ORDER **U.S. DEPARTMENT OF TRANSPORTATION**
FEDERAL AVIATION ADMINISTRATION

8260.TAA

SUBJ: Terminal Arrival Area (TAA) Design Criteria

1. PURPOSE. This order defines TAA design criteria and specifies required instrument approach segment configuration within the TAA.

2. DISTRIBUTION. This order is distributed in Washington headquarters to the director level of the Air Traffic Service; the Offices of Airport Safety and Standards, and Communications, Navigation, and Surveillance Systems; to the division level in the Flight Standards Service; to the National Flight Procedures Office; and the Regulatory Standards and Compliance Division at the Mike Monroney Aeronautical Center; and to the regional Flight Standards divisions.

3. BACKGROUND. Historically, transition from en route flight to the terminal environment required specific ground tracks defined by ground based navigational aids. These transitions were difficult to develop in areas where terrain features interfered with signal propagation and reception. The advent of the GPS and FMS created the possibility of establishing a new transition system. Efforts toward standardization of efficient approach segment configurations generated the TAA random arrival concept.

SECTION 1. GENERAL

4. CRITERIA. FAA Order 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS), FAA Order 8260.38A, Civil Utilization of Global Positioning System (GPS), FAA Order 8260.40A, Flight Management System (FMS) Instrument Procedures Development, and FAA Order 8260.19C, Flight Procedures and Airspace, apply unless otherwise noted. Do not publish a MSA for an approach published with a TAA.

SECTION 2. TAA CONSTRUCTION

5. INITIAL, INTERMEDIATE, FINAL, AND MISSED APPROACH SEGMENTS. The following application guidelines are specific to the TAA. The BASIC T approach segment configuration as described below is standard.

a. Initial alignment to the intermediate segment. The alignment of the initial segment to the intermediate segment is 90°. See figure 1A. Determine the minimum length of the T initial segments by referring to **table 1**. Use the value for the highest approach category published on the procedure. Descent gradient considerations may require longer segment lengths. Maximum leg length is 10 NM. If initial segment descent gradient criteria cannot be met, eliminate the T IAF; therefore, aircraft arriving from the direction of the eliminated T IAF will fly the course reversal holding pattern. See figure 1B. For parallel runway configurations, construct T IAF's so that they serve all parallel intermediate segments. See figure 1C.

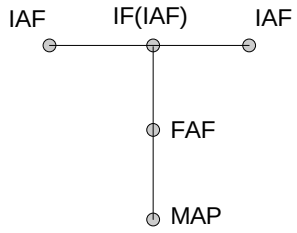


Figure 1A BASIC T

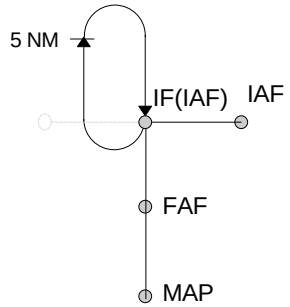
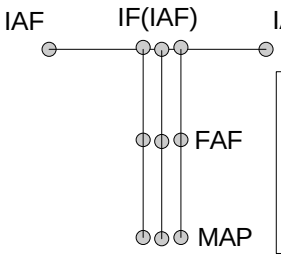


Figure 1B BASIC T With An IAF Eliminated



Scale exaggerated for emphasis. The normal T IAFs serve all parallel runways. Each runway will require a separate IF(IAF). Only one intermediate and final will be depicted on the approach procedure.

Figure 1C Parallel Runway Application

Category	Minimum Length (NM)
A	3
B	4
C	5
D	5
E	6

Table 1 Minimum Initial Segment Length

b. Intermediate alignment to the final segment. Align the intermediate segment with the final segment; i.e., turns over the FAF are not allowed.

c. Establish a Holding in Lieu of PT at the IF(IAF). The inbound holding course shall be aligned with the inbound intermediate course. See figure 1B.

d. OPTIMALLY, construct missed approach segments to allow a "direct entry" into a missed approach holding pattern as illustrated in figure 2A. If the missed approach routing terminates at a T IAF, OPTIMUM alignment of the missed approach holding pattern is with the initial inbound course, with a direct entry into holding. See figure 2B.

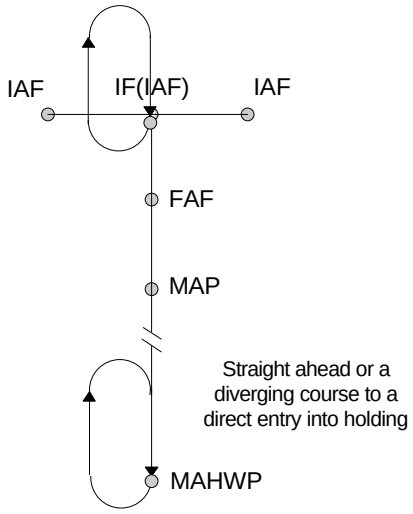


Figure 2A OPTIMUM
Missed Approach Holding

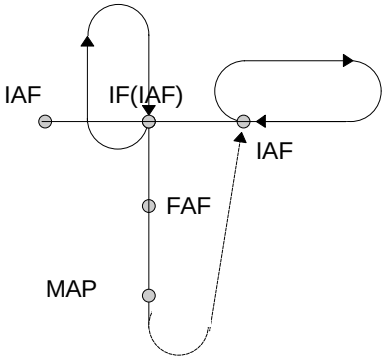


Figure 2B Missed Approach
Holding At An IAF

6. STANDARD TAA AREAS. The standard TAA contains three areas defined by the BASIC T segment centerline extensions: the straight-in area, the left base area, and the right base area. See figure 3A.

