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SPACE SETTLEMENT ON SATURN'S MOON: TITAN

Abstract

After deeply exploring our planet, mankind is looking towards the outer space to find the origins of the universe, to find any extra-terrestrial beings and also to find another habitable place in the solar system other than earth. Out of these areas of study, the topic of creating a space settlement has been most prominent among scientists. The rapid consumption of natural resources on earth, population boom and environmental damage has caused the scientists to search for celestial bodies with hospitable conditions. For life to thrive in a celestial body, the primary and most important constituent is oxygen. Other than earth very few bodies in the solar system have oxygen in their atmosphere and that too in very negligible amounts. But many of the bodies have water on their surface. This compound can be used to produce oxygen artificially. Out of the many celestial bodies in the solar system, Saturn's moon Titan has shown a good prospect of establishing a future space settlement. Titan has large amounts of water in the form of ice and also as liquid deep inside the surface. To generate oxygen, radiolysis technique have to be employed to break the water molecule into hydrogen and oxygen. A nuclear fission reactor will be set up on Titan. This reactor will radiate emissions which will in turn break the water molecule to produce oxygen and hydrogen. The oxygen after reaching the upper reaches of the atmosphere would combine with nitrogen in the presence of lightning to form oxides of nitrogen. The oxides of nitrogen being greenhouse gases would trap the heat inside the Titan's atmosphere. This would heat up the surface and make the average temperature to rise. The temperature rise would result in melting of ice and formation of water bodies on the surface of Titan. Due to the presence of complex organic molecules on Titan, the temperature rise and presence of water and oxygen would lead to the generation of simple living organisms. The presence of magnetosphere does not allow the harmful solar radiation to enter Titan's atmosphere. Under these conditions, human civilisation can thrive easily. These settlements can be used for further deep space missions and colonisation of other celestial bodies. To accomplish this mission successfully, the surface features, atmosphere and characteristics of Titan has to be studied more deeply. Another challenge would be to supply materials for the creation of settlement.