

Use of space technology/energy for human welfare

ROCKET RENAISSANCE

(Employing magnetic levitation & utilisation of oxygen from air for rocket propulsion)

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The concept of rocket levitation can use passive magnetic levitation that is generated when a moving object holding an array of permanent magnets moves over shorted loops of wire embedded in a stationary track. The interaction of magnetic field moving over the wires induces currents in the wire. Tungsten wires can withstand temperature upto 3380°c which have an advantage over copper wires. The wire layout is configured so that the magnets create flux patterns causing levitation but yielding a zero net flux in the adjacent circuits causing minimal harm. Above a critical speed, the induced current interacts with the magnetic field to generate a repulsive force that levitates the rocket above the track. Here HALBACH ARRAYS can be used. They produce spatially periodic magnetic field on the front surface of arrays while cancelling the field on their back surface. They provide motional stability including resistance & both vertical & lateral aerodynamic forces. Carbon fibre composites can be used to shield the rocket components from the intense magnetic field produced. The system would levitate the rocket upto a speed of 600mph without any overboard fuel.

Thrust can be provided by substituting liquid oxidizer by oxygen extracted from air which combines with fuel creating combustion.

The rocket can be launched using magnetic levitation till it reaches twice the speed of sound. Then the oxygen interaction technique can be employed till it comes to ten times the speed of sound after which it can switch back to a conventional rocket powered system for a final thrust into orbit. This reduces the weight of rocket and makes it easier to manoeuvre .

Keywords:-

Halbach array: It is an array of permanent magnet with the direction of magnetisation that is rotated 90° with respect to adjacent magnets.