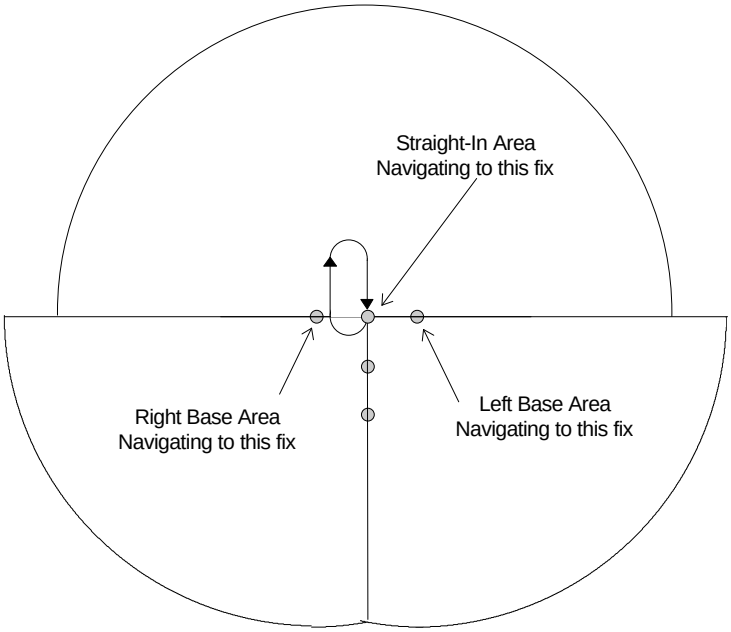


Figure 3A Standard TAA

a. Straight-In Area. The arc boundary of the straight-in area is equivalent to a feeder fix. When crossing the boundary or when released by ATC within the straight-in area, an aircraft is expected to proceed direct to the IF(IAF).

(1) Construction. Draw a straight line through the T IAF's, extending 30 NM in each direction from the IF. Then, on the side of the line away from the airport, scribe a 30 NM arc centered on the IF connecting the straight line end points. See figure 3B.

(2) Obstacle Clearance. The area considered for obstacle clearance includes the entire straight-in area and its associated buffer areas. TERPS paragraph 1720 applies.

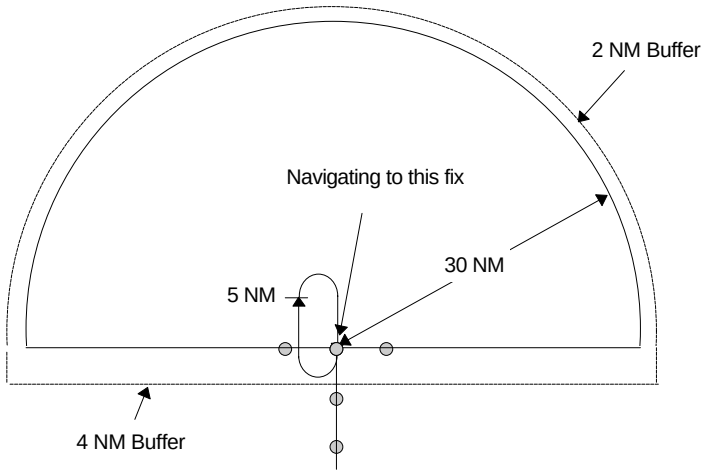


Figure 3B Straight-In Area

b. Right Base Area. The arc boundary of the right base area is equivalent to a feeder fix. When crossing the boundary or when released by ATC within the right base area, an aircraft is considered at the feeder fix and is expected to proceed direct to the IAF.

(1) Construction. To construct the top boundary, extend the line from the IF through the T IAF for 30 NM beyond the T IAF. Draw a 30 NM arc, centered on the T IAF, from the end point of the top boundary counter-clockwise to the point it intersects a straight line extension of the intermediate course. See figure 3C.

(2) Obstacle Clearance. The area considered for obstacle clearance includes the entire right base area and its associated buffer areas. TERPS paragraph 1720 applies.

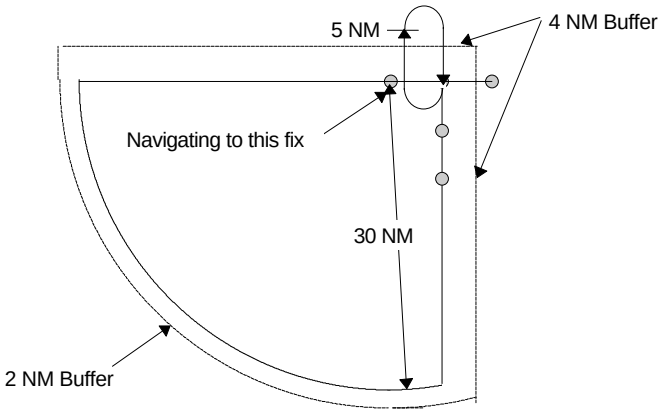


Figure 3C Right Base Area

c. Left Base Area. The arc boundary of the left base area is equivalent to a feeder fix. When crossing the boundary or when released by ATC within the left base area, an aircraft is considered at the feeder fix and is expected to proceed direct to the IAF.

