

I. THE SHORAN RADIOPOSITIONING SYSTEM (continued)

The propagation characteristics of VHF/UHF radio signals is such that they tend to travel in straight lines. While they are refracted in the atmosphere to some small extent, they do not tend to follow the earth's curvature as do radio signals of considerable lower frequency. They lack the ability to "see" beyond the radio horizon. Thus the Shoran system is essentially a "line of sight" system, with the maximum range being limited, to a large extent, by the heights of the mobile and base station antennas.

The range of the system under particular conditions may be estimated from the relationship

$$d = k \left(\sqrt{h_1} + \sqrt{h_2} \right)$$

where,

d = estimated maximum range, in miles

h_1 = height of mobile station antenna, in feet, above sea level

h_2 = height of base station antenna, in feet, above sea level

k = empirical range factor

The factor, k, above depends upon several factors among which are included antenna gain, receiver sensitivity, transmitted power and atmospheric refractive index. It will vary in value from 1.5 to 2.5, under normally encountered conditions.

The range formula, above, presumes no obstructions between mobile and base stations. The presence of intervening hills or other obstructions can reduce the otherwise obtainable range.