Astronomy Lab: Report 1

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Introduction

In this experiment, we learned how to set up and focus a telescope, align the finderscope with the main optical tube, and, ultimately, polar align the telescope.

Theory and Experiment

Telescope installation

Since we were the last group to use the equipment, our telescope was already assembled, so we did not need to set it up from scratch. However, the general assembly process is as follows: First, the tripod is unfolded, and the accessory tray is attached to provide stability. One person holds the optical tube while another secures it by tightening the mounting pin. Next, the counterweights are adjusted to ensure proper balance, preventing unintended movement when the telescope is released. Once balanced, the right ascension lock is engaged. during the experiment we should not accidentally hit the telescope or try to relocate when the motorized tracking system is on or when the knobs are tightened.

Telescope focus and finderscope alignment

To focus the telescope, we aimed at a distant object—a construction crane in our case—and adjusted the focus knob until the image became sharp. Afterward, we aligned the finderscope with the main telescope by adjusting the small knobs on the finderscope until its crosshairs were centered on the same object seen through the eyepiece.

Polar alignment

For polar alignment, we identified a star near the intersection of the meridian and the celestial equator and adjusted the telescope's north-south and east-west axes accordingly. After centering the star in the eyepiece, we observed its motion over time. We then repeated the centering process until the telescope was properly aligned with the Earth's rotational axis. Surprisingly, our telescope was already well-aligned, and after activating the motorized tracking system, the star remained nearly centered in the field of view even after five minutes.

Question

How do you think we should polar align a solar telescope during the day?
We can find the exact time when the sun is at its highest and align the telescope mount's polar axis along the north-south line with a compass then, point the telescope at the sun and engage the motorized tracking system.