(1) Construction. To construct the top boundary, extend the line from the IF through the T IAF for 30 NM beyond the T IAF. Draw a 30 NM arc, centered on the T IAF, from the end point of the top boundary clockwise to the point it intersects a straight line extension of the intermediate course. See figure 3D.

(2) Obstacle Clearance. The area considered for obstacle clearance includes the entire left base area and its associated buffer areas. TERPS paragraph 1720 applies.

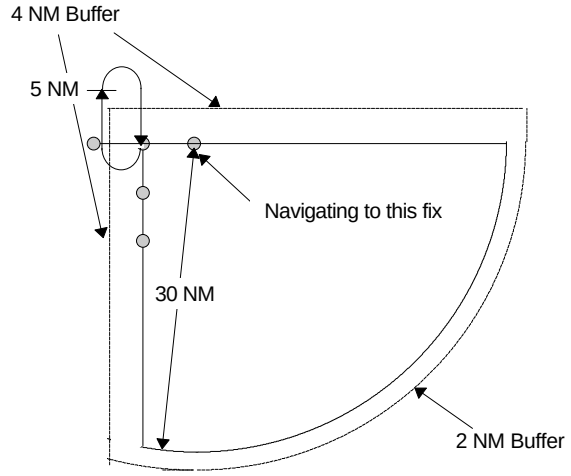


Figure 3D Left Base Area

7. ALTITUDE SELECTION WITHIN THE TAA. OPTIMALLY, all TAA area, course reversal holding pattern, initial segment, and intermediate segment minimum altitudes should be the same. When terrain or operational constraints force high area altitudes that do not allow

descent within gradient limits, the course reversal pattern at the IF (IAF) will allow descent and entry into the approach procedure.

a. Sectors/Stepdown Arcs. The straight-in area may be divided into as many as 3 sectors defined radially (numbered magnetically inbound to the fix) from the IF (IAF) to accommodate terrain diversity or operational constraints that cause excessive descent gradients. Do not radially sectorize the left or right base areas. Stepdown arcs (centered on the fix that defines the area) may also be used, but are limited to one per sector. See figures 4A and 4C.

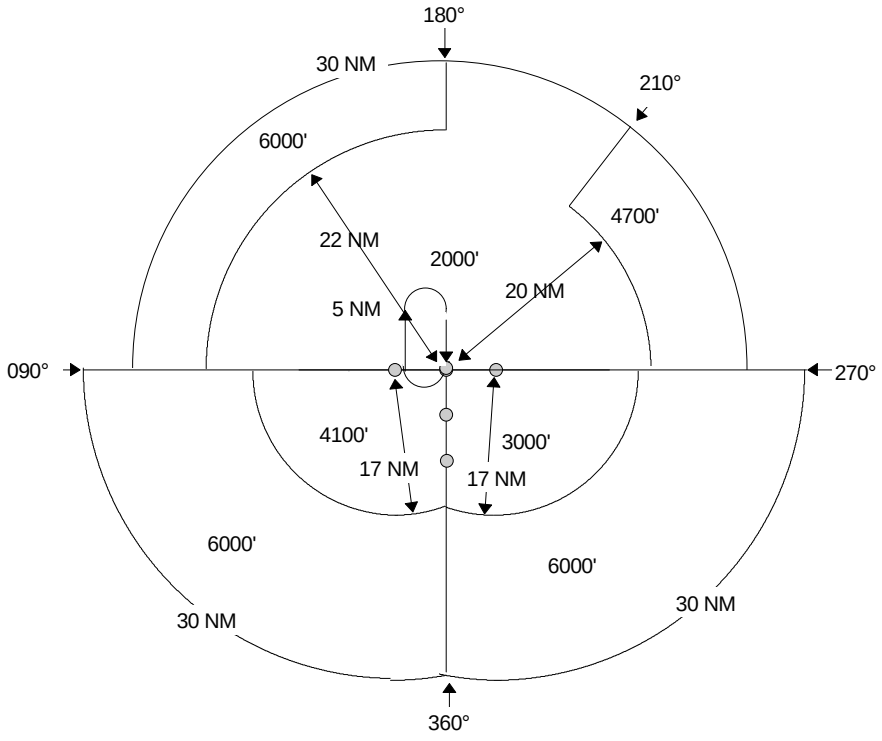
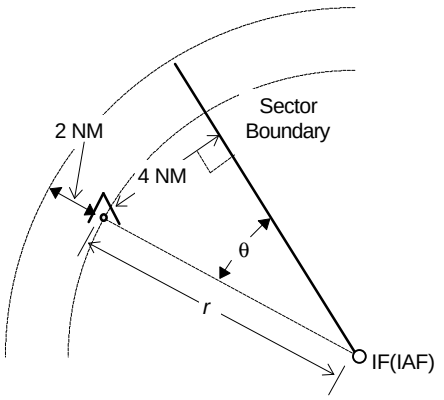


Figure 4A A Sectorized TAA With Stepdown Arcs

b. Altitude Sectors. Sectors must provide appropriate ROC within the sector boundaries and over all obstacles in a 4 NM buffer area (measured perpendicular to the radial boundary line) and in a 2 NM buffer from the stepdown arcs. See figure 4B for a method to calculate distance from a straight-in boundary line.



