Bonus Task

Attached files

bonus_report.pdf: Report of our Bonus Task
data1.bag: Recorded data(rosbag)
data2.bag: Recorded data(rosbag)
description_of_rosbag.txt: Details about rosbag files
microphones.txt: Position of microphones

Environment of the recordings

The recordings were made outdoor and a field was almost flat. Fig.1 shows a scene of the field.

Fig. 1: Scene

Method

There were two static sound sources in a field. The west sound source was a human voice played by a speaker and the east sound source was a whistle. These sounds played repeatedly at a certain interval. Two flight patterns were tested to record the signal (data1 and data2). The flight paths of data1 and data2 are shown in Figs. 2 and 3. The red points show sound sources and the black line shows the flight path.
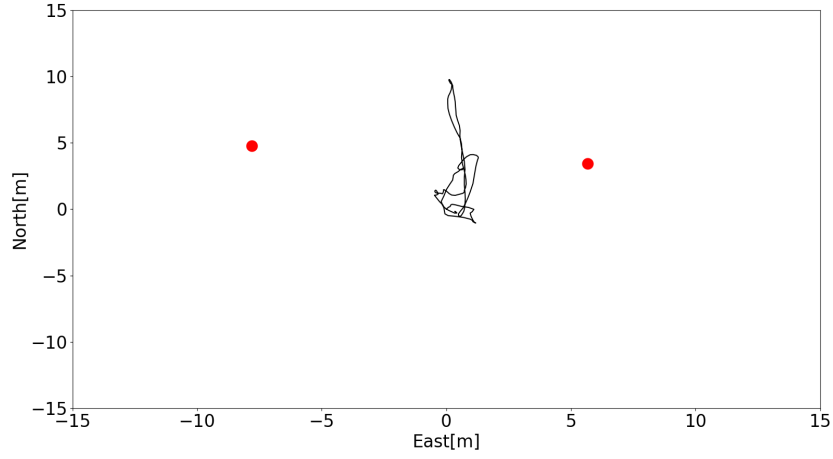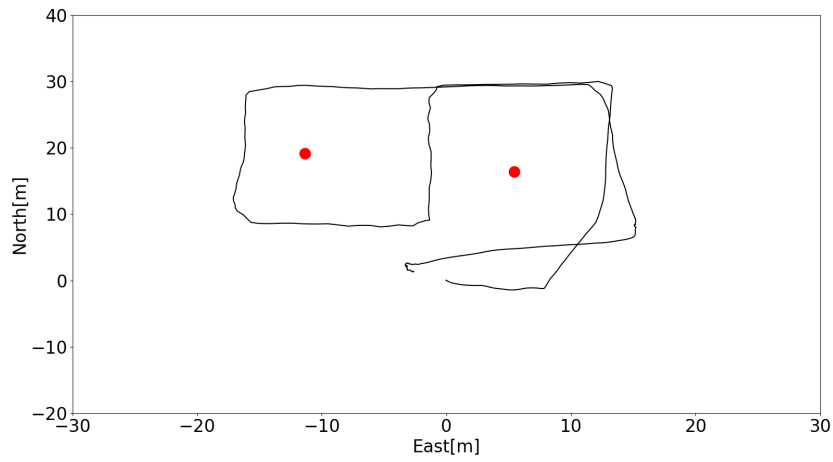
Fig. 2: Flight path of data1

