

**OPSB 0166-17R4**

Date: December 13, 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

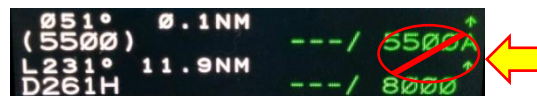
R4 made the following changes:

- Addresses the immediacy of the actions

**Limitations:**

All flight crews shall be immediately informed of these Limitations, and a copy of this OPSB shall be available and accessible to the flight crews during ground and flight operations.

Changing “climb to” altitudes in departures and missed approaches is prohibited at all times for all ground and flight operations.



Use of the FMS Temperature Compensation Feature is prohibited at all times for all ground and flight operations.



If temperature compensation is required, the crew should use manual temperature compensation techniques.

- The LNAV/VNAV minimum is prohibited when using manual temperature compensation techniques.

**NOTICE****INFORMATION SUBJECT TO EXPORT LAWS**

The technical data in this document (or file) is controlled for export under the Export Administration Regulations (EAR), 15 CFR Parts 730-774. Violations of these laws May be subject to fines and penalties under the Export Administration Act.

The barometric altimeter shall always be the primary altitude reference for all flight operations, including instrument approach procedure step-down fixes.

- Step-down fixes may not be available in the navigation database for approaches or certain approach segments.
- The VNAV flight approach glidepath may not be adjusted as required for temperature compensation when manual temperature compensation is used.

### 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 will occur in departures and missed approaches where the shortest turn direction is different than the required turn direction onto the next leg 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
  - L231° 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)

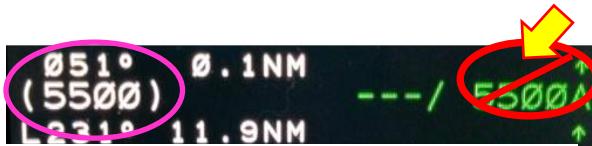


Figure 1a. “Climb to” 5500 feet then Left turn to 231° Course to Fix. (Fix is not shown.)

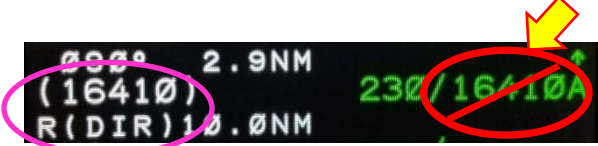


Figure 1b. “Climb to” 16410 feet then Right turn to Direct-to to Fix. (Fix is not shown.)

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.

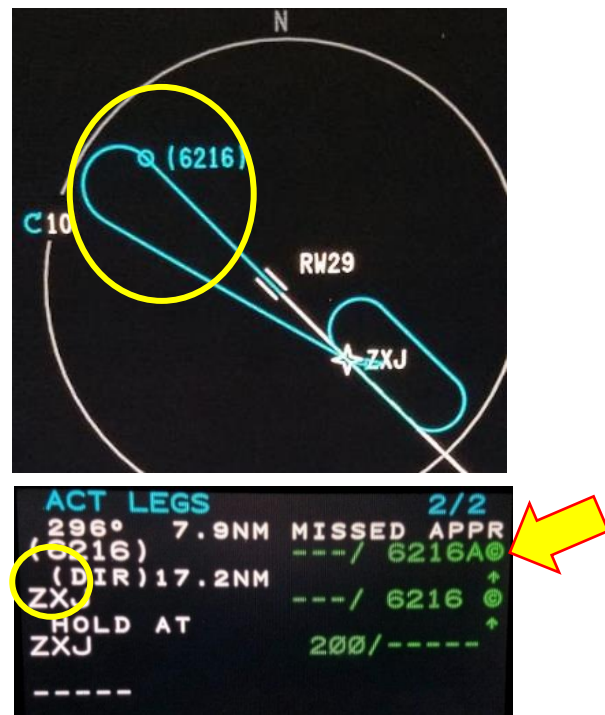


Figure 2b. After the crew uses the left FMS to activate Temperature Compensation, the “R” turn to ZXJ is initially removed (blanked) on the right FMS and will subsequently be removed on both FMSs. The map display may differ from this example.

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



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.

Note: 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.

**Recommendations:**

All flight crews shall be immediately informed of these Limitations, and a copy of this OPSB shall be available and accessible to the flight crews during ground and flight operations.

All training material should be immediately updated for these Limitations.

The navigation databases includes departures and missed approaches which are susceptible to this issue. The flight crew must immediately comply with these Limitations to prevent this issue.

**Other Information:**

The majority of removals are conventional approaches. These can be flown without the FMS if the aircraft is equipped with the following:

- ILS, LOC, LOC BC, SDF, IGS, and LDA
- VOR and VOR/DME
- NDB and NDB/DME
- TACAN

For further guidance on continuing your operations in the meantime, and to help answer any questions you may have, please see our [Frequently Asked Questions](#).

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.

**Revision History:**

R1 made the following changes:

- Provides the cycle in which approaches will be removed
- Provides a link to removed procedures

R2 made the following changes:

- Removes the recommendation to not use Temperature Compensation
- Provides information for flying conventional approaches
- Provides information about an upcoming enhancement that will simplify the process of determining valid approaches for database types 6, 7, and 8
- Provides a link to Frequently Asked Questions

R3 made the following changes:

- Revises Temperature Compensation Limitations