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The future of the Human Species – Part 3: How do we engineer an Earth-like environment?

By K.A.Cassimally

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The process of making an unearthy world more earth-like for the purpose of supporting human life is called terraforming – Steven Wintergerst.

Terraforming Mars is the only way we, humans can live and reproduce thus starting all over again on the red planet. As stated above, terraforming transforms any world unlike Earth into an inhabitable place for humans. Of course we cannot convert another planet, Mars for example, 100% into Earth. However Mars must resemble Earth in the following aspects:

- 1.Thicken the small existing atmosphere and make it comprise the important gases required for life, in their needed volume.
- 2.A new magnetosphere should be set up. A magnetosphere will protect inhabitants and every other object on Mars from being beamed with cosmic rays from outer space. All lives are in danger of being destroyed by cosmic rays as they may destroy DNA bonds of common life.
- 3.Make the temperature more or less similar to that of Earth. As you know, Mars is colder than Earth as the red planet is further away from the sun that Earth is.

Some issues however cannot be changed. The main ones are:

- 1.Gravity of Mars is much lower than that of Earth. If ever humans settle there, they will have to cope with this. They will use much less effort to move about on Mars. But they will then be condemned to stay there unless they exercise regularly. This is simply because their muscles will become weaker and weaker and smaller and smaller in size. These muscles will not be able to cope with the much larger effort needed to walk on Earth.
- 2.Mars is dead. They are no forests nor any bush. In fact there are no greens. Mars is forced to remain as this unless we re-melt its core (that's a joke by the way).

As written above, Mars has a small atmosphere and it should be prevented from completely vaporizing off. One proposed strategy to prevent the vaporization is to put satellites around Mars but only just outside the planet's orbit. When the satellites fly near the atmosphere, they will pull the thin

atmosphere. When the same satellites following their own orbit go further away from Mars, the atmosphere will fall closer to the planet thanks to Mars's gravity. The latter has pulled its atmosphere back down. When this process is done over and over again, the Martian atmosphere will thicken.

Another problem is a magnetosphere. A magnetosphere is a region of space surrounding in this case, Mars. The magnetosphere is thus dominated by the object's magnetic field so that charged particles (found in cosmic rays) are trapped in it. Mars doesn't have any such protection and we should try to set one up. Because I don't have any extremely good ideas about how to solve this problem, what I am going to say may seem like science fiction but who knows...

How about installing giant electromagnets in strategic places of Mars? These will act as a big magnet and this is exactly what the magnetosphere is.

Many people think that to make Mars habitable, we only need to take the planet's temperature into

consideration. Well this is not true of course but these people will also insist that to succeed in making the temperature of Mars same as that of Earth, we only have to crash an asteroid or even a comet into Mars.

Now when you come to think of it, the basic essence of this idea is. If ever we manage to crash a space rock on Mars and this is yet another problem, the temperature of Mars will gradually increase. This is due to the fact that greenhouse gases like methane and carbon dioxide will be released. They will then trap heat making the planet become hotter and hotter. Unfortunately, scientists are working on terraforming so as to manage to make man, one day, live on Mars! The latter's air thus has to be, well... breathable! If the asteroid/comet theory is put in practise, the percentage of these greenhouse gases will mount instantly and will take ages to drop back to normal.

To me huge mirrors might work out alright. These will orbit Mars and reflect light and heat from the sun to the red planet. Another idea is that instead of using these man made mirror-satellite, why not use natural mirror-satellites? Mars has two natural satellites orbiting it namely Phobos and Deimos. We could cover these with mirrors! They may then act as the mirror-satellites and reflect light and heat onto Mars.

Many of the present ideas of how to terraform Mars seem ridiculous and only good for science fiction movies but isn't terraforming itself still in the realm of science fiction? Maybe these ideas will, one day, from part of the revolutionary ideas mankind has had; but maybe they will not.

Terraforming is a dream. And this dream lies on the shoulders of the next generation of scientists and astronauts. But we really should bear in mind that terraforming Mars is only a small step in human flight for survival. When the sun blows up, both Earth and Mars will disintegrate. Terraforming Mars is only an experiment before really doing the ultimate job: terraforming a planet outside the solar system for humans to live in peace at least for some millenniums.

Can humans bear a 2 year-long voyage in shuttle condition though? Won't we be obliged to modify ourselves to make this Mars experiment a success?

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The future of the Human Species – Part 2: Where next?

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Many scientists are currently exploring the idea of going to live on Mars. Mars is the nearest planet to Earth and scientists actually think that the red planet resembled our Earth some million years ago. Some other scientists from the NASA Ames Center have already started the creation of a 'Mars town' and many others are in fact already experimenting it. Of course, these experiments are done on Earth itself but this 'Mars town' has an environment practically alike to that of Mars. And the perfect place for the conduction of this experiment is in Texas, USA.

The astronauts working in these towns wear their space suit and also do everything they would really have to carry out if they ever go to Mars in the future.

But Mars would be, like Earth a temporary place for humans. When the Sun starts engulfing the planets, Mars will disappear barely hours after the earth. So Mars only seems to be the ideal place to spread the human species. It is also a good location to send humans if ever there is a disaster on Earth. By saying disaster, I mean asteroid collision and things like that.

If we, humans do not want to disappear when the earth or mars get swallowed up, we will have to go and live beyond the solar system. But are there any planets outside our solar system prepared to support life? Astronomers' answer is:

"If Earth can support life, why can't other planets do same too? Astronomers have already discovered a Jupiter-like planet orbiting a Sun-like star so why not an Earth-like planet orbiting a Sun-like star next?"

Astronomers clearly think that, yes, there has to be other planets alike to Earth waiting to be colonised out there. And maybe, these planets will in the future hold our species.

But in all cases, this is exactly what some astronomers have in mind: transplant the human species to these planets before it is too late.

Before colonising places outside our system though, it is logical to try and colonise our neighbour, Mars.

To achieve this goal though, many other problems have to be taken into consideration. How do we transform a dusty planet like Mars into one more or less alike to our Earth? How should we proceed? Before we plan to perform any of these though, we should ask ourselves whether we are really prepared to go out there where nobody has ever gone.

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