Fig. 3: Flight path of data2

UAV and microphone array

The UAV was quadcopter (enRoute Zion PG560) as shown in Fig. 4. Flight control module (APM2.6) sent GPS/IMU via MAVLINK, and recorded by MAVROS module of ROS that also recorded the audio stream from an onboard microphone array transmitted over WiFi. All of these are in **data1.bag** and **data2.bag**. The frame of UAV has an octagon shape and 16 microphones (SYSTEM IN FRONTIER INC. RASP-ZX/MEMZ-microphone) were embedded at the ends of a bar attached to each vertex of the octagon as shown in Fig. 5. The position of microphone is described in **microphones.txt**.
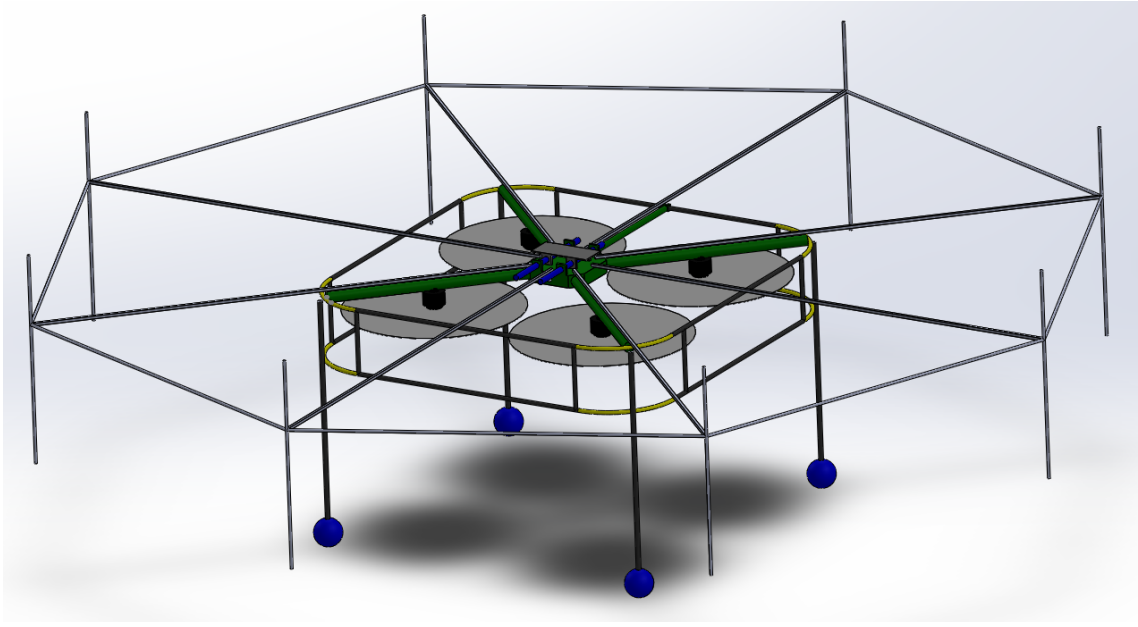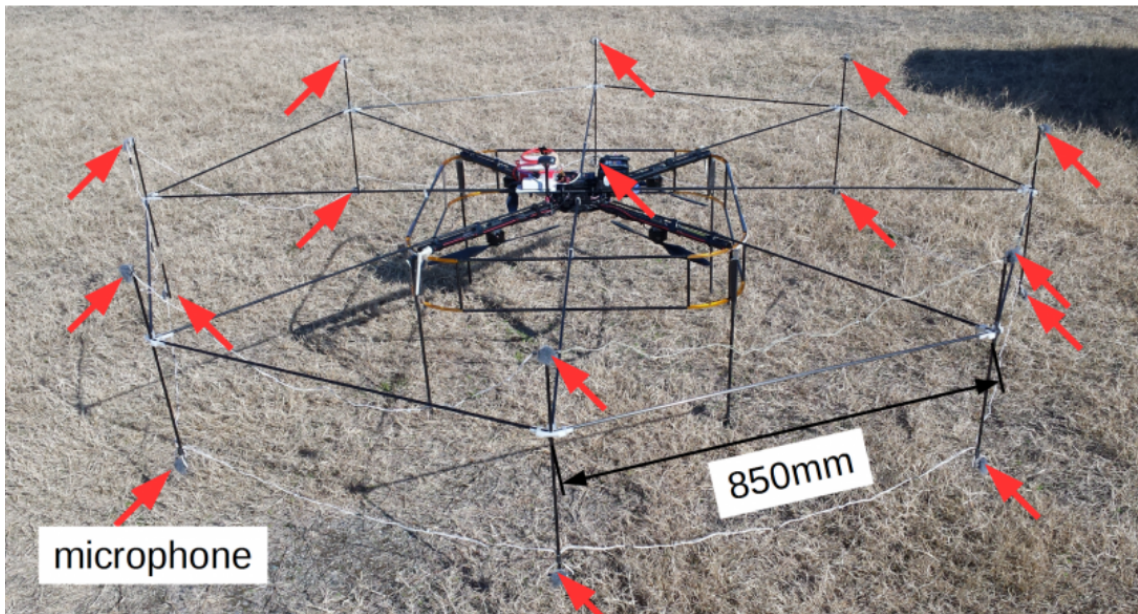
Fig. 4: UAV

