



U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave
Washington, DC 20591

DEC 04 2018

Captain Mark Bradley
Chairman
Performance Based Operations
Aviation Rulemaking Committee (PARC)
Delta Airlines
1030 Delta Boulevard
Atlanta, GA 30354-1989

Dear Captain Bradley:

Thank you and the PARC for your Recommendation for Maximum Design Bank Angle and your Recommendation for Intermediate Segment Length.

Based on the study by the PARC, we will revise Federal Aviation Administration (FAA) Order 8260.58, United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design, to authorize use of a maximum bank angle of 25.49 degrees for Radius-to-Fix turn construction including legs based on Required Navigation Performance (RNP) values of less than RNP 1. We will also allow an exception to the 15 Nautical Mile maximum intermediate segment length as recommended. See the enclosed action plans for further explanation of the proposed revisions.

The Flight Technologies and Procedures Division will work in cooperation with the FAA's Air Traffic Organization to integrate these revised standards into Instrument Flight Procedure development software and procedure amendment policies.

If you have any questions, please contact Mark Steinbicker, Manager, Flight Technologies and Procedures Division, at (202) 267-8790.

Sincerely,

Ali Bahrami
Associate Administrator for Aviation Safety

Maximum Design Bank Angle AVS Action Plan

Recommendation: Amend the procedure design criteria in Order 8260.58A regarding maximum bank angles and remove the breakpoint for RF leg design at RNP 1. Set the new, maximum bank angle for RF legs to 25 degrees for all RNP values, including RNP values less than RNP 1.0 (RNP<1.0).

Discussion: Full analysis and reasoning behind the recommendation is contained in the MITRE paper “Analysis of Radius-to-Fix (RF) Bank Angle Margin Requirements”, Cramer/Herndon/Sprong, April 2009, MP090076.

Reference DO-236C, Paragraph 2.6 Lateral Control Performance for the control authority requirement of 30 degrees for future systems.

Reference AC20-138D, Appendix 7-1c for the bank limit tested to in the RF demonstration for approval to use RF.

Task 1: Update guidance in Order 8260.58A

Responsible Office(s)	Expected Completion Date
AFS-420	Tentative: 8/31/2019

Proposed: Update guidance in Order 8260.58A to authorize a maximum design bank angle for RF legs of 25 degrees for all RNP values.

Intermediate Segment Length Increase AVS Action Plan

Recommendation: The Navigation Working Group (Nav WG) recommends that 8260.58A take exception to the sentence related to intermediate segment length in 8260.3C, Section 2-5-3, item (b) (1). 8260.58A should be changed to add the following text:

1. “The intermediate segment length may not be greater than 15 NM unless the nominal track of the entire segment is within 15 NM of the airport reference point. If the intermediate segment requires a stepdown fix, increase the segment Required Obstacle Clearance (ROC) for the segment preceding (as flown) the stepdown fix by 5’ per tenth of a track mile between the stepdown fix and the final approach fix. The maximum distance from the stepdown fix to the final approach fix is 15 NM.”

Discussion: Working Group discussion focused on why the requirement might have been limited to a total segment length of 15 NM. Since the standard ROC for the intermediate is 500’, it appears that the segment length limit was a way to limit the errors in barometric altitude that could result from the aircraft being an excessive distance from the altimetry source. In cases where a remote altimetry source is used, the intermediate segment ROC is increased from 500’ by an amount governed by distance between the source and the procedure airport, as well as by an amount that reflects the elevation difference. The group concluded that the segment length was an attempt to limit the distance from the airport where the airplane is only protected by the 500’ ROC. The revision to the requirement that the WG is recommending solves this problem while simultaneously allowing the segment to have a total length more than 15 NM where needed, as long as the entire path is within 15 NM of the airport. Further, to limit exposure to the smaller 500’ ROC when a stepdown fix is employed inside the intermediate segment, the recommendation employs an additive to the segment ROC prior to the stepdown that depends on distance from (elevation above) the final approach fix.

Task 1: Update guidance in Order 8260.58A

Responsible Office(s)	Expected Completion Date
AFS-420	Tentative: 8/31/2019

Proposed: Update guidance in Order 8260.58A to authorize an intermediate segment to be longer than 15NM provided the segment remains within 15NM of the ARP and to applies a 5’ per 0.1NM additive for stepdown fixes.