

ABSTRACT

Automatic Dependent Surveillance-Broadcast (ADS-B) is an air traffic surveillance technology that can periodically transmit position, altitude, speed, and aircraft identity information from aircraft to earth stations or other aircraft. However, the performance of ADS-B is hindered by geographic constraints, therefore a satellite-based ADS-B signal receiver system that can receive ADS-B signals without the geographical constraints is needed.

An uplink communication model between the ADS-B signal receiver placed on the low-orbit satellite and the aircraft as an ADS-B signal transmitter has been made. The purpose of making this simulation model is to evaluate the quality of ADS-B communication on low orbit satellites by looking at the Bit Error Rate (BER) value based on the antenna radiation pattern used. The simulation was carried out using 2 types of antennas in 8 different scenarios to show the quality of ADS-B signal reception using low orbit satellites under different conditions.

In this study, the BER obtained for the ADS-B receiver system with a microstrip antenna that has a gain of 1.22 dB, the average BER is in the range 0.0073-0.0074. While the microstrip antenna has a gain of 5.05 dB, the average BER is in the range of 3.4741×10^{-6} to 3.8964×10^{-6} . From the two results, the antenna with a gain of 1.22 dB is far below the recommended BER, and the antenna with a gain of 5.05 dB is slightly above the recommended BER. Thus, it is necessary to optimize both antennas to operate on the ADS-B receiver system properly.

Keyword : ADS-B, System-Level Simulation, Low Earth Orbit, Satellite, Bit Error Rate