$$\theta = ArcSin\left(\frac{4}{r}\right)$$

where: θ = angle in degrees
$r \geq 4$ NM

e.g. If $r = 8$ then

$$\theta = ArcSin\left(\frac{4}{8}\right) = 30°$$

Figure 4B Calculating Radial Sector Boundaries

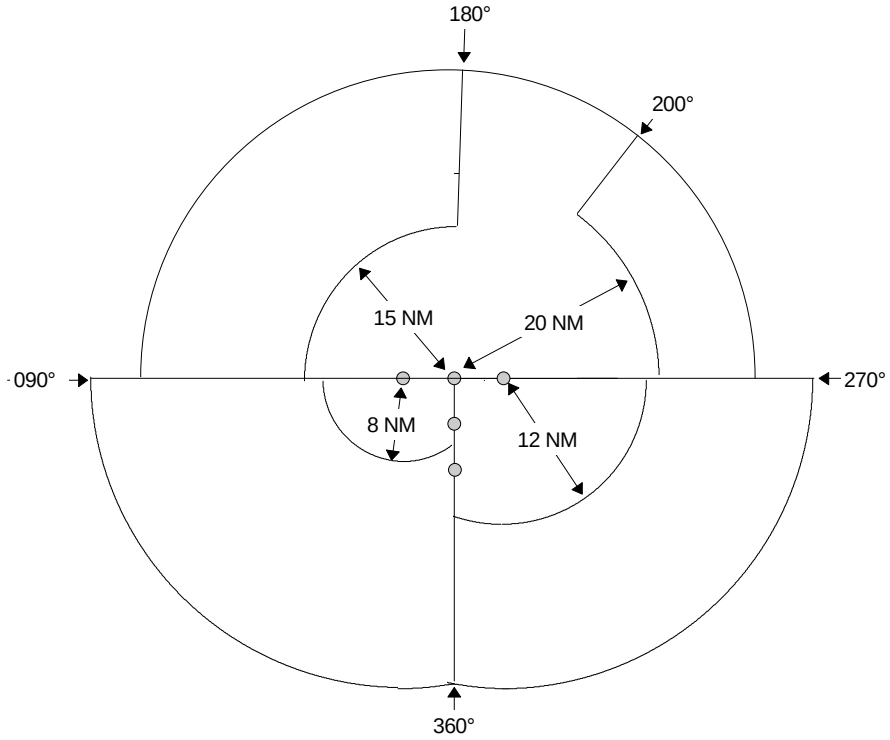


Figure 4C TAA Maximum Sectorization
With Maximum Stepdown Arcs

8. TAA AREA MODIFICATONS. Modifications to the standard TAA design may be necessary to accommodate operational necessities. Variations may eliminate one or both base areas, and/or limit or modify the angular size of the straight-in area. If the left or right base area is eliminated, modify the straight-in area by extending its 30-mile radius to join the remaining base area boundary. If the left and right base areas are eliminated, extend the straight-in 30-mile radius to complete 360° of arc. Construct a PT Required sector in the extended straight-in area as necessary to accommodate entry at the IF (IAF) at angles greater than 120 °. *NOTE: TERPS Table 3 applies when determining the PT Required/NoPT boundary line.* This sector does not count toward the sectorization limitation stated in paragraph 7a. See figures 5B-5E.

9. Connection to en route structure. Normally, a portion of the TAA will overlie an airway. If this is not the case, construct a feeder route from an airway fix or NAVAID to the TAA boundary aligned along a direct course from the en route fix/NAVAID to the appropriate T IAF(s). See figure 5F.

10. Airspace Requirements. The TAA will normally overlie Class "E" 1,500' airspace (1,200' floor). If the TAA overlies Class B airspace, in whole or in part, the Air Traffic facility exercising control responsibility for the airspace may recommend minimum TAA sector altitudes. Modify the TAA to accommodate controlled/restricted/warning areas as appropriate.

