Team 16: Kite Generator

Andrew P. Barba; Jared A. Gremley; Brian C. Lyn; Libni Mariona; Simone I. Nazareth

FAMU-FSU College of Engineering 2525 Pottsdamer St. Tallahassee, FL. 32310

1.8 Project Plan

The Final Design Work section (Appendix C) aims to finish modeling the solenoid application and compare it against the selected design through a meeting with our sponsor Jeff Phipps. This section also aims at generating and selecting a design for the kite's flight path. When all the design aspects are selected, the team will move into the Project Construction Planning section. This section aims to evaluate all the factors and variables that might occur in the construction phase while also verifying that the product fits within the project scope and budget. Project Construction & Testing will be executed to make sure that the final design is functional and aligns with the previously set targets. Project Completion & Graduation is the final process in which each member of the team shows our families, friends, the FAMU-FSU College of Engineering, Jeff Phipps, and the rest of the world the education we have acquired and how hard we worked for it.

Chapter Two: EML 4552C

2.1 Restated Project Definition

Analyzing and designing applications to induce an electromotive force (emf) through the oscillation of a magnet within a solenoid by produced with wind.

The team has reconstructed the project definition in order to produce a project that sponsor Jeff Phipps can further market and size. Before, the team has been comparing the feasibility and cost of a solenoid power generator vs a gear-box transmission for use from a wind powered kite. Following a meeting with sponsor Jeff Phipps, the team and sponsor both agreed to move forward with the solenoid application. Currently, the solenoid is modeled through MATLAB and COMSOL computer programs. Together, the computer programs have helped the team to size the design of a solenoid kite generator. To help Jeff Phipps further promote his patent, the team has decided to produce a small-scale prototype of the solenoid power generation. The prototype will show that based off of the displacement of the magnet, the solenoid will be able to power varying electrical sources with varying power loads. The team has also decided to help size, design and analyze the solenoid power generation application for two possible markets through research-oriented reports.

2.1.1 Restated Project Scope

The purpose of this project is to prove the application and produce a prototype of a solenoid power generator utilizing wind from a kite. The idea is to harness the energy of the wind without constructing a permanent wind turbine. Conventional wind turbines need a permanent setup and require a high amount of maintenance. Kite power allows for maneuverability and cheaper maintenance due to less complex mechanical parts. Primarily, the

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project will aim to produce a prototype of the solenoid power generator and to determine the size and feasibility of designs for other applicable markets and power loads.

2.1.2 Key Goals

- Design and test a prototype of the solenoid power generator.
- Size and analze the feasibility of a solenoid power generator for different power levels.

2.1.3 Markets

Depending on the output power desired, there are several potential markets for a kite generator to be scaled. Chief among these is Makani, a company with a distinguished airfoil design. However, the implementation of this product has stalled due to the cost of its elaborate design creating the need for a cheaper alternative. Another viable market would be to replace current combustion gas generators with a similarly rated solenoid power generator. These new power generators could be used for areas far removed from the electrical grid or in the event of a collapse of the grid. Applications for use involve disaster relief organizations, and military use.

2.1.4 Assumptions

- Variable wind speeds will produce non-constant.
- Operate at less than 20 MPH and at altidue of 400 feet.

2.1.5 Stakeholders

- Jeff Phipps - Sponsor
- Ron Pandolfi Fluid dynamics expert providing fixed wing aircraft
- Makani
- Disaster Relief Organizations and Governments

2.1.6 Timeline

Designing & Buying February 1st – March 1st

- Analysis of lift, drag and oscillation of kite and tether
- Catalog purchase or produce viable solenoid

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