GOVERNMENT/INDUSTRY AERONAUTICAL CHARTING FORUM
Instrument Procedures Subgroup
November 28-29, 2000
HISTORY RECORD

FAA Control # 00-02-231

SUBJECT: Missed Approach Climb Rate – Presented as a Discussion Item Only

BACKGROUND: The signatories of TERPS (U.S. Army, U.S. Navy, U.S. Air Force, and the FAA) meet every six months to discuss, review, propose, and approve changes to TERPS and TERPS related documents. This group is known as the TERPS Working Group (TWG). Discussion in the last meeting (Aug 2-3, 2000) touched on the concept of using departure criteria in the missed approach segment.

DISCUSSION: The TWG discussion centered on the recent change in the Aeronautical Information Manual (AIM) paragraph 5-4-19, Missed Approach. Subparagraph b. states "*A climb of at least 200 feet per nautical mile is required, unless a higher climb gradient is published on the approach chart*." Some members of the TWG contend that a 152 feet per NM climb is required. The FAA position is that 200 feet per NM is required. After the initial edition of approach construction criteria was issued, a meeting was held February 8-11, 1966 with Mr. Red Callaway, Mr. Bob Newhouse, and Mr. Shea to ascertain basis of some of the criteria. The question of what climb gradient supported the missed approach surface was asked. The minutes of the meeting indicate the answer was 200 feet per NM. (see attached sheet) Additionally, the 200 feet per NM climb is based on the nonprecision missed approach segment. The missed approach segment must deliver the aircraft to a clearance limit at an altitude sufficient for holding or en route flight. Holding and en route flight requires a minimum ROC value of 1,000 feet. The missed approach trapezoid expands to initial segment width over 15 NM. From that point, holding could be entered, the approach repeated (if the clearance limit was an IAF or feeder fix, or en route flight commenced at an airway fix. In order to achieve 1,000 feet of ROC at the point the trapezoid reaches initial segment width, a climb of 200 feet per NM is required if the final segment ROC was 250 feet (worse case).

RECOMMENDATION/STATUS: This document serves to inform the ACF Instrument Procedures Subgroup of the basis for the climb requirement established for missed approach procedures. It has been widely misunderstood for several years what aircraft climb requirements are in this phase of flight in order to attain sufficient ROC at the 15-mile point for further operations. The TWG recommends the ACF be informed of the basis of missed approach climb gradient criteria, and to discuss the issue as necessary to reaffirm the 200 feet per NM requirement is acknowledged by the flying community.

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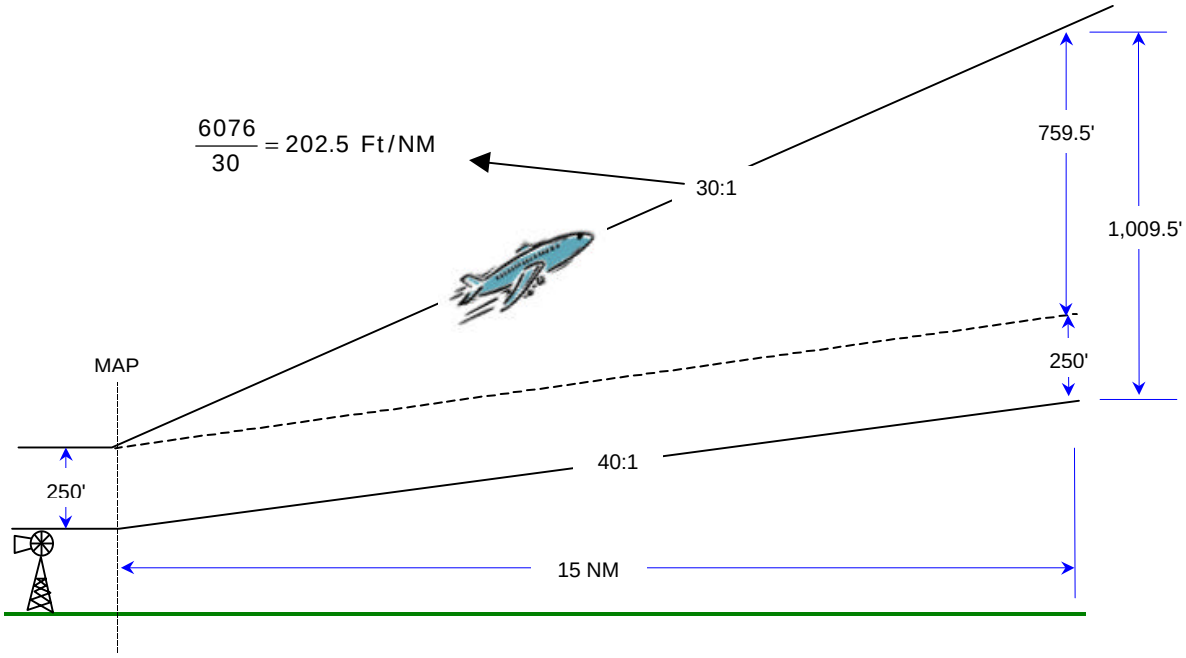
Quote from minutes of **'Well,.'** Discussion: "…we assumed a climb gradient of 30:1 based on pilot habit and air carrier inspector observations. The difference between this 30:1 and a 40:1 missed approach surface becomes 1000 feet at 15 miles when you assume a beginning difference of 250 feet. The flare of the missed approach area results from a symmetrical joining of the final approach area and the en route area dimensions."

