

A review of copter drone detection using radar systems

ABSTRACT

The exponential growth of copter drone usage and the threats posed by drone users, such as unauthorised imaging and filming in restricted areas, illegal surveillance, air collisions, drug smuggling, terrorist attacks, and radio frequency (RF) jamming, have led to many efforts and research projects aimed at drone detection. The attempted methodologies include using acoustics, cameras, cascades (audio-visual) and radio frequency. In addition, there are the nontechnical methods such as shooting and netting. This paper presents radar systems as a method for copter drone detection. It presents the state of the art review of the efforts so far made towards detecting drones given preference to radar systems for micro-Doppler-based analysis. It also introduces passive forward scatter radar (PFSR) as an emerging methodology, presenting its reported achievements for both ground and airborne target detection. In an attempt to improve the detection of low-profile targets, this paper discusses the basic parameters aiding Doppler and micro-Doppler analysis of a copter drone. The paper concludes by proposing digital video broadcasting satellite (DVBS) based PFSR for drone detection due to its improved capabilities, thereby making microDoppler analysis for a low-profile target, a feasible endeavour.

Keyword: Micro-Doppler; Passive forward scattering radar (FSR); Drone; ;Low-small-slow (LSS); Radar cross section (RCS)