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SENTINEL SMART ORB-SYSTEM: A SCOUT ROBOT FOR SPACE OPERATIONS AND MONITORING

Abstract

Sentinel-orb is an ongoing project with exploratory technology focused on developing a smart orb (small sphere) that can fly, navigate, and map. This project aims to be a service robot for assistance and cooperation, supporting the extravehicular activity (EVA) on the Moon, in outer space, and in spacewalks carried out by astronauts. The robot developed under this project will ultimately be tested in a microgravity environment during a parabolic flight. Sentinel-Orb aimed to build upon the underwater technology developed by the INESCTEC team as part of the UNEXUP initiative, specifically based on the UX1-NEO system. The main objectives are: (i) miniaturize and develop a robotic system based on UX-1Neo for Space; (ii) integrate sensors and give the ability to fly and navigate; (iii) utilize visual-inertial odometry with a high-resolution camera; (iv) integrate algorithms for object detection and anomaly identification; and (v) test Space maneuvers in a microgravity environment.