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A NOVEL ANTENNA PHASED ARRAY CONCEPT FOR AIS AND ADS-B SIGNAL DETECTION USING NANO/MICRO-SATELLITES

Abstract

Satellite based AIS missions for vessel detection and identification are a reality and satellite based ADS-B missions for aircraft detection and tracking are at the verge to be a reality soon. A novel concept to avoid the signal collisions was presented by a previous at IAC 2012. The objective of this paper is to present the details of the novel antenna concept based on phased array technology and on-ground beam forming flying on nano/micro satellites. A detailed analysis of the interference scenarios for the AIS case was presented already at the previous paper. Missing is a similar analysis for the ADS-B case required to derive the Phased Array Antenna size. Due to the use of different flight levels in commercial air transport a criteria similar to the AIS case was not found. Instead a generic interference analysis is performed based on the assumption that the number of aircrafts in highly dense controlled air- traffic space is proportional to the phased array antenna, taking as a major constraint into account the required downlink bandwidth. The implementation of the required boom on a nano/micro-satellite is a challenge but essential for mission success. Finally options for the implementation of such booms will be discussed as well.