Future of human spaceflight and exploration

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The future holds endless possibilities for space exploration. A key discussion of the future of space exploration is the colonisation of a planet other than earth. In today's space interest, our Moon and the planet Mars are widely talked about. Both planets have harsh environments but the possibility for humans to colonise. With technology growing at an alarming rate, it is becoming more viable to design and manufacture the ability bases on other planets. In this report I shall be discussing my thoughts and findings on how mankind could be able to live on another planet.

1. Construction of the colony

To eliminate costly missions to deliver materials and to allow the base and colony to grow the base must be self-sustainable. One such way that the colony can continue to thrive without reliance on Earth is sourcing as much materials from the environment as possible. Regolith from the Moon has been proven by the European Space Agency to provide support structures that can be 3D printed in to housing domes. A 1.5 tonne replica was produce on Earth by using a compound similar to Regolith; based on the samples returned from the Moon by Neil Armstong. Current ideas show the simulation having an inflatable core which is pressurized for human life and can dually function as the scaffolding to the Regolith exterior. The core will provide Oxygen and shelter for up to four personal whilst the exterior can protect the humans from solar radiation, meteoroids and the fluctuating temperatures of the Moon. (3D-printing a lunar base ESA, 2015)

This ethos can further be projected onto the Mars mission where frost is trapped under the surface of the planet; purification process can be used to make this frost suitable for human consumption. The frost can even be separated into its elements of Hydrogen and Oxygen for fuel cells that can be used on the base and on Rovers.

In most simulations of colony life 3D printing is a vital tool for the survival of the humans. Setting up a connection between Earth and a 3D printer in another colony will allow minimal weight being carried in the initial flight. Tools would be able to be produced once in the new colony reducing spare parts being carried and allowing the base to grow and eliminate carrying redundancies. (TED X ESA: Tommaso Ghidini, 2015)

2. Surviving the Environment

Another way that the colonies would need to reduce their reliance on Earth is the production of food and oxygen. Sustained long term colony living would involve the personal functioning as farmers. The humans living in the colonies would most likely be on a vegetarian diet where ensure that the crops survive would be directly related to the survival of the colony. To mitigate diseases and crop failure a wide range of biodiverse crops would need to be chosen to prevent wipe-out of food sources. The plants would need to be a mixture of food as well as plants that would provide Oxygen back into the bio dome. (Collinize Mars, 2008)

Not only would plant section need to be considered for colony living but also the reinvention of farming. The lack of nutritious soil on Mars and the Moon would prevent the plants from growing; the toxic soil of Mars killing the crop instantaneously. The change in gravity would also prevent draining from the roots causing the plants to drown in Space, clever irrigation solutions are being investigated. On top of this LED lighting would need to be taken up initially with the colony to replicate the sunlight that the crops will need to survive.

3. Conclusion

For a colony to start and sustain living on another planet, the majority of materials will need to be sourced from the newly colonized planet or body. This entails long planning and using innovate technology, making the most of the surroundings the colonised body has to offer.

References

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Collinize Mars. 2008. [Film] America: The History Channel.
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