

10.5 A 10 GHz weather radar uses a 15 cm diameter lossless antenna. At a distance of 1 km, what are the dimensions of the volume resolvable by the radar if the pulse length is $1\ \mu\text{s}$?

Solution: Resolvable volume has dimensions Δx , Δy , and ΔR .

$$\Delta x = \Delta y = \beta R = \frac{\lambda}{d} R = \frac{3 \times 10^{-2}}{0.15} \times 10^3 = 200\ \text{m},$$

$$\Delta R = \frac{c\tau}{2} = \frac{3 \times 10^8}{2} \times 10^{-6} = 150\ \text{m}.$$
