

AN ELUCIDATION OF THE THEORETICAL ASPECTS OF THE OF HUMAN SETTLEMENT ON MARS

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Humans have been on Earth for 200,000 Years, first humans started as hunter-gatherers then humans started farming and since then Humans have been evolving in biological and technological ways transforming from spears to supercomputers. One of the major problem faced by the human race is overpopulation, there are more humans on the earth than there should be to have proper habitat conditions. The vast amount of humans on the planet has adversely affected the environment of Earth and is also one of the root causes of major problems like global warming and food shortage. There are a lot of advancements in technology being done for the betterment of the world. But taking a different route might work even better for the people on Earth, taking a trip to the outer space, it creates an infinite number of possibilities for humans to settle on any planet creating an intergalactic species. This would need some major advancements and inventions that are not available to humans.

Some of the technology requires inputs that cannot be produced in mass to help in the settlement of humans on other planets.

PRESENCE OF HUMANS IN OUTER SPACE

As of 2020, humans do not have a major impact on space and planets in the solar system. About 2,600 satellites are operating, satellites were also launched to the moon and all other planets, some exist as heliocentric satellites and some that are destined to become interstellar satellites, voyager 1 and voyager 2 have already reached interstellar space, they would be followed by Pioneer 10, Pioneer 11 and New Horizons. The farthest man-made object is the voyager 1, it has traveled 22 billion kilometers since it left Earth but still, it has only made a fraction of a difference, if voyagers aimed towards the nearest star, Alpha Centauri(4.24 light-years) has only traveled 0.05% of the

way to it. Voyager has been sent to the constellation Ophiuchus which is 171 light-years away, the voyager would reach its destination around 40,000 years later.

The present technology available is not sufficient for traveling to any planetary body outside the solar system. Hence considering establishing a community near planets would be better.

ACCESSIBLE PLANETS

The planets to moons that could be the hub for a secondary settlement of human life. Man-made objects have escaped to interstellar space while on the other hand humans themselves have not traveled beyond the point where the influence of gravity of the Earth ends. Humans have gone to the moon setting foot on it 50 years ago and have never gone farther than that. Future missions have been planned to Mars for experimentation for living on the planet. If the missions were to be successful, building a colony on mars has complications that make the simple task of colonizing the planet difficult.

COLONIZATION PROCESS OF MARS

The colonization of Mars should be done in multiple stages taking resources from Earth to Mars in multiple bits, first taking the basic resources for the humans that first have to settle, and taking the subsequent trips to deliver basic resources that would aid in the process and help the Martians survive.

Multiple problems would be faced by the Martians that would be on the planet, the main problem faced by humans on Mars would be the isolation faced by the first Martians. The first people who would be landing on the surface of Mars would rather be a small group to ensure the maximum capacity of payload and machinery they would need.

The travel from Earth to Mars takes 7 months and the window of travel to Mars only appears once every two years. The time for any communication between the travelers and the people on the Earth would be from 3 minutes to 24 minutes, so any immediate correction needed in the vehicle would have to be done by the crew or the computer inside, they would have very little support from the Earth and would have to take all the steps on their own. This makes the job of landing the vehicle safely more difficult, it would be containing equipment and other essential items that would be needed by the astronauts for their survival. If the ship crashes they would have to wait another 2 months before any other supplies can be landed, the window can also be closed, this means that the astronauts might even have to stay for another 2 years.

Humans are social creatures, one of the main problems of going to Mars as an exploration team would be alone, the group of five or six at max would face problems of boredom and isolation but this is the least of the crew's concern. They can fix this problem by having chats which would be having some delay, and proper training and task assigned every day with a good schedule can help them solve the problem of isolation.

One of the major concerns that the Martians would face would be the new environment, they would have to face the level of gravity, and to work in that level, their bodies would take time to adapt to the lower gravity. The human body has been designed to work in the standard gravity of the Earth, changing it to a lower one would make it difficult to walk, work, and other everyday tasks.

The Martians would have to deal with a bigger problem that is right above their heads, the Sun. On Earth, energetic particles from the sun hit the magnetosphere which deflects the particles and they don't get through. On the other hand, Mars due to its size does not have its magnetosphere and it has a very thin atmosphere,

hence minimal protection from the energetic particles is on Mars.