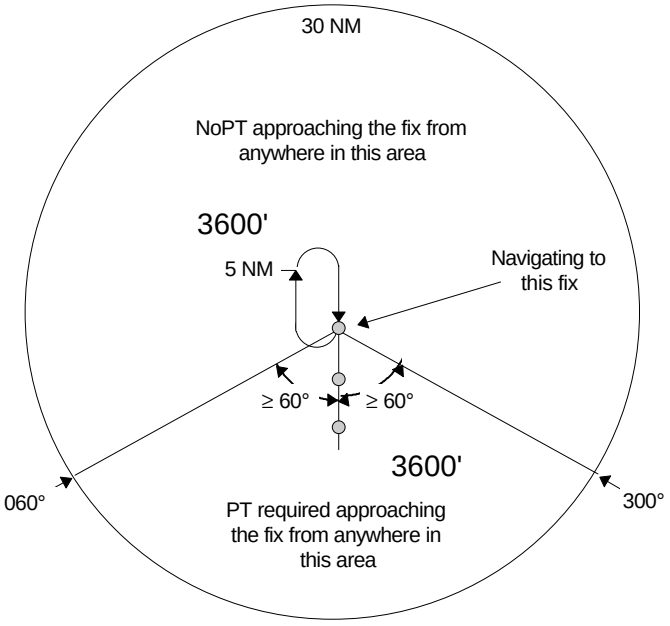


Figure 5A TAA With Left and Right Base Areas Eliminated

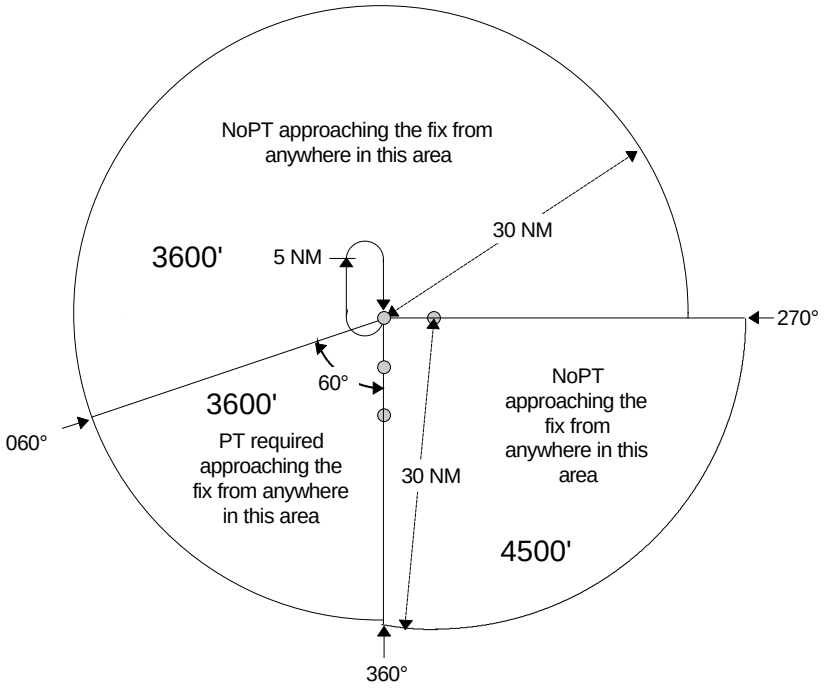


Figure 5B TAA With Right Base Eliminated

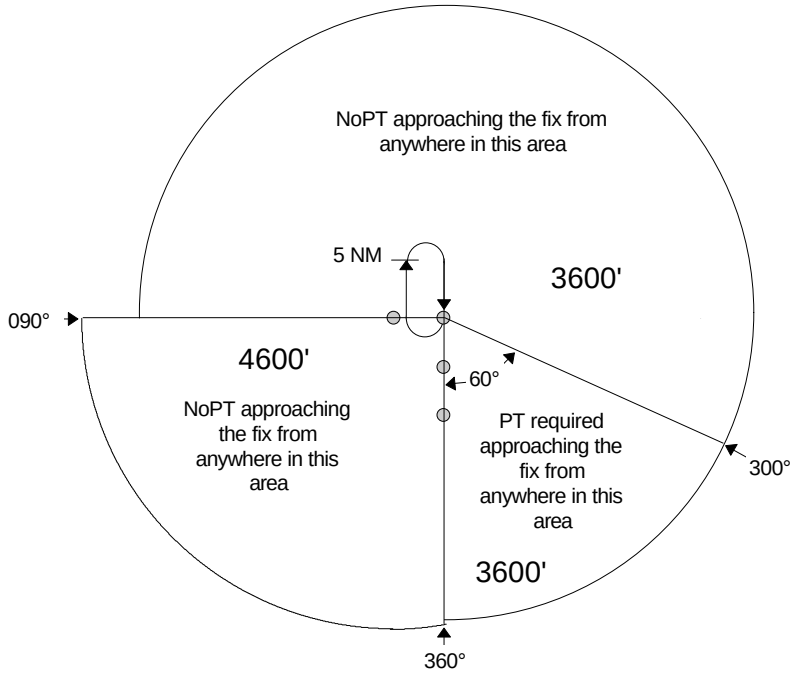


Figure 5C TAA With Left Base Eliminated

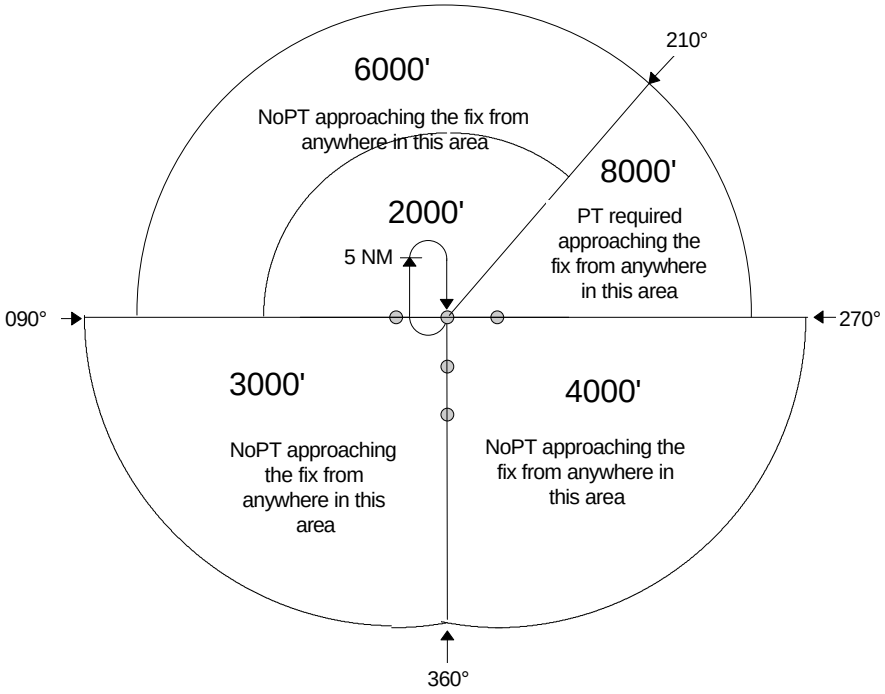


Figure 5D TAA With Part Of Straight-In Area Eliminated

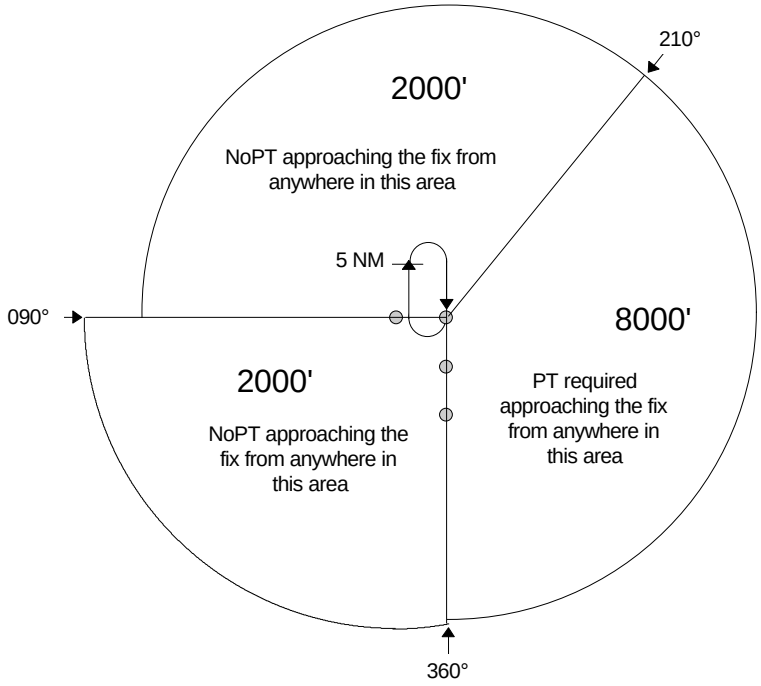


Figure 5E TAA Example With Left Base and Part of Straight-In Area Eliminated

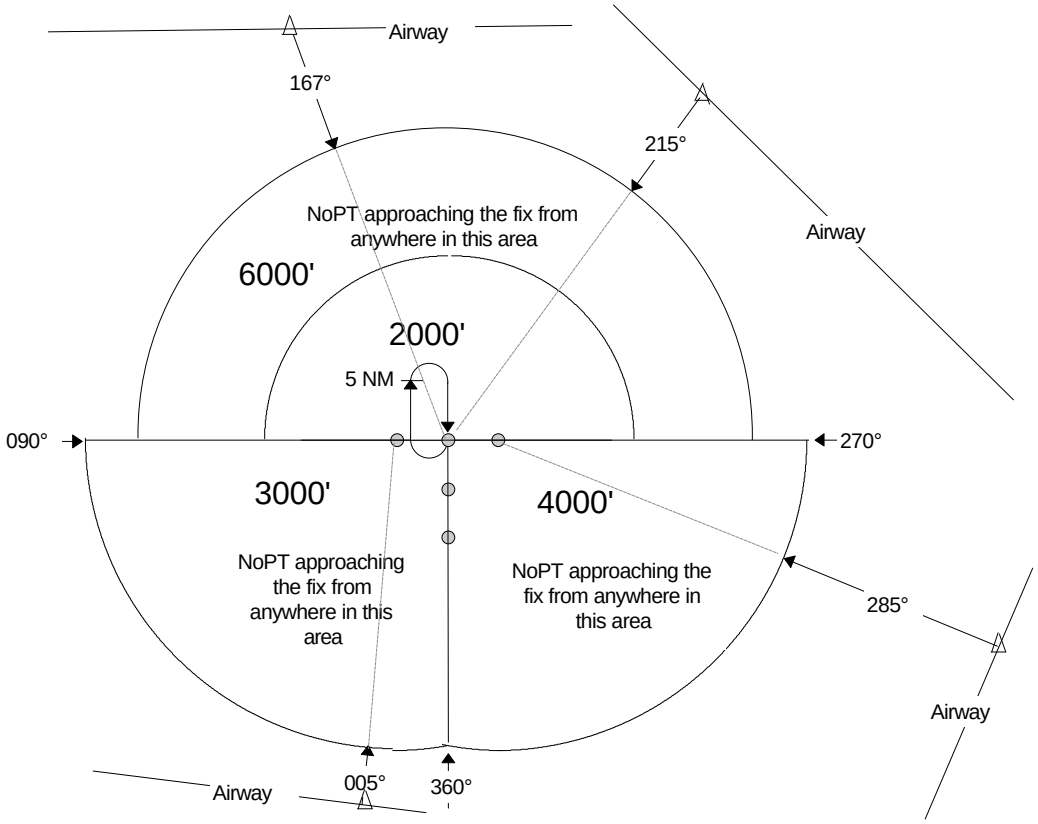


Figure 5F Examples Of A TAA With Feeders From An Airway

SECTION 3. DOCUMENTATION AND PROCESSING

11. FAA 8260-SERIES FORMS INSTRUCTIONS

a. FAA Form 8260-10 (Continuation Sheet). Enter all normal terminal route information on the appropriate FAA 8260-series forms; enter all necessary TAA data on an FAA Form 8260-10. For TAA entries, the "From" and "To" entries do not describe routes of flight, but rather describe a volume of airspace within which an aircraft will proceed inbound from the 30-mile arc boundary toward an associated T IAF. Enter the data in the specified standardized format detailed below to assist cartographers in developing the desired published display. Each entry shall coincide with the corresponding entry on FAA Form 8260-9 to provide correlation between terrain/obstacle data and the minimum altitude associated with the appropriate TAA area. Provide a graphic depiction of the TAA with areas defined and indicating the minimum altitude associated with each area/sector. Do not establish minimum altitudes which will require aircraft to climb while inbound toward the respective T IAF. Comply with existing instructions in FAA Order 8260.19C relative to Terminal Routes, except as noted below:

