

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

FAA Control # 93-01-123

SUBJECT: Symbolic Depiction of Holding Pattern Authorization and Limitations in a Common Manner; Update of Holding Pattern Criteria

BACKGROUND/DISCUSSION: The directive information about holding patterns was compromised with the change effected by GENOT some four years ago. Further, the FIFO's are not always providing for turbojet climbs in holding patterns at mountainous locations.

ALPA has informally submitted to FAA-OKC a comprehensive proposal which would provide uniform and logical information about holding patterns to both pilots and controllers. Our proposal is attached hereto. Further, intertwined in this issue are agenda items about holding presented at last December's forum.

RECOMMENDATION : That the proposals set forth in the attached be adopted by the FAA.

COMMENT: This recommendation affects the US TERPS, FAA handbook 8260.19B, FAA Handbook 8260.19C and various FAA directives.

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

ATTACHMENT: ALPA Proposal TO MODIFY CHARTING OF HOLDING PATTERNS AND RELATED DIRECTIVES TO FAA PROCEDURES, AIR TRAFFIC SPECIALISTS AND THE AVIATION COMMUNITY

By Captain Wally Roberts, Friend of ALPA CHIPs Committee

STATEMENT OF PROBLEM: The issue of proper application of holding pattern criteria and procedures for use by both flight crews and air traffic controllers seems presently to be in a general state of confusion. This was exacerbated approximately three years ago by changes to the holding pattern directive information contained in the AIM, which was reflected in incomplete changes to the FAA's holding pattern criteria. When applied to instrument flight procedures, holding patterns are intended primarily to protect aircraft from obstacles below and adjacent to the protected airspace. Additionally, ATC employs holding patterns to separate aircraft and absorb delays. Where obstacles exist laterally to established holding patterns, ATC must not authorize "on the fly" modifications to such patterns.

It appears that the FIFOs, air traffic facilities, and pilots are not in concert with each other over this issue. On the one hand, the FIFOs appear to be still protecting for 310 Knot climbing turbojet operations, but on the other hand, they are not authorizing 310 Knot holding patterns on the official holding pattern document, the Form 8260-2. The ATC manual, FAA Handbook 7110.65G, "Air

Traffic Control," contains somewhat confusing and misleading instructions to controllers about the assignment and modification of holding patterns during non-radar operations. The material in the AIM makes no reference to what type of holding patterns protect for climbs nor is guidance provided as to the climbing speeds provided by criteria.

TECHNICAL BACKGROUND:

The holding pattern criteria are contained in FAA Handbook 7130.3, *"Holding Pattern Criteria."* These are essentially the criteria that evolved about the same time that the TERPS criteria were first implemented into the National Airspace System. These criteria need to be updated to reflect current, more realistic information about winds aloft. (The issue of holding pattern criteria wind assumptions was submitted by ALPA to the FAA during the December 15-17, 1992 FAA Charting TERPS Forum.) Except for these inadequate wind assumptions, the criteria appear to be valid today, both as to procedural airspace dimensions and aircraft speed requirements.

For civil operations, the following are the maximum authorized holding speeds for level and descending flight holding per Figure 1 of Handbook 7130.3:

- (a) Propeller-driven (including turboprop)
 - (1) MHA through 30,000 feet 175K IAS
- (b) Civil turbojet
 - (1) MHA through 14,000 feet 230K IAS
 - (2) Above 14,000 feet 265K IAS

The pattern length is based on either time or DME. Standard time values are one minute from the minimum holding altitude (MHA) through 14,000 feet and 1.5 minutes above 14,000 feet.

Additionally, Paragraph 35 of 7130.3 states that the aforementioned speeds are not adequate for climbing turboprop and turbojet aircraft. The following speeds shall be used for such climbing operations:

- (a) The 230 Knot patterns shall be used for turboprop aircraft in lieu of the 175 Knot patterns.
- (b) The 310 Knot patterns shall be used for turbojet aircraft in lieu of the 230 Knot patterns.

Further, criteria are provided for turbojet level and descending operations during turbulent conditions. These criteria protect for 280K IAS. These turbulent-conditions patterns are intended to form the basis for the providing of 1:500,000 templates for use by ATC during assignment of level/descending non-radar holding to turbojet aircraft during turbulent weather conditions.

Finally, there are criteria contained in 7130.3 for 265 Knot patterns which were intended to provide level and descending flight holding patterns for a host of military tighter aircraft. These templates were adopted in Change 7 of 7130.3 for level and descending turbojet holding above 14,000 feet.

Handbook 7130.3 contains 31 pattern/templates which are used to satisfy five different holding speed categories: 175 Knots, 200-230 Knots, 265 Knots, 280 Knots, and 310 Knots. These pattern/templates are further refined by certain outbound end reduction areas to tailor a pattern to a particular combination of speed and altitude, but with timed holding only outbound-end-area No. 4 reductions have any application where lateral obstacle clearance is being provided by the holding pattern. The outbound-end-area reductions are more flexible where DME holding is designated instead of timed holding.

Approximately three years ago the AIM was amended to change level flight and descending

holding speeds for turbojet aircraft to 230 Knots from the MHA through 14,000 feet and 265 Knots above 14,000 feet. The change to the 265 pattern criteria for level and descending turbojet holding above 14,000 feet represents an improvement which reflects the realities of intermediate and high altitude turbojet level/descending holding operations. Since there already existed in 7130.3 a selection method for 265 Knot pattern/templates, this change could be made with the existing criteria. However, the existing criteria do not support the change to 230 Knots for level/descending turbojet holding below 14,000 feet, because the 200-230 Knot selection method in the criteria assume 210 Knots below 14,000 and above 6,000 feet, and 200 Knots at 6,000 feet and below.

