CubeSat Club Meeting 12/08-15/11

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Last Time

- Continued building testing device
- System Requirements

Today

- Learn about telescopes
- Build one!
- Take measurements

Our CubeSat

- Telescopes on our payload!
- ICONS uses two telescopes
- ICONS telescopes at 90° angle

What is a telescope?

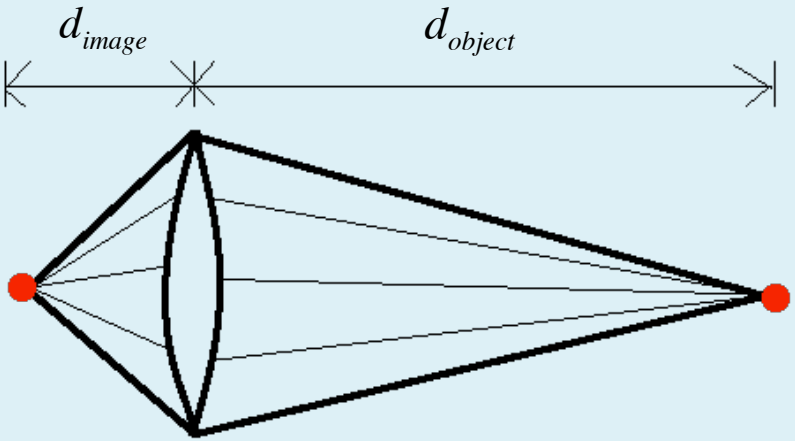
- Device that helps us see objects that are far away
- Made of a set of lenses and/or mirrors

- TODAY: Refractive telescopes
- Two lenses:
  - Eyepiece lens
  - Objective lens

Lenses

- Focal Length: distance at which lens focuses image
  - Assumes the rays of light are parallel
  - Otherwise use lens equation:

$$\frac{1}{d_{object}} + \frac{1}{d_{image}} = \frac{1}{f}$$



Magnification

- How much bigger the object looks

$$M = \frac{h_{image}}{h_{object}} \qquad M = \frac{f_{objective}}{f_{eyepiece}}$$

Today's Task

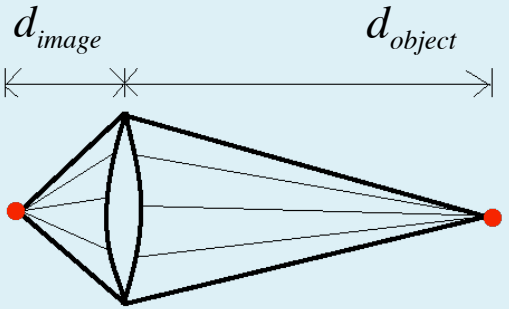
- Get 1 Eyepiece and and 1 Objective Lens
- Measure Objective focal length
  - Focus an image of the light on a piece of paper
  - Measure the distances between
- Build Telescope with eyepiece and lens
- Measure Magnification

- Does it match the expected value?

Instructions

- 1: Measure Objective focal length
  - Focus an image of the light on a piece of paper
  - Measure the distances between the lens, light and paper

$$\frac{1}{d_{object}} + \frac{1}{d_{image}} = \frac{1}{f}$$



  - Solve the equation for focal length!!
- 2: Build the Telescope
  - Objective lens focuses the image at Eyepiece focal point

Instructions

- Measure Magnification
  - Use two identical objects
  - Look at one from a distance using the telescope
  - Move the other object close to you until it looks the same size
  - Measure the differences in distance
  - Find the magnification!

$$M = \frac{d_{image}}{d_{object}} \qquad M = \frac{f_{objective}}{f_{eyepiece}}$$

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