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DEEB: DETECTION OF LIFE IN EXTREME ENVIRONMENTS WITH MINIATURIZED BIOSENSORS

Abstract

Finding life beyond our planet would not only be a scientific discovery of great importance, but it would also have a profound impact on our worldview and our place in it. This research aims to address the challenges associated with space exploration by implementing these biosensors in nanosatellites and probes, specially designed for missions in environments such as Enceladus, all under the framework of development of a developing country like Costa Rica, with the support of different regional research entities.

The design of this miniaturized and low-power biosensor for the detection of life in nanosatellites and space probes is a research field with great potential. This project seeks to make a significant contribution to the search for life in outer space, based on the actual missions from the different Space Agencies, and new devices, with the technology such as the mass spectometers, but miniaturized and cheaper, adapted for the nanosatellite technology. Bringing this area to the Central American region, which is a niche. In addition, it could inspire new generations of Costa Rican scientists and engineers and promote interest in science and technology, as well as international connections and networking.

The study is based on the need to obtain detailed information about various life forms and the identification of volatile atoms crucial to sustaining them. Critical questions are addressed, such as what types of biosensors are most effective in harsh space conditions, how they can be adapted to extraterrestrial environments, and how they can be efficiently implemented in nanospace platforms.

The aim is to provide a solid foundation for the detection of life on distant planets and moons, offering a significant contribution to the advancement of astrobiology and space exploration. This work not only addresses the technical aspects of biosensor development, but also the strategy for identifying volatile atoms and life forms, thus establishing a comprehensive framework for future space exploration missions, as well as a future generation of jobs for the industry of tomorrow in our region, all this development under the economic environment that we have as a country emerging in the industry from the economic point of view. In addition to the academy that such a project can generate by teaching about nanosatellites, since the project seeks to be used as a platform for learning and academic development.