

Donald P. Shiley School of Engineering
EGR 491 Telescope Design, Fall 2019
Design Report Requirements

The final design report shall be submitted 1 per team. I do not have any particular format in mind – could be memo, could be a traditional design report, could be something else. You figure out how to present the following information clearly and concisely:

- Overall telescope design criteria (created by the class long ago)
- Design criteria for your piece of the design
- Discuss at least 3 alternatives and discuss why you chose the alternative you did and not the others (should relate to the criteria). Photos and/or sketches of all 3 alternatives is required. Some components are often purchased, so if your design could have been purchased then one of the alternatives should be “purchase” (include approximate cost information). Common purchased items include: mirror cell, OTA (we did purchase mostly), secondary holder/spider, focuser, finder.
- Include design details of the piece you designed – photographs and explanations. Discuss how well it meets the criteria and how well it works. Discuss any suggested improvements.
- Discuss overall finished telescope design. Discuss how well it meets the design criteria. Discuss anything you think could be improved on the existing scope and/or on a future scope.
- Include a cost estimation table (cost of each component and total). Assume we used 1 sheet of plywood, 1 2X4, 2 10” diameter sonotubes, 2” diameter PVC pipe...all things The Home Depot and Lowes’ carry (they have awesome web pages, too). Some 3D printing... We also purchased the mirrors (http://www.jimsmobile.com/buy_mirrors.htm). Assume \$10 for miscellaneous (fasteners, tape, lens, batteries, etc.). Assume \$50 for an eyepiece. Compare with what it would cost to purchase a comparable completed telescope.

While all pieces of telescope design are important, some pieces can be tricky to get right. All teams should discuss design of the following:

- Primary mirror cell (discuss 2 different designs that allow the mirror to be adjusted for collimation)
- Secondary mirror size – discuss how it is determined, and what an appropriate size would be for our telescope (8” diameter, f/7.5). Discuss pros/cons of “undersized vs. oversized” secondary mirrors. Assume 7” from diagonal to focal plane, assume 1” field stop for the eyepiece, and use Mel Bartels’ calculator: <https://www.bbastrodesigns.com/diagonal.htm>
- Secondary mirror holder (“spider”) – discuss 2 common methods to allow the secondary mirror to be adjusted for collimation.

If your team did design one of the above, then you do not need to discuss it again, but do be sure you have addressed the issues requested.

A few additional comments:

- Remember, photographs and sketches are a very effective, and often underutilized, communication tool! 1 photograph = 1000 words. Be sure to include figure numbers and descriptive captions (each photograph plus caption should tell a complete story).

- Cite all sources – photographs, ideas, etc...whenever you used information in any capacity from some source, cite it! (so you will need a reference section).
- Since there are two students per team, writing the report should be divided into two – but well integrated into a single cohesive document. Please make it clear to me who the primary person was who was responsible for which parts of the report. Separate grades may be assigned to individuals.