

## FLOATING AIR ROTOR SYSTEM

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### ABSTRACT

*Floating air rotor system (FARS) is next generation wind turbines with cost efficient and advantageous over the existing ones. FARS is much lighter than air tethered wind turbine which rotates about horizontal axis in response to wind, generating electric power. The electrical power generated is transferred to tether for direct consumption, or to a set of batteries or power grids. Helium gas gives initial lift and sustains FARS at an altitude of best winds. The rotation of the turbine produce a phenomenon called "magenn effect". This effect sustains the floating property of FARS. Hence due to this, FARS is also called as MARS (magenn air rotor system).*

**Keywords:** Eco-friendly, Magnus effect, Wind turbine, CLEAN energy.

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### 1. INTRODUCTION

An Ontario-based company is experimenting to place "turbines" floating higher altitudes and the system is known as "FARS" Floating Air Rotor System or "MARS" Magenn Power Air Rotor System. The "Magenn Power Air Rotor System" (MARS) is a helium filled, cylindrical device, deployed at 1000ft maximum altitude, which rotates about its horizontal axis in response to the wind, generating clean energy at a low cost than other systems.

### 2. CONSTRUCTION OF FARS

It has following important parts:

**Aluminium tube:** It is used to restrict air flow, and to provide thrust for the rotor to rotate in the direction as shown in the figure. Here it converts the actual linear motion of wind flow energy into rotary motion, which is necessary to rotate the generator shaft.

**Cylindrical Balloon:** It is the balloon which is cylindrical shape and is filled with helium air which is lighter than air, hence it could be placed above 300m height, and where as conventional windmills could be maximum 125m height.

**Wind vane stabilizer:** It is one of the important parts of MARS. It restricts the MARS in horizontal direction, and gives stability to the balloon.

**Axle:** It acts as a frame of MARS which is a single shaft connecting balloon, and aluminium tube to the generator shaft, hence it is the power transferring element of the MARS.

**Generator:** It is the actual machine which converts the rotary motion into electrical power.

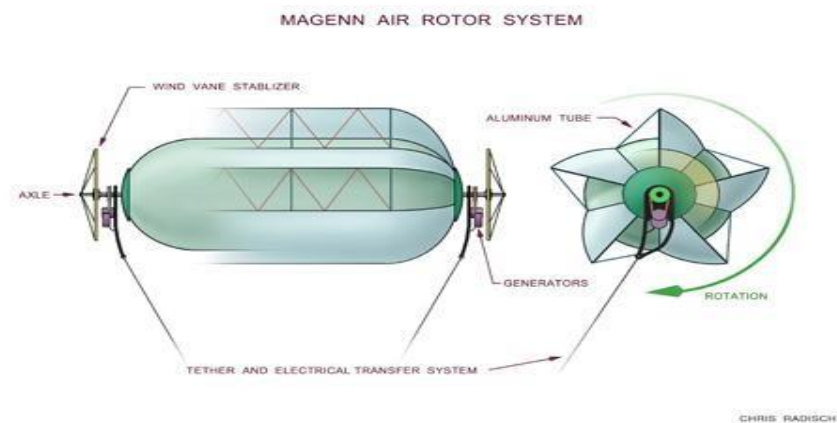


Figure 1: FARS Structure

### 3. WORKING OF FARS

In the very near future years, you may see giant balloons floating overhead. Those balloons are actually wind turbines called FARS, which will high the air at altitudes ranging from 600 to 1,000 feet.



Figure 2: FARS Structure

In FARS turbine blades are actually a part of three-dimensional blimp itself. These blades catch up the wind, causing the blimp to spin. Generator converts this movement into electricity. The electricity produced is transferred down the turbine's long tether.

Although basic concept behind FARS is same as that of traditional wind turbines there are several differences and advantages that make FARS more efficient. One of those advantages is FARS does not depend on large tower to support it up.



Figure 3: FARS Wind Farm

The Floating Air Rotor System (FARS) is lighter-than-air tethered device which rotates about a horizontal axis in response to wind, efficiently generating clean renewable electrical energy. It is also cost efficient than any other systems. This electrical energy is transferred down the tether to a transformer at a ground station and then transferred to the battery or a power grid. Helium gas gives provides initial lift to the Air Rotor which ascends to an altitude for best winds and its rotation also causes the Magnus effect which sustains its floating nature.

#### 4. ADVANTAGES

- Air turbines have numerous advantages over traditional systems, and are more eco-friendly.
- Wind farms can be placed closer to demand centres, reducing transmission line costs and transmission line losses.
- In terms of electrical energy output, the FARS systems are less expensive than traditional wind power systems air turbines can be placed close to wherever they are needed,
- Air turbines can operate at higher wind speeds than conventional wind turbines Conventional wind generators are only operable in wind speeds between 3 meters/sec and 28 meters/sec. floating Air Rotors are operable between 1 meter/sec and in excess of 28 meters/sec.
- Air turbines can float high up in the air, up to 1000ft, thus capitalizing on higher wind speeds.
- Noise pollution is also reduced due to the high altitude operation.
- Air turbines and can be shifted easily.

#### 5. SUMMARY

As we know Wind energy is a CLEAN Energy and renewable source of energy i.e. 100% Pollution-free and environmental friendly and harnessing power out of it is a biggest challenge. This F.A.R.S is a latest mobile power generating technology which uses the wind energy in the effective manner so as to generate more electrical power. This system proves as better & more efficient power generating system than the convectional

wind power systems. F.A.R.S is the most convenient, reliable, renewable and efficient way of generating power at almost all possible environmental conditions in the world.

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