(1) ***From***. For TAA entries, begin at the outermost boundary, and work inward toward the respective T IAF. Enter an Area/Sector description *beginning* at a convenient point where a straight line boundary intersects an arc boundary. Enter the magnetic value of the straight line boundary (or its extension) described "TO" the associated T IAF, followed by the arc boundary distance (NM) for that point, and separate the entries by a "/"; e.g., **090/30**. Then enter "**CW**", followed by a point along the same arc boundary intersected by the next straight line

boundary; e.g., **180/30**. The "From" entry would thus appear as "090/30 CW 180/30." Enter data in a similar manner to describe other areas and sectors.

(a) Sequentially number (1, 2, etc.) the first line entry describing the area/sector for which different minimum altitudes are established. It is possible for an area/sector to be irregularly shaped, but have only one minimum altitude. Enter the associated data for such an area together as a group of sequential line entries.

(b) The charting agency will publish the words "NoPT" or "PT Required", as appropriate, on the 30-mile arc boundary between an associated straight line boundary pair. Enter "**NoPT**" or "**PT Required**" following each line entry which contains the specific 30-mile arc boundary for which that label is appropriate.

(2) ***To***. Enter area/sector straight line/arc boundary descriptions as above which, *in combination with* the associated entry in the "From" block, encloses the area being documented. For example, the "To" stepdown arc entry associated with the "From" entry above, could be "090/22 CW 180/22." Where the area/sector inwardly terminates at a T IAF, enter the appropriate WP name and fix type; e.g., POPPS IF (IAF), MAACH IAF, etc.

(3) ***Course and Distance.*** No entry is required for TAA area/sector documentation. The provisions of Order 8260.19C apply where a route is established.

(4) ***Altitude*****.** Enter the minimum altitude of the area/sector on each line.