Further, the present AIM directive information fails to inform pilots that criteria supports turboprop climbs at 230 Knots (depending upon altitude) and at 310 Knots for turbojet climbs at all altitudes. These facts are also omitted from ATC Handbook 7110.65G.

RECOMMENDATIONS:

- (1) Published holding patterns should include minimal uniform numerical data which will unambiguously inform both pilots and controllers of the MHA for the pattern and the type of operation supported. This could be accomplished with one of four speed values: "175" "230" "265" or "310." The directive information provided to pilots would be uniform and would define these four speed categories as follows:

175- Pattern valid for all piston holding and turboprop level/descending holding only. No turbojet holding is authorized nor is turboprop climbing.

230 - Pattern valid for all piston, turboprop holding and turbojet level/descending holding, but from the MHA to 14,000.

265- Pattern valid for all piston, turboprop holding and turbojet level/descending holding, from the MHA to any altitude.

310- Pattern is valid for all aircraft operations, level, descending and climbing.

Piston: 175 Knots for all holding operations.

Turboprop: 175 Knots level/descending, 230 Knots climbing.

Turbojet: Level/descending: 265 Knots above 14,000, 230 Knots

14,000 and below. 310 Knots climbing for all altitudes, subject to the provisions of 91.117(a) and (d) where applicable (i.e., 250

Knot limit below 10,000 feet unless a higher speed is required by the aircraft's approved flight manual for existing conditions).

The appropriate one of the four aforementioned speed values would be included in the charted holding pattern oval icon and would appear over the numerical value of the MHA in feet. Example for a 310 pattern with an MHA of 6,000 feet:

310
6000

- (2) Directive material provided to FAA FIFO personnel should be amended to direct the establishment of 310 Knot patterns for all turbojet climbing patterns, including missed approach holding patterns which are intended for turbojet missed approach climbs. Turbojet holding patterns must be established for all terminal procedures which are authorized for use by turbojet aircraft. All en route published holding fixes must provide for turbojet aircraft. Forms 8260-2 for mountainous airports should be reviewed and revised on a priority basis to include completion of the 310 limitation whenever turbojet climb holding operations are authorized. All Forms 8260-2 for non-mountainous locations should be reviewed within a specified and reasonable period of time.

- (3) Form 8260-2s amended in accordance with (2) foregoing should trigger charting of the appropriate speed value and MHA in the holding pattern icon. The aviation community would be informed that this is an evolutionary process and to assume that holding patterns which do not contain the numerical information are authorized for the normal holding speeds for their aircraft and operation, i.e., 175, 230, 265, or 310, as per the new directive information to be contained in the AIM.
- (4) The Handbook 7130.3 pattern selection process for 230 value holding patterns should be increased by a specified number of pattern sizes to accommodate 230 Knot turbojet level/descending holding below 14,000 feet. It appears that the applicable pattern/template selection subset of Handbook 7130.3, 200-230, supports only the former turbojet level/descending holding speeds below 14,000 feet; i.e., 210 Knots below 14,000 and above 6,000 feet, and 200 Knots at 6,000 feet, and below.
- (5) ATC Handbook 7110.65G should be amended to provide directive information to controllers about the purpose of the four speed values. Controllers should be directed as to exactly what templates to use when approving non-radar holding at an unpublished fix. Further, controllers should be directed to not approve or disapprove any modifications to holding pattern sizes and speeds unless holding is being accomplished with radar surveillance and at altitudes above the MVA/MIA. Finally, it should be verified that controllers are presently receiving proper training on the use of 1:500,000 holding pattern templates for non-radar holding at unpublished fixes and for non-radar holding at published fixes where a need is indicated for turbulent pattern holding.
- (6) An analysis should be made of historical wind data obtained from INS aircraft. These data should be used to revise the procedurally protected airspace provided by the various holding pattern templates contained in Handbook 7130.3.

The changes proposed herein will require changes to both instrument procedures implementation directives and cartographic standards. Further, they will require coordination within the FAA between the appropriate Flight Standards and Air Traffic divisions both for uniform implementation and application, as well as modification of the directive information provided to the aviation community. Finally, Handbook 7110.3 needs to be amended to provide revised pattern/templates which reflect present-day wind data and to change the 200-230 Knot subset to reflect 230 Knot level/descending turbojet holding operations below 14,000 feet.

INITIAL DISCUSSION (MEETING 93-01): Unavailable

MEETING 94-01: (From Frank Parr AVN-210 notes) A paper has been written by Wally Roberts, ALPA which has merit. It covers many items in the holding criteria which I have seen as potential areas which could use improvement. I told Wally and Tom I would like to insert these concepts into Gerry's upcoming project and they agreed. I promised to keep them in the loop. NBAA will monitor and report. **Action: Item Open (NBAA and AVN-210)**

MEETING 94-02: Mr. Chuck Everest, FAA AVN-210 briefed the group that the holding pattern simulator is working and promises some useful information, but AVN is short of manpower at the time. Mr. Everest added that the change to the holding pattern Order will be effective in April and that field personal are designing to the new numbers. The group agreed that the AIM must be changed by April and that AVN-210 should submit the change to ATP-210. After a discussion of pilots not using the proper bank angles in holding patterns, Mr. Best, AFS-420 agreed to approach Jim Enias about an Air Carrier Ops Bulletin reminding the pilots to use the proper bank angle. **Action:** Item Open (AFS-420).

MEETING 95-01: Group agreed this item need to be referred to the charting portion of the ACF. Moved and combined with CG ACF # 94-01-037. **Status:** Item Closed.