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THE BENEFITS OF THE SPACE ELEVATOR TO TECHNOLOGY TRANSFER

Dr. Berna Bolat
YTU. Faculty of Mech. Eng.
Mech. Eng. Department,
Besiktas, 34349 Istanbul
Turkey

Dr. Serkan Anilir
University of Tokyo
Hongo 7-3-1 Bunkyo-ku,
113-8656 Tokyo
Japan

ABSTRACT
Most of the technology which we use in daily life is discovered through the results of space studies. The studies in this field are very important to humanity and technological developments. The space elevator is one of the most important projects in space technology. The aim of the space elevator is a proposed structure designed to transport material or people from a celestial body's surface into space. Although it is not possible to make the space elevator with our technology, the studies in this field carry on with high speed. In this paper, the studies on the space elevator are given and the workshop of students is presented. The paper also includes the benefits to humanity of the technology transfer which is obtained from the results the space elevator studies.
Keywords: Space elevator, space technology, transportation**.**

1. INTRODUCTION
Nowadays, rockets are currently the only transportation system to the space. However, the space elevator could be an alternative method to go to the space. The space elevator was first proposed by a Russian scientist, K.Tsiolkovsky and since then discussed by various researches including Artsutanov in 1960 [1], Clarke in 1978 [2], Edwards in 2000 [3] and Anilir in 2006 [4]. The aim of the space elevator was to transport materials and people between the earth and the space and supply technology transfer. The space elevator involves new technologies in most of its subsystems and the success of the space elevator requires a significant amount of development. When many technologies have been developed for application, they might become available for the construction of a space elevator.

A space elevator would consist of a cable, known as a ribbon, anchored to the Earth's surface, reaching into space. By attaching a counterweight at the end, centrifugal force ensures that the cable remains stretched taut, countering the gravitational pull on the lower sections, thus allowing the elevator to remain in geostationary orbit. Once beyond the gravitational midpoint, the carriage would be accelerated further by the planet's rotation. The basic system of a space elevator is shown in Figure 1 [5].

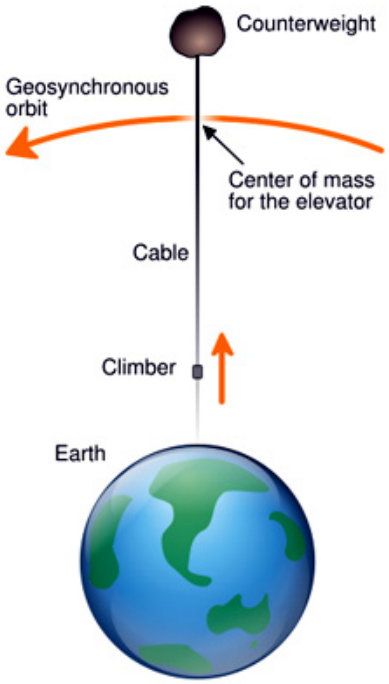

Figure 1. The basic concept of the space elevator

A space elevator might become reality or not, but the discovery of a lot of things are found in the results of space studies. A number of scientists and engineers have worked in this field and they have suggested many different types of space elevators. The purpose of this paper is to demonstrate an effective way of technology transfer for humanity, besides, it is explained that the study on space elevator is not only beneficial to technology, but it is also important to the education especially for the young scientists of the future and the workshop with students' sketches is given.

2. THE CONCEPT OF THE SPACE ELEVATOR

The construction of the space elevator is thought to be built in the equator region, which is the point of balance of the world. The space station will be built in the equator and the length of the space tower is approximately 12-13 km. There are sensors on the space tower and the balance of the tower is provided with electronic circuits. The elevator cars depart from the space tower and then they move on the cable. Most scientists have made the cable with nanotechnology. Anilir and his group carry on their studies on the Zylon PBO materials. The structure of this material is stronger than the other materials.

The space elevator car is different from the classical elevator car. The expectations from the space elevator car are;

- Safety,
- To function with minimum friction force,
- Lightness,
- To recharge itself,
- Reasonable costs.

