2nd REVIEW

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Problem statement:

Usual space shuttles require large amount of fuels and still they have limited access into the space. The normal shuttles use up lot of fuel in providing it the required thrust and angle to launch into the orbit. The new ideology is designing a fuel and volume saving space elevator that can be used to transport cabins and satellites into the space. This amazing concept requires only sideward thrust for the cargo and saves lot of fuel.

Structural problems and solution:

A **space elevator** is a proposed type of planet-to-space transportation system. A space elevator is constructed with various components. First one being the cable that connects all the block components called tether. This component is modified only on the basis of material used which I believe is best when carbon nanotubes several meters long are braided along with the main material. Carbon nanotubes (CNTs) have been identified as possibly being able to meet the specific strength requirements for an Earth space elevator. Other materials considered have been boron nitride nanotubes, and diamond nano-threads, which were first constructed in 2014.

The second component is the climber. This portion is responsible for transporting the cargo from the anchor station to the geo-station. It mainly consists of the payload to be sent, two huge solar panels for generating power and cables holding all the

components together. With less fuel than what is required for the space shuttle, it is transported up with the help of the tether which acts like a lift. The first 40 km are powered by fuel and rest is covered by the solar energy. When the payload is released, the orbital velocity gives it enough force to reach large distances. For instance, if released from 100,000 km, the payload would have enough speed to reach the asteroid belt. The anchor station is the portion that is built on the surface of earth around the equatorial line from which the tether is constructed.

One important component is the counterweight which is located at each end of the lifter that rolls up the ribbon at the rate of about 200 mph. This component is the reason the entire setup is stable. The counterweight provides us the required centrifugal force.

The major drawback of this amazing discovery is that if the tether breaks it can cause lot of destruction that can be very harmful to us. To avoid this, we can understand the concepts written in the past. The counterweight used asteroids initially when the structure was built but it had to find the asteroid with mass given in a particular range. Later this was countered by making a manmade counterweight. The weakest point from where the tether can break is close to earth, near anchor station. My new model takes into consideration the risk of breaking of tether at this point. Once the system realizes that the tether is getting weaker, it will warn the counterweight to capture an asteroid. When this happens the centrifugal force on the outer side increases and the tether, instead of falling on the earth is pulled out into the space.

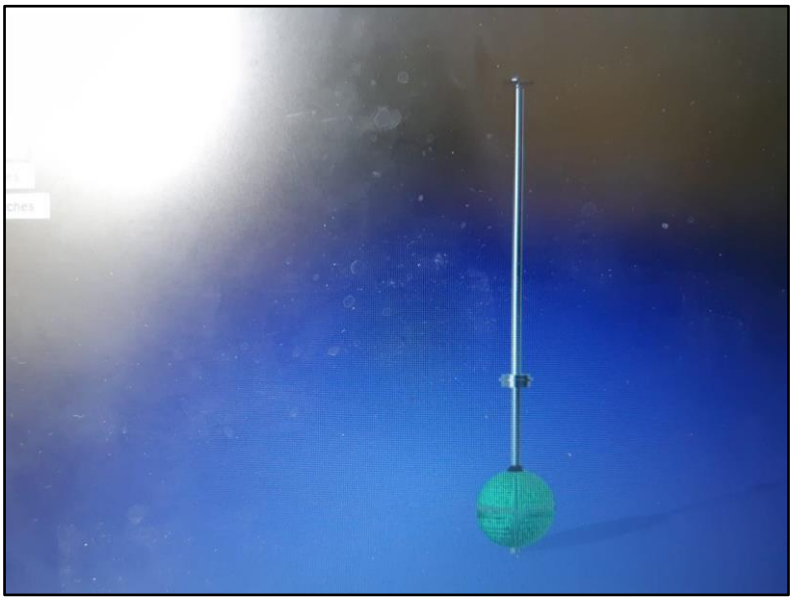
My modification though being practically effective has a drawback. If this entire body is pulled out in space, we cannot neglect the fact that this huge body will be wandering around in the space possibly affecting the bodies existing outside. This can be countered by a simple solution. We need to attach sensors that will detect the presence of zero gravity on the lower portion of tether. So, when the tether is pulled out completely out of the earth's gravity the tether will automatically start to disintegrate and thus, we can avoid the risk of letting the whole tether to float around

in the space. This way, the only thing to stop us from this massive outreach is countered and the vision of creating other Earth on Mars won't sound impractical.

