

OPERATING MODES for the AST

In ASTDOC53, some compound interferometer operating modes were presented for the 6km AST. In this document some minimum redundancy operating possibilities are considered, all of which provide for mapping in one or two days.

Beamshape cuts are given for each of the configurations. Antenna locations are given in accordance with ASTDOC53. The appropriate layout diagram is appended in Figure 8. The gradings used were approximately Gaussian after weighting the spacings to obtain an approximation to equal density.

Cases 1 and 2 (Figures 2 and 3, next pages) are 6km 1-day configurations with major grating responses at 3' and 6' for 1.4 GHz operation, while cases 3 and 4 (Figures 4 and 5) are two 2-day configurations providing better UV fill and 3' or 6' grating responses.

A two day configuration with 20m inner spacing increment and increasing gaps towards the outer spacings is given in Case 5 (Figure 6).

Case 6 is a 1-day configuration with 720m maximum baseline and 20m inner increments (Figure 7).

Utilization of stations

In the configurations proposed, no use is made of stations b, n, p, r, t, v, y-1, y-3 and y-5. Two additional stations are proposed at C-3 and C-5. The overall saving is seven stations - \$140K to \$280K!

Sensitivity

The noise after 12 hours with 5 spacings involving the 64m antenna and 10 pairs of 22m antennas is 14 μ Jy assuming 64 MHz beamwidth, two polarizations, 60% efficiency, 40K system temperature.

Layout modifications for a compact array

The provision of two extra stations in between stations b and c allows a 1-day synthesis with 720m maximum baseline. Thirteen spacings are provided, the outer 5 resulting from products between the 64m antenna and the 22m antennas.

Figure 1 shows the amendments required to the layout of ASTDOC53. The additional stations are numbered according to the convention of ASTDOC53 in terms of the number of 20m increments back from the next major station.

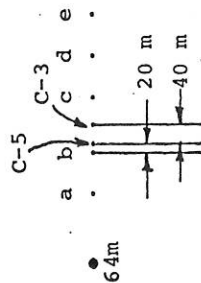


Figure 1

Showing position of additional stations C-5, C-3.

The stations occupied are C-5, C-3, c, d and e (see Figure 7). The appropriate resolutions are given in Table 1.

If on a second day, stations f, g, h, i and j are used, the baseline becomes 1.32km (no beamshape is given for this case).

TABLE 1

Frequency	1-4	5	10	22	43
Baseline:					
0.72km	61"	17"	8.5"	3.9"	2"
1.32km	33"	9.6"	4.5"	2.2"	0.9"

