WIND ENERGY

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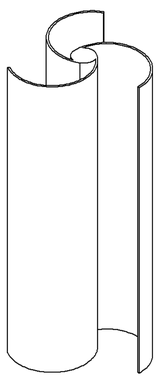
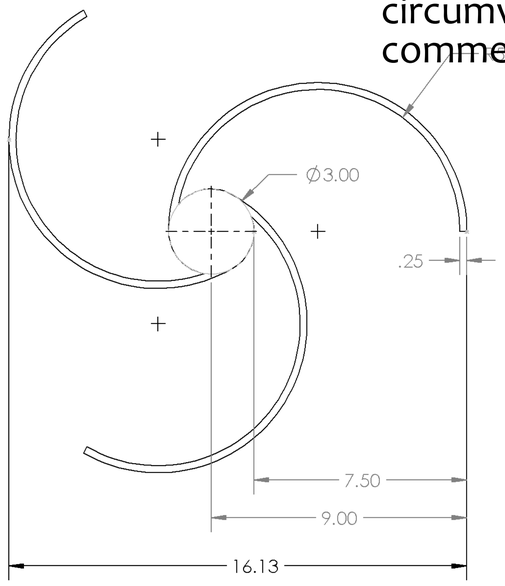
AIRBORNE TURBINE

- Diameter: ≤ 20 in
- Height: ≤ 20 in
- Balloon size: 1.2 m
- Balloon Payload: 2.54 lbs
- Weight: 7.5-15 lbs



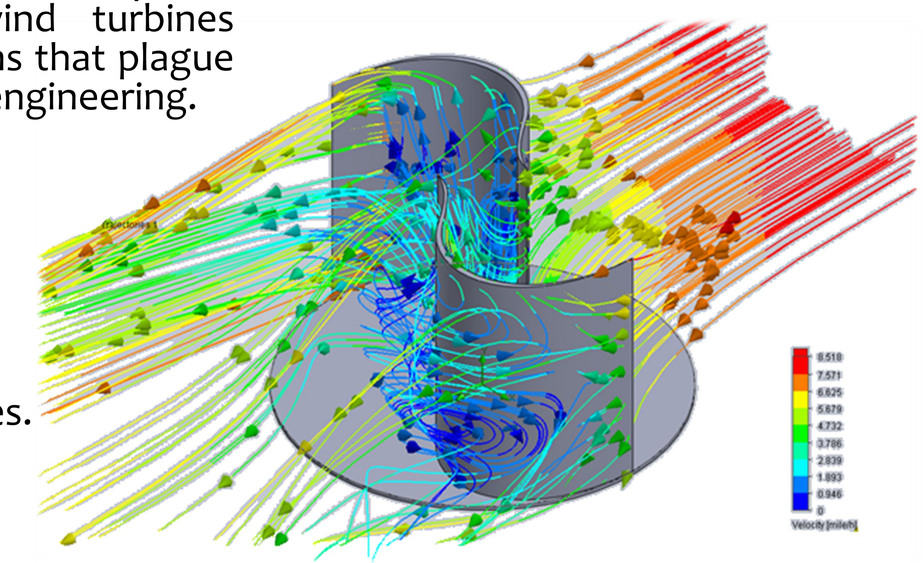


ABSTRACT

Wind energy is a form of renewable energy; however, it has several major drawbacks which include a dependence on variable wind speed and intensity, the need for an initial input of power to induce rotation, and large turbine blades to generate a substantial amount of power. This project aims to address these limitations through the use of a self-starting savonius design that will be grounded, and another savonius design that will float at some height to capture wind. These turbines can be deployed for use by researchers or be used by small and rural villages with no connection to an electrical grid. Grounded savonius turbines self-start and operate at low wind speeds which make them ideal for areas with wind speeds ranging from 10 to 20 mph. In conclusion airborne and grounded wind turbines circumvent many of the common problems that plague commercial wind turbines through clever engineering.

METHODS

- Optimal rotor blade shape was found through research and computational fluid dynamics.
- Blades are constructed from multilayer fiberglass composites.
- High density foam used to construct exterior stator for Airborne Turbine.



GROUNDED TURBINE

- Diameter: ≤ 20 in
- Height: ≤ 20 in
- Weight: ~8 lbs
- Power: 30-60 W

Cole Gnadt, Athanasios M. Kaplanis, Harjot Purewal, Abdullah Abdal, Danny Chu, Erick Cruz, Alexander Cuenca, Paul DeMesa, Jonathan Guevara, David Kim, Hunkee Kim, Derek Kuey, Yue Ma, Milton Paredes, Laura Perez, Ethan Shin, Joshua Valdivia, Linan Zhu