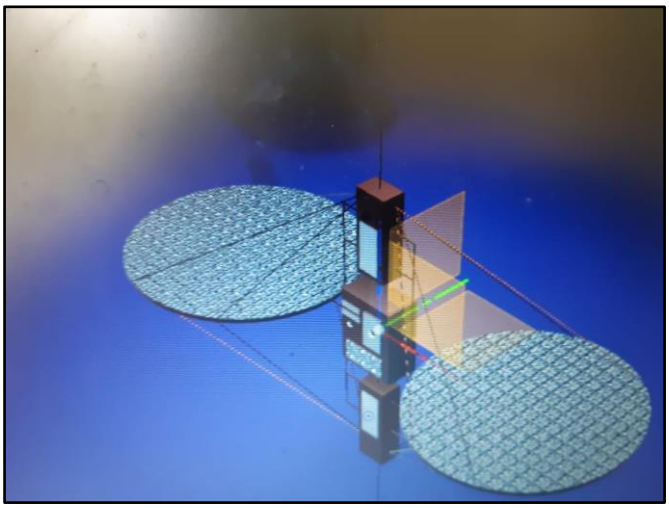
This space elevator is a great revolution that could replace the space shuttle as the main space vehicle, and be used for satellite deployment, defense, tourism and further exploration. If we are successful in establishing space-based power systems, the idea could provide clean power for developing countries, help resolve environmental issues surrounding the use of nuclear and fossil fuels, preserve fossil fuels for future plastic materials production, and reduce dependence on nuclear systems with related military applications.

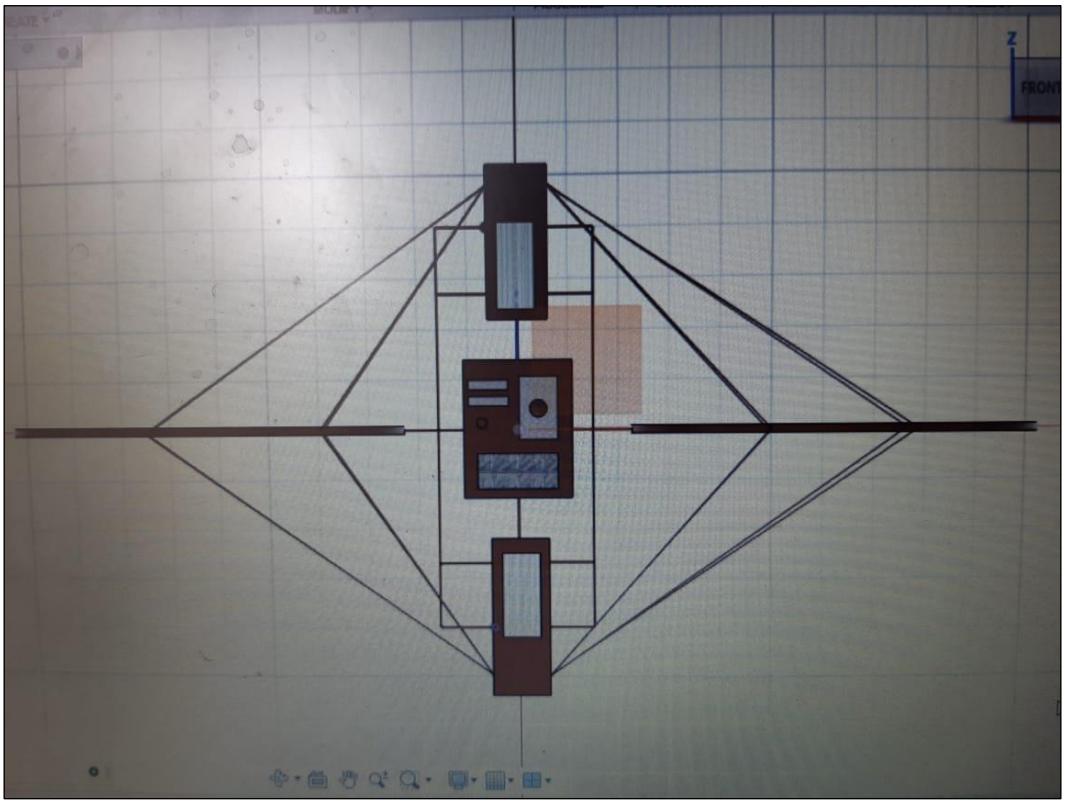
Components:

