
Subject: Cold Weather Altimeter Corrections

Introduction

Barometric altimeters are calibrated to indicate true altitude under ISA conditions. With ambient temperature higher than ISA, true altitude is higher than indicated altitude. When the temperature is colder than ISA, true altitude is lower than indicated. In very cold conditions, this altimeter error is significant, resulting in decreased obstacle clearance. Delta's Airway Manual, SUP-4WX.3.3, is the source document for cold weather altimeter corrections. The intent of this bulletin is to provide additional information for applying these procedures to the A319/320.

Delta, in collaboration with the FAA, has developed procedures to apply cold weather altimeter corrections at specific airports in our route system. These airports are identified by Special Page (10-7) guidance. Depending on terrain, cold weather corrections may be required (per the Special Pages) on one or more of the following approach segments:

- From the MSA down to and including the FAF
- From below the FAF down to and including the MDA/DA
- During the missed approach

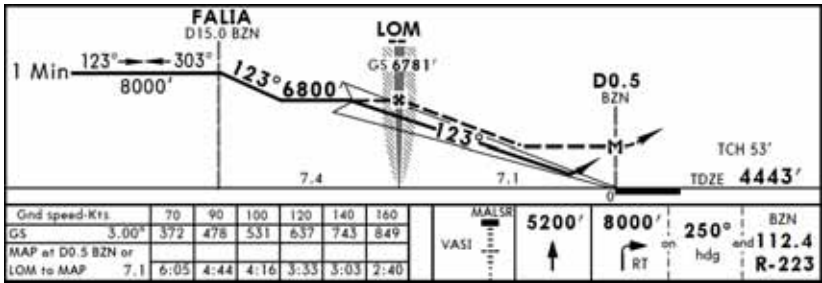
Airbus Limitations

The Airbus FMS includes two design requirements that limit how cold weather corrections can be applied. These are:

Final Approach Segment Angle: A database approach angle (e.g. -3.0°) defines the Final Approach Segment. This database angle safeguards the integrity of the approach by ensuring the aircraft flies the same profile each time. Because of this requirement, it's not permitted to modify altitudes in the FMS F-PLN in the Final Approach Segment. As shown in this FMS example, the Final Approach Segment begins at YUSGU, as this is the first point connected to the runway by the descent angle. Therefore, constraints at YUSGU and SOSUE may not be modified in the FMS F-PLN, while constraints prior to these points (i.e. WOMRU and any prior) may.

	TIME	SPD/ALT
WOMRU	----	---/+8700
C187°		3
YUSGU	----	---/+8000
C187° TRK 187°		-3.0°
SOSUE	----	---/+7480
C187°		3 -3.0°
KJAC19	----	---/ 6450

Note: The Final Approach Segment for most approaches connects two waypoints and the runway. In some cases (like the previous KJAC example) the start of the Final Approach Segment coincides with the FAF. However, in others (KBZN ILS 12 shown below) it extends to the point prior to the FAF (FALIA). This is not readily apparent by looking at the Jeppesen chart, so pilots must use the FMS F-PLN descent angle to identify where the Final Approach Segment begins.



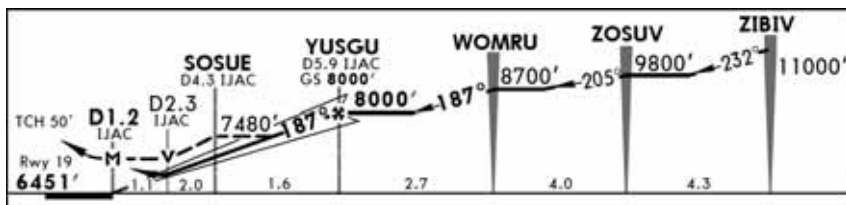
FINAL APP Capture Zone: For all APPR NAV approaches (RNAV (GPS), RNAV (RNP), VOR, and NDB), FMS vertical tolerance for capturing FINAL is +/- 150 ft. If an altitude outside the Final Approach Segment is modified by more than 150 ft., FINAL will not capture and another form of descent (i.e. DES) is required.

