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Exploration of Other Destinations (5)
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GANYMEDE BASED HABITAT: AN ICY DESIGN CONCEPT

Abstract

Mankind's future lies beyond this planet of ours, and so shows the hard-work and research that's been done in this age to push humanity towards inter-planetary travel. With that intention, planetary study is key to extract all information necessary for creating a base and to find scope of prosperity of life. So, the era of space missions has begun that explores targeted celestial body from orbit, which allows for in-depth study. The water rich Galilean moon of Jupiter, Europa, and Saturn's moon Enceladus, are suitable for an exploratory mission for ensuring habitable environments for Human survival. Ganymede is the outer-most moon of the orbital-resonance system of Io, Enceladus and itself, which means that tidal forces are less and heat production in its core is minimum with bare tectonic movements and volcanic activities. It has very large ice-oceans on the surface and liquid water below its crust. Terraforming Ganymede will cause the ice to melt, which results in the sinking of easily-accessible mineral resources hundreds of kilometers beneath the surface. There is the possibility of future civilizations inhabiting Ganymede by excavating caverns; the low gravity makes it easy to excavate the ice-layers and allows for whole ecologies to thrive within. The ice on Ganymede fulfils many criteria for its selection as a suitable candidate for mining and studying the asteroid belt. The ice can be split to form oxygen and hydrogen, and in turn rocket fuel for space mining. Its use for acting as a coolant in rocket systems and Radioisotope Power Generator (RPGs) is abundant. The low gravity makes it difficult for drilling and stability of assembly components, but the low escape-velocity more than makes up for it. The moons of the outer solar-system might one day be home to outposts and habitats, if not a full-scale settlement. Future scope of study might answer the atmosphere and internal ocean formation, remote sensing of surface for surface study and subsurface study by electromagnetic sounding.