

UAS Alert

1.1 Historical Introduction

Unmanned Aircraft Systems (UAS) have been in use for over a century and a half. The first was a military design used by Austria to attack Venice.[1] Since then, they have been used for many tasks ranging from military missions to taking the next great selfie.

Unmanned Aerial Vehicles (UAVs) are used for filmmaking, photography, and recreational activities. The main reason that UAVs are used for these tasks is because it is an inexpensive way to get the job done. For example many of these tasks were done by helicopters which are quite expensive to use and not very accessible to the average person. Since these aircraft are allowed to operate in the same air space, new rules and regulations have been enacted to keep both the UAVs and other aircraft safe.

Automatic Dependent Surveillance–Broadcast (ADS-B) was set into motion by the Federal Aviation Administration (FAA) for the purpose of mapping planes by setting aside frequencies for air traffic communication.[4] UAS Alert will allow compatible UAVs to listen to these frequencies as well and will provide a warning if the UAV is in the way of an oncoming plane. Therefore UAS Alert will help protect the UAV and other aircraft from harm's way while following the rules established by the FAA.

1.2 Market and Competitive Product Analysis

The current selection of ADS-B equipment for UAVs is limited, with the most notable supplier being Uavionix. Uavionix provides the hardware necessary to implement a detect and avoid system, but do not provide the entire system themselves. Uavionix sells small, lightweight ADS-B receivers and transceivers. Uavionix products currently support integration into the Pixhawk flight controller and, in collaboration with DJI, is currently developing an ADS-B collision avoidance developer kit for DJI products; however, this kit is not yet available and is specifically for DJI products[3].

UAS Alert will be attachable to any UAV that is capable of carrying it, and will not be connected directly to the UAS flight controller. The aviation community would benefit from a system like this, as an ADS-B system that is able to be equipped to a variety of UAVs would increase availability and help to provide a safer environment for other aircraft pilots.

1.3 Concise Problem Statement

The FAA does everything in its power to prevent mid-air collisions but still makes fatal mistakes. Even with mountains of rules and regulations used to prevent those accidents, the future landscape for UAV and safe airspace is still being imagined. During a nine month period, November 2014 to August 2015, the FAA reported 764 UAV sightings where the UAV compromised the safety of the aircraft [2]. Our product offers a step in the direction of minimizing these situations, also creating a platform to connect with other efforts in making higher standards for airspace awareness.

The UAS Alert, at its core, is awareness technology. The basic function of the UAS Alert is to give UAS pilots the best possible view of any near ADS-B equipped aircraft. UAS Alert must give a visual representation of nearby aircraft, displayed on the ground station on a user-friendly interface. Any aircraft considered to be close enough to compromise the safety of the aircraft will trigger an alert to be displayed on the ground station interface.

1.4 Implications of Success

The current systems that are used for UAV aviation are very basic and highly restrictive. Current UAVs are piloted using single camera units and line of sight maneuvering. The UAS Alert system will become a valuable tool for UAV pilots as it will improve the user's awareness of local air traffic conditions. The UAS Alert system will accomplish this by giving an accurate and easy-to-read representation of air traffic conditions in the immediate flight space of the UAV. With the data gathered, the UAS Alert system will also issue advisories to the UAV pilot that will aid in the avoidance of dangerous conditions that may result in damage to the UAV and other aircraft.

In the long term, the proper and widespread use of the UAS Alert system will decrease the occurrences of air collisions caused by uninformed UAV pilot's. This could greatly impact the negative opinions that manned aircraft pilots hold for the UAV enthusiast community. The system will also develop a safer environment for all aircraft types sharing the same airspace.

References

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