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NOVEL METHODOLOGIES IN THE QUEST FOR LIFE: ROBOTIC EXPLORATION OF THE OCEAN WORLD ENCELADUS

Abstract

Since the dawn of time, humans have been fascinated by the stars, wondering, *"what is out there? Are we alone in the universe?"* Science fiction has served astronomers, artists, novelists, and scientists alike, in pondering on this question, welcoming the uncertainty of what lies ahead in space exploration. Now, humanity's destiny beyond Earth is on the verge of a new phase of ground-breaking discoveries as we send robotic explorers on deep space exploration missions.

Our mission, **SENTIENT**, aims to further this quest and explore the possibility of life, past or present, on the icy Saturnian moon, Enceladus. The mission concept consists of a spacecraft composed of an orbiter and lander. The orbiter will contain remote sensing instruments to determine an optimal landing zone near the Tiger Stripes around the south pole. The probe will then collect samples and data from the surrounding ice and atmosphere and transmit it to the orbiter, to relay it in turn back to Earth for further analysis for potential bio-signatures.

What if we do find life out there? This would in turn raise many other questions from the point of view of science, law, policy, and humanities. Apart from excitement, such an event is anticipated to incite mixed reactions from the public, including ethical concerns around interactions with newly found organisms. Apart from a whole new dimension opened to the scientific community, novel studies would need to be conducted on human behavioral change, new laws and policies would have to be developed, and fresh welfare policies across the globe implemented.

The SENTIENT mission aims to create a bridge to this new world of possibilities, where, finally, we are not alone in our universe. Since that first glimpse of the universe that the Hubble Space Telescope presented the world, the power of ingenuity would have moved us yet another step closer to the stars and beyond.