

December 8 , 2006

Mr. Nicholas Sabatini
Associate Administrator for Aviation Safety
Federal Aviation Administration
800 Independence Avenue
Washington, DC 20591

Dear Nick:

The Performance Based Aviation Rulemaking Committee is pleased to forward to you its recommendations, suggestions, and issues requiring additional work related to performance-based flight operations where decision altitudes might be authorized along turning flight paths within the final approach segment. These recommendations, suggestions, and issues are detailed in the attachment and fall into four areas:

- Procedure Design and Development
- Lighting Systems, Minima and Vision
- Aircraft System Functionality
- Simulation, Training and Standards

It is expected that the FAA may require additional information and coordination with the PARC Final Approach Segment Decision Altitude working group members when action is taken on the recommendations and suggestions.

Lastly, I feel that it's appropriate to acknowledge the efforts of Ted Demosthenes in leading this effort and the working group in producing results on this complex topic.

Sincerely,

A handwritten signature in black ink, appearing to read "Dave Nakamura". The signature is fluid and cursive, with a long horizontal stroke at the end.

Dave Nakamura
Chairman, PARC

Cc: J. McGraw
J. Williams
T. Demosthenes

PARC/FASDAWG Suggestions and Recommendations

General:

The Performance-based Aviation Rulemaking Committee respectively submits the following suggestions and recommendations to the FAA for consideration in the implementation of operations designed with a decision altitude placed in the turning portion of the final approach segment.

Procedure Design and Development:

Identify existing operational capabilities that can support near-term RNAV goals:

Location of a DA in a turn should be limited to RNP SAAAR operations. The PARC further recommends “Basic” (non-SAAAR or “SAAAR Lite”) RNP approach operations NOT be authorized to include DA in a turn, regardless of the form of turn specified.

Procedure operational concepts and “flyability”:

The PARC strongly suggested that concepts and flyability be assessed and evaluated by operator/proponent and regulator early in the development and operational flight-testing of proposed procedures. Additionally, appropriate consideration should be given to missed approach operations that will be initiated, and performed, while turning.

Maximum angular offset from the runway centerline that a DA could be located:

DA location may be offset from runway centerline up to a maximum of 30 degrees.

Maximum angular difference between track at DA and FAS track to runway:

With the angular offset limit of 30 degrees, track angles between the path at the DA and the centerline of runway be limited to a maximum of 90 degrees.

Das at offset angles greater than 30 degrees and track angles greater than 90 degrees:

PARC will consider authorization of an Action Team or Work Group to address operations that may include offset angles greater than 30 degrees and track angles greater than 90 degrees. Examples might be RNP path replacements for RNAV Transitions and circling procedures.

Maximum allowable procedure design bank angle at the DA:

Bank angle limitations currently defined in 8260.52 are considered adequate. Order 8260.52 may need amendment to include any additional guidance deemed necessary.

Maximum allowable glide path angle associated with a DA located in a turn:

Glide path limitations currently defined in 8260.52 are considered adequate. Order 8260.52 should be amended to include any additional guidance deemed necessary.

Validity of Glideslope Qualification Surface (GQS) in the design of turning FAS:

PARC suggests that Flight Standards review the applicability of the current GQS for turning FAS.

Maximum and Minimum speeds and charting of speed:

Maximum speeds will be as defined by 8260.52(as amended). PARC also recommends adequate information regarding any procedure speed restrictions be provided to operators and flight crews.

Minimum rollout altitude for a turn (after passing DA):

Current 8260.52 criteria should be used. Considerations such as aircraft size, speed, path limit cases, weather, use of HAT, HATh, or AGL, stabilized approach definitions, and the length of the final straight

portion of the FAS, must be addressed before determination of the minimum rollout altitude in the visual segment.

Lighting Systems, Minima, and Vision:

Approach Light Systems (ALS):

Visibility credit for ALS be granted only when the DA is located within the operational service volume of the installed ALS and the DA is located within a 30 degrees of (current maximum Operational Service Volume, if authorized) the runway centerline in order to allow application of visibility credit. In summary, light credit would be authorized only if DA is located:

- Within the TERPS service volume, or
- Within the DEMONSTRATED service volume, but,
- No credit will be allowed where the DA is located more than 30 degree offset (this may be revisited after further research and development or the validation of other path-type procedures).

