

ASTR101L

Night Lab 1 Procedures

MAKE SURE I SIGN YOUR DATA SHEET BEFORE YOU LEAVE!!!

Clear skies:

- Begin by taking field of view measurements with the telescope unaligned.
 - Follow the procedure in part C of Lab 1 in the manual, starting from step 3 (ignore sections A and B).
 - In step 4, when the manual says “unplug the telescope’s clock-drive”, simply turn the telescope off.
 - Find the field of view using at least three stars, and take an average.
- Feel free to look at whatever you want in the sky.

Cloudy skies:

Normally, we would be following part C of the lab manual (you probably want to look over this anyways, to get an idea of what we’re trying to do). However, since we cannot see the stars, we must improvise.

- Align the telescope (see ETX-90 Guide).
 - When the telescope asks you to center the guide stars, simply press **ENTER** as if the star was already centered. Your telescope will still be pretty well aligned.
- Aim the telescope at a stationary light source in the distance (farther is better).
 - Since the telescope is aligned, the tracking motor is moving so as to counter the motion of the sky. This makes it so your stationary light source moves across the telescope’s field of view, just like a star would if we were looking at it with an unaligned telescope. Thus, we can use this distant light source as a substitute for a real star.
- View the light through the telescope long enough to see which direction it drifts in the field of view.
- Use the Autostar controller to move the telescope in the **opposite** direction of the drift, placing your light source just outside the telescope’s field of view.
- Time how long it takes for the light source to drift across the full field of view. Do this a few times and take an average.

- Using step 7 on page 4 of the lab manual, find the field of view.

For Lab Report

We can find a theoretical value for the field of view based on the specifications of the telescope and the eyepiece. The theoretical field of view can be found with

$$F_{th} = F_a / M$$

F_{th} is the theoretical field of view, M is the magnification, and F_a is what is known as the *apparent field of view*. *Apparent field of view* is a deceiving name, since it is not a field of view at all. It is simply a specification for the eyepiece, and definitely not the field of view you measured in lab.

Find F_{th} and use it to find the percent error for your measured value of the field of view. You'll need three numbers:

$$F_a = 52 \text{ degrees}$$

$$f_{\text{eyepiece}} = 26 \text{ mm}$$

$$f_{\text{telescope}} = 1250 \text{ mm}$$

Also, how does your field of view compare to the angular size of the moon? Would the full moon fit inside the field of view? (If your measured value and theoretical value of the field of view are drastically different, you should comment on both). Also, answer the question in step 8 on page 4 of the lab manual.

In the report, don't forget to discuss the **major** sources of error. Make sure you follow the lab report format.