BEng Aerospace Project

Individual Research Report

Identifying the position of small airborne vehicle by using radio technology

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# Abstract

This paper aims to develop a radio navigation system for airborne vehicle to obtain vehicle’s direction (heading) and speed. It uses VOR (Very High Frequency Omnidirectional Ranging) principle to determine the bearing of the vehicle and obtain its speed by analysing Doppler shift of the signal. The approach uses Software Defined Radio (SDR) to carry out the research of the signal and uses MATLAB for signal producing and processing.

The system consists of a Red Pitaya as a SDR for transmission, and uses a RTL-SDR receiver only system as the terminal for drones. The method proposes a low cost navigation implantation for drones and other micro vehicles, in the fact that RTL-SDR is extreme cheap to obtain.

It also covers the potential ability to be a GNSS (Global Navigation Satellite System) compatible navigation solution by developing its Pseudolites potential of combing GPS navigation mechanism with the system proposed in this paper.

# Introduction

Radio navigation and positioning is an ancient technology but still can be found in the modern aviation, though it’s now replacing by the state of art GNSS (Global Navigation Satellite System). However, three decades ago, radio navigation is the most important method for both military and civil aviation.