Charging platform of chess-pad configuration for Unmanned Aerial Vehicle (UAV)

ABSTRACT

The authors of this study designed and optimized a charging landing pad system that mitigates the landing accuracy issues of unmanned aerial vehicles (UAVs). The study looks at the charging process, energy conversion during periodic landing on a unique platform, and an onboard and on-ground scheme design procedure. The circuit is fixed on the UAV platform and comprises six integrated bridge rectifier diodes to alter the four connection pin terminals' charge polarity. The inclusion of a current indicator shows the flow of charge during successful docking. The charging platform consists of square conductive copper plates of specific dimensions that provide positive and negative polarity in a chess form to ensure the contact of various polarities. This design considers two power supply options: a solar panel and a standard mains supply. The contact point coordinate probability when landing is the crucial aspect of this design. A first version of the proposed system was implemented to measure its effectiveness for commercial drones. This system provides an automated recharge station with reliable performance. Numerical experiments showed that the system's energy conversion remains efficient regardless of drone orientation over the platform or the environment's nature.

Keyword: UAV charging system; Charging platform; Charging efficiency