$$\frac{15 \times 6076}{30} = 3{,}038 \quad \text{Rise of } 30:1 \text{ surface over 15 NM}$$

$$\frac{15 \times 6076}{40} = 2{,}278.5 \quad \text{Rise of } 40:1 \text{ surface over 15 NM}$$

$$3{,}038 - 2{,}278.5 = 759.5 \quad \text{Increased separation between surfaces}$$

$$759.5 + 250 = 1{,}009.5 \quad \text{Final ROC + increase over 15 NM}$$



<u>INITIAL DISCUSSION (Meeting 00-02)</u>: Dave Eckles, AFS-420, presented this issue as a discussion only item. The FAA position, presented at the TWG, that missed approaches also require a minimum climb gradient of 200 Ft/NM faced opposition by both the AFFSA and ALPA representatives. Tom Schneider, AFFSA, stated that the USAF position has always been that a 152 Ft/NM climb gradient is sufficient to provide missed approach (MAPCH) obstacle clearance. He went on to state that this position is supported by PANS-OPS, which only requires a 2.5% climb (152 Ft/NM) for the MAPCH segment. Tom requested that the FAA address the need for a 200Ft/NM MAPCH climb gradient at the ICAO Obstacle Clearance Panel (OCP) and a resulting change to PANS-OPS criteria. Wally Roberts, ALPA, added that his organization was concerned that the 200 Ft/NM premise may lead to a proliferation of missed approach procedures that contain published climb gradients, but are not 40:1 clear. He recommended that this issue be discussed in a public venue with representation by performance engineers from major carriers. Wally also suggested the AIM language be revised to state that a climb of at least 200 Ft/NM is "expected" vice "required". Dave noted that TERPS criteria fall under the purview of the TWG and that publication is expected in TERPS Change 20, which will provide all interested parties the opportunity to formally comment on the position/criteria. Dave agreed to have AFS-420 take the issue for clarification. <u>ACTION</u>: AFS-420.

MEETING 01-01: Bill Hammett, AFS-420 (ISI), presented a status update paper prepared by Jack Corman, AFS-420 and briefed the results of the Feb 7-8 TWG discussion. At the last TWG meeting, there was extensive discussion on missed approach obstruction clearance. All TERPS signatories are now in agreement that a standard 200 ft/NM missed approach climb gradient is a basic premise of TERPS obstruction clearance for both departures and missed approaches. The TWG also noted that TERPs does not explain various ROC concepts. To satisfy this omission, the TWG unanimously voted to add a ROC explanation/clarification to Chapter 2 of TERPS to be included in TERPS Change 19. Bill provided an informational copy of the TERPS change to all attendees requesting that any comments be forwarded to Jack Corman at jack_e_corman @mmacmail.jccbi.gov. This explanation will also be modified/formatted for inclusion in the AIM/AIP. Bill recommended the issue be closed. Wally Roberts, ALPA, noted that aircraft are lighter and climb better on missed approach than departure. Simon Lawrence, ALPA, added that some aircraft do not climb at maximum performance on missed approach; however, 200 Ft/NM should present no problem. The group agreed to close the issue. ACTION: Closed.