Low■Cost Telescope (LCT) — Quick■Start Guide

The LCT project enables affordable, hands■on observational astronomy. This guide walks you through choosing a budget tier, preparing equipment, performing a first observation, and processing data. It is designed for rapid adoption in courses and outreach.
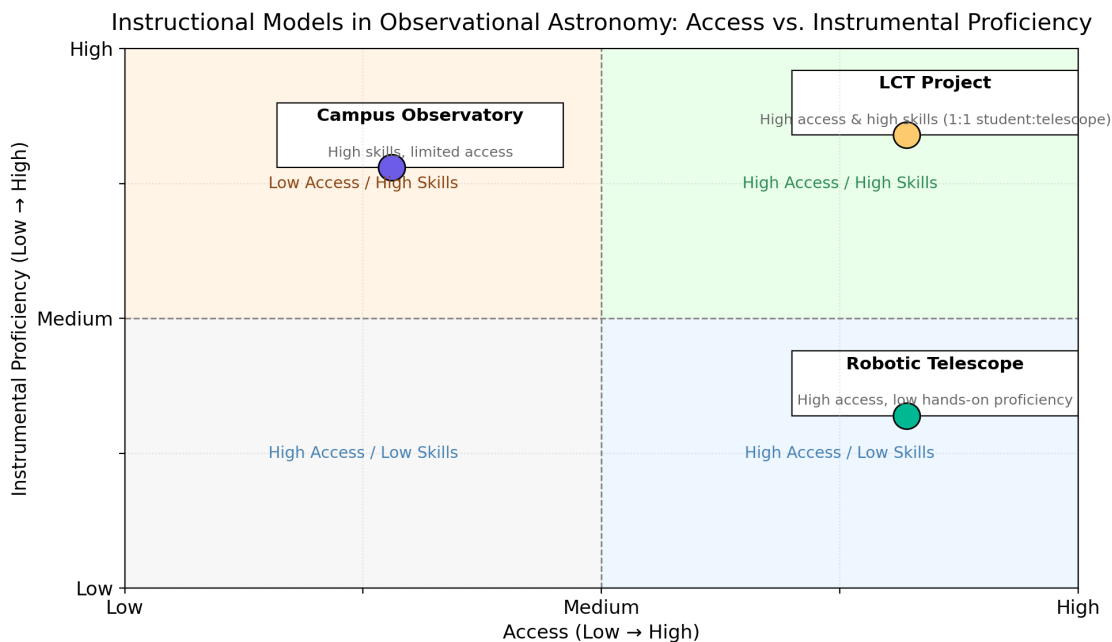

Figure 1. Instructional models: LCT delivers high access and high instrumental proficiency.

Getting Started (15–30 minutes)

1 Choose a tier (B1–B4) that fits your budget and learning goals.

2 Gather materials: telescope, mount, adapter, filters; camera (smartphone or CCD/CMOS).

3 Assembly & Alignment: assemble, collimate (if reflector), and perform a daylight alignment test.

4 Target & Capture: start with the Moon or Jupiter; set ISO/exposure; capture a burst of frames.

5 Data Handling: organize files; record metadata (date, time, location, exposure, device).
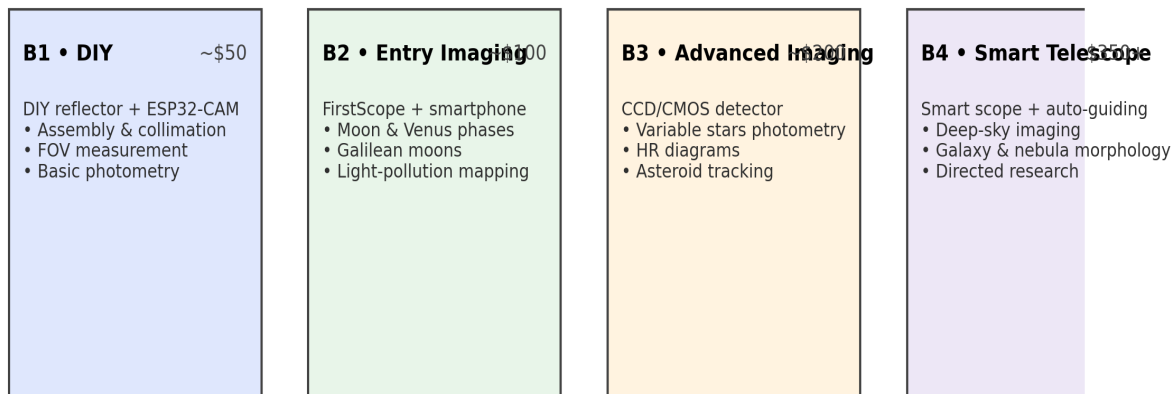
LCT Budget Tiers Overview
Choose a tier that matches your budget, course goals, and desired outcomes.

Figure 2. LCT budget tiers and typical projects.

First Observation (Moon Phases or Galilean Moons)

1   Plan: check weather & moon phase; avoid heavy light pollution.

2   Acquire: capture 20–50 short exposures (smartphone: burst mode) at multiple times.

3   Preprocess: create dark frames; subtract; align; stack to improve signal■to■noise.

4   Enhance: histogram stretch; gentle sharpening; color balance as needed.

5   Analyze: measure phase angle or moon separations; compare to published ephemerides.

6   Report: paste final image & one plot (e.g., brightness profile) with a 150■word summary.

Safety & Tips

Solar Safety: Never point at the Sun without a certified solar filter. Inspect the filter before each use.
Data Quality: Prefer RAW (or highest-quality) capture; log settings; repeat observations for reliability.
Troubleshooting: If stars trail, reduce exposure or improve alignment; if saturated, lower ISO or add shorter exposures.

Resources

- Lab manual & observation guides (B1–B4)
- Image preprocessing & stacking tutorials
- ESP32■CAM starter code and wiring diagrams