

Good challenges research proposal example

[Engineering](#), [Aviation](#)



Importance of undertaking the research

Tethers are used in Airborne Wind Energy (AWE) systems instead of the use of rigid towers. With the use of tethers, there is new degree of freedom in the flight. AWE systems come with different shapes when compared to aircrafts and aerostats. This, therefore, requires that unique attention be directed at safety dynamics, and systems control. The use of tethers instead of towers brings challenges to the whole process. Although this is the case, there is the introduction of performance optimization. Currently, AWE systems which have turbine blades with horizontal axis will be required to make adjustments to the altitude of the flight and direction when they are looking for optimal winds. This shows that stability and control is an important requirement for AWE systems. This is because they will need to obtain characteristics that are adequate for the flight. Control and stability is also required in order to optimize the energy that is directed to the AWE systems. There are many uses to the new design that are shown in this project.

Some of the uses include new way of enabling remote villages in developing countries get power. This is because it is expensive to provide power grid and power plants that make use of utility grades. They are also used to provide ships and offshore drilling platforms with auxiliary energy. This is because it is not possible to provide the ships with external power given their locations and the separation provided by the sea. The drilling places are located in remote and rough terrains and makes provision of external power impossible. The use of the new design has made the provision of services simpler and accessible. The main aim is to provide power to places where

external power is hard to be installed. The social benefit of providing power to remote villages is that the inhabitants of these villages will have an opportunity of getting quality life. The people could have been denied source of power. The project presented is hope to ships which have crippled, or to remote areas with rough terrains but lack drilling platforms. It is also a solution for industrial development for remote areas which could have been ignored.

This research, therefore, will come up with Helical Vertical Axis Wind Turbine (VAWT) to be used by Airship. The turbine will have a unique design that has been enhanced in order to reduce control and improve the stability. In addition, the Helical VAWT will give a design that has blades with twisted bodies in a helical position around the axis that is used for rotation. This design will decrease vibration and stress on the structure of the turbine. This research will be a major milestone in the research towards Air Wind Turbine AWT Design.

There are many challenges that are encountered while designing airborne turbine body structures. One of the main challenges is that the structure of the airborne wind turbine should undergo optimization so that it will attain the life cycle cost of the entire system. Other challenges that are faced by AWT designers include resistance of ice and corrosion that is experienced at high altitudes (10, 000m). Another challenge is air turbulence that is experienced in some places. It is also hard to attain a stable aerodynamism. It is also hard to get Helium Gas which is used to inflate Airship balloon. There is also an issue with the design of the balloon together with the material that is used to design.

There is also the challenge that is expected to be experienced by the team. These are main technical challenges like numerical model validation, being able to attain six degree-of-freedom, ability to add dampers to turbine structure, the process of designing the tether, and the ability to validate outputs with the use of computational analysis. These are taken to be challenges because this will be the first time that the evaluation and testing is done for this type of structure.