February 4, 2019

Mr. Ali Bahrami
Associate Administrator for Aviation Safety
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

Dear Ali,

The Performance Based Operations Aviation Rulemaking Committee (PARC) is pleased to submit the following recommendation for your consideration. The PARC Navigation Working Group (NAV WG) recently completed an analysis to further harmonize the obstacle clearance surface (OCS) of an RNAV RNP (AR) approach and an RNAV approach with LNAV/VNAV minima. It was the working group's determination that this harmonization would lower the minima of most RNP (AR) procedures throughout the NAS while maintaining the current safety levels.

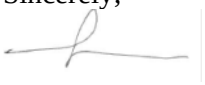
The following recommendation was approved by the PARC Steering Group (SG):

The PARC Nav WG recommends that FAA harmonize the RNP AR procedure design criteria's vertical OCS and the height loss assumptions with the current RNP APCH LNAV/VNAV Missed Approach Segment (MAS) design criteria by applying the height loss criteria for an LNAV/VNAV line of minima to the missed approach transition in an RNP AR procedure design.

Further details are delineated in the recommendation on the following pages.

The PARC appreciates your continued support of our activities and I personally commend the many participants across all lines of business who address a multitude issues, both technical and conceptual to foster progress of NextGen. The PARC also respectfully requests the FAA to provide us with a formal response to these recommendations. Please call me if you have any questions or would like to set up a discussion.

Sincerely,



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Background

In 2005, FAA and industry developed today's RNP AR APCH procedure design criteria in published in 8260.58A. The objective of the design criteria public RNP AR APCH Instrument Flight Procedures (IFP) down to a decision altitude (DA) with an HAT of 250'. However, applying the RNP AR approach procedure design criteria in real world conditions, often does not result in procedures with an RNP of 0.3 that can reach a DA with minimum HAT of 250'. The HAT for most of today's RNP AR approach procedures is often greater than 300'. At locations in the NAS with both an RNP APCH with an LNAV/VNAV line of minima and RNP AR approach to the same runway end, 68% of the RNP AR approaches have higher mins and HATs than the mins and HATs for the RNP APCH LNAV/VNAV line of minima. The root cause of high DAs and HATs for these RNP AR procedures is the criteria applied to the transition from the final approach segment (FAS) to the missed approach procedure (MAP). FAA's RNP AR approach criteria uses a height loss projecting a continuation of the sloping FAS VEB OCS beyond DA. This technique forces the resulting RNP 0.3 OCS below the ground between DA and LTP (see Figure 2). Since the criteria also prohibits penetrations of the OCS, the procedure designer must raise the DA to keep the OCS clear. In contrast, the FAA's criteria for an RNP APCH with an LNAV/VNAV line of minima does not project the OCS beyond the DA. Likewise, FAA RNP AR APCH criteria is not in harmony with the ICAO RNP AR APCH procedure design criteria in Document 9905, where the criteria uses a tabular height loss model for the transition between the FAS and MAP and does not project the OCS beyond the DA.

Figure 1.

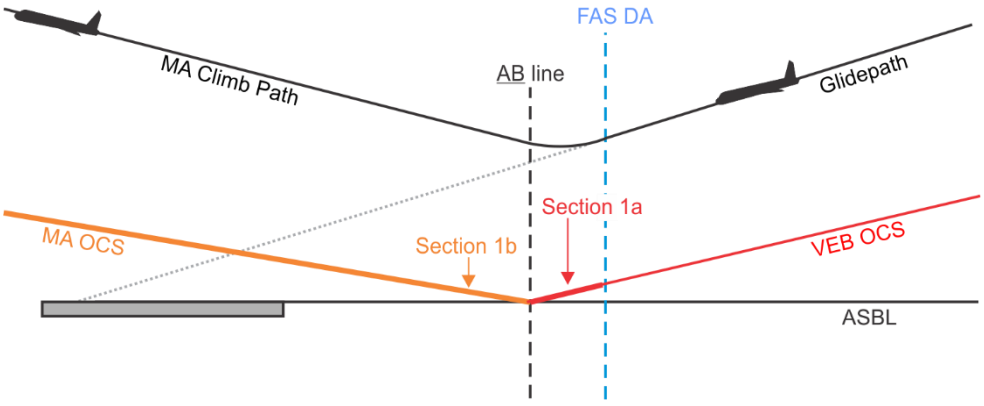


Figure 1 is an example where the RNP AR procedure design criteria limits construction where Section 1a sloping surface intersects the ground. The intent of the downward slope of Section 1a of the OCS beyond DA is to protect for a 50' height loss by the aircraft when the flight crew initiates a go-around at DA to begin the missed approach.

