ANTENEH ENGINEERING

NEW SOUND VIBRATION CANCELING MECHANISM FOR OFF-SHORE WIND TURBINE INVENTION

1. Problem statement

Underwater sounds of varying intensity and duration, are generated during the four stages of a wind farm's life cycle:

1. Pre-construction, which often includes geophysical/seismic surveys to assess site condition and increased vessel traffic to and from the site;
2. Construction, which may include pile driving, drilling, excavation with explosives, dredging, cable laying, and continued ship and barge operations;
3. Operation, including long-duration noise associated with mechanical vibrations when the blades are spinning and maintenance vessel traffic, continuing over the 20 to 25-year lifetime of the facility; and
4. Decommissioning, which may include mechanical cutting and explosives as well as increased vessel traffic to and from the site.

During the operational stage of a wind farm, low frequency sound is produced when the blades are spinning. As a turbine operates, vibrations inside the nacelle (the housing that contains the generator, gearbox, and other parts) are transmitted down the main shaft of the wind turbine and into its foundation. These vibrations then propagate into the water column and seafloor. The sound is primarily below 1 kHz (generally below 700 Hz), with a source level of 80-150 dBre 1 µPa @ 1 m. Aerodynamic noise produced by the rotor blades may also enter the water through an airborne path. Sound levels increase slightly as wind speed increases.

Many offshore wind farms are constructed in coastal waters. Significant growth in offshore wind development has led to concern about the potential for negative impacts on fishes, marine mammals, invertebrates, birds, and bats. Potential negative effects include collision, habitat displacement, and exposure to electromagnetic fields and underwater noise.

2. Our Solution

This project is about building a new system that can highly minimize sound vibration waves generated from off-shore wind turbines propagated in to the oceans killing and/or hurting aquatic animals.

Because less sound is absorbed in solids and liquids than in gases, sounds can propagate over much greater distances in these mediums but not in vacuum. The sound waves generated by the wind turbines either from the collusion with air or from the mechanical components travels in the nearest surface water which will travel long distance affecting aquatic animals nearby because sound wave is less absorbed in oceans. This can be avoided by using vacuum blocking mechanism installed in surface of the shore where the wind turbine is erected X meter above from the level of the shore in 360 circular degrees. This will greatly minimize the propagation of the sound generated by the wind turbine and this can be proved by simple experiment in laboratory by vibration sensing devices.

The cover need to be 100 percent transparent to avoid dead zones below the turbine because natural life below need sun light like algae's and other which are essential for the natural ecosystem of the shore. The only limitation from this mechanism is boat cannot travel because of the cover near the turbines but this is a good thing because it will maximize safety and ship navigation near off-shore wind turbines do not work either.

The detail design for the cover will be provided but the main structure is shown below.

The following diagrams show the basic structure and working principle of the system when the wind turbine is stationary and rotating.

