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Floating wind generators for generation of power any where

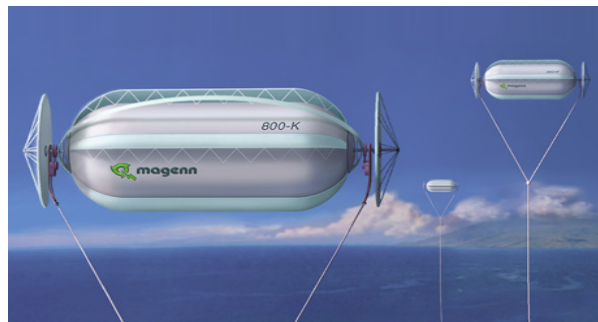
Prof. S Kalpanadevi¹, Shri Ram M.J.R², Ramya S³
Knowledge Institute of Technology

Abstract: Floating wind generators are the new dimension for the generation of power by converting the energy of conventional air currents in the atmosphere at high altitudes for the generation of electricity and power with the help of MARS technology. MARS (magenn power air rotor system) is a Wind Power Anywhere solution with distinct advantages over existing Conventional Wind Turbines and Diesel Generating Systems including: global deployment, lower costs, better operational performance, and greater environmental advantages.

MARS is a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy. This electrical energy is transferred down the 1000-foot tether for immediate use, or to a set of batteries for later use, or to the power grid. Helium sustains MARS and allows it to ascend to a higher altitude than traditional wind turbines. MARS captures the energy available in the 600 to 1000-foot low level and nocturnal jet streams that exist almost everywhere. MARS rotation also generates the "Magnus effect" which provides additional lift, keeps the MARS stabilized, and positions it within a very controlled and restricted location to adhere.

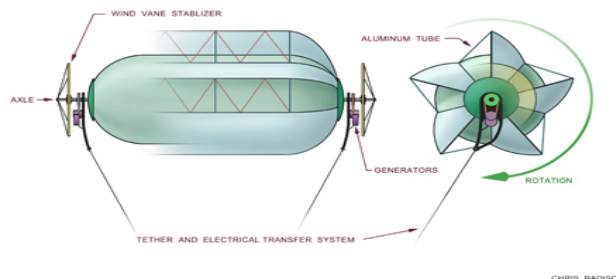
I. INTRODUCTION

The Magenn Power Air Rotor System (MARS) is an innovative lighter-than-air tethered device that rotates about a horizontal axis in response to wind, efficiently generating clean renewable electrical energy at a lower cost than all competing systems. This electrical energy is transferred down the tether to a transformer at a ground station and then transferred to the electricity power grid. Helium (an inert non-reactive lighter than air gas) sustains the Air Rotor which ascends to an altitude for best winds and its rotation also causes the Magnus effect. This provides additional lift, keeps the device stabilized, keeps it positioned within a very controlled and restricted location, and causes it to pull up overhead rather than drift downwind on its tether.



M A R S

MAGENN AIR ROTOR SYSTEM



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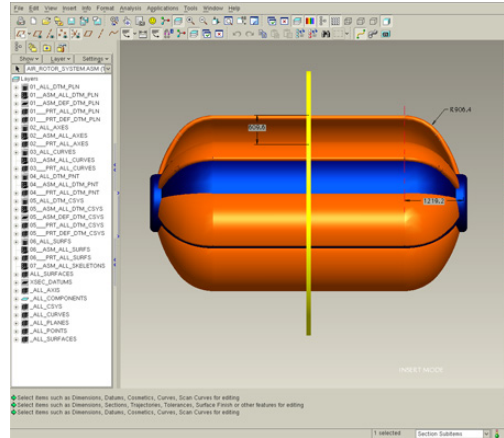
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A. Mechanism of Mars

All competing wind generators use bladed two-dimensional disk-like structures and rigid towers. The Magenn Power Air Rotor system is a closed three-dimensional structure (cylinder). It offers high torque, low starting speeds, and superior overall efficiency thanks to its ability to deploy higher. The closed structure allows Magenn Power to produce wind rotors from very small to very large sizes at a fraction of the cost of current wind generators.

