

## A Review of Emerging Technologies in Antennas and Phased Arrays for Avionics Systems

**Authors :** Muhammad Safi, Abdul Manan

**Abstract :** In recent years, research in aircraft avionics systems (i.e., radars and antennas) has grown revolutionary. Aircraft technology is experiencing an increasing inclination from all mechanical to all electrical aircraft, with the introduction of inhabitant air vehicles and drone taxis over the last few years. This develops an overriding need to summarize the history, latest trends, and future development in aircraft avionics research for a better understanding and development of new technologies in the domain of avionics systems. This paper focuses on the future trends in antennas and phased arrays for avionics systems. Along with the general overview of the future avionics trend, this work describes the review of around 50 high-quality research papers on aircraft communication systems. Electric-powered aircraft have been a hot topic in the modern aircraft world. Electric aircraft have supremacy over their conventional counterparts. Due to increased drone taxi and urban air mobility, fast and reliable communication is very important, so concepts of Broadband Integrated Digital Avionics Information Exchange Networks (B-IDAIENs) and Modular Avionics are being researched for better communication of future aircraft. A Ku-band phased array antenna based on a modular design can be used in a modular avionics system. Furthermore, integrated avionics is also emerging research in future avionics. The main focus of work in future avionics will be using integrated modular avionics and infra-red phased array antennas, which are discussed in detail in this paper. Other work such as reconfigurable antennas and optical communication, are also discussed in this paper. The future of modern aircraft avionics would be based on integrated modulated avionics and small artificial intelligence-based antennas. Optical and infrared communication will also replace microwave frequencies.

**Keywords :** AI, avionics systems, communication, electric aircrafts, infra-red, integrated avionics, modular avionics, phased array, reconfigurable antenna, UAVs

**Conference Title :** ICAAE 2023 : International Conference on Aerospace and Aviation Engineering

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** August 03-04, 2023