Fig. 5: UAV and microphones

Localization result and correct

The correct positions and the localization results of sound sources are shown as below. Red points show the west sound source position and blue points show the east one. We can see that it is possible to localize the sound sources, which indicates that the provided data from us are usable for practicing sound source location methods.
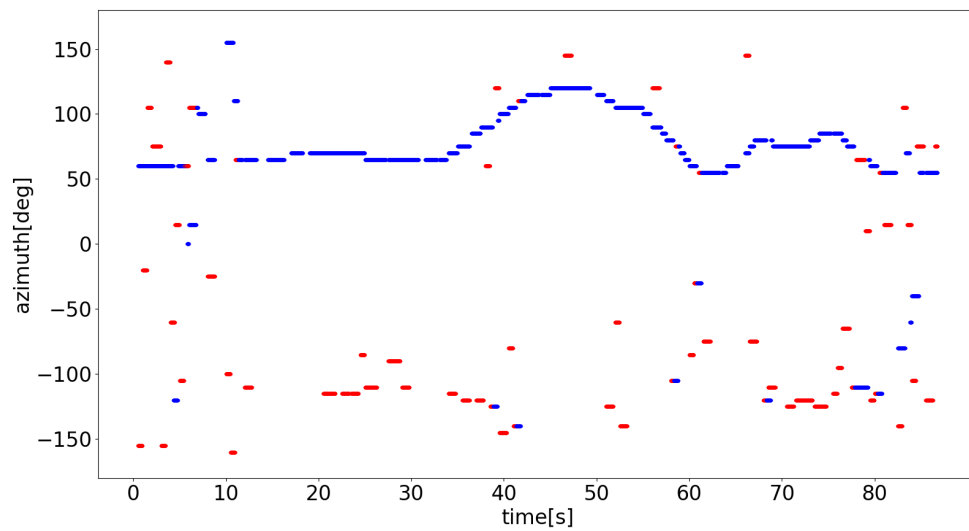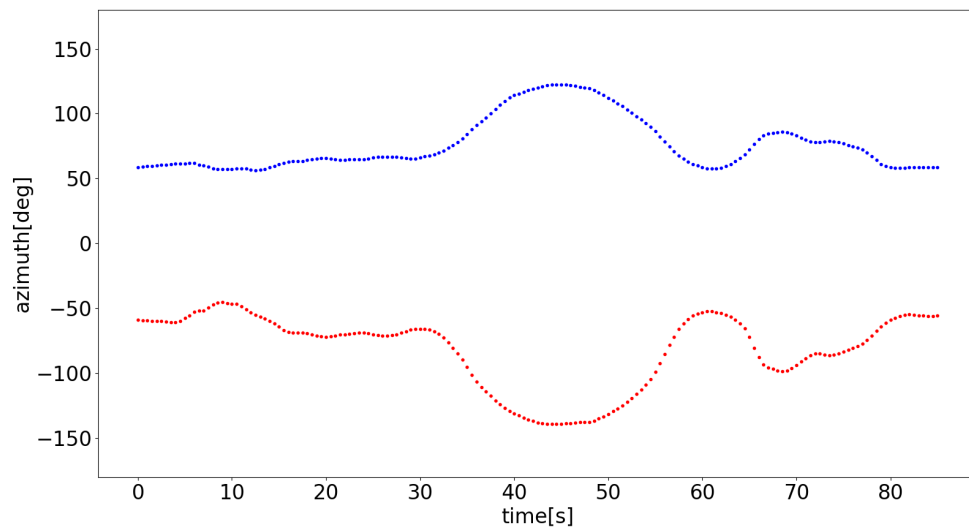
Fig. 6: Localization of data1(azimuth)
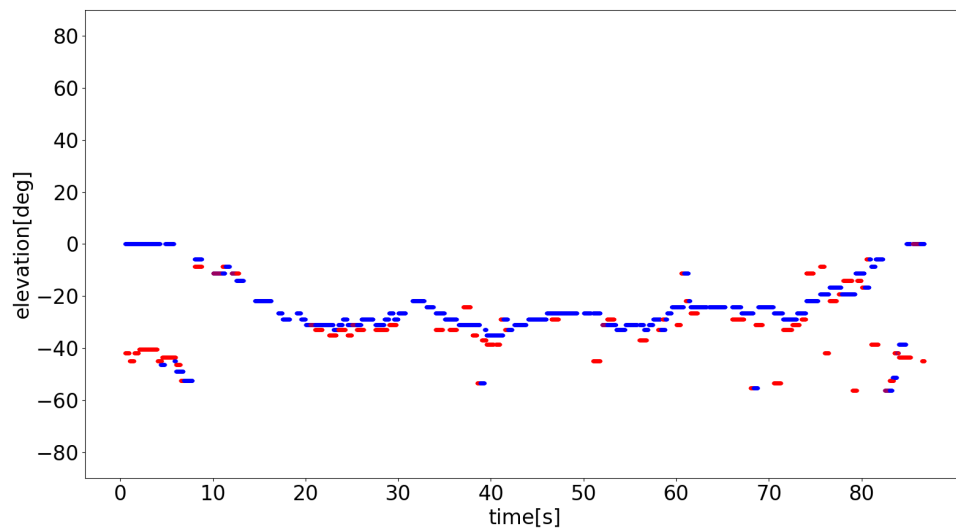

