

GOVERNMENT/INDUSTRY AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
(Transcribed/Re-Formatted)
HISTORY RECORD

FAA Control # 93-01-119

SUBJECT: Obstacle Collision Risk Definition for GPS Terminal Instrument Procedures

BACKGROUND/DISCUSSION: The VOR system was evaluated in the early 1960's to determine system accuracy assumptions to both 95% and 99% statistical confidence levels. Such analyses need to be accomplished in a scientific manner for pending GPS instrument approach and departure criteria. The VOR system accuracy values were used to describe the widths of VOR IAP final approach segments at the limits permitted by criteria. Most procedures do not use the most critical trapezoid permitted by criteria, thus an undefined greater protection from lateral collision from some obstacles exists in some procedures. Further protection is provided by the facility siting limitations, thus the opportunities for massive terrain structures to abut the edges of procedural airspace are seldom realized.

Because GPS is a linear system, its errors will be generally constant. In fact, its errors will not be limiting, rather it will be the other components of flight technical which will limit. The flexibility of GPS will permit many more opportunities for procedural airspace to abut significant terrain masses. Thus, all segments of GPS terminal procedures must contain a scientifically assured low risk of lateral collision with obstacles. The risk level should be the same as that enjoyed on an ILS systems final approach segment where masses about the protected airspace.

Finally, the present assumptions in TERPS that terminal procedures should funnel and splay on approach and missed approaches within reasonable distances should be logically retained in GPS criteria. Procedure turn and holding pattern protected airspace should receive no credits for GPS, as such airspace protects primarily for dead reckoning, large turning maneuvers.

The first order of business should be to design and evaluate the low altitude GPS en route segment.

RECOMMENDATION : Objective, scientifically valid studies, including comprehensive simulator studies, should be undertaken to formulate and validate GPS terminal and low altitude en route criteria. Wind and turbulence conditions representing both bad and worst case operational conditions should be randomly introduced on a comprehensive basis. Computer simulations, if properly designed and controlled, could contribute significantly to this process. These comprehensive studies should be conducted for both public and special GPS terminal instrument procedures criteria, and for both FMS and non-FMS aircraft.

COMMENT: This recommendation affects the United States Standard for Terminal Instrument Procedures (TERPS), FAA Handbook 8260.3B, and related directives.

Submitted by: Charles K. Guy
June 3, 1993
AIR LINE PILOTS ASSOCIATION

INITIAL DISCUSSION (MEETING 93-01): Unavailable

MEETING 94-01: (From Frank Parr, AVN-210 notes) ALPA requests that studies be made on GPS accuracy. Frank advises they already are. Copies were sent to various groups, including (we believe) ALPA. NBAA will send copies of the T-39 tests ASAP, and these were mailed on February 3 to those requesting (Tom Young, ALPA and Danny McClain, AFFSA). **Action:** Item Open (NBAA)

MEETING 94-02: ALPA withdrew this item subject to future interest. **Status:** Item Closed (withdrawn)