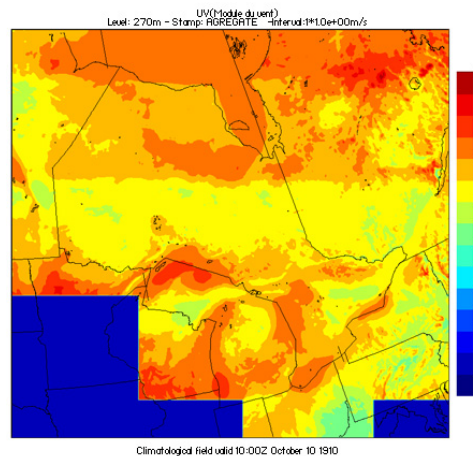
B. Design Parameters of Mars

Computational Fluid Dynamic Simulation allows Magenn Power to simulate various designs quickly and efficiently without the need to build or test hundreds of prototypes in an actual wind tunnel.



C. Wind Data

270 meter Wind Data Map, Province of Ontario Canada (courtesy of Environment Canada)



With the Magenn MARS "Wind Power Anywhere" technology, there are less limits on placement of our wind turbines as we are able to get into the "low level wind jet streams" that exist the higher you go in elevation. The 270 meter wind map clearly shows that most areas of Ontario have winds above the 8 m/s range when you get to a height of 270 meters.

MARS technology of a tether versus a tower, enables more areas around the world to utilize wind power.

D. Floating Wind Turbine Installation and Deploying

- 1) It's easy to install and deploying the FWG.
- 2) To setup a wind turbine it takes nearly about few minutes.

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E. Environmental concerns

These are usually the main environmental concerns that arise in association with the set up of a wind turbine.

1) *Visual Impact:* Wind turbines are highly visible structures often opposed by homeowners or real estate developers owning land near a proposed site. Several studies have shown that opposition often diminishes after the turbines are in place as homeowners find the structures aesthetically pleasing and realize their environmental benefits. Thus, opposition related to visual impact can be reduced through careful arrangement of the wind turbines, rendering them impressive against a landscape and through the education of the benefits of wind energy. Less opposition arises in rural settings where farmers are often paid rent or fees by the owners of the turbines. Magenn Power has an added benefit in that our MARS units may be deployed much higher above surrounding terrain than conventional systems, thus capturing more wind. Conventional systems are positioned in areas where winds are higher such as coastal areas and high terrain. These locations are typically at greater distances to customers. MARS, due to its ability to reach greater winds at higher altitudes can be placed closer to demand centers, reducing transmission line costs and transmission losses.

2) *Avian Mortality:* Birds and bats occasionally collide with wind turbines, as they do with other tall structures such as buildings. However, collisions with Magenn's Air Rotors should be significantly less. Birds and bats tend not to fly into objects directly in front of them. Birds can see these objects and bats can sense them. Current terrestrial wind turbines are large fast-moving blades slicing through the air, hitting birds and bats from the side without the animals sensing the presence of blades. In contrast Magenn wind turbines are three-dimensional, softer objects. Birds and bats will more easily be aware of the turbine's presence. A large number of studies have addressed this issue. The findings indicate that overall, bird deaths due to wind turbines are low, especially when compared to other manmade structures. An extensive literature review was conducted and a comparison of annual avian mortality in the United States was presented. The table outlines the results.

3) *Noise:* There are two types of noise generated by a wind turbine: mechanical noise from the gearbox and generator; and aerodynamic noise created by the rotors passing through the air. Progress through technological improvements has practically eliminated mechanical noise. Aerodynamic noise has also improved through better rotor design although it will tend to increase with increasing wind speeds. This is not of great concern since background noise will also increase with increasing wind. The table below compares the sound levels of various items. Notice the sound level emitted by a 660kW wind turbine at 200m (650 ft) is less than the noise levels of a normal suburban residential area. The Magenn Power Air Rotors are expected to be even quieter than wind turbines because the Magenn Air Rotors will operate at 1000 feet.

4) *Exposure Time Limits:* Sound levels are logarithmic: a small increase in decibels represents a large increase in sound energy. For this reason, exposure to sound should be cut in half for every increase of 3 decibels.