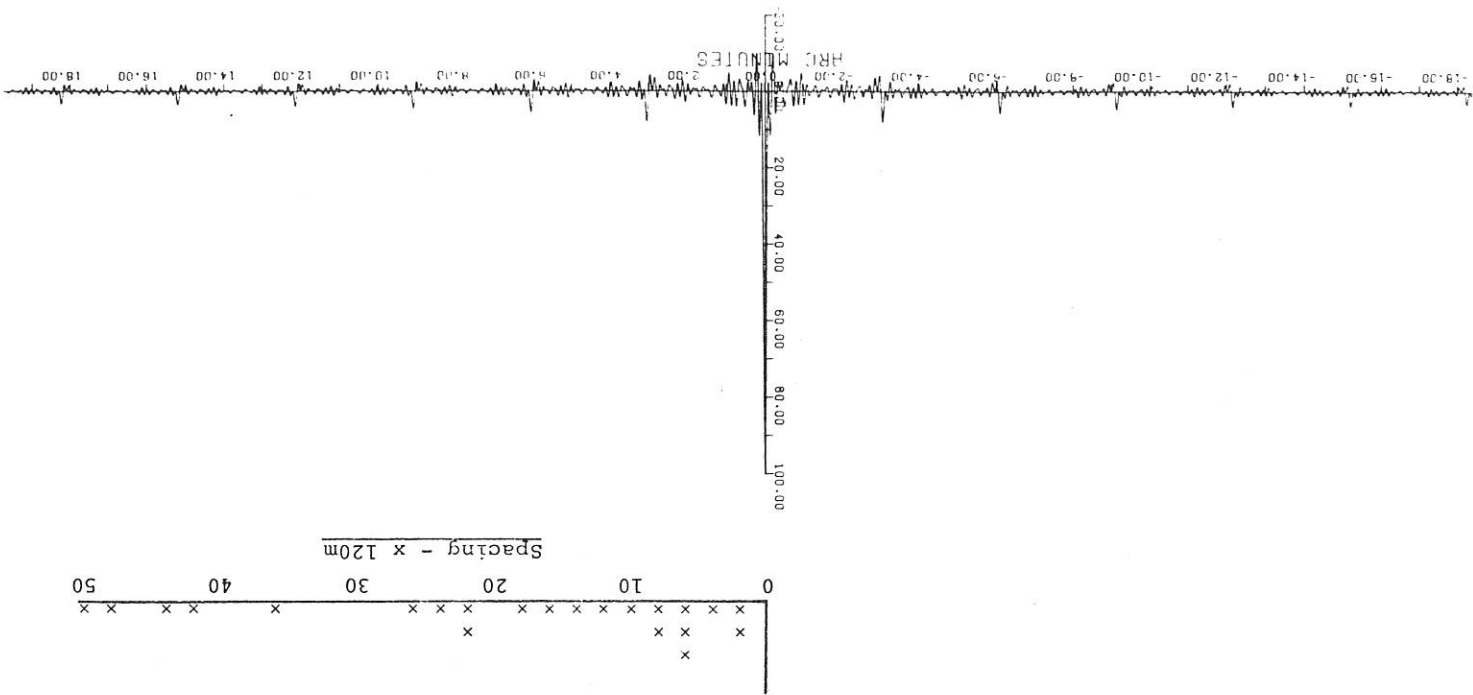
It might be noted that spacing 6 is redundant in the suggested arrangement. Using b, C-4, C-1, d and e results in the redundancy occurring at spacing 18 giving the possibility of tying the 64m phase back to the 22m array.

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Case 1: (3' grating at 21 cm) 1 day
64m + a,e,g,m,w and z

