Internship report

Eike Blomeier (s1073175)

General information

The internship took place from the 1st of July until the 31st of August 2022 at Ocean Maps GmbH. Ocean Maps is a globally operating, Salzburg based survey office specialized in hydrological surveys as well as merging point cloud data from different sensors in a single model. By loading the model with the inhouse developed digital twin, a model becomes intuitively usable for experts and ordinary persons.

Tasks

During my internship, I gathered insights in the different fields Ocean Maps is dealing with. On the one hand, I was able to learn about how purpose-oriented research and testing is done, on the other hand I was taught about the full process of hydrological surveying. From gathering the data, to process it and what is important for the clients' technical report.

Camera testing

One of my first tasks was to test an industrial camera by the Bavarian manufacturer *SVS-Vistek*. The goal was to figure out if the camera is suitable for mounting on a remote-controlled survey vessel, to combine the imagery with an already mounted laser scanner. During the testing phase, different tests were carried out to see how the camera is working in a stationary environment, how the camera is working in a moving environment and how customizable the camera is.

After getting familiar with the SVS-Visteks camera control tool *SVCamKit*, the first tests were carried out to see how the camera is working in a stationary environment and to get more familiar with the camera in general. The focus of the test was to see how realistic the colouring of the images is, how good the camera-

focus and zoom works for different ranges from very short (~1m) to far away (~100m) and how well the camera works in different lighting conditions.

In the next phase, the camera was mounted on a movable tripod to see the cameras behaviour in a moving environment and pushed alongside similar structures like the camera was supposed to work with when mounted on the vessel. After this was repeated several times in different distances and lighting conditions, the pictures were analysed using the GIMP editor. In particular, the behaviour of the camera's rolling shutter was to be analysed when the camera is moving while taking pictures.

Finally, I researched the manual of the camera to gain knowledge of the extensibility of the camera.

For my personal learning objectives, I learned about what are important features a camera should fulfil when being used on a moving platform as well as what are important camera specs when a camera must be used for professional, surveying tasks. Additionally, I learned about how a product testing is rolled out and what information is necessary to obtain and communicate with other persons in charge.

Field work

In the advanced phase of the internship, I gained insights into vessel based hydrological surveying. Experienced colleagues taught me the fundamentals of hydrological surveying. Here, three major points were important:

1. On-site GPS calibration of the sonar system before the boat is put into the water. This was performed using a tachymeter to measure the positions of the GPS-antennas in the used coordinate system. Later, the measured positions were compared to the positions measured by the GPS antennas to proof the absolute accuracy of the system.
2. Setting up a base-station. The base-station is needed in case of loosing the connection for RTC-data while surveying. For set up, the base-station can either be placed over an official marking or the positions is determined using a tachymeter and / or RTC. To guarantee a good satellite-lock, the base-station must be place in a location where it can't tip over (e.g., by cattle or

human) and the sky-view is optimal (no buildings or trees a blocking the sky).

3. Surveying using the "iWBMS" sonar on a vessel. The iWBMS Multibeam Sonar is used for the hydrological surveying. It is capable to measure the bottom of a waterbody with a precision up to 2 cm. Here, I was taught how to operate the survey-vessel in order to achieve optimal results surveying the waterbody. Additionally, I learned about the fundamental physics for sonar-based measurements. One of the most important things for high-quality results is to know the current speed of sound in the water column, since it can change a lot depending on the temperature and floating sediments. Using no or not the right sound-profile can result in a depth-difference of centimetres.

Data processing

During the final phase of my internship, the basics of hydrological data processing were shown to me. I learned about how to clean the previous surveyed data using BeamworkX AutoClean. This is important since the sonar data will contain noise which leads to a false model. Noise can come from several sources. The most popular one is the noise which is produced by the system itself when the angle of the backscatter is relatively horizontal. This data is useless and must be deleted from the dataset. Other noise, e.g., algae usually has to be deleted as well since they will affect the quality of the interpolation for a 3D-model.