

Improvement in energy conversion for unmanned aerial vehicle charging pad

ABSTRACT

An efficient charging station is a necessity for Unmanned Aerial Vehicle (UAV) systems. However, if that implementation adds more complexity and onboard weight, then that exercise becomes a burden rather than a benefit since UAV's engineers aim to improve efficiency by reducing the energy consumed by the software and hardware of the complete aeronautical system. This article recommends a fully automatic contact charging station for UAVs, which can charge UAVs and thus resolve flight endurance restrictions of the UAV. The ground station consists of square copper plates that are positively and negatively polarized successively in a chessboard with particular sizes to guarantee electric contact at the landing. The design methodology used with the landing station takes into account the differences in UAV orientation once the platform has landed. In addition, this innovation uses independent charging after touchdown. Thus, this technology relaxes common flight times and help to enhance general mission times. This paper presents a unique charging platform in a “chessboard” configuration, which is devised as an interconnecting interface to facilitate the charging process and overcome inaccuracies with the landing. The solution devised in this research requires few components and presents two power source options (solar & mains power). Additionally, this work presents, to the best of our knowledge, a uniquely innovative recharging landing platform, which incidentally requires no additional software or changes to the UAV’s onboard software settings.

Keyword: Charging platform; Charging systems; Electrical fundamentals; Landing; UAV