

ABSTRACT

ADS-B technology is a new method for aircraft surveillance that combines the Global Positioning System (GPS), allowing aircraft to be tracked in terms of position, speed, wind direction, and altitude. This equipment can be installed on aircraft or ground stations and is superior to radar. ADS-B is indeed considered revolutionary, as with just an antenna and a device no larger than a small refrigerator, it is possible to detect aircraft and display air traffic.

Automatic Dependent Surveillance-Broadcast (ADS-B) is a modern surveillance technology used in aviation to enhance safety, efficiency, and situational awareness. The system works by utilizing navigation data from aircraft, such as position, speed, and altitude, obtained through GPS. One of the main components in the ADS-B system is the antenna, which plays a vital role in transmitting and receiving signals. Within the antenna, there is a filter that functions as a signal filter and can improve the performance of the ADS-B system. A microstrip filter is chosen due to its lightweight nature, compact size, and cost-effectiveness, making it ideal for aviation applications, particularly in systems like ADS-B.

This research aims to design a simple bandpass filter capable of operating effectively in the frequency range of 1.080–1.100 MHz. The filter is designed at a center frequency of 1.090 MHz using FR-4 (epoxy) as the substrate. Parameters such as VSWR, bandwidth, S-parameters, return loss, and insertion loss will be optimized through simulations using CST Studio Suite 2019 software. The filter design is expected to produce optimal performance and be integrated with the antenna as part of the ADS-B receiver system. This technology is anticipated to support the advancement of aviation technology with high efficiency, wide coverage, and affordable cost. However, in its realization/measurement, a shift in the center frequency occurred from 1.090 MHz to 890 MHz, a difference of –18.35%.

Keywords: ADS-B, Filter hairpin, Antenna mikrostrip, GPS