Figure 2



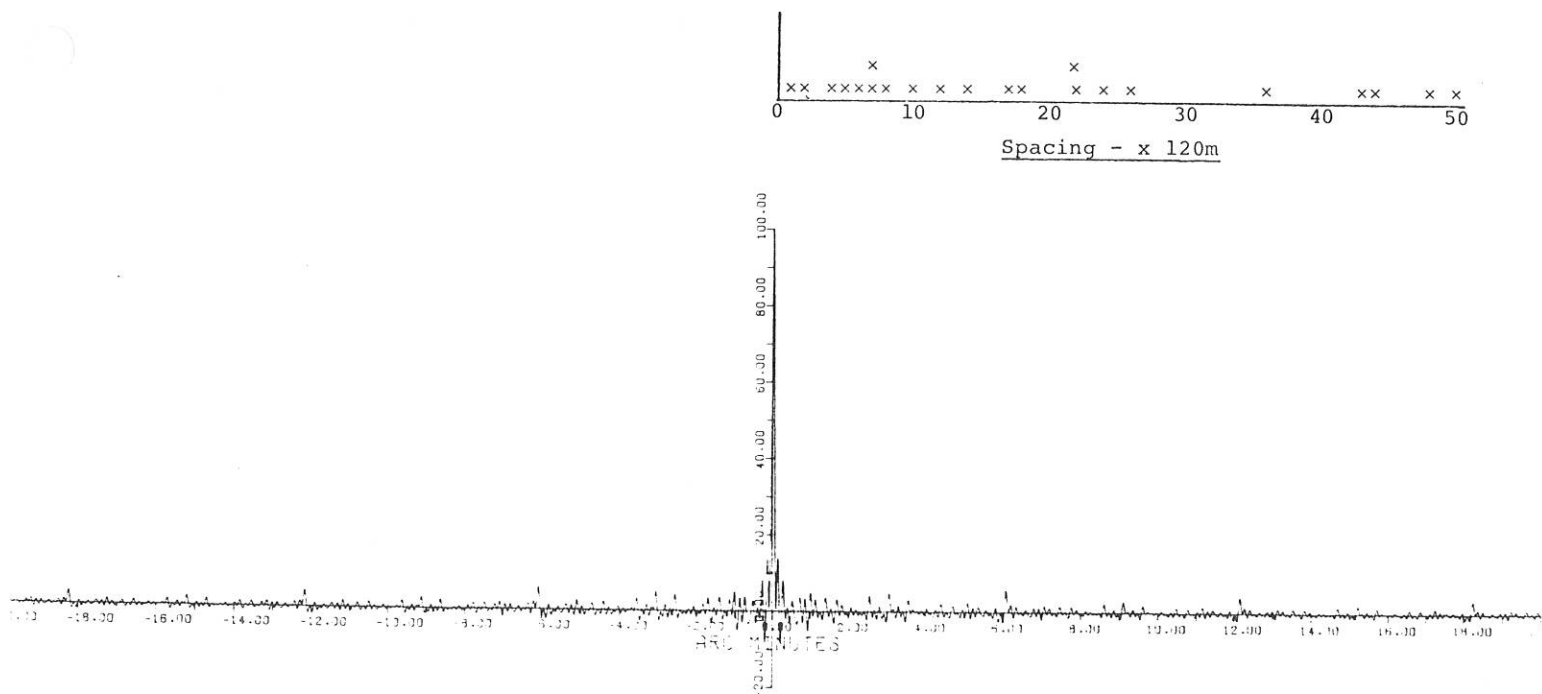


Figure 3

Case 2: (6' grating at 21 cm) 1 day
64m + a,e,f,m,w and z

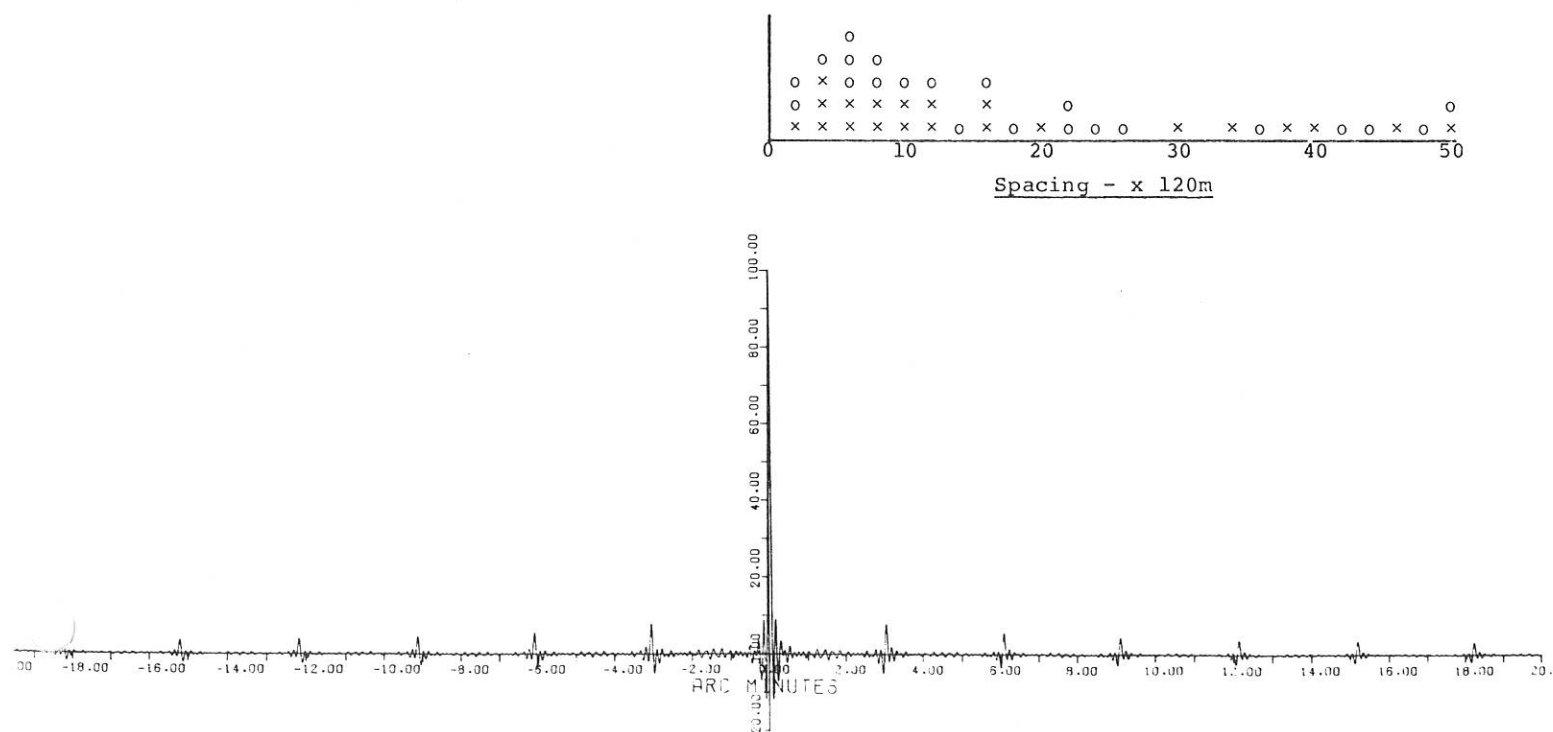


Figure 4

Case 3: (3' grating) 2 days