b. FAA Form 8260-9, Standard Instrument Approach Procedures (SIAP) Data Record. Comply with existing Order 8260.19C instructions for documenting controlling obstacles/terrain, coordinates, minimum altitudes, etc., except as noted below:

(1) ***Part A, Block 1 - App. Segment***. Enter the number assigned to the particular area/sector as in paragraph 12a(1) (a) above. Then enter associated documenting data across the form.

(2) ***Part A, Block 5 - Minimum Safe Altitudes***. Do not develop MSA's for RNAV SIAP's utilizing the TAA.

(3) ***Part C - Remarks***. Do not develop airspace data for RNAV SIAP's utilizing the TAA. The entire TAA area overlies Class B/C/D/E Surface Area with 1200' floor.

Par 11

U.S. DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

GPS **STANDARD INSTRUMENT APPROACH PROCEDURE**

FLIGHT STANDARDS SERVICE - FAR PART 97. 33

Bearings, headings, courses, and radials are magnetic. Elevations and altitudes are in feet, MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated. Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or in feet RVR.

FROM	TO	ALTITUDE
1. 090/30 CW 180/30 (NoPT)	090/22 CW 180/22	6000
2. 210/30 CW 270/30 (NoPT)	210/20 CW 270/20	4700
3. 090/22 CW 180/22	POPPS IF(IAF)	2000
180/30 CW 210/30 (NoPT)	POPPS IF(IAF)	2000
210/20 CW 270/20	POPPS IF(IAF)	2000
4. 270/30 CW 360/30	270/17 CW 360/17	6000
5. 270/17 CW 360/17	MAACH IAF	3000
6. 360/30 CW 090/30	360/17 CW 090/17	6000
7. 360/17 CW 090/17	SISSY IAF	4100

(This relates to Figure 6A)

CITY AND STATE	ELEVATION: 123 TDZE: 123 AIRPORT NAME:	FACILITY IDENTIFIER:	PROCEDURE NO. / AMDT NO. / EFFECTIVE DATE:	SUP:
ANYWHERE,CA	ANYTIME ARPT	ANY	GPS RWY 18	AMDT: NONE
				DATED:

U.S. DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

GPS

STANDARD INSTRUMENT APPROACH PROCEDURE

FLIGHT STANDARDS SERVICE - FAR PART 97. 33

Bearings, headings, courses, and radials are magnetic. Elevations and altitudes are in feet, MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated. Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or in feet RVR.