Fig. 7: Correct of data1(azimuth)

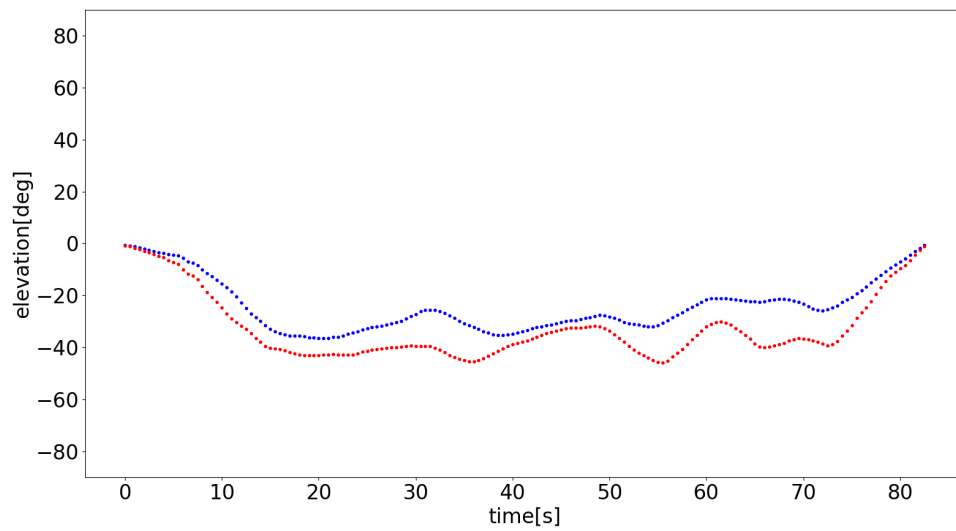Fig. 8: Localization of data1(elevation)
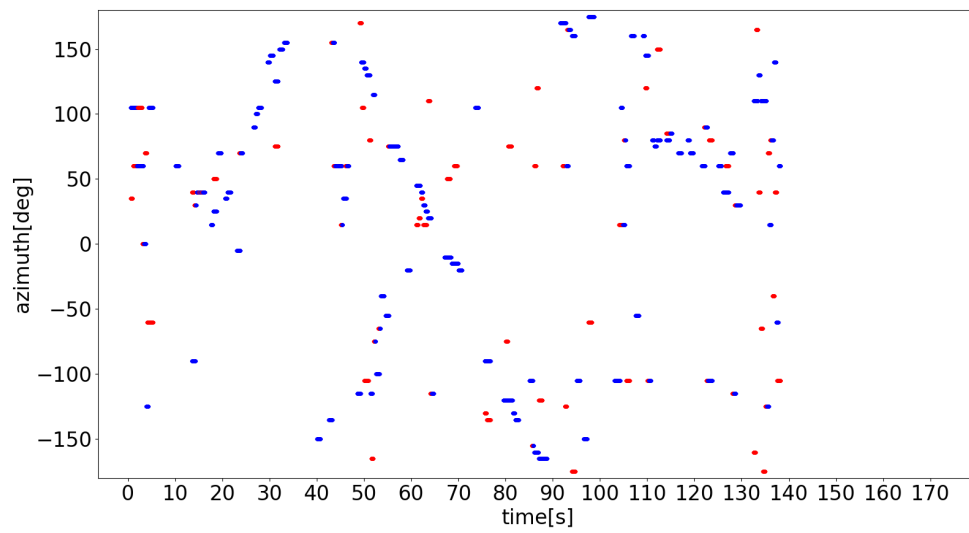

Fig. 9: Correct of data1(elevation)

