 Intercept Range of I.T.T 29 JAN 59

$P_D = \frac{P_T G_T}{4\pi D^2}$ (Fig 20, 21)

$P_D = 1 \times 10^{-10}$ w/cm²

$P_T = .631 \times 10^6$ w.

$G_T = 40$ db $= 10{,}000$

$P_T G_T = .631 \times 10^{10}$

$D = \sqrt{\frac{P_T G_T}{4\pi P_D}}$

Trigger Loss = 3 db

Temp. Loss = 1 db

P_D with Losses =

$2.512 \times 10 \times 10^{-10}$

$= 2.512 \times 10^{-9}$ w/cm²

$= \sqrt{\frac{.631 \times 10^{10}}{4\pi \, 2.512 \times 10^{-9}}}$

$= \sqrt{.20 \times 10^{19}} = 4.48 \times 10^5$ cm.

$= 4.48 \times 10^3$ meters

$= 4.48 \times 10^3$ Kmeters (A)

$.5396 \times 4.48 = 2420$ mi slant range

3 db Crystal Loss:
Zero Bias (B)

$D = \frac{1}{\sqrt{2}} \cdot 2420 = 1710$ n.mi. slant range

this doesn't incl. variations with Freq, Sphere Position, Polarization

Alt	Max. Slant R.	Max. Ground Range (Line of Sight)
(A) 700 mi.	2420	2100
(B) 400 mi.	1710	1570 mi.

Note: ~~SECRET~~ case, going up in alt. ground range is less than indicated.

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Slant Range = 2420

$3.44 + H = \sqrt{3.44^2 + 2.42^2}$

$= \sqrt{11.83 + 5.85}$

$= \sqrt{17.68}$

$= 4.2$

$H = 4.2 - 3.44$

$= 760$ mi.

$\text{Cos } \alpha = \dfrac{b^2 + c^2 - a^2}{2bc}$

$\dfrac{H^2 + 6.88H + 17.78}{6.88(3.44 + H)}$

At 1000 mi: $H = 1$ $H^2 = 1$

$\dfrac{1 + 6.88 + 17.78}{6.88(4.44)} = \dfrac{25.66}{30.5} = .842 = 32.65°$

$60 \times 32.65 = 1960$

At 1200 mi: $H = 1.2$ $H^2 = 1.44$

$= \dfrac{1.44 + (6.88 \times 1.2) + 17.78}{6.88(4.56)} = \dfrac{27.47}{31.9} = .862$

$30.4°$

$R = 1830$

1500 mi: $H = 1.5$ $H^2 = 2.25$

$\dfrac{2.25 + (6.88 \times 1.5) + 17.78}{6.88(4.94)} = \dfrac{30.33}{34.0} = .891$

$= 27°$

$R = 1620$

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Max Slant Range

3db greater than 2420

$\sqrt{2} \times 2420 = 3420$ slant

2700 mi. ground range

+ 1 db

$\sqrt{1.259} \times 2420$

$= 1.12 \times 2420 = 2710$ n. mi. slant range

2280 ground range

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2 db

$1.26 \times 2420 = 3100$ n. mi.

2520 ground range

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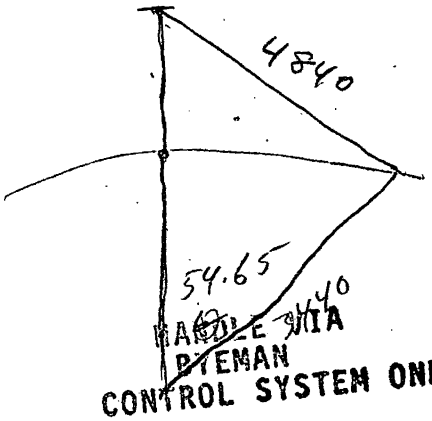
6 db

$\sqrt{6\text{ db}} = 2 \times 2420 = 4840$ n. mi. slant

$= 3280$ ground range



$\tan \theta = 1.41$

54.65

60 X 54.65

~~SECRET~~

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$\cos 54.65 = .5788$

$H + 3440 = \frac{3440}{.5788} = 5950 - 3440 = 2510$ mi. alt.

 JAN 59

~~SECRET~~	Slant Range	Ground Range	Altitude
10×10^{-10}	2420	2100	760
+1 db	2710	2280	930
+2 db	3100	2520	1150
+3 db	3420	2700	1425
+6 db	4840	3280	2510
−3 db	1710	1570	400
−6 db	1210	1160	200

~~SECRET~~

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