VASI/PAPI installation and placement supporting the DA:

Offset VASI/PAPI will not be required.

Requirements and/or visibility credit for Lead-In Lights:

LDIN Lights will not be required and no credit will be allowed.

NOTE: Where LDIN lights are currently installed, it is recommended that, to preclude path ambiguities for the crew, the defined lateral RNAV path reasonably follow the lead-in light path. It has been suggested that the reasonable lateral difference between the defined path and the LDIN light path be no more than ± 100 meters.

Minima development and criteria:

Minima development and criteria should be based on, but not limited to, required instruments and displays, operational concepts, missed approach methods, aircraft systems capabilities, and operational authorizations.

Flight Deck Vision Requirements:

The applicant must demonstrate that at the procedure design limit (roll & pitch) each pilot must be able, from the DA, to have an unobstructed view of the visual references (approach lights & runway) as cited in 91.175. Specifically, at the DA location and given the worst-case aircraft heading, procedure design maximum bank angle (as proposed, plus 5 degrees for overshoot and turbulence), and vertical path, the aircraft structure should allow the crew an unobstructed view of the required visual references. These requirements must be considered for the specific procedure. (The windscreen posts would not be part of this assessment, as they are considered transitory and limited in their obstruction).

Spatial disorientation issues:

Initial applications for DA in a turn operations should be evaluated by operationally experienced Human Factors experts for spatial disorientation problems using simulation and in-flight testing.

Aircraft System Functionality:

Flight guidance system operational concept: For these RNP-based operations, the pilot will be expected to follow the defined and displayed lateral and vertical RNAV path to the runway threshold and during missed approaches, go-arounds, or rejected/balked landings. In summary:

- RNP (RNAV) path guidance must be available and utilized throughout an RNP SAAAR IAP and,
- The aircraft should remain in LNAV (TOGA to LNAV) during the initiation and execution of the missed approach, go around, non-normal, or rejected landing.

Autopilot, F/D, and HUD usage above DA:

As currently authorized. The PARC also suggests that operators and authorities give appropriate

consideration to operational problems associated with ATC or pilot specified high airspeeds in the intermediate segment and how speeds may affect the aircraft's ability to transition to the FAS.

Autopilot, F/D, and HUD usage below DA:

Flight Standards should authorize the use of these "tools" and others below the DA, to the maximum extent possible, for operations on all final approach segments. Rulemaking changes to Part 25.1329, and proposals for 121.579, 135.93, and others, may be required. The WG believes the JAA/FAA Flight Guidance Systems Harmonization Working Group's draft revisions to these Parts/Paragraphs provide the basis for appropriate, well considered, and harmonized changes to the current rules.

Flight guidance system capabilities during the turning portion of the FAS:

Flight guidance systems must meet the intent of AC 90-101 to provide lateral navigation ("TOGA to (in) LNAV") capability during a missed approach initiated during a turn.

Minimum equipment/displays required:

A navigation display (ND), with appropriate range capabilities and deviation information, and a primary flight display (PFD) with displays of lateral and vertical deviation information on the as described in AC 90-101, be required for operations with a DA in a turn. Minima proposed may be close to those authorized for Cat I ILS operations. For similar minima, requirements for equipment, instruments, and displays should be similar, if not identical, to those currently in effect.

Simulation, Training, and Standards:

Stabilized approach criteria and definitions:

PARC, in order to ensure appropriate and comprehensive clarity and guidance, will task an Action Team to review appropriate documents (Order 8400.10, AC 120-71, PANS-OPS, and JAR-Ops), and provide recommendations for revision, if any.

Simulator compatibility and capability:

The applicant and Flight Standards must ensure that the simulator provides adequate visual replication and valid functional capability for the procedure to be flown.

Training and simulation requirements and guidelines:

The ground school curriculum, number of approaches required during training, and the types of weather to be used, are to be determined by Flight Standards. PARC also recommends that appropriate credit be considered and authorized for current RNAV approach training.

Operator's flight standards and checking requirements:

Operations to runways served by IAPs utilizing a DA positioned in an RF turn should require runway specific training and qualification.