Figure 1- single structure of the mechanism

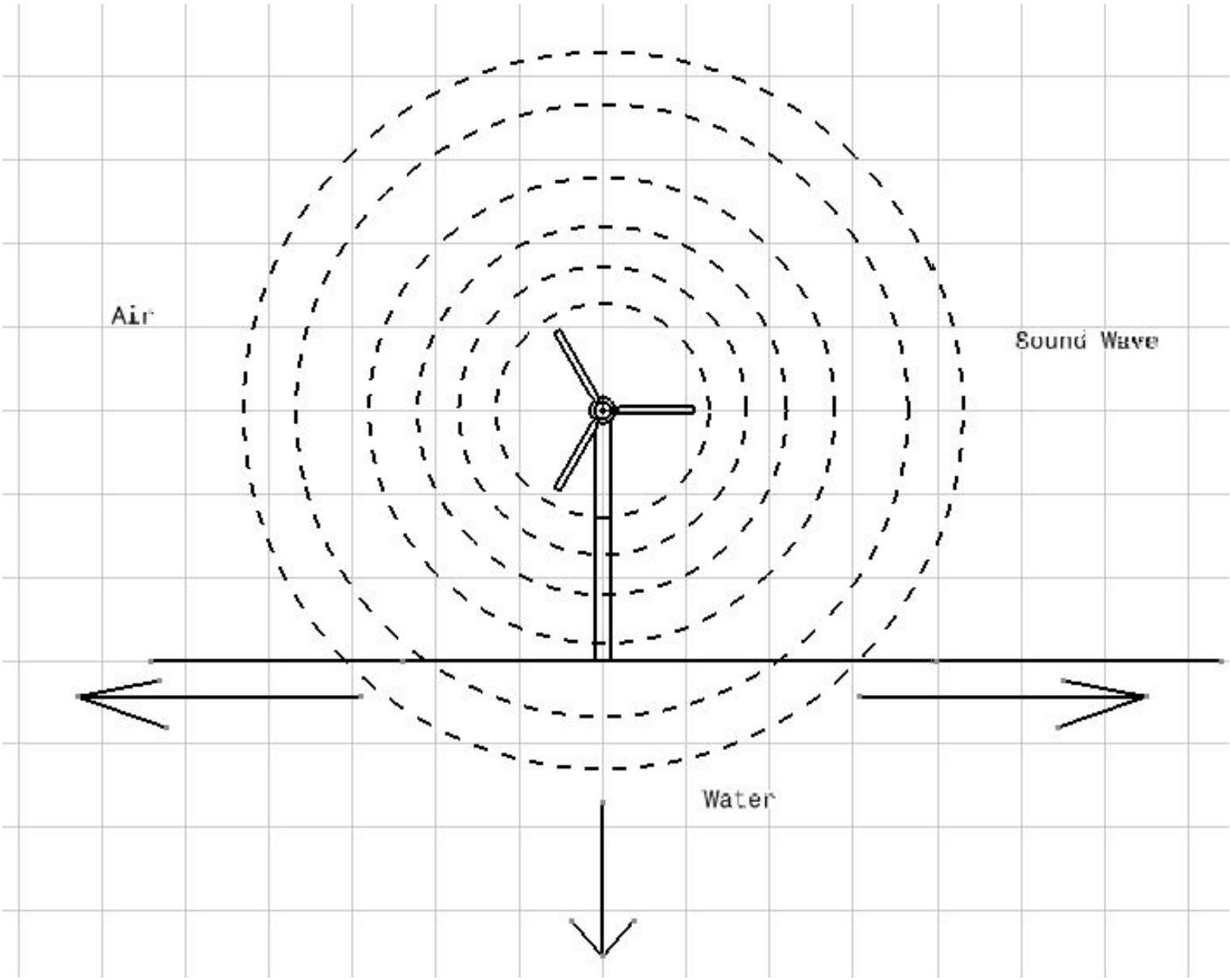

Figure 2- basic sound propagation principle of wind turbines

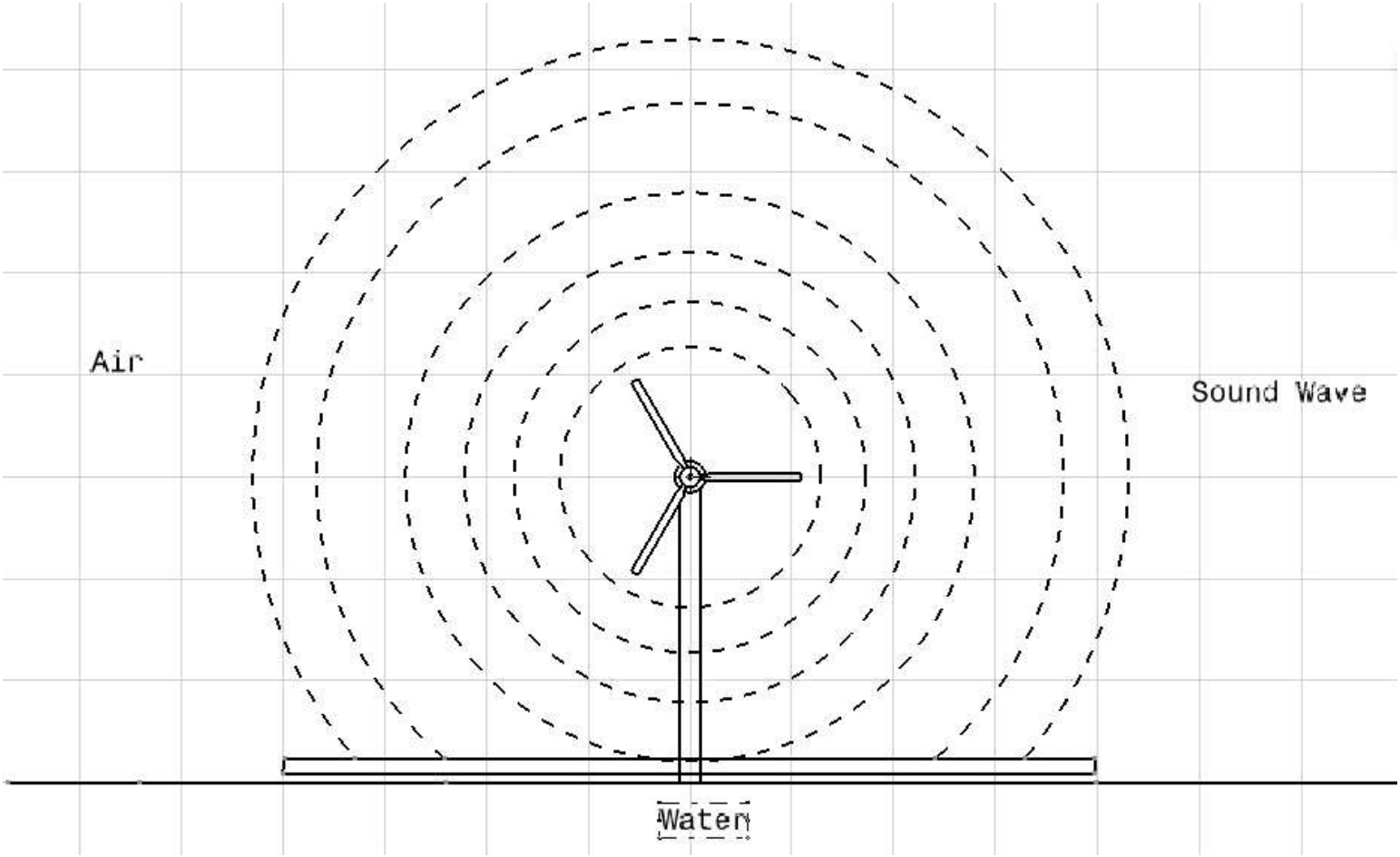

Figure 3- working principle of the mechanism

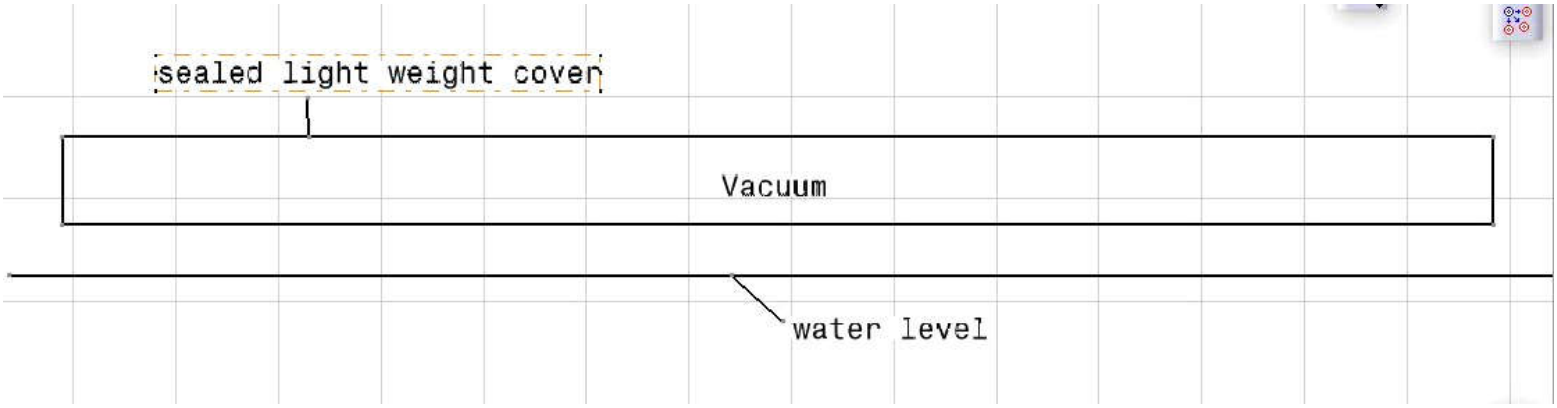

Figure 4- basic structure of the cover

Figure 1- structure of the mechanism working collectively

Inventor profile

To say few words about my background, I have dedicated my life for invention and research because not only I have big dreams but also it is my only way out of poverty. We all have a talent we know or did not find out yet. Mine happens to be inventing. I discovered this talent of mine when I was in second year student during my university life. Starting from that point everything seemed not important except creating new ideas. So, until now I have invented more than 70 inventions.

