Adding flight trajectory of VHF communication with transcription

Adam Rajko*

Abstract
The aim of this application is to provide convenient way displaying and replaying recordings of communication between pilot and the ATC (Air traffic control). The application uses data available from open-source project OpenSky Network, which provides live information about aircraft, such as their position and more. Communication data is provided from SpokenData, where a recording at a specific time is associated with a flight based on the recorded time. The result of this project is web application that provides basic flight information and a user-friendly way to play back the recordings in a map view. The application provides a more complete view of flight communication, which can be useful for the purpose of analysing and making flight communication more transparent to the public.

*xrajko00@stud.fit.vutbr.cz, *Faculty of Information Technology, Brno University of Technology*

1. Introduction

The project deals with adding VHF communication between the pilot and ATC to the flight trajectory. By displaying the result of the project on a map, it provides a more user-friendly representation of the processed data.

By adding interaction with the map, flights and individual airports, the user can easily find flights that contain recordings of the communication. As it would be great to see recordings from more than just current flights, the user is also provided with the ability to search for flights that have already been completed.

There are currently both open-source and paid options to access individual recordings. An example would be liveatc.net where there is a list of recordings but the current solution does not provide a very user friendly environment.

The project uses the OpenSky Network to get live information about the aircraft, where this information is stored in a database. This time record contains information about the state of the flight at a certain point in time (timestamp). SpokenData is used to obtain the communication data, which provides both the recordings and its transcription. Based on the time when recording was obtained and the callsign of the flight, the recording and its transcript are then assigned to the nearest timestamp.

By providing application to the public, it makes the communication more transparent or may provide an opportunity for further analysis.

2. Flight communication

Communication is an essential part of aviation that helps to ensure the safety and efficiency of flights.

2.1 Radio communication

It is the most common form of communication in aviation and is used for many reasons, such as communicating with air traffic control (ATC), other aircraft and ground personnel.

VHF The information in this paragraph was obtained from [1]. VHF communication systems are widely used for maintaining contact between the ground and the aircraft. These use so-called "Line of Sight" transmission, which is at a range of around 50 kilometres for an aircraft operating at 300 metres above the ground, or 220 kilometres for an aircraft operating at 3000 metres.

Callsign An aircraft call sign is a group of alphanumeric characters used to identify an aircraft in air-to-ground communications.

2.2 Data communication

It is a system that allows an aircraft to exchange data with other aircraft and with ground systems using digital communications. This communication can include things like flight plans, weather information and messages between pilots and ATC.

ADS-B The information in this paragraph was obtained from [2]. Automatic Dependent Surveillance Broadcast is a monitoring technique used by aircraft or airport vehicles to broadcast their identity, location and other information obtained from on-board systems.

Mode S The information in this paragraph was obtained from [3]. Mode S is a secondary monitoring radar process that allows selective interrogation (monitoring) of an aircraft according to a unique 24-bit address assigned to each aircraft.
Airborne transponders are used to provide altitude and identification data, while (ADS-B) adds global navigation data, which is typically obtained from a GPS receiver. The position and identification data provided by S/ADS-B mode transmissions are available to pilots and air traffic controllers.

3. Data retrieval

To display flights and their information to the map, you need to know their position, direction and other parameters.

3.1 OpenSky Network API

To get the current flight status, the OpenSky Network API is used, which provides information not only about the flights currently in progress but also about flights that have already ended and others.

OpenSky Network provides information about the current flight in the form of a state vector that contains data from ADS-B and Mode S messages. The current flight status is a summary of all tracking information at a certain point in time.

3.2 SpokenData API

SpokenData API is used to obtain a recording of the audio communication and its transcription of the spoken speech between pilot and ATC. Provides information about the current status of the individual translation works, when the communication was captured, from which airport the communication was captured, a link to the recording of the communication and its transcription.

4. Conclusions

This project that aims to add communication records to the flight track which can make a valuable contribution to the aviation industry. By providing a more comprehensive view of flight communication, the application can help improve flight safety and efficiency. Project was design to be easily modified, so anyone with some experience can contribute to this project with it's own features and improvements. The implementation of this application can enhance the transparency aviation industry.

Overall, this project represents an exciting opportunity to advance the field of aviation and contribute to the continued growth and improvement of air travel.

Acknowledgements

References

[1] Jim Sparks. Aircraft communications. online, October 1998.

[2] SKYbrary. Automatic dependent surveillance broadcast (ads-b). online.

[3] SKYbrary. Mode s. online.