FROM	TO	ALTITUDE
1. 090/30 CW 210/30 (NoPT)	090/17 CW 210/17	6000
2. 090/17 CW 210/17	ALPHA IF(IAF)	2000
3. 210/30 CW 270/30 (PT Required)	ALPHA IF(IAF)	8000
4. 270/30 CW 360/30 (NoPT)	BRAVO IAF	4000
5. 360/30 CW 090/30 (NoPT)	CHRLY IAF	3000

(This relates to Figure 6B)

CITY AND STATE	ELEVATION: 123 TDZE: 123 AIRPORT NAME:	FACILITY IDENTIFIER:	PROCEDURE NO. / AMDT NO. / EFFECTIVE DATE:	SUP:
ANYWHERE, CA	ANYTIME ARPT	ANY	GPS RWY 18	AMDT: NONE DATED:

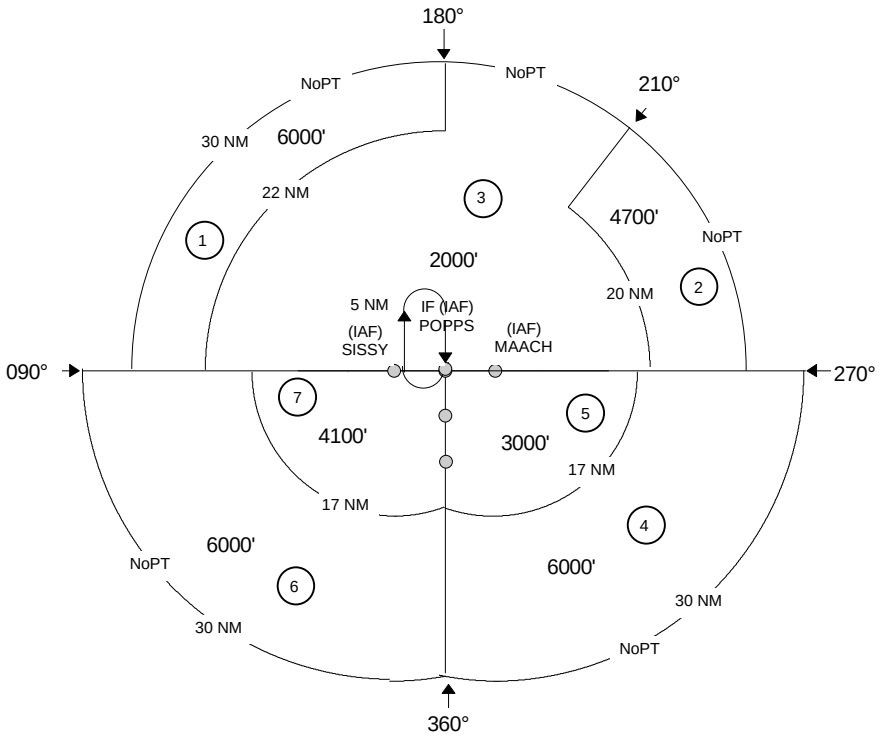


Figure 6A Example 1

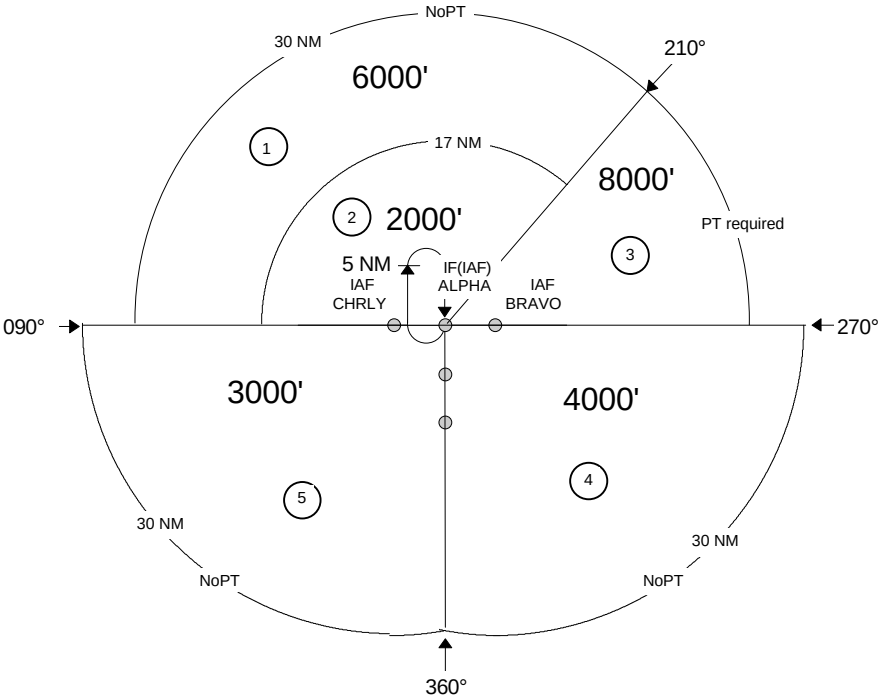


Figure 6B Example 2