To gain protection against these high energy particles the desires can implement a shield, this shield would contain hydrogen compounds like water which can reflect the high energy particles. It can be made by using the outer layer of the compound as a water container or purposing the other layer as a shield. Using this most of the radiation can be reflected on the surface.

The hostile conditions on Mars also include the soil, due to the absence of organic material, the soil is very fine and also contains perchlorates. To survive for long on the surface of Mars, the Martians would have to process the soil to grow anything of anything, the spaceship must also be isolated, ie. nothing goes in and out, this is because the soil on the surface is dry and is charged electromagnetically, it sticks to the astronaut's suits and then gets inside the living quarters and it can also damage the lungs if it is inhaled.

A new system for the removal of space suits would be needed in which the side that is exposed to the surface is always outside the spacecraft, this can be done by having the cut attached to the outside of the spacecraft and making a small hole through both for the human to crawl out.

Another problem is having to deal with the winds and frequent dust storms on Mars, the average wind speed on Mars is almost the same as Earth ie. 11 miles or 16 km per hour, but the famous dust-storms on Mars can have an equivalent wind speed of a moderate type F1 tornado, ie 72+ miles per hour

POSSIBILITY OF SUSTAINING LIFE ON MARS

As more and more missions to aim for a Martian civilization are coming up, the possibility of a Martian base in the recent future is becoming a reality. To properly sustain a community on Mars it would need various families living in different connected compounds, making them would be difficult but a more difficult task would be to ensure that the whole structure is tear-proof and there are no weak points where the structure can be ruptured and the community dies.

Establishing a community would have to meet its energy requirement this can be achieved by the wind. There are not a lot of energy sources on Mars but the collection of sources can provide enough energy to start a new civilization.

For colonizing Mars humans would have to create a new model for the people living on Mars, by setting up a new society which would be very far away from Earth, Decisions should be taken independently, the community should get continuous help from Earth and supplies to have reserves of every necessity in the case of an emergency.

One of the problems of the martian people would be the continuous sandstorms on Mars, the sandstorms can last up to 2 days and can enclose the whole planet, this would have devastating effects on the solar energy. The martian base would need to be cleaned and the solar panels would also need cleaning after every Strom, this would ensure that the solar panels are working good and while cleaning the base, it can be ensured that the storm did not induce any weak points.

HISTORY OF MARTIAN LAND

By recent studies, it has been determined that the surface of Mars had water bodies and could have been the spot to have life. Over several million years, Water on Mars slowly either froze or was converted into gas and escaped its environment. Signs like the dry delta formation in the martian land suggest that flowing water once existed on Mars due to its small size. Due to its size, the gravitational attraction of the planet was not enough to keep the atmosphere intact and gases started to leave and escape into space. Other effects include Mars's loss of its magnetosphere, earlier mentioned, due to this high energy particles can now enter and damage the environment, It would also affect the Martians that are on the base.

EFFECT OF A MARTIAN COLONY

Due to the added Martian colony, the human community would greatly benefit due to it, the various benefits that humans would get would help us build better and better technology and have a better chance of exploring the universe.

Mars had lost its water and its ability to develop life

First of all, due to the presence of the second colony of Humans on Mars, the survival rate of Humans would increase, it would have a better chance at surfing natural disasters. In a hypothetical situation where both Earth and Mars have well developed, self-sustained societies, and if a natural calamity would wipe off one of the population, the other can survive and redevelop the wiped out colony.

Secondly, taking astronomical data would become easier. At this point the basic thing to know about any star is its distance, by using the parallax method, a scientist on Earth need to wait a half year to get their preferred result, by this if the planets are at opposite sides of the sun, the distance would be known to all of humanity in under 24 minutes.

Thirdly, The reach of humans in our space would increase, due to the presence of low gravity on Mars, rockets would need a fraction of the fuel to escape the gravitational pull of Mars, It would require some amount of fuel to escape the pull but it would be drastically less than used on Earth. Building and launching large spacecraft for further exploration of the universe would be easier to launch from Mars and would also be more out efficient.

CONCLUSION

Having a colony on mars would be tremendously important and beneficial for the human race. It would help us explore develop and experiment more. Although going and building a stable community or society on mars would need a lot of planning and time but is not an impossible task, experiments on the surface should be done before sending any astronauts and the efficiency of the rockets along with their failure rate would need to be improved.