
Subject: Updated FMS U12.0 Operational Software Retrofit

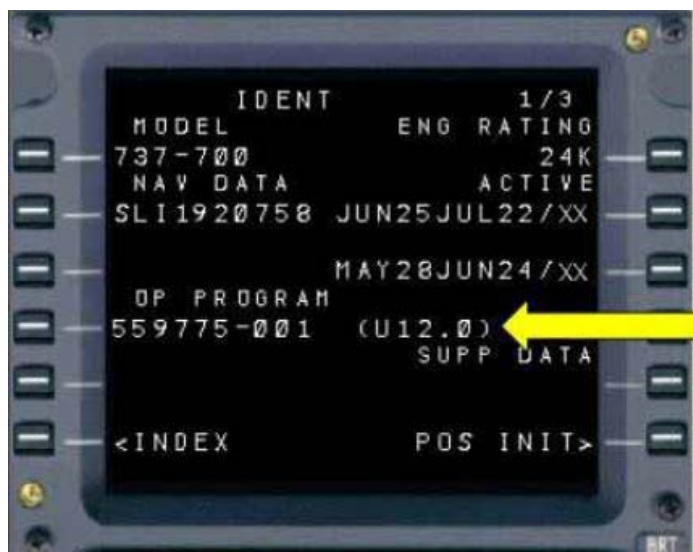
Introduction

Beginning in mid June, TechOps will commence retrofit of FMS U12.0 on all 737-700, -800, and -900ER aircraft (3801-3852).

Note: This bulletin reviews the FMS U12.0 features and authorizes the immediate use of the Critical Terrain Box FMS Loading Procedure on all aircraft equipped with this software. In addition, details of newly discovered U12.0 anomalies are also presented.

Preflight Procedure

Flight crews should check the IDENT page (LSK 4R) during preflight to determine if FMS U12.0 is installed.



New Software Features

There are many new features of FMS U12.0. This bulletin highlights the features that are pertinent to Delta's 737 operations. Additional information can be found in Volume 2, sections 11.40-11.43.

Altitude Intervention to Cruise Descent

Previously during cruise, if the MCP altitude is set below the current altitude and altitude intervention is pressed, the FMC initiates an early descent, regardless of where the plane is in the cruise segment. With FMS U12.0, a transition to a cruise descent occurs if the aircraft is more than 50NM from top-of-descent.

Transition Cruise Descent to Descent Path

FMS U12.0 software will now allow a cruise descent to capture the descent path if the descent path is encountered prior to reaching the new cruise altitude. The descent phase will be entered from cruise descent at the time that the extended descent path is captured.

New Route 2 Capability

The FMS U12.0 software provides capability to use a second route. For example, this new capability can be used for critical terrain boxes, an alternate approach, a pending divert, an emergency return approach, or ETP data on over-water flights. Flight crews can display Route 2 on their navigation display.

Note: Use of RTE 2 for critical terrain boxes is authorized immediately on aircraft installed with U12.0. The Critical Terrain Box FMS Loading Procedure is located on page 5 of this bulletin and will be included in the July 2016 revision of Volume 1, SP.11.

Route 2 - Preflight

Unlike larger Boeing aircraft (with Honeywell FMCs), the contents of Route 2 are not purged after engine shutdown. This FMC design characteristic is intentional and allows short haul airlines to pre-load the next route on multi-segment flight plans.

As a result, it is possible to see lingering route data (i.e., ETP or critical terrain boxes) in Route 2. To correct this situation during preflight, the pilot flying should “swap” the databases (DBs).

Note: Swapping the DBs to clear the routes must be accomplished prior to initializing the ACARS to preclude clearing the datalink requests (and any uplinks previously loaded). If the DB is swapped after ACARS initialization, an FMS RESET must be accomplished (see Volume 1, SP.5).



ALTN DEST Function

On FMS 10.8A aircraft, the ALTN DEST function is displayed on the INIT/REF INDEX page and on all active route pages. With FMS U12.0, the ALTN DEST function is only displayed on the INIT/REF INDEX and on page one of the active route.

RTE COPY Function

A new RTE COPY function (5R) allows the crew to keep the active flight plan for later reference, a technique which can save time and reduce flight planning errors.

Maximum Altitude Limit Labeling

This feature provides additional crew awareness when the airplane may be operating with limited maneuver capability due to proximity to the thrust limited maximum altitude. The requested change adds a suffix to the MAX altitude header on the CRZ page: a “-T” suffix when the available thrust is the limiting criterion; or a “-B” when buffet limited.



Maximum altitude limited by thrust (-T)



Maximum altitude limited by buffet (-B)

Critical Terrain Boxes

This bulletin authorizes the immediate use of critical terrain boxes on all aircraft equipped with U12.0 software. Crews should use the following procedure on applicable routes.