Figure 2.

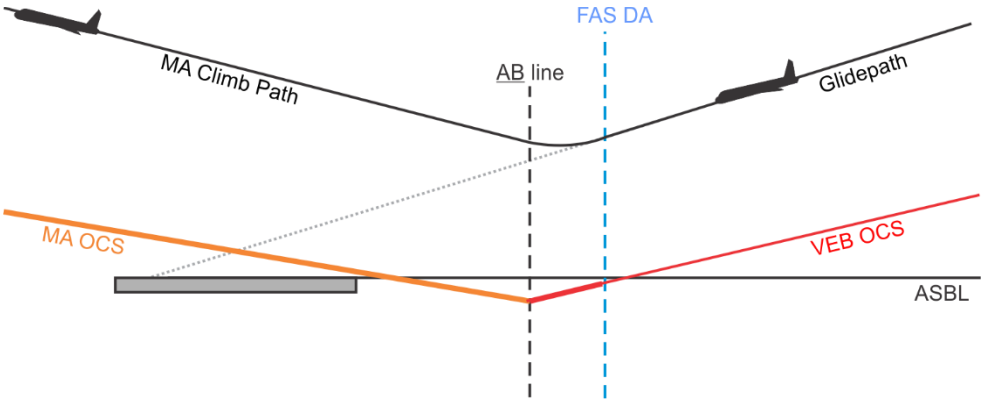


Figure 2 shows the existing surfaces with a HAT of 250'. The RNP AR vertical error budget's (VEB) OCS extends below the ASBL. Since the criteria prohibits a penetration of the OCS, the procedure designer using existing criteria must raise the DA so that the MAS OCS does not have a penetration.

Figure 3.

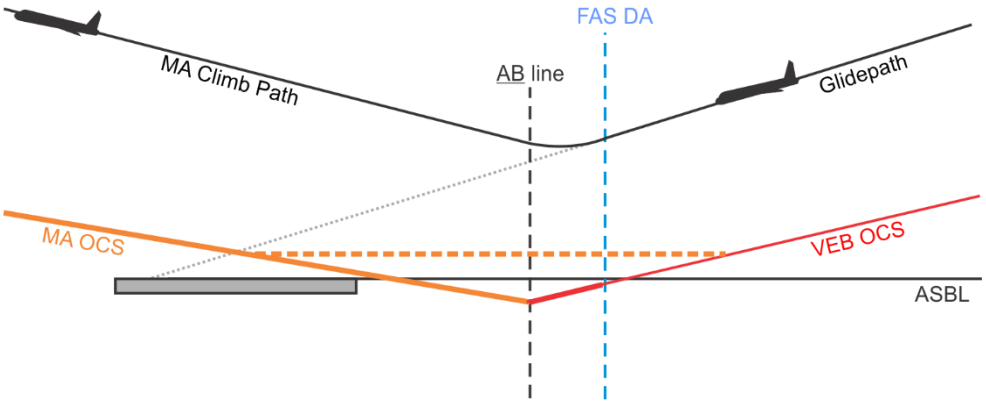


Figure 3 illustrates the PARC Nav WG proposal to amend the vertical OCS and protect the aircraft's height loss through use of our current OCS procedure design criteria for an RNP APCH (*i.e*. an approach titled "RNAV (GPS)") and the LNAV/VNAV line of minima. The dashed orange line connecting the VEB OCS to the MA OCS is an application of the required obstacle clearance (ROC) from 8260.58A Table 3-3-2, and this criterion is in harmony with the LNAV/VNAV methodology and the RNP AR procedure design criteria in ICAO Doc 9905.

