



## HyDrone-ASV and HyDrone-ANP with Single Beam Echosounder for Bathymetric Surveys in Mines.

### PROBLEM:

Carrying out bathymetric surveys in mines using conventional survey methods as single beam echosounders on manned vessels, can present several challenges and potential problems. Here some of the key issues

#### 1. Safety Concerns:

- The structural integrity and stability of the Tailings Pond and water bodies must be ensured to prevent accidental breaches or collapses.
- Tailing Ponds and water bodies could have some degree of toxicity and hazards, that could cause health risks to personnel that conduct the surveys.

#### 2. Access and Equipment:

- The remote locations and challenging terrain can difficult the access to the ponds with the required equipment.
- Traditional vessels could be not suitable for very shallow water and small areas.

#### 3. Environmental Factors:

- Adverse weather conditions, such as heavy rains or storms can restrict the entrance to the Tailings Ponds or water bodies for the surveys.
- Using manned vessels that work with fossil fuel and oils can lead to contamination of the water bodies.

#### 4. Regulatory and Environmental Compliance:

- The requirements of multiple permits and regulations for compliance the environmental regulations can make complex the use of manned boats for surveys.
- The process of conducting a bathymetric survey can disturb the pond environment, potentially affecting the local wildlife and water quality.

#### 5. Technical Challenges:

- Proper Calibration and Maintenance of the equipment is required for the accuracy of the information collected, especially in harsh conditions.
- The availability of trained personnel with the permits required to carry out the surveys is necessary.

### SOLUTION:

A HyDrone-ASV or HyDrone-ANP equipped with a HydroLite Plus Dual and a compatible GPS or GNSS, offers a robust solution to many of the challenges posed by conventional bathymetric surveys with manned vessels. The HyDrone significantly enhance safety by eliminating the need for human presence in hazardous or remote mining environments.

They can easily access difficult or dangerous areas, such as tailings ponds with unstable banks or submerged obstacles, without risking human life. This automation also allows surveys to be conducted in harsh conditions that would be unsafe for manned operations.

The HyDrone also improve the efficiency and accuracy of bathymetric surveys. They can be pre-programmed to follow precise survey paths, ensuring comprehensive coverage and consistent data collection. The stability of HyDrone helps maintain more reliable echosounder readings, even in challenging water conditions. Additionally, the smaller size and agility of the HyDrone enable them to navigate tighter spaces and shallow waters more effectively than manned vessels.

Furthermore, the operational complexity and costs associated with the HyDrone are generally lower. They require less manpower, and their maintenance and deployment costs are typically reduced compared to manned vessels. The automation of surveys using the HyDrone can also shorten the time required to complete them, leading to cost savings and more timely data collection.

#### **PURPOSE:**

To demonstrate the advantages of using a portable Unmanned Surface Vessel (USV) with a Single Beam Sonar Technology for bathymetric surveys in water bodies at mines, eliminating the need to use manned survey vessel in hazardous or remote mining environments.



HyDrone-ANP with HydroLite Plus Dual and Trimble R8s - Setup for Training

#### **WHO:**

Mining, Consulting or Surveying Companies that want and need to carry out bathymetric surveys in water bodies at mines.



Setting up the HyDrone-ASV with HydroLite to collect bathymetric data with Trimble Access



## APPLICATIONS:

The use of the HyDrone for bathymetric surveys in mines have a variety of applications that are essential for the efficient and safe management of mining operations. Some of the key applications include:

### 1. Water Management:

- In mines that rely on water for processing ore, bathymetric surveys help in managing water resources by providing data on the depth and volume of water bodies. This information is crucial for optimizing water usage and ensuring a sustainable water supply.



Autonomous Tailings Pond Bathymetry Using a HyDrone-ASV Equipped with a HydroLite Echosounder

### 2. Environmental and Safety Monitoring:

- These surveys help in monitoring the impact of mining activities on surrounding water bodies. By tracking changes in the depth and volume of these water bodies, companies can assess the environmental impact and ensure compliance with environmental regulations.



Conducting a Bathymetric Survey to Verify the Volume of a Process Water Pond

## 5. Infrastructure Planning:

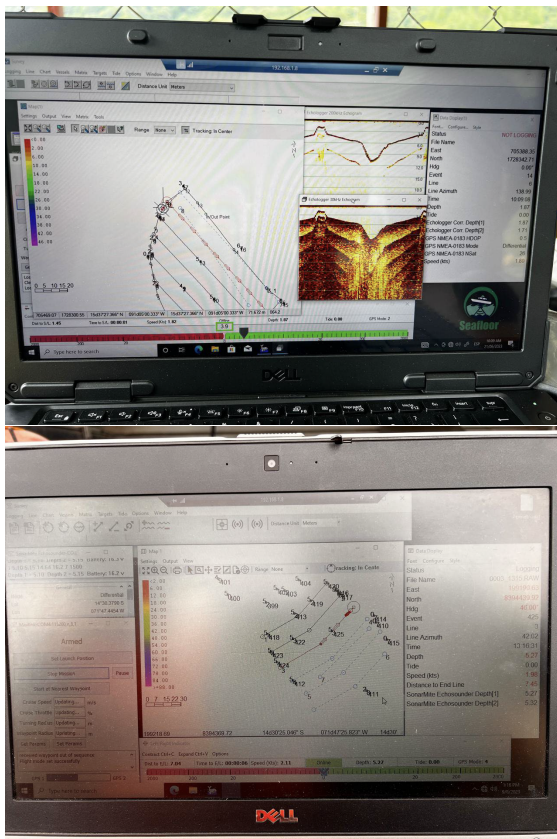
- Accurate bathymetric data is essential for the design and construction of mining infrastructure, such as dams, reservoirs, and drainage systems. It helps engineers understand the underwater terrain and plan structures that are safe and efficient.

## 6. Geotechnical Analysis:

- Bathymetric data can be used in conjunction with other geotechnical data to analyze the stability of underwater slopes and structures. This helps in designing safer and more effective mine layouts.

## 7. Regulatory Compliance:

- Many jurisdictions require detailed monitoring and reporting of water bodies affected by mining activities. Bathymetric surveys provide the necessary data to meet these regulatory requirements and demonstrate compliance.



Different Setup Configurations in Hypack Survey for Bathymetries with the HyDrone-ANP

As a summary, bathymetric surveys are a critical tool in the mining industry, providing essential data for a wide range of applications that reinforce the safety, efficiency, and environmental sustainability of the mining operations.