Additional information is located in the Airspace & Enroute Navigation (NAV) and Mountainous Terrain (MT) sections of the Airway Manual.

Critical Terrain Box FMS Loading Procedure

If the dispatcher remarks and body of the flight plan are annotated with THEATER CO ROUTES and CO ROUTE/TERRAIN BOX remarks, the flight is planned to enter or be in close proximity to a critical terrain box. When this occurs, prior to the entry point, accomplish the following:

Identify the CO ROUTE theater designation associated with the critical terrain box entry point (e.g., SAT01) on the flight plan.

Note: Refer to the Airway Manual, Mountainous Terrain.

- Identify and review the relevant Coverage Area chart associated with the theater on the flight plan.
- Referencing the terrain box and routing, locate and assess the suitability of the divert/alternate airports listed in the remarks section of the flight plan.

Load the appropriate CO ROUTE into Route 2 of the FMS:

RTE 2 Select

Load the Critical Terrain Box CO ROUTE (e.g., SAT01).

Note: The origin and destination airports that are automatically loaded have no operational significance.

LEGS (RTE 2 LEGS) Select

- Page through and delete all DLETE waypoints.
- Do not close the route discontinuities.

Note: Do not activate or execute RTE 2.

Note: Repeat process whenever a new CO RTE is loaded.

U12.0 Anomalies

In the last few months, Delta 737 pilots have discovered three software anomalies while operating 737 aircraft installed with U12.0 software.

VERIFY TAKEOFF SPEEDS Scratchpad Message

Crews have reported receiving the VERIFY TAKEOFF SPEEDS scratchpad message after PERF INIT and TAKEOFF data have been successfully accepted via takeoff data uplink. The message is normally generated after engine start on aircraft with FMC U12.0 when a tolerance between the planned gross weight and the actual takeoff weight on the TAKEOFF REF page exceeds 500 lbs.

CAUTION: The FMC alert message VERIFY TAKEOFF SPEEDS indicates the removal of V speeds from the airspeed tape, leaving no speed reference for the crew during takeoff roll. FMC takeoff reference V speeds also revert to small font and <REJECT and ACCEPT> prompts reappear.

If the VERIFY TAKEOFF SPEEDS message is received, verify the V speeds and select ACCEPT> at LSK 5R. This will reinstate V speeds at the speed tape and change FMC V speeds to large font.

Illumination of the Execute Light While the VNAV Engine Out MCDU Page is Displayed

With the U12.0 update, selection of the ENG OUT prompt on the VNAV CRZ page followed by (R or L) ENG OUT will illuminate the execute light on the other MCDU. This anomaly is readily apparent if the other FMC is displaying any other page except VNAV CRZ (including any ACARS page).

CAUTION: DO NOT press the Execute light. To clear the Execute light, navigate to any MCDU display page which causes the Execute light to display, then select ERASE (LSK 6L) to clear the light.

Navigation Display (ND) and Engine Instrument Blanking

Several airlines have reported NDs “blanking” for short periods of time (approximately 1 second) at random times during a flight. This only occurs on aircraft with FMS U12.0 software and DEU-1 computers.

Boeing states that this anomaly can occur when the aircraft is processing the maximum number of TCAS targets (32) and the crew changes the EFIS Control Panel Range selector or adds map background objects such as stations, DATA, airports, or waypoints. Boeing's reproduction of the event indicates that a single occasional blink is the most likely scenario. Continuous blinking of the display has not been reported, nor has such been observed in lab testing.

Note: To mitigate display “blanking”, pilots should “declutter” the ND anytime the EXCESS DATA navigation advisory message is displayed.

Boeing considers momentary occasional loss of navigation and non-critical engine displays of less than 2 seconds as a nuisance to the crew and is a possible distraction. In all cases, the displays return in less than 1 to 2 seconds. During these instances, there is no erroneous data presented, and the information on the Primary Flight Display (PFD) and critical engine thrust display is not impacted. The crew never loses guidance information (heading and track on the PFD compass rose) and the autopilot and autothrottle remain engaged.

Boeing and Delta 737 Fleet Team Management have conducted safety risk assessments and have concluded that there is no hazard to continued safe flight and landing in this condition. A future software modification scheduled for release later this year will provide a fix for this issue.

QCQ Training Update - Arming VNAV for Takeoff

The recent QCQ training module described arming VNAV for takeoff with FMS U12.0. After an extensive review, Fleet Management has decided not to use the VNAV takeoff function with FMS U12.0.

CAUTION: Flight crews are not authorized to arm VNAV prior to takeoff.

Summary

Volume 1 and Volume 2 will be updated during a future revision.

Approved By:

Rich Kaynor	Mike Spicuzza	Michael Mannino
737 Fleet Captain	737 Chief Line Check Pilot	737 Technical Manager