1. Overall structure with earth, anchor station, climber and counterweight as major components

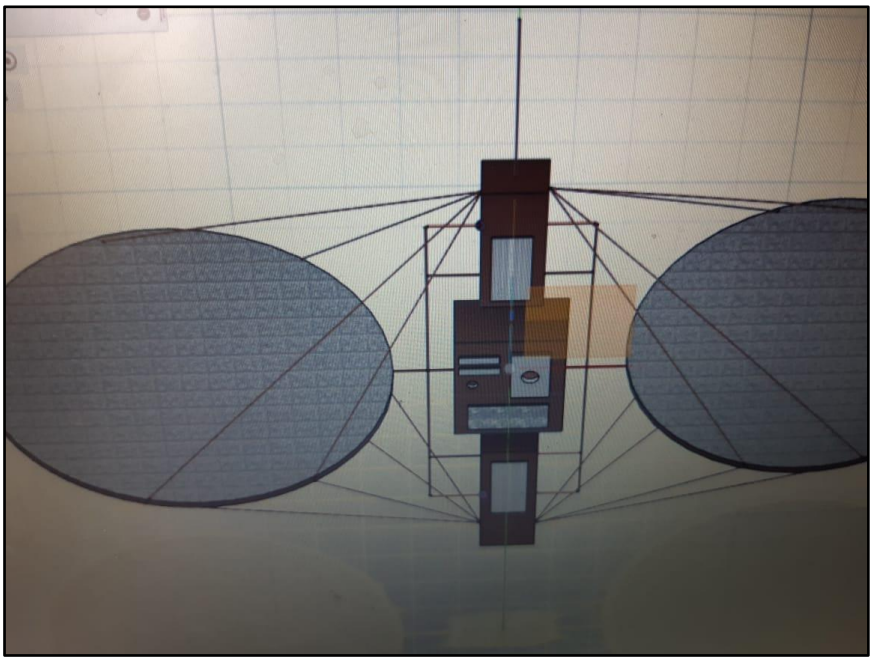


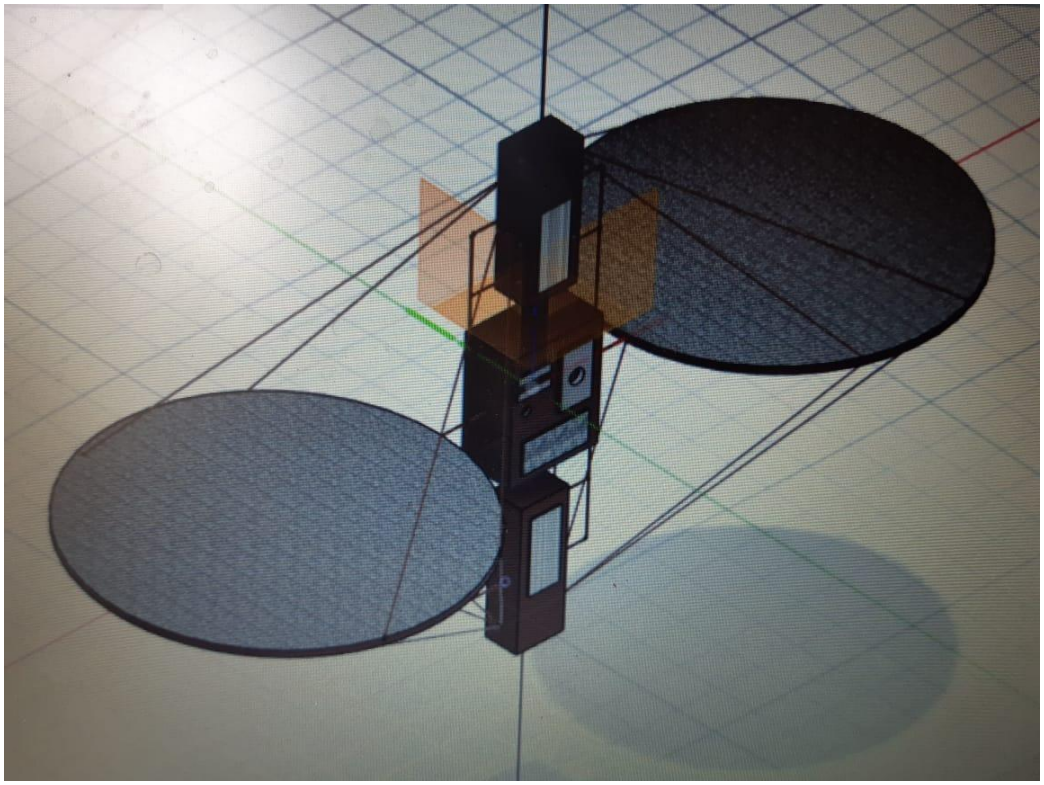
2. Climber



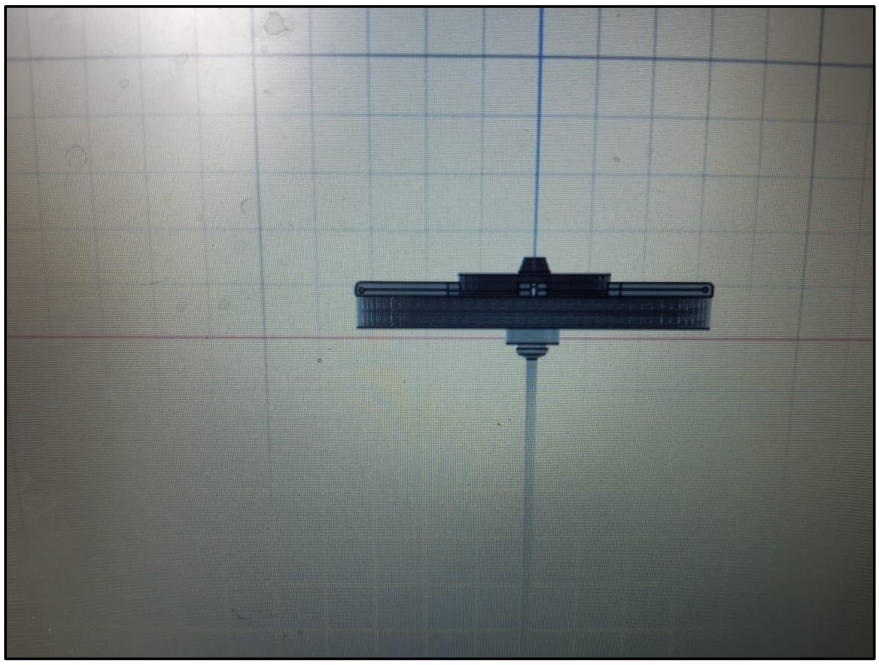


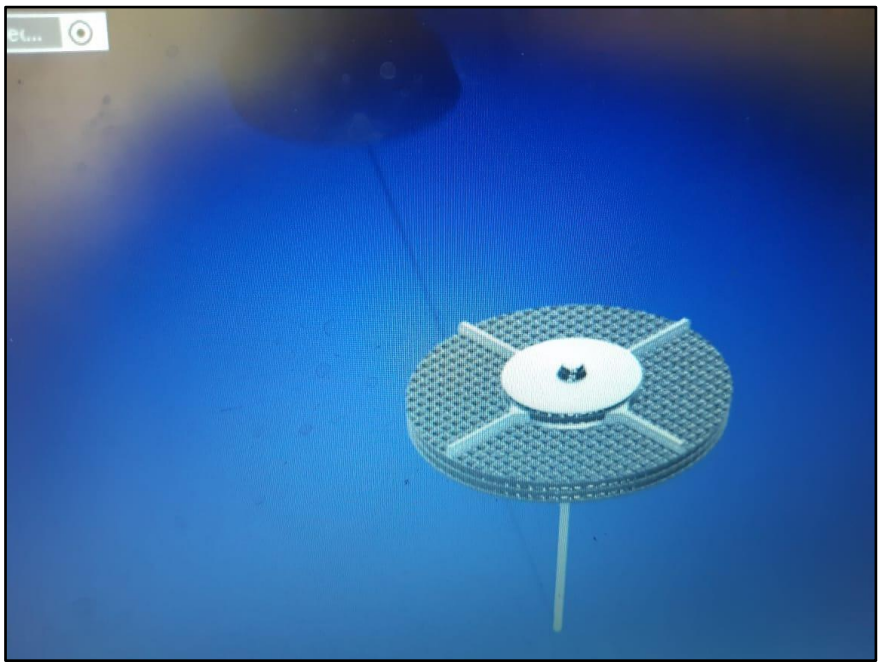

Origin
Bodies
Sketches

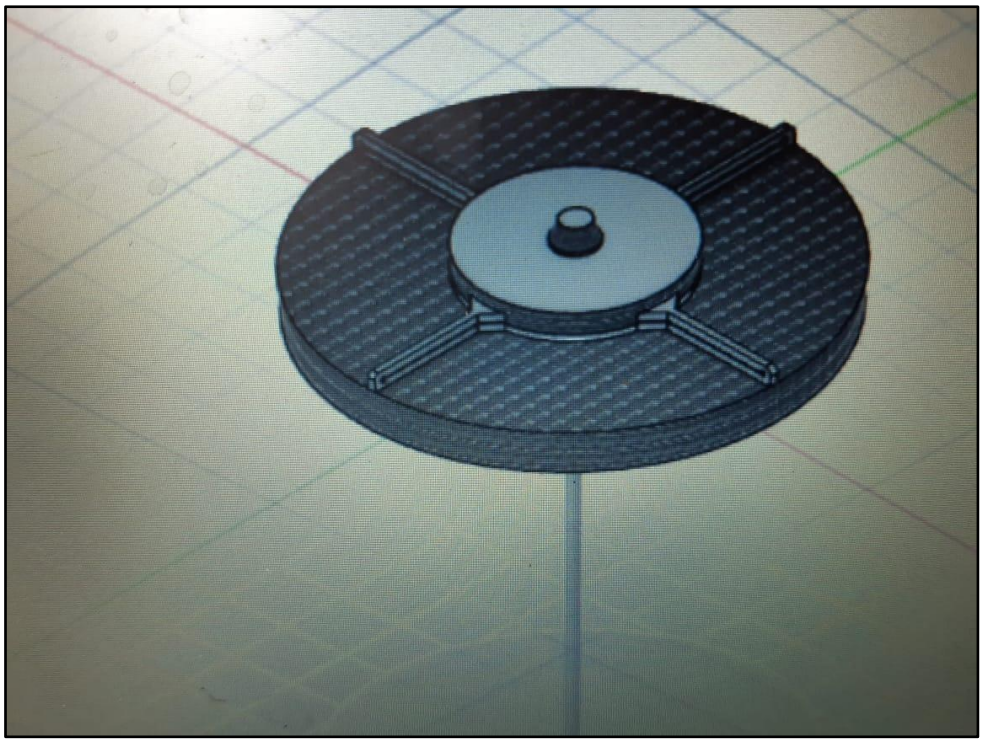




3. Counterweight







Notice the change in the model. Instead of flat area the counterweight contains emergency holders for the asteroids.

Advantages and economics of the project:

The space elevator will reduce the cost of getting from Earth to space. Since we know that the normal space shuttles use immense quantity of fuel to provide it upward and sideways thrust. The space elevator saves this by reducing the fuel required for the upward thrust. It will also allow us to take very large payloads into space very easily and very safely. Now this can help us create cities on moon and constructing a space tether there will be much more efficient and easier. This is possible