

## Pointing a Telescope

Most telescopes only look at a very small part of the sky (a small Field of View, or FOV). A "finder" of some type is used to aim the telescope to a specific point in the sky.

There are several types of finders: a finder scope: a reflex sight, and a laser pointer.

**Finder Scope:** a very small, often low-quality telescope, with crosshairs in the eyepiece to target a specific point in the sky. There are several variations for finder scopes: one can look straight-through or one can have a mirror (or prism) that bends the view at an angle (typically 90 degrees); the eyepiece view can be a correctly oriented view, or can be inverted (upside down), or can be mirror-reversed (up-down correct, but left-right switched); and the diameter of the objective (front lens) can range from very small (30mm) to moderate (50mm) to very large (80mm). [RACI finder = right angle correct image finder]

**Reflex Sight:** a battery-powered tiny red light is projected onto a piece of glass or clear plastic (window), where the reflected light seems to be superimposed on the "stars" seen through the window. There are two major types of reflex sights: one where the reflected light looks like a dot, or tiny "x", or very tiny "o" (often called a Red Dot Finder, or RDF); and another where the reflected light looks like rings of light, as miniature "bull's eye" (two major brands are Telrad and Rigel QuikFinder).

**Laser Pointer:** a battery-powered laser beam, parallel with the telescope, is aimed at the sky, reflecting off dust and moisture particles in the air, such that the beam is seen for at least hundreds of feet into the skies. Laser pointers suitable for astronomers intentionally have limited power, are often internally multi-stage (thus often adversely affect by cold temperatures) for the bright green colors, or single stage (thus more effective in colder weather) for less visible blue colors.

Tradeoffs for finders are many, hence the "best" finder depends on the telescope's ergonomics, the observing site or location, and most of all, the observer's preferences.

- *Finder scopes* may be too heavy for the telescope, may be in awkward-to-use locations, may be too small for the ambient sky brightness (with not much to see), and may provide a view that doesn't match the one in the telescope or that doesn't match paper charts.

- *Reflex sights:* RDFs may block a star being targeted, may be in an awkward-to-use location, or may be too bright at a dark location. A Telrad may be too large for the telescope, may be in an awkward-to-use location, or may not be able to see much (for "star-hopping") at a not-so-dark location. A QuikFinder has parallax (inaccuracy) issues, may be in an awkward-to-use location, or may not be able to see much (for "star-hopping") at a not-so-dark location. Also, batteries can wear out in all of them.

- *Laser pointers* should not be used near an airport or when aircraft are in the vicinity (to avoid flashing the cockpit with bright light). They can interfere with fellow astronomers trying to image the skies. Most large star parties forbid using laser pointers. Laser pointers work as a finder only when its dark, not during twilight and with difficulty when Luna (or the observing location) is bright. Also, batteries can wear out.

All finders first must be aligned with the telescope, meaning the telescope is pointed at a distant object (1/2 mi away or more) and the finder is adjusted to point at what the telescope sees. Sometimes this is difficult, depending on the adjustment screw design and overall stability/repeatability.

Often a telescope will come with a finder of some type, but observer satisfaction is most important, and no general advice can be given in an article like this one.

Source: Jim Kaminski, 10 April 2023 email