ORDER

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8260.23

6 Jul 71

SUBJ: CALCULATION OF RADIO ALTIMETER HEIGHT

1. PURPOSE. This order prescribes the approved method for use in determining the radio altimeter height which corresponds to the ILS decision height, as required by Handbook 8260.19, paragraph 453.

2. DISTRIBUTION. This order is distributed to the branch level in Washington, Regional Headquarters, Area Offices and the Aeronautical Center, and to all Flight Standards General Aviation, Air Carrier, Flight Inspection and Flight Standards District Offices.

3. ACTION. FAA regions will take action to assure that the radio altimeter height which corresponds to the ILS decision height is published for each Category II ILS instrument approach procedure. **Where the terrain contour or survey information is questionable, the regions should request NFID to perform confirming flight checks.**

4. BACKGROUND. With the advent of Category II ILS operations has come a requirement to publish on instrument approach charts the radio altimeter indication which corresponds to the Category II ILS decision height. The method prescribed by this order is to be used to standardize calculation of the radio altimeter height for all Category II ILS approach procedures.

5. DEFINITIONS.

   a. Approach surface base line (ASB). An imaginary horizontal line at threshold elevation.

   b. Ground point of intercept (GPI). A point in the vertical plane on the runway centerline at which it is assumed that the straight line extension of the glide slope intercept the runway approach surface base line.

   c. Decision Height (DH). The height, specified in MSL, above the highest runway elevation in the touchdown zone (first 3000' of the runway) at which a missed approach shall be initiated if the required visual reference has not been established.

   d. Radio altimeter height (RA). An indication of the vertical distance between a point on the nominal glide slope at DH and the terrain directly beneath this point.

Distribution: FFS-1, 2, 4 & 7 (all employees)
FFS-5 & FIA-0 (normal)
WRFS-3; CMFS-2; AC-955 (80 copies)

Initiated by: FS-460

6. METHOD. As defined, DH is related to the highest runway elevation in the touchdown zone. This elevation may occur at the threshold or at any point in the first 3000' of the runway depending on the slope of the runway surface. The approach surface base line has been defined and established to be used as a convenient horizontal reference to simplify calculations of obstacle clearance requirements, threshold crossing heights, etc. It can be used to assist in radio altimeter height calculations by reducing to only two the number of situations which must be considered. For simplicity a DH of 100' and a threshold height of sea level are assumed in the examples.

a. Situation #1. Threshold elevation is the highest point in the touchdown zone. In this situation the elevation of the approach surface base line and the highest elevation of the runway in the touchdown zone are identical. DH (100' in this example) is therefore 100' above both and the calculation is simplified.

Given: DH - 100'
GPI - 1000' in from threshold
GS angle (θ) - 2.5°

To find: D_1 - The horizontal distance from GPI to a point on the ASB directly below DH

$$D_1 = \frac{DH}{TAN\ \theta} = \frac{100}{.04366} = 2290'$$

The radio altimeter indication of DH is measured at a point 2290' from GPI. DH is 100' MSL, terrain height is 12' MSL. The radio altimeter height is therefore 88'. See Figure 1.

SITUATION #1
(not to scale)

