

65. Using the same notation found in Sample Problem 37-6,

$$\frac{D}{L} = \theta_R = 1.22 \frac{\lambda}{d}$$

where we will assume a “typical” wavelength for visible light: $\lambda \approx 550 \times 10^{-9} \text{ m}$.

- (a) With $L = 400 \times 10^3 \text{ m}$ and $D = 0.85 \text{ m}$, the above relation leads to $d = 0.32 \text{ m}$.
- (b) Now with $D = 0.10 \text{ m}$, the above relation leads to $d = 2.7 \text{ m}$.
- (c) The military satellites do not use Hubble Telescope-sized apertures. A great deal of very sophisticated optical filtering and digital signal processing techniques go into the final product, for which there is not space for us to describe here.