CLAIMS

1. A Magnus rotor comprising:

a rotor rotatable about a rotor axis and having an external surface defining a rotor diameter, the rotor having an internal running surface defining a running surface diameter no greater than 80% of the rotor diameter;

a support structure configured to rotatably support the rotor; and,

a plurality of wheels, each wheel being rotatably mounted to the support structure so as to rotate about a respective wheel axis extending substantially parallel to the rotor axis and being positioned such that the wheel rolls against the internal running surface as the rotor rotates about the support structure.

2. A Magnus rotor according to claim 1, wherein the running surface diameter is no greater than 70% of the rotor diameter; preferably, no greater than 60% of the rotor diameter.

3. A Magnus rotor according to any preceding claim, wherein each wheel has an outer surface defining a wheel diameter at least 10% of the rotor diameter.

4. A Magnus rotor according to claim 1, wherein:

the plurality of wheels are spaced apart from one another about a pitch circle such that each wheel axis extends through the pitch circle; and,

the pitch circle defines a pitch diameter no greater than 70% of the rotor diameter; preferably no greater than 50% of the rotor diameter.

5. A Magnus rotor according to any preceding claim, wherein:

the support structure comprises a hollow tower having a wall with a substantially circular cross-sectional shape; and,

at least one of the plurality of wheels lies at least partially within an outer diameter of the tower.

6. A Magnus rotor according to claim 5, wherein one or more of the wheels lying at least partially within the outer diameter of the tower is positioned so that a majority of the or each wheel lies within the outer diameter of the tower.

7. A Magnus rotor according to claim any preceding claim, wherein the rotor further includes:

a bearing ring having an inner surface or outer surface that is the running

surface of the rotor; and,

a radial flange configured to have an annulus shape with an inner edge that is connected to an outer surface of the bearing ring, and an outer edge which is connected to an inner surface of the rotor; preferably, the radial flange comprises an accessway.

8. A Magnus rotor according to any preceding claim, wherein at least one wheel has an axial height at least 50% of the wheel diameter.

9. A Magnus rotor according to any preceding claim, wherein at least one wheel comprises a substantially cylindrical outer surface.

10. A Magnus rotor according to any preceding claim, wherein at least one wheel comprises a solid tyre; preferably a solid tyre including polyurethane or a completely polyurethane solid tyre.

11. A Magnus rotor according to any preceding wherein the plurality of wheels define a drive assembly for the Magnus rotor, the drive assembly comprising:

one or more drive wheel mechanisms, the or each drive wheel mechanism including a drive wheel positionable to, in use, roll against the internal running surface of the rotor, and a drive mechanism for supplying torque to drive rotation of the drive wheel and, in use, the rotor; and,

one or more idler wheel mechanisms, the or each idler wheel mechanism including an idler wheel that is freely rotatable and positionable to, in use, roll against the internal running surface of the rotor as the rotor rotates,

wherein:

at least one drive wheel comprises a first tyre having a first tyre composition and at least one idler wheel comprises a second tyre having a second tyre composition different to the first tyre composition; and/or,

at least one drive wheel mechanism further includes a biasing mechanism configured to, in use, bias the corresponding drive wheel towards the internal running surface, the biasing mechanism configured to increase the degree of bias applied as the torque supplied by the drive mechanism increases.

12. A Magnus rotor according to any preceding wherein the plurality of wheels define a wheel assembly for the Magnus rotor, the wheel assembly comprising:

the support structure, wherein the support structure defines a pitch circle;

at least one wheel mounted to the support structure and rotatable about a wheel axis to, in use, roll against the internal running surface of the rotor as the rotor rotates;

and

at least one biasing assembly comprising:

a first coupling connected to the support structure;

a second coupling connected to the at least one wheel, whereby in use the wheel rolls against the internal running surface of the rotor as the rotor about the rotor axis; and

a biasing member interconnecting the first and second couplings and configured to urge the wheel axis, in use, towards the internal running surface with a displacement dependent degree of force, wherein the biasing member urges the wheel towards the internal running surface according to a first force characteristic while the wheel axis lies in a first displacement region and urges the wheel towards the internal running surface according to a second, different force characteristic while the wheel axis lies in a second displacement region.

13. A Magnus rotor according to claim 12, wherein:

the at least one wheel is a plurality of wheels and the at least one biasing assembly is a respective plurality of biasing assemblies; and,

the second force characteristic of each biasing assembly replicates a stiffness and the second force characteristics of the plurality of biasing assemblies replicate a stiffness effective on the rotor in use that is greater than a desired moving mass of the rotor multiplied by the square of a desired maximum operating angular velocity of the rotor.

14. A Magnus rotor according to claim 13, wherein the stiffness effective on the rotor in use is between 1.5 times and 10 times the effective moving mass of the rotor multiplied by the square of the maximum operating angular velocity of the rotor; preferably, between 2 times and 5 times the effective moving mass of the rotor multiplied by the square of the maximum operating angular velocity of the rotor.

15. A Magnus rotor according to any preceding claim, wherein at least one wheel forms a part of a gimballed wheel mechanism for the Magnus rotor, the gimballed wheel mechanism comprising:

a wheel rotatable about a wheel axis to, in use, roll against an internal running surface of the rotor as the rotor rotates about the rotor axis;

a mounting assembly rotatably supporting the wheel, in use relative to the support structure, and including a gimballing support configured to allow pivoting of the wheel axis about a gimballing axis which extends substantially perpendicularly to the wheel axis, wherein, in use, the wheel axis and the rotor axis extend along a

substantially common radial plane and the gimballing support is configured such that the gimballing axis additionally extends substantially perpendicularly to the radial plane.