Because of these two limitations, APPR NAV (all RNAV, VOR, or NDB) approaches are **not authorized** when altimeter corrections are required, **unless** visual conditions are expected from the last corrected altitude or the FAF, whichever is higher.

ILS Approach Cold Weather Corrections

Use the KJAC ILS Z 19 as an example with an ATIS reported temperature of -35°C (Ref. KJAC 11-1, 10-7F, and 10-7G charts). Per the Special Page charts, each of the three segments of the approach require corrections for temperatures -26°C/-15°F and colder.

The MSA for KJAC is 15,000 to the north of the airport. Therefore, when flying from TOCUD, the minimum altitudes of 14,700 (WATBU), 12,900 (DNW), and 11,000 (ZIBIV) require correction. Using the 10-7F chart with a temperature of -35°C yields corrected altitudes of 16,800, 14,600, and 12,200 respectively. The pilot enters these altitudes to overwrite the F-PLN constraints at the respective fixes.



Going next to the profile view (shown), the altitudes at ZOSUV (9,800) and WOMRU (8,700) are modified to 10,700 and 9,300 respectively.

However, the next fix (YUSGU) begins the Final Approach Segment and cannot be modified in the FMS. The crew has two options; either descend from WOMRU to the FCU corrected altitude (i.e. 8,000 corrected to 8,400 per the 10-7G chart) or simply intercept the GS at the last FMS corrected altitude of 9,300.

The approach minimum is corrected by adding the 10-7G charted value of 360 ft. to the published DA (6651). This corrected value (7011) is entered in the BARO field of the PERF approach page.

The missed approach altitude is adjusted from 14,000 to 15,900 per the 10-7G chart and this value set in the FCU after GS capture.

LOC & FPA Approach Corrections

Cold weather corrections for a localizer approach are similar to an ILS. For a LOC approach, use FMS corrections and managed DES to the fix prior to the Final Approach Segment (WOMRU in this example). Then descend to the corrected FCU altitude at the FAF, followed by an FPA descent to the adjusted BARO minimum. The corrected missed approach altitude is set in the FCU no later than 1,000 feet AGL.

APPR NAV (RNAV [GPS or RNP], VOR, or NDB) Corrections

FMS F-PLN altitude corrections are not permitted on the Final Approach Segment and FCU altitude corrections could exceed the FINAL capture tolerance. Therefore, these approaches are **not authorized** except when visual conditions are expected from the last corrected altitude or the FAF, whichever is higher.

Using the KTVC RNAV (GPS) 28 and 10-7B page as an example, corrections are required from "below the FAF down to approach MINIMUMS". Therefore, the approach is not authorized when the temperature is -14°C or below, unless visual conditions are expected from the FAF.

Cold Weather Approach Procedure

All Approaches

- Use the FMS F-PLN descent angle to identify the Final Approach Segment. Corrections to F-PLN constraints in this segment are not authorized.
- Apply corrections to points prior to the Final Approach Segment when required per Special Page guidance.
- Correct BARO minimum when required. When circling, add the "minimums" correction to the published circling MDA or 1,000 feet AFE, whichever is higher.
- Determine missed approach altitude correction when required.

ILS Mode (ILS and LDA with GS)

- Join glideslope from either the last corrected FMS F-PLN altitude or the corrected FCU altitude.
- Set corrected FCU missed approach altitude after GS capture.

LOC & FPA Mode (ILS [GS out], LOC, LDA w/o GS)

- Descend to the corrected FCU FAF altitude.
- Initiate FPA descent from the corrected FCU altitude.
- Set corrected FCU missed approach altitude no later than 1,000 AGL.

APPR NAV Mode (all RNAV, VOR, or NDB):

FMS F-PLN altitude corrections are not permitted in the Final Approach Segment. Therefore, these approaches are **not authorized** unless visual conditions are expected from the last corrected altitude or the FAF, whichever is higher.

Summary

Airport specific cold weather correction tables simplify procedures and limit corrections to airports where terrain is a concern. Pilots should look for Special Page cold weather guidance and apply the procedures contained in this bulletin when directed to do so. Information in this bulletin supersedes previous guidance and will be incorporated into Vol. 1, NOI in a future revision.

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