

Lidar Testing 20.03.19

Motivation

As part of our Master thesis, the task of locating powerlines must be done using camera sensors along with distance rangefinders. The group was supplied with a LeddarTech VU8 in the 'Wide-angle' configuration (100° HFOV/ 3° VFOV) to use for this task. However, it was found that during initial testing in Semester 3 that the sensor had a very limited range in detecting small objects, such as the 35mm diameter of the powerline.

A narrower lidar sensor was requested for the project, which would have a number of benefits over the 'Wide-Angle' configuration. From the lidar documentation, it can be observed that the 'mid-angle' configuration would allow the line to be detected from a further distance.

This document serves as the test results from the comparison between the wide and mid angle configurations for the lidar.

Test setup

The test powerline was prepared in the Hangar at the SDU UAS centre at Hans Christian Andersen Airport, North of Odense. The line spans a distance of 19 metres from one side of the hangar to the other, displaying a curve similar to the outdoor version. At its lowest point, the powerline extends approximately 4.5-5 metres from the ground.



The lidar was set up on a 1.3-metre table, underneath the lowest point on the line. The lidars laser beam was oriented perpendicular to the line to simulate the intended use on the UAV. The Lidar was then moved horizontally and vertically to the line to test the lidars location and distance estimations.

For both sensors, the ends of the power line were ignored due to its close proximity to the roof, resulting in the sensors being unable to discern between the two.

Testing on the balcony would allow for testing in the inspection phase to be carried out. It also allows for sensor testing without the roof causing an obstruction.

The lidar sensors can be set up with different parameters to optimise the functionality of the lidar. These include Accumulator, Oversampling and Points (definitions can be seen here ¹)

¹ https://www.robotshop.com/media/files/pdf2/leddarvu_and_configurator_user_guide.pdf (Page 30)

The settings recommended for use were as follows:

Accumulator:	16
Oversampling:	16
Points:	30

Wide Angle Test results

Below powerline

The lidar did not pick up the line when placed on the table - instead, the lidar had to be held at arms-length beneath the line to be detected (~1.6 metres). Moving along the powerline did not fare much better. With the lidar losing detection around the 2-metre mark.

Balcony

- Unable to detect line

Mid-Angle Test results

Below powerline

- Able to detect the power line from the table
- sensor was placed on the floor to test distance, able to detect full 4.8 metres
- Sensor unable to detect near the end of the line (roof obstruction, same as Wide-Angle)

Balcony

- Found the line with a distance of 5.31 metres
- Able to discern between the mocap truss and the power line.

Conclusion