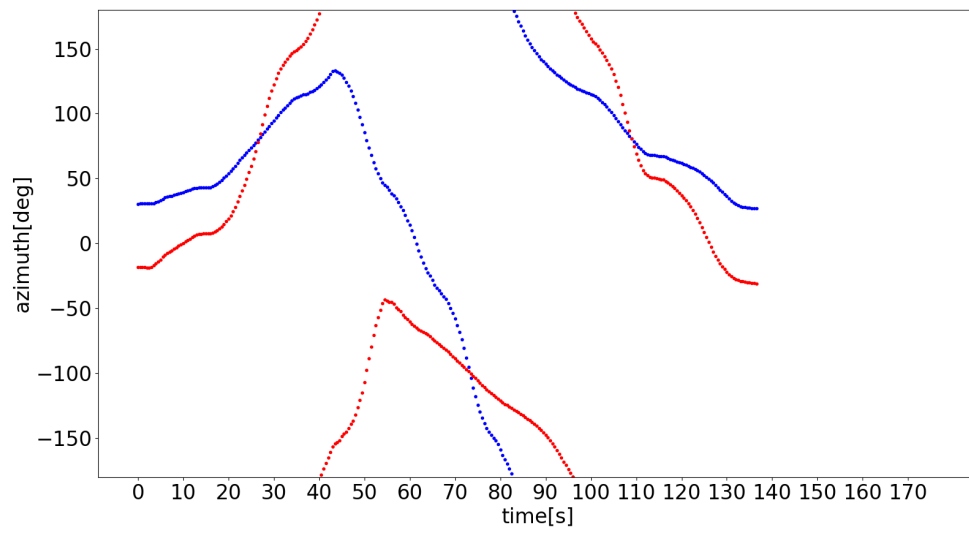Fig. 10: Localization of data2(azimuth)
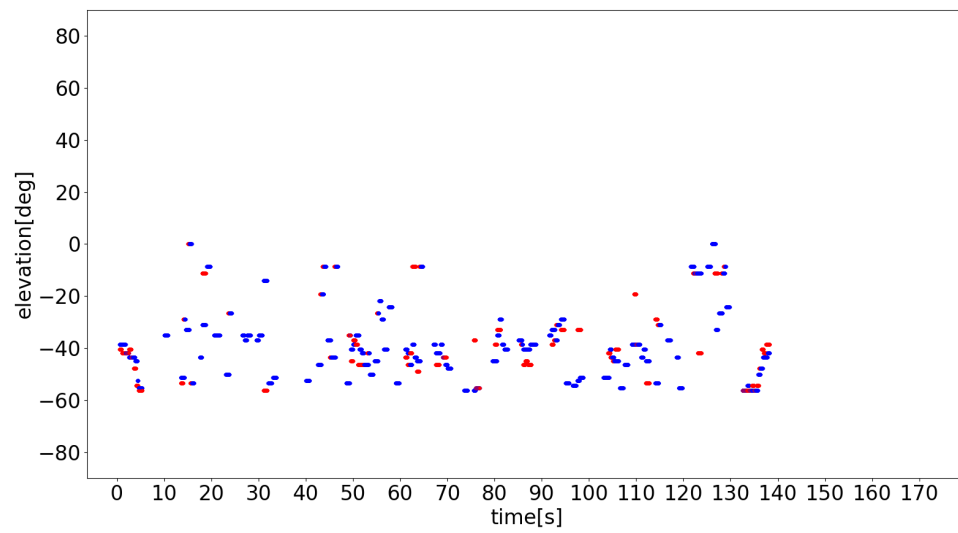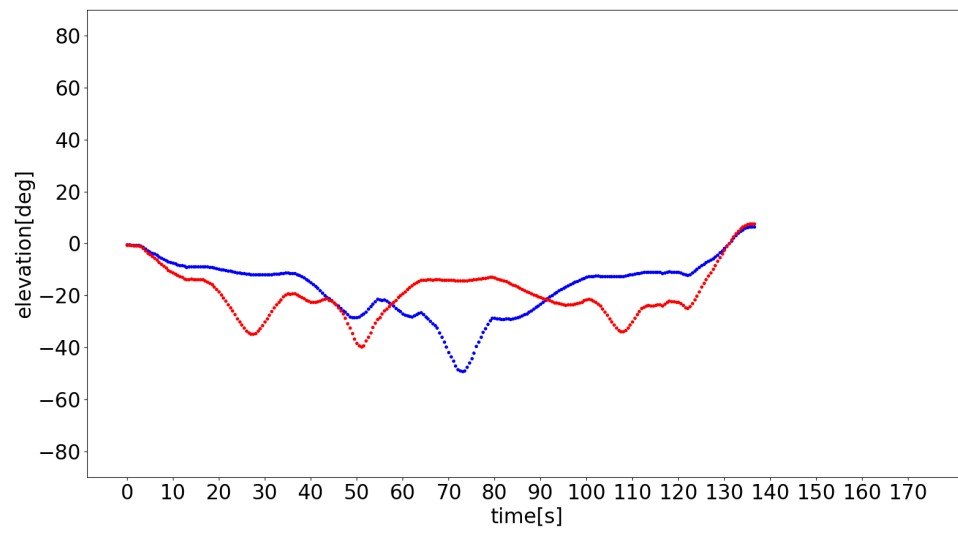

Fig. 11: Correct of data2(azimuth)

Fig. 12: Localization of data2(elevation)

Fig. 13: Correct of data2(elevation)