5) *Height Restrictions:* Magenn has carefully studied deployment of its MARS units. Of particular focus are altitude guidelines as directed by FAA regulations. The five points, below represent a summary of Magenn planning to satisfy these guidelines. Magenn has established a rapport with cognizant FAA officials.

- a) MARS units may not operate in controlled airspace or within five miles of the boundary of any airport.
- b) MARS units that are deployed over 150 feet on a permanent basis will require a NOTAM, which stands for: Notices to Airmen. A NOTAM is issued by the FAA or its equivalent to inform pilots of new or changed aeronautical facilities, services, procedures, or hazards, temporary or permanent. NOTAMS are not difficult to obtain, but will be necessary in most deployment cases in US, Canada and Europe.
- c) MARS units that operate over 150 feet will have a lighting system including individual lights that are placed every 50 feet on its tether. The lights will flash once per second.
- d) MARS units will have a Rapid Deflation Device installed that will automatically and rapidly deflate the balloon if it escapes from its moorings. MARS device will be equipped with at least two deflate systems that will bring the units slowly and safely to the ground. If the MARS unit "cut down" system does not function properly, it will immediately notify the nearest ATC facility of the location and time of the escaped and the estimated flight path of the balloon.

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- e) MARS units balloon envelope is equipped with a radar reflective material that will present an echo to surface radar operating in the 200 MHz to 2700 MHz frequency range.

II. ADVANTAGES

A. Advantage of MARS over Conventional Wind Turbines: Wind Power Anywhere removes all placement limitations. Coast-line or off-shore locations are not necessary to capture higher speed winds. Reaching winds at 1,000-feet above ground level allow MARS to be installed closer to the grid. MARS is mobile and can be rapidly deployed, deflated, and redeployed without the need for towers or heavy cranes. MARS is bird and bat friendly with lower noise emissions and is capable of operating in a wider range of wind speeds - from 4 mph to greater than 60 mph.

B. Advantage of a MARS combined Wind and Diesel Solution over a Diesel Generator-only solution: MARS can complement a diesel generator by offering a combined diesel-wind power solution that delivers power below 20 cents per kWh. This compares to a wide range of 25 cents to 99 cents per kWh for diesel-alone, reflecting the high fuel and transportation costs in remote areas. The MARS combined solution allows lower pollution and green house gas emissions. It also results in lower handling, transporting, and storage costs.

C. The distinct advantages of the Magenn Air Rotor System design are as follows:

- 1) Magenn Air Rotor System is less expensive per unit of actual electrical energy output than competing wind power systems.
- 2) Magenn Power Air Rotor System will deliver time-averaged output much closer to its rated capacity than the capacity factor typical with conventional designs. Magenn efficiency will be 40 to 50 percent. This is hugely important, since doubling capacity factor cuts the cost of each delivered watt by half.
- 3) Wind farms can be placed closer to demand centers, reducing transmission line costs and transmission line losses.
- 4) Conventional wind generators are only operable in wind speeds between 3 meters/sec and 28 meters/sec. Magenn Air Rotors are operable between 1 meter/sec and in excess of 28 meters/sec.
- 5) Magenn Air Rotors can be raised to higher altitudes, thus capitalizing on higher winds aloft. Altitudes from 400-ft to 1,000-ft above ground level are possible, without having to build an expensive tower, or use a crane to perform maintenance.
- 6) Magenn Air Rotors are mobile and can be easily moved to different locations to correspond to changing wind patterns. Mobility is also useful in emergency deployment and disaster relief situations.

III. MARS TARGET MARKETS

Developing nations where infrastructure is limited or non existent; off-grid combined wind and diesel solutions for island nations, farms, remote areas, cell towers, exploration equipment, backup power & water pumps for natural gas mines; rapid deployment diesel & wind solutions (to include airdrop) to disaster areas for power to emergency and medical equipment, water pumps; on-grid applications for farms, factories, remote communities; and wind farm deployments.

IV. CONCLUSION

MARS is most effective, cost effective, eco-friendly, mobile, low maintenance way of generating electrical energy out of wind energy.

It would be an ideal for the country like India which is having vast varieties in geographical landmarks to implement such power stations as it could be installed where it could be.

It is the best solution for the power-crises faced by the world.



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