Day 1 as for Case 1
Day 2 - 64m + c,i,k,o,s and z

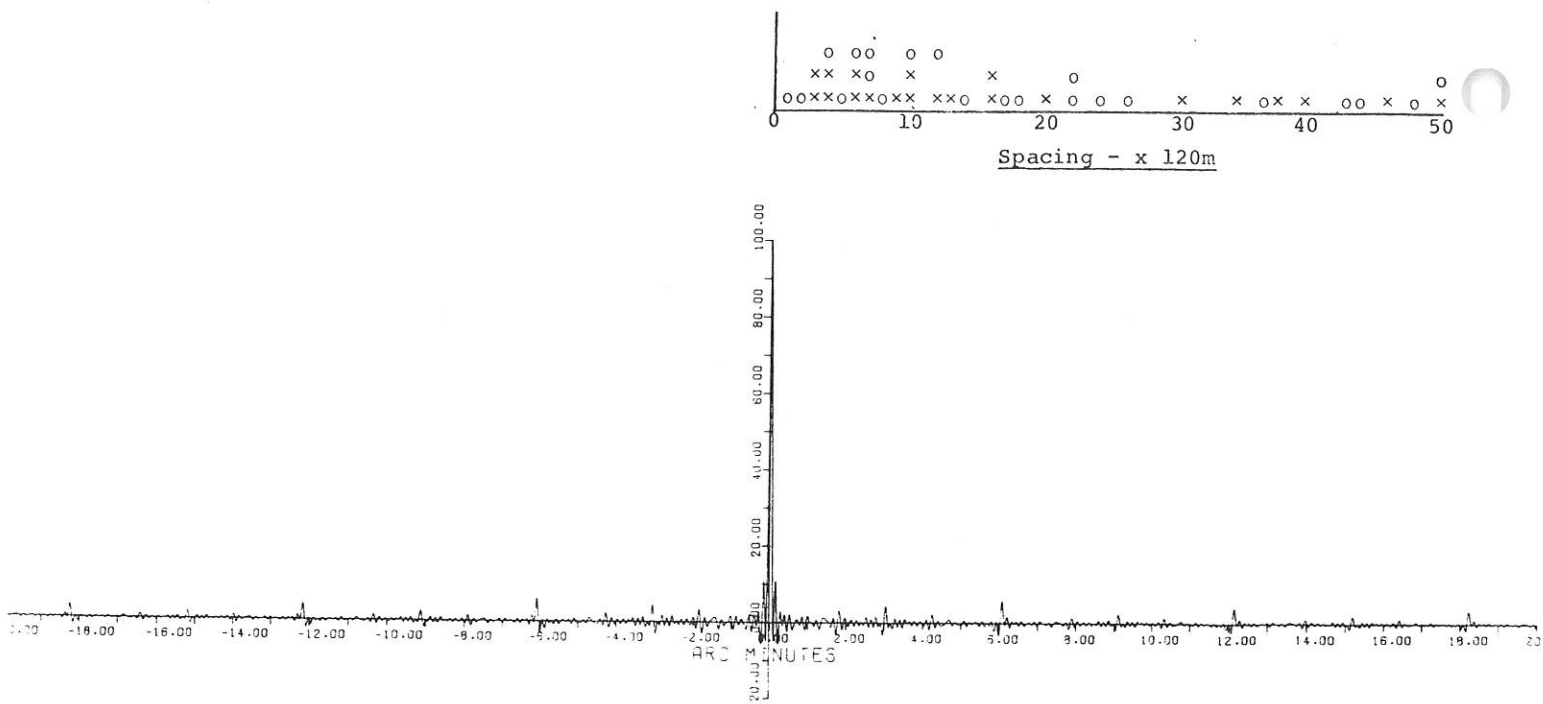


Figure 5

Case 4: (6' grating) 2 days
 Day 1 as for Case 2
 Day 2 - 64m + c,i,l,o,s and z