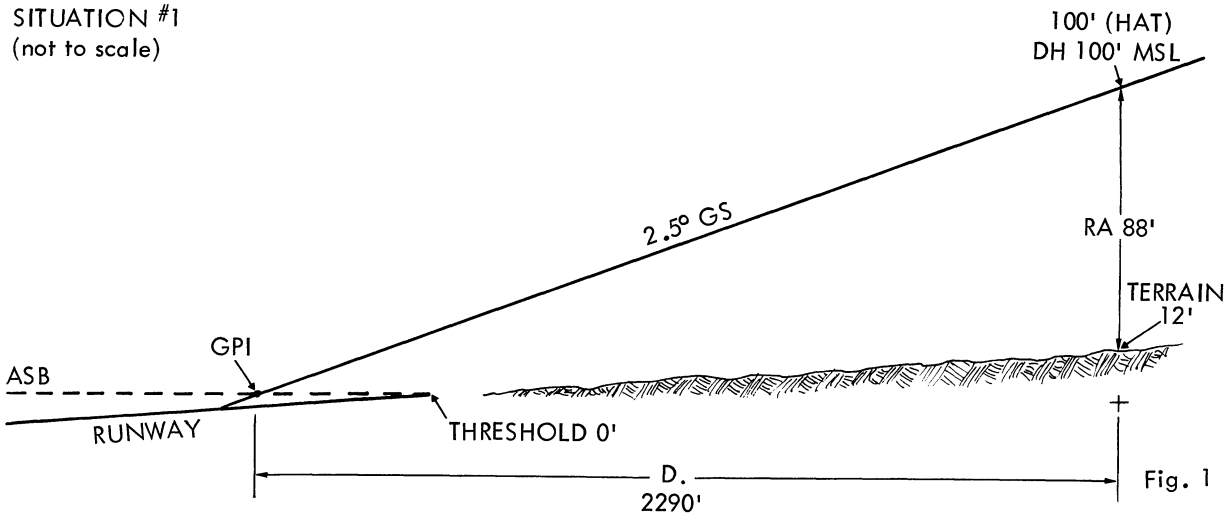

Fig. 1

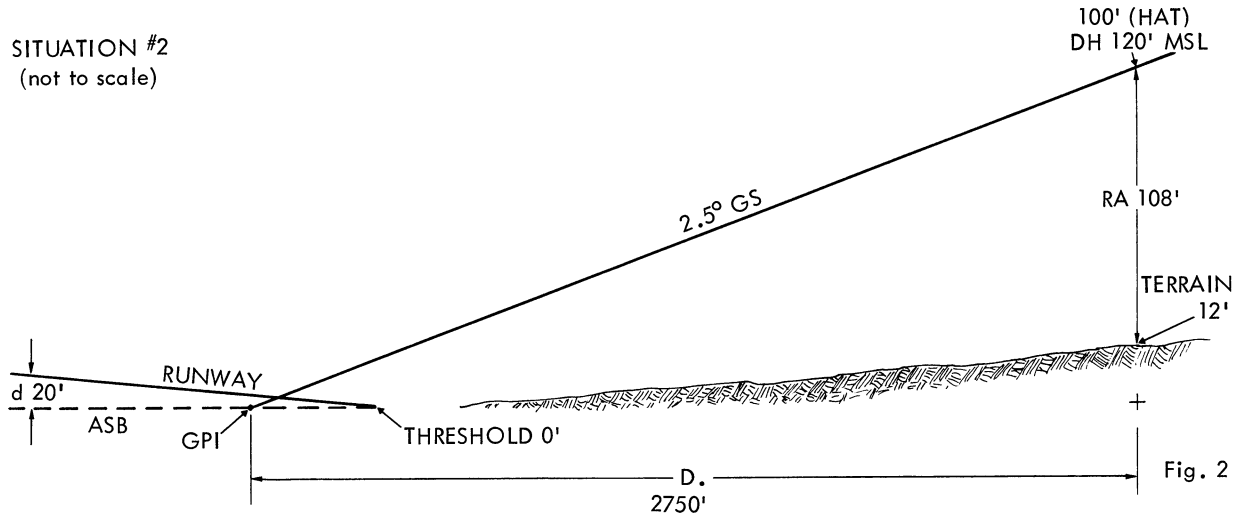

Fig. 2

b. Situation #2. Threshold elevation is <u>not</u> the highest point in the touchdown zone. In this situation it is necessary to account for the difference in height between the approach surface baseline and the highest elevation of the runway in the TDZ. The calculation is similar to Situation #1 except that d = the difference between the height of the threshold and the highest point in the TDZ is added to the formula (in this example d = 20').

$$D = \frac{DH + d}{\text{Tan } O} = \frac{120}{.04366} = 2750'$$

In situation #2 radio altimeter height is greater than in situation #1, even though the threshold and terrain elevations are the same in both cases. This is because DH is relative to the highest elevation of the runway in the touchdown zone and, as a result, occurs somewhat further from GPI and higher above the threshold than in situation #1. See Figure 2.

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