Table 3-3-2. Level OCS ROC by Approach Category

Aircraft Category	ROC
A	131
B	142
C	150
D/E	161

Recommendation

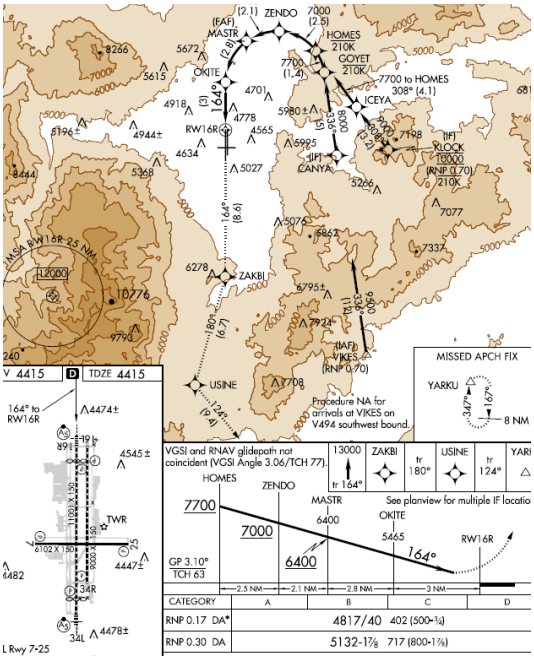
The PARC Nav WG recommends that FAA harmonize the RNP AR procedure design criteria's vertical OCS and the height loss assumptions with the current RNP APCH LNAV/VNAV MAS design criteria by applying the height loss criteria for an LNAV/VNAV line of minima to the missed approach transition in an RNP AR procedure design.

Motivation for Change

The motivation for this change is to achieve the 250' HAT the U.S. intended through implementation of RNP AR APCH procedures. If the FAA accepts this recommendation, new and amended RNP AR APCH procedures will achieve lower minimums at virtually all locations throughout the NAS.

Example locations

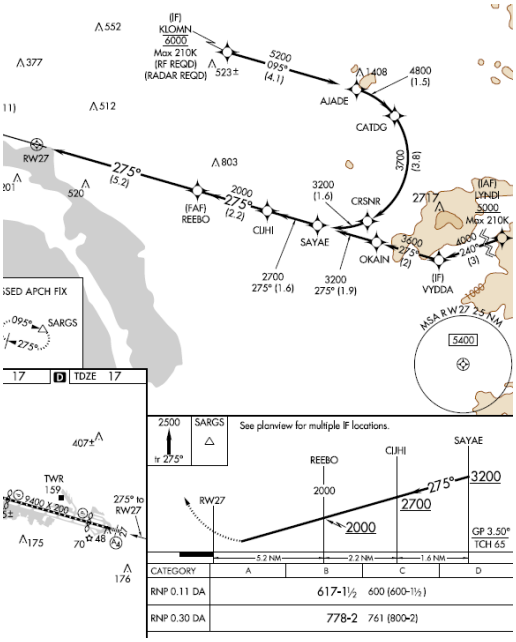
Reno RNP RWY 16R



February 4, 2019

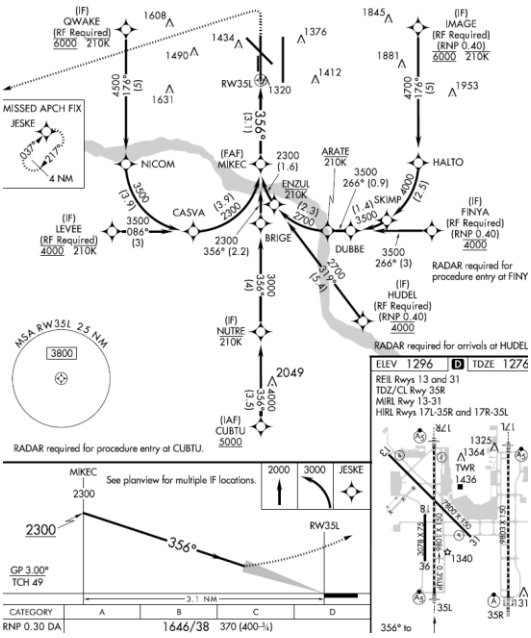
Reno RNP RWY 16R has a MAS 1b controlling obstacle of a 4507’ terrain point within today’s level OCS segment. This terrain would not push the HAT above 250’ if the procedure designer applies the height loss protection of this proposal.

San Diego RNP RWY 27



San Diego RNP RWY 27 has a MAS 1b controlling obstacle of a 309’ (a pole) within the proposed level OCS segment. With application of the proposed new RNP AR criteria, the procedure designer can reduce the HAT for the RNP 0.11 line of minima from 617’ to 453’.

Oklahoma City RNP RWY 35



February 4, 2019

Oklahoma City RNP RWY 35 has a tree as a controlling obstacle at 1349’ MSL, and the tree is within the level OCS segment. With application of the proposed criteria, the procedure design can reduce the HAT from 370’ to 261’.

Summary

Harmonizing the RNP AR height loss protection with LNAV/VNAV and ICAO Doc 9905 will enable some RNP AR APCH procedures to achieve the goal of a 250’ HAT. This recommendation will benefit the NAS by allowing procedure designer to amend existing RNP AR procedures with lower DAs and HATs, and it will allow them to create new RNP AR APCH procedures with a realistic possibility of achieving a 250’ HAT.