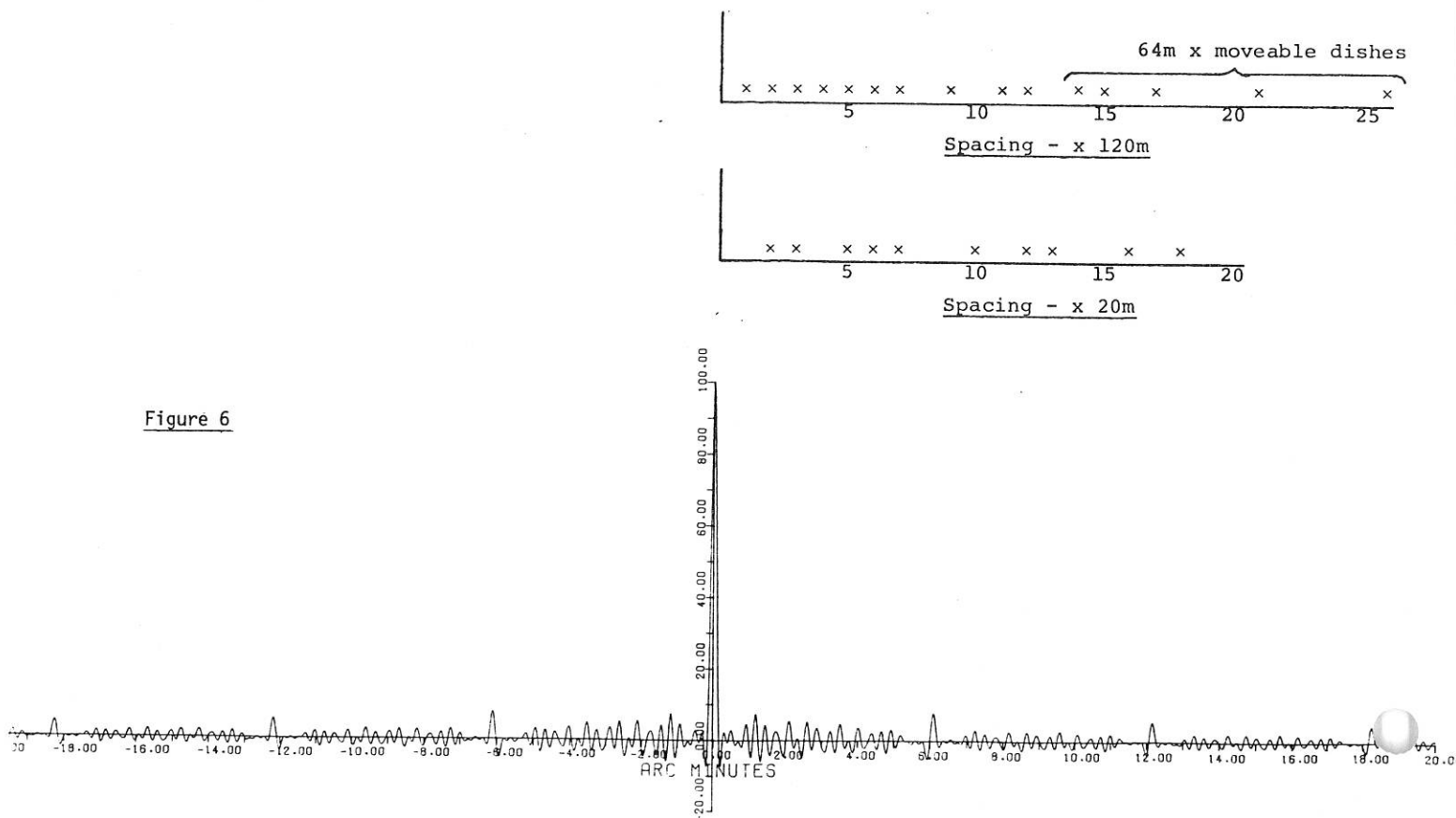


Figure 6

Case 5(a): day 1
 64m + l,m,o,s and x
 (b): day 2 (36' grating)
 v,w,y-5,y-2 and y
 64m may be added to enhance outer
 coverage in 24 to 27 x 120m area