because the atmosphere of moon is totally free and no risk of breakage is possible. Though the space elevators are much slower than a conventional rocket no high-g forces or explosives are used in this. The best part is that reusable space elevators could displace disposable rockets and spacecraft reducing waste. Space elevators might enable development of solar collecting satellites and enable maintenance of existing satellites which would reduce waste due to loss at end of life. space elevators would allow exploration for off planet minerals and energy sources

For a space elevator, the cost varies according to the design. Bradley C. Edwards received funding from NIAC from 2001 to 2003 to write a paper, describing a space elevator design. In it he stated that: "The first space elevator would reduce lift costs immediately to $100 per pound" ($220/kg). For comparison, in potentially the same time frame as the elevator, the Skylon, a 12,000 kg cargo capacity single-stage-to-orbit spaceplane (not a conventional rocket) is estimated to have an R&D and production cost of about $15 billion. Servicing systems in space would permit lower cost satellite systems that can be refuelled, upgraded, and repaired as needed.

Conclusion

The concept of space elevator is very vast and with every complexity solved, it increases the scope for extending our reach into the deep space, even to Saturn and planets ahead. We can carry more weight safely at a low cost and increase the possibility of life outside earth for even miners, peasants, workers, settlers and adventurers. The success of space elevators will help us environmentally, economically, scientifically and demographically i.e. by cleaning our biosphere, pollution control and population reduction, etc. and thereby broadening our reach.

With this I remind ourselves what Sir Thomas Edison said “If we did all the things we are capable of, we would literally astound ourselves”. This discovery can completely change the perspective of space travel and open the door to a new world.

Thank you!