

Statistics Project—Celestial Navigation With a Digital Camera?

Background: If a digital camera can be used in the place of a sextant to measure angles between celestial objects and the horizon then it can be used as a navigation tool. The use of a digital camera could improve the process in many ways—more/faster sightings, easy sightings from a rocking platform, auto sight time logging, additional coverage of sightings with partially obscured horizon, etc. To be practical the camera must be able to consistently measure angles to within 2 minutes of arc (<1 minute would be better). This project looks at the feasibility of using a digital camera in the place of a sextant for the purposes of celestial navigation.

Test Plan: From a suitable location take sextant sightings and corresponding photos. Use the pixel distances as the explanatory variable and the sextant altitudes as the response variable. Answer the question—Can the photos be reliably used to measure the altitude? Take special care to control for camera settings such as zoom, resolution focus, lens, etc.

Getting Started: Run a sample set of measurements and photos to check for potential problems.

First Meeting: Prior to the meeting do the “Test Plan” and “Getting Started” exercises above. Discuss your study proposal and any questions you have with your instructor. Your instructor will provide you with clarifying directions. Write a summary of this meeting and turn it in to the instructor.

Formal Procedures Statement: Write down the procedures for your study and have your instructor critique these procedures. Your procedures statement should include: site selection, sighting time/dates, camera(s) selection, camera settings, celestial objects, data recording forms, etc.

Collect Data and Compute Statistics: You should end up with a table of test results, an angle computation formula, and a statement of accuracy based on the test results.

Penultimate Meeting: Present your results. If there are problems with the testing procedures resolve them and run the tests again. Discuss what conclusions are justified. Discuss every section of the project report and what your report should have for each section.

Write Project Report Draft: Write your report based on the discussions with your instructor.

Final Meeting: Present your draft report to the instructor. Use your instructor’s critique to write the final report.

Write the Project Report.

Additional Project Guidelines:

Due Dates

[Report Format](#)

[Report Writing Cautions.](#)