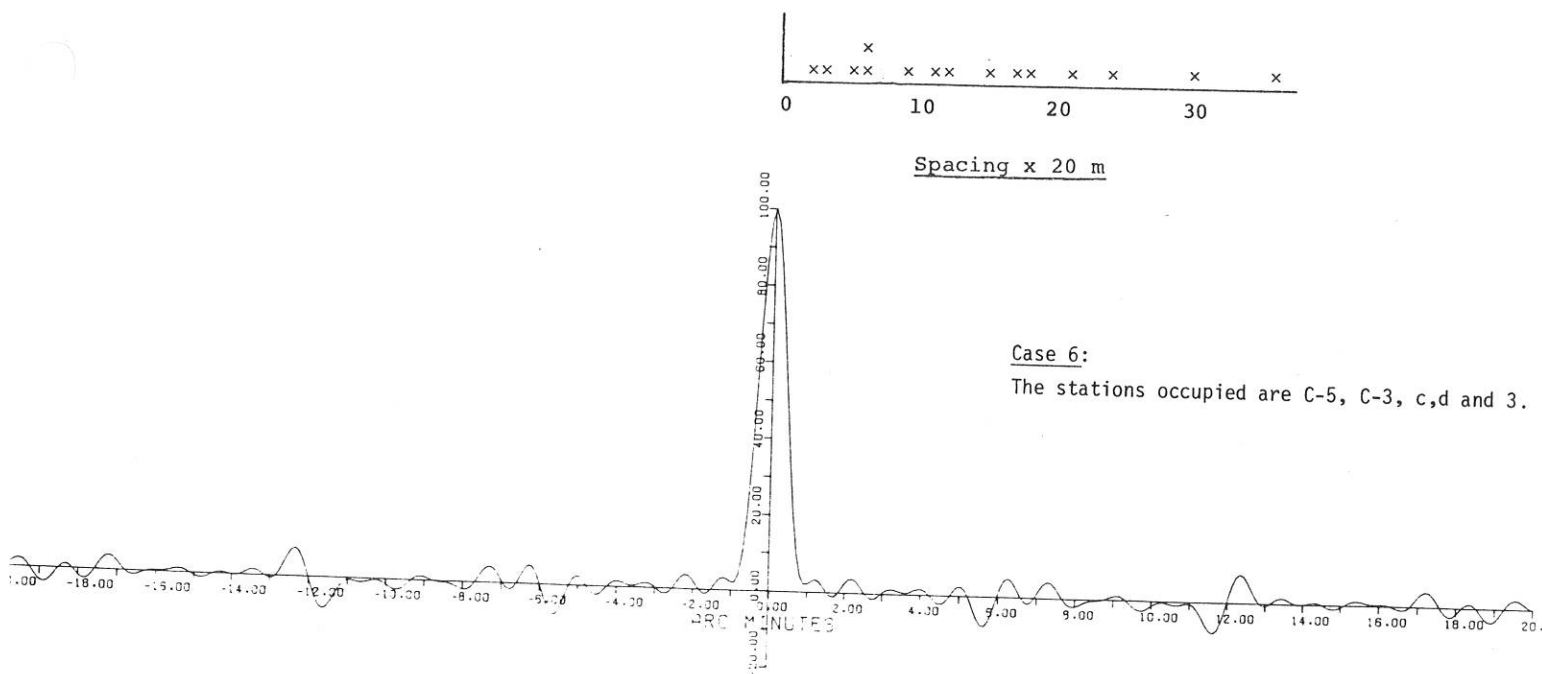


Figure 7

