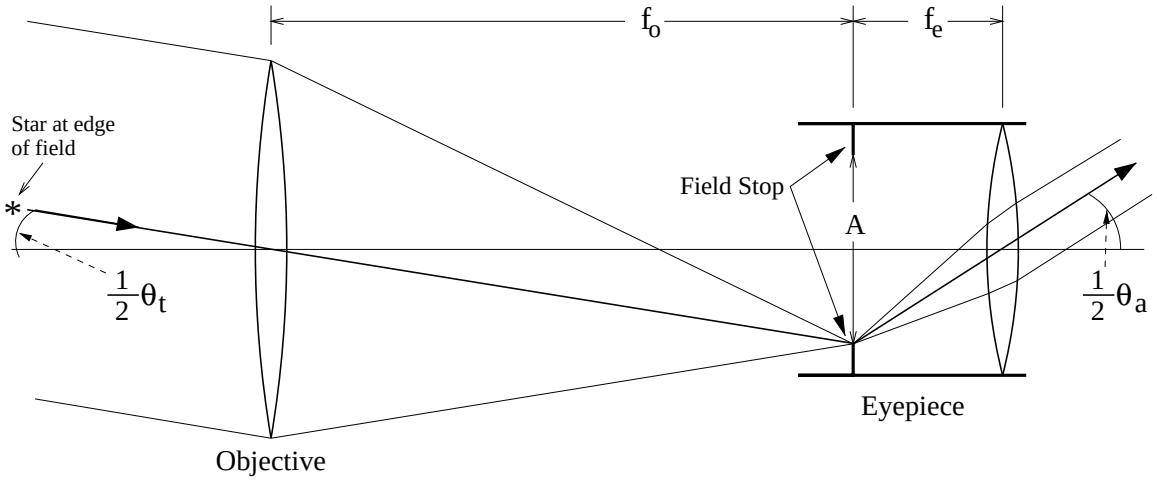

The **true field of view** (TFOV) of a telescope/eyepiece combination, denoted by θ_t in the diagram, is the actual size of the small patch of sky that is visible in the eyepiece. It is determined by the focal length of the telescope and the diameter of the eyepiece's field stop, and can be calculated by a simple one-ray trace as shown in the diagram. For a telescope with focal length f_o and eyepiece with field stop diameter A, we get: $\theta_t = 2\arctan(A/2f_o)$. This is exact for all telescopes and all eyepieces. It can be simplified to $\theta_t = A/f_o$ (θ_t in radians) when the small angle approximation $\arctan(\theta) \approx \theta$ is applied (for $\theta < 0.1$ radian). To convert radians into degrees, multiply by $180/\pi \approx 57.3$. Note that the focal length of the eyepiece, and thus magnification, does not come into the formula for the TFOV.

The **apparent field of view** (AFOV) is the magnified angular diameter of the image as it enters the observer's eye. It is labeled θ_a in the diagram. As discussed in *Derivation #1*, magnification can be defined as $M = \theta_a/\theta_t$ when distortion is negligible. Rearranging this to solve for θ_a gives:

$$\theta_a = M\theta_t = \frac{f_o}{f_e}\frac{A}{f_o} = \frac{A}{f_e}.$$

Thus, the AFOV is a function of the eyepiece alone. This gives a pretty good approximation to the AFOV for any eyepiece. However, finding the exact AFOV for a complex eyepiece design requires a full ray trace.