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MURRAYA KOENIGII BASED NANO-DRONE DEPLOYMENT FOR TITAN EXPLORATION

Abstract

Titan is currently been dubbed as a potential home to humanity, owing to its atmosphere and earthlike liquid cycle. Hence, it is important to make a vast study to understand the nature of the largest moon of Saturn. This paper proposes a cluster-based nano-drone deployment. With the main recharging parent drone-flight in between that clutches onto the daughter nano-drones in an opposite-arrangement, these kind of drones can be used for long-range autonomous surveillance purposes. When the entire-flight arrangement system enters the radius of surveillance, the drones detach themselves with a mechanism copied from the plant Murraya Koenigii, using pneumatic technologies. Once they are deployed and their periods are complete, they get back to the parent drone for recharging and relocation purposes. The drones can also be controlled remotely from the earth. The central stem has massive power storage capacity and VTOL capabilities, giving it high maneuverability and control. The recapturing of drones is done by mapping the location of the drones based on their battery-level and uses an algorithm to prioritize based on Voronoi diagrams. The paper also proposes a novel and efficient nano-drone technology that makes the mission highly efficient and facilitates a longer duration of the flight. The main stem is designed aerodynamically with variable swept wings which can facilitate room for the nano-drones and can itself act like a drone. The carrier has a nuclear reactor that generates power and recharges light and super-fast rechargeable batteries onboard the daughter drones. While the individual drones relay messages to the parent drone which is further relayed to ground staff on earth, these drones can be highly useful for research and surveillance purposes in the vastness of the Titan. Missions like this can collect wide information due to their easy relocation capabilities compared to a conventional massive single rover/drone assembly.