There are 5 elevator cars in the space elevator, four of which transport materials and one of which transports people. These cars also transport the broken parts in orbit and the energy sources of the space back to the earth. The passenger car works by an interactive car. The velocity of this car is approximately three times faster than a plane. The elevator cars have minimum windows and passengers watch the outside from screens. The first trip to the space would take seven days, but some scientists says that could be reduced to four days by this journey.

A working elevator would reduce the cost of launching anything into space by roughly 98 percent. The $500 million it takes to launch the average satellite would be a thing of the past. The project cost is approximately $15,000 billion. The completion of the space elevator project will probably be in 2008.

During the space elevator project, a lot of new materials have been developed and these are used in different fields of technology in our day.

3. THE WORKSHOP ON THE SPACE ELEVATOR WITH STUDENTS

The space elevator is not only beneficial to technology, but it is also important to the education especially for the young scientists of the future. Anilir prepared a workshop only for students in 2007. 312 students from 29 different towns in Turkey participated in this workshop. The aim of this workshop, which was called “to be scientist in a day”, was explained to the students as the space elevator and their ideas were asked. And also this workshop gave the students a vision related to their fondness of and belief in science. They put forward a lot of ideas and demonstrated their ideas in drawing. Some of the sketches are shown in Figure2-3-4.

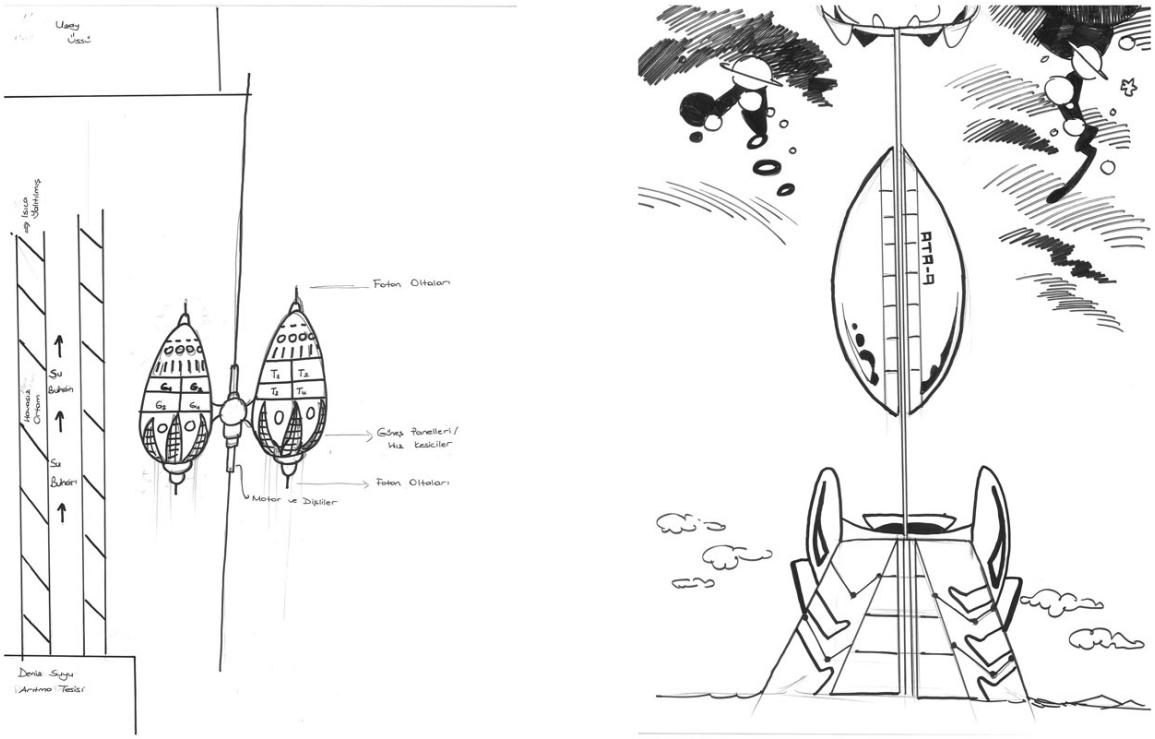

Figure2. The studieswith students on the space elevator

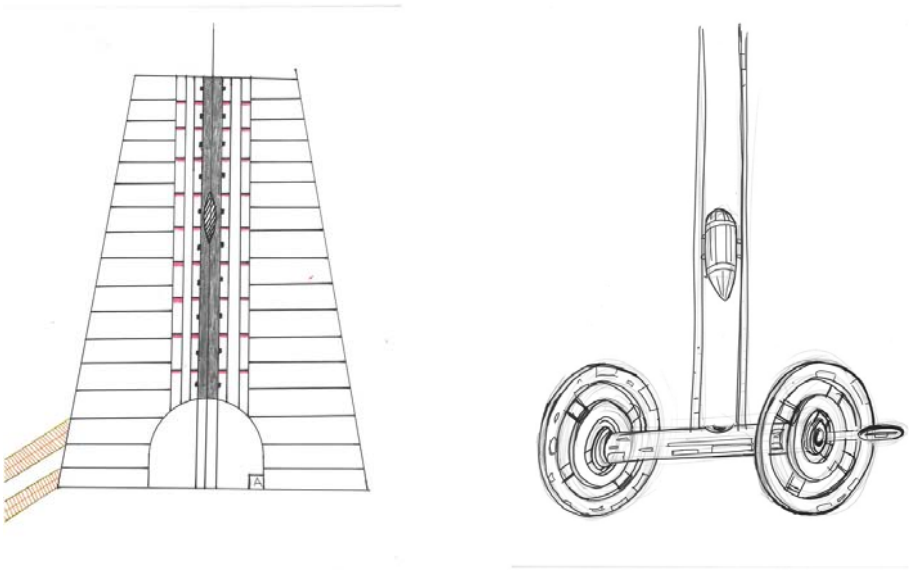

Figure3. The studieswith students on the space elevator

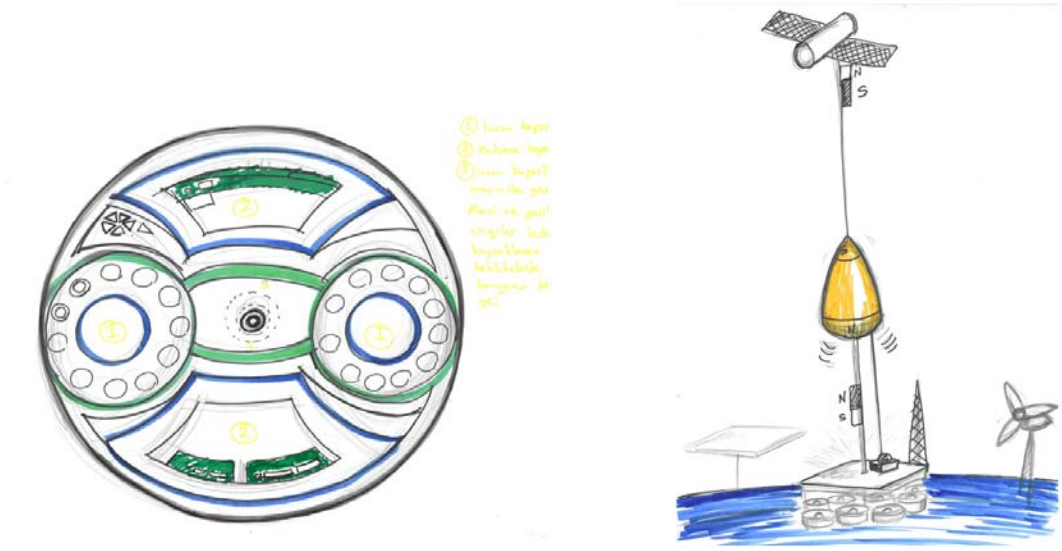

Figure4. The studies with students on the space elevator

4. CONCLUSION

The space elevator is an advanced space transportation system to go on a space travel. The space elevator will probably become viable in the near future. Most of the scientists and engineers will find solutions to possible problems in the space elevator with current or near-future technology. When the space elevator project is finished, we believe that the space elevator will have tremendous potential for improving technology transfer and it will give us limitless opportunities.

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