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Space Vehicles for Exploration & Propulsion for Deep Space (3)
Space Vehicles for Exploration & Propulsion for Deep Space - Session 2 (2)

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# EXPLORING BIOSIGNATURE POTENTIAL IN VENUSIAN CLOUDS: DESIGN AND SIMULATION OF AN AERIAL VEHICLE FOR ATMOSPHERIC ANALYSIS

**Abstract**

Microbial Life on earth have flourished in extreme environments ranging from acidic hot springs to high altitude clouds, this adaptability points to the possibility of life sustaining in intense conditions of Venusian atmosphere, utilizing atmospheric particles and sunlight for their survival, employing sulphur-based or iron based metabolic processes. The clouds of Venus possessing moderate temperature conditions similar to earth, offers promising yet largely unexplored region with potential of harbouring life, therefore focused mission is required to gather critical data and perform in-situ analysis is crucial. With our research we aim to develop an aerial vehicle specifically designed to withstand the severe temperature, pressure and acidic conditions. The vehicle would be crafted in such manner that it can equip dedicated payloads for biosignature detection and cloud chemistry analysis. Additionally, comprehensive simulations and assessments shall be performed to test the efficiency and reliability of proposed vehicle design in such rigorous environmental conditions. This research, through detailed examination of our design strategy will provide crucial understandings of the prospect for biosignature detection in thick cloud layers of Venus, propelling forward technologies for extra-terrestrial conditions.