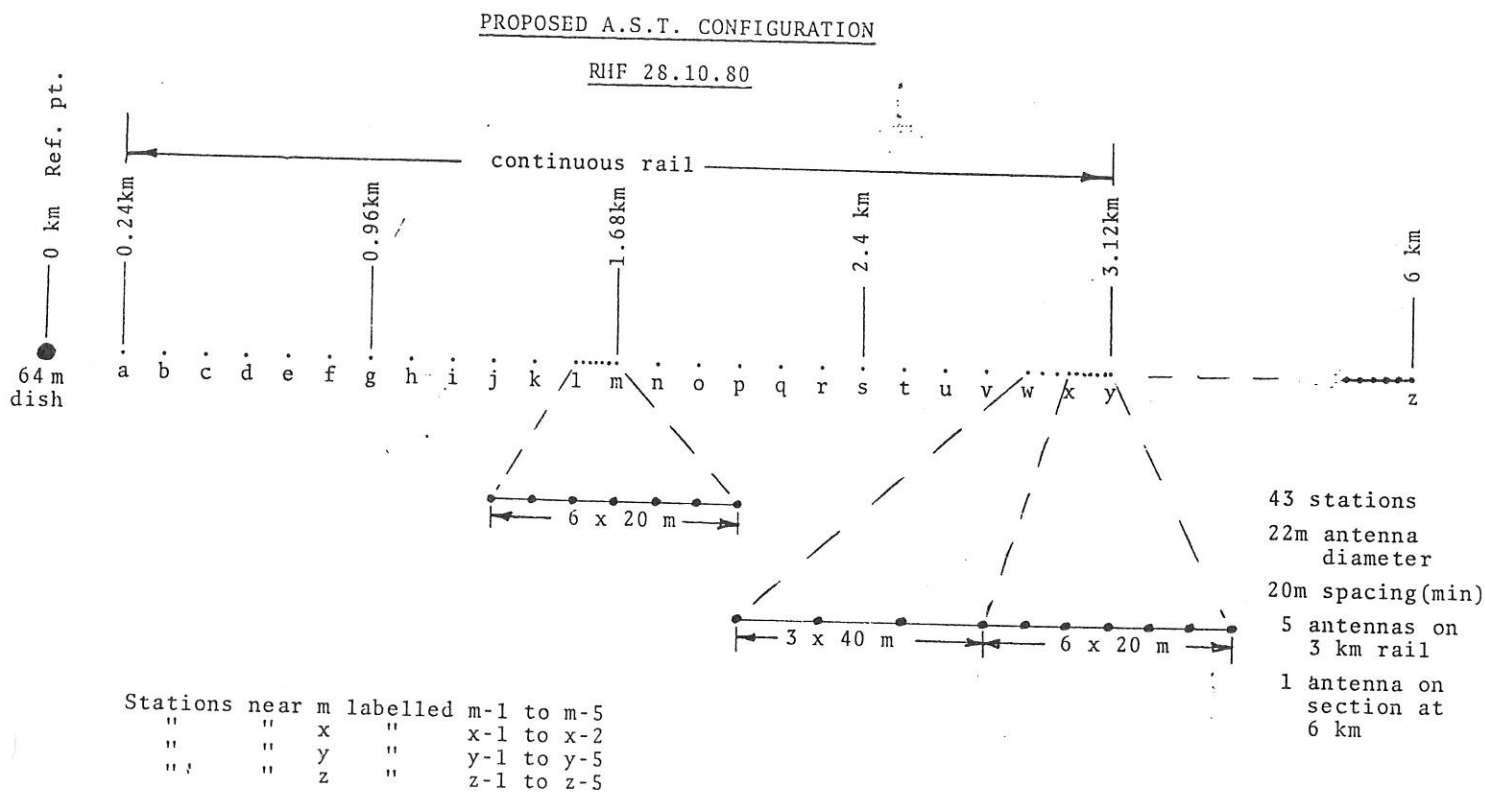


Figure 8