turn direction is immediately removed from all active FMSs

Temperature Compensation Example:

Figures 2a and 2b show the issue for the CYXJ (Ft. St. John, BC) ILS Rwy 29 missed approach. In Figure 2a, on the LEGS page,

- **"Climb to" altitude of 6000 feet** is identified by the parentheses: "**(**6000**)**"
- **Turn direction is right,** identified by "**R**" (Right) for the immediately following leg

Figure 2b shows that after the crew activates Temperature Compensation, the turn direction is removed, initially on the "non-edit-side FMS" in a dual/triple FMS installation. In other words, if the pilot-not-flying (non-coupled side) makes the edit, the turn direction is initially removed on the pilot-flying (coupled) side. After the active TO waypoint sequences, the turn direction will be removed on both FMSs.

Figure 2a. "Climb to 6000 feet followed immediate by Right turn Direct-to ZXJ.

Figure 2b. After the crew uses the left FMS to activate Temperature Compensation, the "R" turn to ZXJ is initially removed (blanked) on the right FMS and will subsequently be removed on both FMSs. The map display may differ from this example.

In a single FMS installation, activating Temperature Compensation does not immediately remove the turn direction. Instead, the turn direction is removed if the crew subsequently reselects the same approach.

Manual Altitude Entry Example:
A manual altitude entry immediately removes turn direction on all active FMSs. Figures 3a and 3b show the issue departing LFBO Runway 14L on FIST5A. In Figure 3a, on the LEGS page,

- **"Climb to" altitude of 4000 feet** is identified by the parentheses: "**(**4000**)**"
- **Turn direction is right,** identified by "**R**" (Right) for the immediately following leg

  - Figure 3b shows that after the crew enters 4200A in place of 4000A as the "Climb to" altitude The "R" (right) turn direction is removed, as shown on the LEGS page
  - The shortest turn is currently computed to be left (instead of right), as shown on the map

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Figure 3a. "Climb to 4000 feet followed immediate by Right turn 356° course to TOU.

Figure 3b. After manually entering 4200A (in places of 4000A), the "R" turn direction is removed and the FMS computes the shortest turn direction, left in this case.

Recovery

The database turn direction can be restored by the following sequence

1. If Temperature Compensation is ON, turn Temperature Compensation OFF, and press EXEC.
2. Reselect the procedure (departure or approach), and press EXEC.
3. Do not again manually edit the "Climb to" altitude, and do not re-activate Temperature Compensation.

Impact on Flight Operations:

If the crew manually edits or temperature compensates a "Climb to" altitude, the FMS removes the database turn direction (if any) on the immediately following leg if the leg is Course-to-Fix or Direct-to-Fix. After sequencing the "Climb to" leg, the FMS will turn in the wrong direction if the shortest turn direction is different than the required turn direction. This can occur in departures and missed approaches.

Restrictions/Limitations:

The crew

- Should not manually edit "Climb to" altitudes in the FMS flight plan, and

- Should not use the FMS for manual or automatic Temperature Compensation

If the flight plan contains the susceptible leg sequence and a "Climb to" altitude has been edited, including altitude edits due to activating Temperature Compensation, the flight crew should prepare to manually turn to the required direction should the FMS turn incorrectly after sequencing the "Climb to" leg. Turning off Temperature Compensation and then reselecting the procedure restores the database turn direction.

Rockwell Collins will remove from both the Jeppesen and Lufthansa (LSY) Navigation Databases the approaches for which the FMS may not turn correctly after an altitude is edited starting cycle 1712. This will result in the removal of approximately 10,000 approaches. Rockwell Collins is working on corrective actions for this issue to restore the removed procedures and will provide more information prior to the release of cycle 1713.

A complete list of procedures removed can be found at the following link:
http://www.rockwellcollins.com/Services_and_Support/Database_and_Software_Updates/Navigation_Databases/Database_Alerts_and_Certifications.aspx

For assistance in finding the FMS version of an aircraft see SIL 523-0824752 (Flight Management System Version (FMS) Matrix).

This Operators Bulletin (OPSB) provides generic guidance for flight crews to operate Rockwell Collins systems or products. For each aircraft configuration the Flight Operations department of the OEM or Operator is required to verify the specific instructions for their flight crews.

If you have questions regarding this operator bulletin, please contact your local Rockwell Collins Customer Support Engineer or call Rockwell Collins Technical Support at 319.295.5000.