

# **(Rocket name) Rocket Report**

First A. Author, Second B. Author Jr and Third C. Author  
*Course Name, Section*

## **Introduction (primary author(s))**

State the purpose of this lab and provide background using your own words (i.e. do not just copy the rocket project handout). Include the rocket goals and constraints imposed. Include a picture of your rocket and summarize the design you came up with (i.e. # stages? Strap on boosters? Motor types?). The following text describes what you need to include at a minimum in your report.

### **A. Rocket Design (author(s)\*)**

Describe the process that you and your team went through to arrive at your final design solution. What options did you consider (called “trade studies”) to find the optimal design that balanced cost, performance and schedule (had to finish on time)? Explain in detail how the project requirements, constraints and goals drove your design decisions. Include any design drawings that you used. How did you consider drag in your design? Did this drive your decisions on fin sizing, location, shape, etc with respect to stability (i.e. how straight it flew)? Include your filled in Spec Sheet that has your mass and cost data and your calculated CMR score.

### **B. Modeling and Simulation (author(s))**

Explain how you estimated your rocket’s performance, i.e. altitude achieved. Describe all the assumptions you made (masses, drag, etc), the propagation method you used, and how you simulated the staging if applicable for your design. Include a well labeled plot of your trajectory clearly showing the maximum altitude achieved. Also describe how you used the wind tunnel and rocket motor test stand data in your simulations.

### **C. Flight Test Results and Analysis (author(s))**

What happened when you flew your rocket? What went right? What went wrong and why? Clearly state your actual maximum altitude achieved. Did you meet the stated requirements (i.e. achieve > 300’ altitude and bring the payload/altimeter back to Earth safely)? How did your actual altitude compare to your prediction from Part B?

Provide an analysis. This is important. Describe why you think your actual flight was different than what you predicted. Were deviations due to environmental conditions? Errors in

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\* In a technical journal, you would not list the author for each section, but for these academic reports it is required in order to assess individual student participation and performance. Clearly indicate the author(s) who significantly contributed to each section or part in parentheses next to the title.

the model? Assumptions? Explain these in detail. Also be sure to comment on the stability of your rocket and why you think it was stable or unstable. Did you make any adjustments between the first and second launch?

### **Conclusion (authors)**

This section sums up the lab and important results. What do you need to consider when designing and testing rockets, what were some of the problems encountered, etc. What would you do different if you were to make another rocket? Do not cite references in the conclusion as all points should have been made in the body of the paper. Do not refer to appendices, figures, tables, or equations.

### **References**

[1] Author, I.M., The Title of the Book, Publisher, Edition number, Year, page numbers.

In the first 3 lab reports you must include at least one reference besides the lab guide, in the final 4 lab reports you must include at least two references.

### **Acknowledgments**

Use this part if you received extensive help from a classmate. You may also recognize a helpful faculty if that was the case.

### **Appendix A Title of Appendix**

Any material that distracts from the discussion in the main body of the text should be included in the appendices. Some examples might be lengthy calculations or derivations, Matlab code, and long data tables.

### **Appendix B General Grammar and Preferred Usage**

Grammar and spelling count! Word spellchecker and grammar checker are good tools, but do not rely on them exclusively. The following are some rules to remember in technical writing. Hyphenate complex modifiers: “zero-field-cooled magnetization.” Avoid dangling participles, such as, “Using Eq. (1), the potential was calculated.” [It is not clear who or what used Eq. (1).] Write instead “The potential was calculated using Eq. (1),” or “Using Eq. (1), we calculated the potential.”

Use a zero before decimal points: “0.25,” not “.25.” Use “cm<sup>2</sup>,” not “cc.” Indicate sample dimensions as “0.1 cm × 0.2 cm,” not “0.1 x 0.2 cm<sup>2</sup>.” The preferred abbreviation for “seconds” is “s,” not “sec.” Do not mix complete spellings and abbreviations of units: use “Wb/m<sup>2</sup>” or

“webers per square meter,” not “webers/m<sup>2</sup>.” When expressing a range of values, write “7–9,” not “7~9.”

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within parenthesis.) In American English, periods and commas are placed within quotation marks, like “this period.” Other punctuation is “outside”! Avoid contractions; for example, write “do not” instead of “don’t.” The serial comma is preferred: “A, B, and C” instead of “A, B and C.”

If you wish, you may write in the first person singular or plural and use the active voice (“I observed that...” or “We observed that...” instead of “It was observed that...”). Remember to check spelling.

The word “data” is plural, not singular (i.e., “data are,” not “data is”). The subscript for the permeability of vacuum  $\mu_0$  is zero, not a lowercase letter “o.” The term for residual magnetization is “remanence”; the adjective is “remanent”; do not write “remnance” or “remnant.” The word “micrometer” is preferred over “micron” when spelling out this unit of measure. A graph within a graph is an “inset,” not an “insert.” The word “alternatively” is preferred to the word “alternately” (unless you really mean something that alternates). Use the word “whereas” instead of “while” (unless you are referring to simultaneous events). Do not use the word “essentially” to mean “approximately” or “effectively.” Do not use the word “issue” as a euphemism for “problem.”

Be aware of the different meanings of the homophones “affect” (usually a verb) and “effect” (usually a noun), “complement” and “compliment,” “discreet” and “discrete,” “principal” (e.g., “principal investigator”) and “principle” (e.g., “principle of measurement”). Do not confuse “imply” and “infer.”

Prefixes such as “non,” “sub,” “micro,” “multi,” and “ultra” are not independent words; they should be joined to the words they modify, usually without a hyphen. There is no period after the “et” in the abbreviation “et al.” The abbreviation “i.e.,” means “that is,” and the abbreviation “e.g.,” means “for example” (these abbreviations are not italicized).