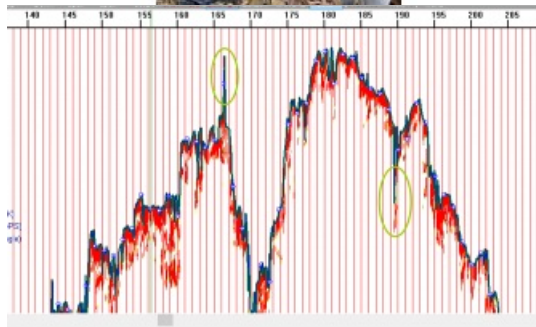
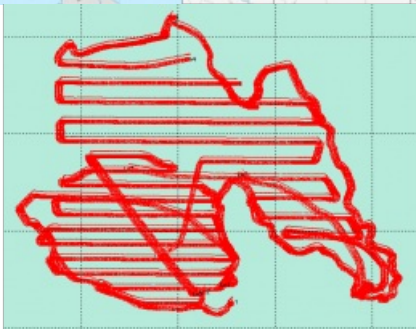
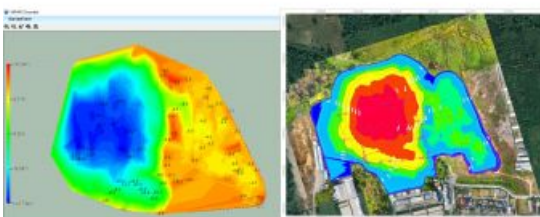


Hydrographic Survey USV Helps with Volume Acquisition in Lake Regions



Hydrographic surveying in lakes and canal regions has not been an easy job in the past. Due to a lack of professional and portable surveying equipment and mobile platforms, the precision and accuracy are not always reliable enough. The process is also complicated and time-consuming. A real unmanned surface vehicle (USV) survey project took place in a lake in Thailand and a [Hi-Target hydrographic USV](#) successfully collected dependable results. It helped to calculate the volume data much more accurately and in less time.

Geography



Pathumthani province lies on the low alluvial of the Chao Phraya river that flows through the capital city of Thailand. It is one of the most populated provinces in the country. There are lots of canals and lakes in the region that distribute water to the local agricultural and fishery industries.

Figure 1: Location of the Pathumthani Province, where the project was conducted.

Project Task

Human beings are becoming more and more ambitious — they want more space for development purposes. Therefore, the relationship between humans and waterways, canals and lakes is under increasing pressure. For example, in the land reclamation project described in this article, after an environmental evaluation the local authority planned to fill in a small lake for commercial use. It was therefore necessary to carry out marine mapping to calculate the precise amount of earth needed for the project.

Challenges

Tight deadline

The construction site had to be ready within one month, placing high demands on efficiency.

Safety risks

As this region was once a large swamp area and full of muddy alluvial, it would be hard to guarantee the safety of the surveyor

when wading into the water to finish the marine mapping. Besides that, the soft lakebed and unknown occasion raised the risk of accidents.

Limited budget

This was the most vital factor to consider. The project manager had to prepare enough earth to fill in the lake without redundancy in order to save costs and reduce waste. Reliable information about the lake's depth and width achieved by the USV survey, which is not easily distorted by incorrect signals, could help him estimate the amount of earth needed more accurately.

□ Figure 2: Launch of the Hi-Target iBoat.

Hi-Target BS Series USV

Equipped with a slim body, modularized parts and a safety guidance system (autopilot), the Hi-Target USV is a convenient mobile platform of a professional survey system with stable performance for hydrographic surveying. The onboard echosounder is an exclusive design for the [BS series boat](#), with high reliability preserved, as shown in the workflow below.

Workflow

1. Environmental investigation. Make sure that there are no distinct obstacles or hidden objects on and under the surface of the water which may pose a risk to the boat during the USV survey. Then mark the different points between the satellite map and the real scenario, and then find a proper deployment point accordingly.
2. Set up the communication between the laptop ashore and the boat before launching it on the water.
3. Deploy the boat on the water. Guide it along the border and then design the survey lane in the safe zone.
4. Make the boat sail and survey in autopilot mode, and switch to manual mode if necessary.
5. Correct the depth data in the post-processing procedure of the USV survey. Taking the results in this project as an example, the green lines and the little blue bubbles shown in the image are the raw depth data recognized by the echosounder, while the red waves are the echogram that shows the true signal feedback from the lake bottom. To reduce the occurrence of wrongly recognized depth information and obtain results closer to reality, surveyors must read the echogram to align the raw depth data. Otherwise, the results will be unreliable.

□ Figure 3: Track of the survey lines.

□ Figure 4: Echogram showing depth recognized wrongly.

Key Benefits

High Efficiency

The small surveying equipment is agile enough to turn around swiftly and go for shorter distancing survey lanes to provide more real data. It allows surveyors to finish the bathymetry work of the hydrographic survey within less time.

Reliable Results

With the help of professional post-processing software, the raw depth is overlaid on the echogram and the real depth can be aligned by reducing the wrong signals.

Safety Guarantee

A USV survey helps surveyors eliminate risks since they can operate the boat ashore rather than venturing into the water for marine mapping.

Results

Hi-Target Hi-MAX software processed the depth data and filled the contours as a terrain preview.

"This project is very important for my team. We want to get a result as accurate as we can while reducing the cost at the same time. The [Hi-Target USV](#) and the professional software system truly gave me confidence on site. I believe that the reliable earthwork result created by the Hi-Target USV survey will help to reduce the cost of the truckload and soil." — **Manager of this project**

□ Figure 5: Preview of results and overlay on the satellite image.

About Hi-Target

Established in 1999, [Hi-Target](#) is the first professional high-precision surveying and mapping instrument brand to be

successfully listed in China. Hi-Target provides a wide range of surveying equipment including GNSS receivers, CORS stations, total stations, 3D laser scanners, GIS data collectors, UAV/UAS, and hydrographic products to offer complete commercial solutions for various industries.

As the leading brand in the geospatial industry, Hi-Target invests heavily in research and development, on top of collaborating with more than 100 universities globally to bring the latest positioning technology and innovations for product development.

For over 20 years, Hi-Target has approximately 3,300 employees worldwide, with an established network of 64 subsidiaries, 28 branches and more than 200 partners in over 60 countries to service and support our customers.

<https://www.gim-international.com/case-study/hydrographic-survey-usv-helps-with-volume-acquisition-in-lake-regions>