You can find some of my inventions via
https://contest.techbriefs.com/profile?user=89682
https://www.herox.com/crowdsourcing-community/antenehgashaw-123126
https://desall.com/User/AntenehGashaw/Portfolio
https://challenges.openideo.com/profiles/antenh.g/contributions#recent-contributions

My latest big international honors are

- Winner of Mechanical maker challenge by NASA/ JPL- 2019 with my design invention “Mechanical eye”
- Finalist for the TIC AMERICAS 2020 competition with my project “Caribbean Sargassum Problem” project
- Finalist in TKF plastic innovation challenge 2019 with my invention “Smart green washer”
- Top 100 inventions of 2019 by create the future contest by tech briefs with my project “Cone solar panel”
- Top 10 winner of TIA challenge 2019 with my multiple unique solutions and invention
- Finalist in Enel challenge on MV & LV distribution challenge 2019 with my invention “Turbine for avoiding birds in MV & LV distribution lines”

I believe that I have made many contributions to science so far and just to mention some,

- In the recent Hawaii natural problem challenge which is the saving the Ohi'a challenge (https://conservationx.com/challenge/invasives/ohia), I submitted more than 30 possible solution which you can see via https://conservationx.com/challenge/invasives/ohia/projects
- I have developed more that 20 inventions for solution, management and prevention of the Coronavirus (COVID-19) which you can see via https://solve.mit.edu/challenges/health-security-pandemics/solutions/22229 or https://contest.techbriefs.com/profile?user=89682
- I have designed a Green- technology that will solve the micro fiber problem in the oceans which you can see via https://2019.spaceappschallenge.org/challenges/earths-oceans/trash-cleanup/teams/the-saviors/project
- I have designed a Green- technology that will solve the micro Plastic problem in the oceans which you can see via https://contest.techbriefs.com/2019/entries/medical/9465
- I have many contribution for agriculture industry with my multiple project like https://challenges.openideo.com/challenge/food-system-vision-prize/open-submission/isolation-farming
- I have contributed to Teraforming Mars with my project Melting mars polar ice cap https://www.globalinnovationexchange.org/innovation/melting-mars-polar-ice-cap
- I have contributed on reduction of plastics in packaging in beverage industries with my project bottle belt https://contest.techbriefs.com/2019/entries/sustainable-technologies/9466

- I have invented a mechanism that will solve the hurricane crisis of the USA for good and I am looking for a department to submit my white paper which you can see via https://www.herox.com/ideas/128-solving-us-hurricane and few of my honorary certificates are shown below.

Figure 12 – NASA / JPL winners' certificate

Certificate of Achievement

This Certificate of Achievement Presented to

Anteneh Gashaw

Recognizing your submission as a Top 100 Entry in the
Create the Future 2019 Design Contest

Cone Solar Panel

Presented
November 2019

Joseph T. Pramberger
President, Tech Briefs Media Group

Figure 13 - Certificate of achievement for top 100 inventions of 2019

OAS More rights for more people · YABT · PEPSICO Latin America

TIC AMERICAS 2020 Talent and Innovation Competition of the Americas · startup challenge · eco challenge11 Sustainability Awards · Caribbean 2020 Innovation Competition

2020

TIC AMERICAS

Talent and Innovation Competition of the Americas

CERTIFICATE OF PARTICIPATION

Awarded to:

Caribbean Sargassum Problem

For your participation as a Finalist of the Caribbean Innovation Competition during the Talent and Innovation Competition of the Americas (TIC Americas 2020).

Washington, DC, United States of America, July 2, 2020.

Luis A. Viguria
Chief Executive Officer
Young Americas Business Trust

Valerie Lorena
Executive Director
Young Americas Business Trust

Figure 14 - Certificate of participation for the TIC AMERICAS 2020 contest finial