

# AE483: Lab #1 Rubric

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Your activities in Lab #1 will be assessed with the following rubric.

## **(20%) Attendance (assessed individually)**

You are expected to attend lab during the section for which you enrolled. If you must be absent on a certain day, please speak with your TA or with Prof. Bretl at least one week in advance.

- (10%) You arrived on time and participated actively throughout the first lab session.
- (10%) You arrived on time and participated actively throughout the second lab session.

## **(40%) In-Lab Demos (assessed as a group)**

Your group is expected to show all of the following things to your TA during lab. (More detail about each one is provided in the lab manual.) If you do not finish these things during your lab session, you may show them during any TA's office hours until the time at which your report is due.

*From agenda for the first day:*

- (2%) You flashed the quadrotor with the required code.
- (2%) You received all required IMU data through the ACI tool.
- (2%) You saved all required flight data to a text file.
- (1%) You created a plot of quadrotor position as a function of time.

*From agenda between the first and second day:*

- (2%) You created a plot of yaw, pitch, and roll angles from integration and from mocap.
- (2%) You identified at least one significant difference between results from integration and from mocap and provided at least one reason for this difference.
- (2%) You provided a logical argument for or against relying only on IMU data.
- (2%) You created a plot of angular velocity from differentiation and from IMU data.
- (2%) You identified at least one significant difference between results from differentiation and from IMU data and provided at least one reason for this difference.
- (2%) You provided a logical argument for or against relying only on mocap data.

- (2%) You showed a 3D animation of your quadrotor’s flight in MATLAB that correctly visualized your own flight data.
- (2%) You described the relationship between the 3D animation and the video recording of your flight, and provided at least one reason for any difference between them (if any).

*From agenda for the second day:*

- (2%) You conducted an experiment to identify and describe the mocap workspace and saved all data from this experiment to a text file.
- (1%) You created a plot of quadrotor position as a function of time from your experiment.

**(40%) Report (assessed as a group)**

Your group is expected to submit a report no later than 11:59PM on Friday, September 29. No late submissions will be accepted for any reason. Your report must satisfy the following requirements:

- It is a PDF with size 8.5x11 pages.
- It uses font “Times New Roman” (or similar) and size 12 point.
- It is single-spaced.
- It has 1-inch margins.
- It has a title, a list of authors, and a date.
- It has, at minimum, four pages of text and two pages of figures.

Any report that does not satisfy these requirements will receive zero credit. You are encouraged to submit your report early and to follow up with your TA to confirm that it satisfies requirements. (You may resubmit a new draft of your report with the same filename at any time before the deadline.) Your report will be evaluated as follows:

- (10%) Goal
  - (2%) There is a section with this title.
  - (4%) An engineer would understand what you wanted to achieve after reading this section. (Restating what appears in the lab manual is insufficient. What does “identify and describe the region within which the quadrotor must remain in order for mocap to provide accurate measurements of position and orientation” really mean, anyway? Part of your job is to figure this out.)
  - (4%) An engineer would know how successful you were in achieving your goal after reading this section. (It is not necessary to be 100% successful in order to write a useful report.)
- Method of approach
  - (2%) There is a section with this title.
  - (4%) An engineer would be able to repeat the experiment that you implemented after reading this section.

- (4%) An engineer would understand why the experiment was designed the way it was after reading this section.
- Results
  - (2%) There is a section with this title.
  - (4%) There is at least one figure in this section. It, and all other figures in the report, have the following characteristics:
    - \* Each figure has a descriptive caption.
    - \* Each figure is labeled, for example, Figure 1, Figure 2, etc.
    - \* The axes in each figure have descriptive and appropriately sized labels.
    - \* The tick labels (i.e., the numbers along the horizontal and vertical axes) in each figure are appropriately sized.
    - \* The lines in the plot (both axis lines and data curves) are sufficiently thick.
    - \* Plots containing more than one set of data contain a descriptive legend that is appropriately sized.
  - (4%) An engineer would understand key characteristics of the mocap workspace (e.g., its shape and size) by looking only at the figures in this section, even if he or she ignored every other part of the report.
- Discussion
  - (2%) There is a section with this title.
  - (4%) An engineer would understand at least one limitation of the results (e.g., a source of error) and would know how to change the experiment in a way that might improve the results after reading this section.
  - (4%) An engineer would be able to use the results to help keep the quadrotor inside the mocap workspace after reading this section.