

2020



GreenValley International

Mining Applications

Fast | Accurate | Safe



LiDAR Solutions For Mining Industry

• Advantages:

Complete value-added 3D solutions comprising advanced software, sound hardware and deep integration and professional customer centric technical support

Data collected from LiDAR are of high accuracy

Both under & above ground: LiAir /LiBackpack can be used above ground , LiBackpack can be used underground

3D modelling of enterprise for planning, controls, simulations, safety, mapping, etc.

Easy and Fast. Real-time 3D data acquisition on the move by one operator in any tough environment via LiBackpack is available.

LiDAR360 provides fast measurements, DEM, as well as other functions with a large variety. Easy to scan and get the deliverables.

• Solutions Details :

Use LiAir/LiBackpack to acquire data from the field. And then use LiFuser-BP/LiGeoreference to georeferencing the data acquired to obtain point cloud. Lastly, use LiDAR360/ AutoCAD/ Orbit and other applications to generate deliverables like volume , DEM , Modelling and others.



Hardware Recommended



- **LiAir V70**

- The LiAir V70's lightweight and portable design offers a wide-angle field of view and fast scanning rate that makes UAV-LiDAR data capture efficient. There are few operating restrictions with this device, and it has the adaptability to perform effectively in a wide variety of environments. As a UAV-based 3D laser scanning device, LiAir V70 is well-positioned to obtain detailed and accurate measurement data from hard-to-access upper mine pile regions. It is very suitable for the scanning of the tall mine piles in a large area, or the large buildings like the mining facility.

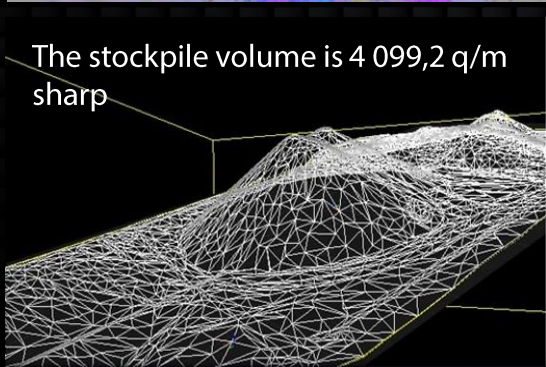
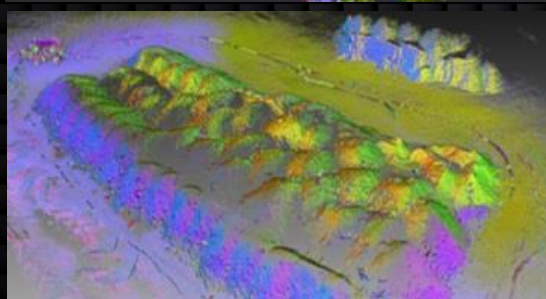
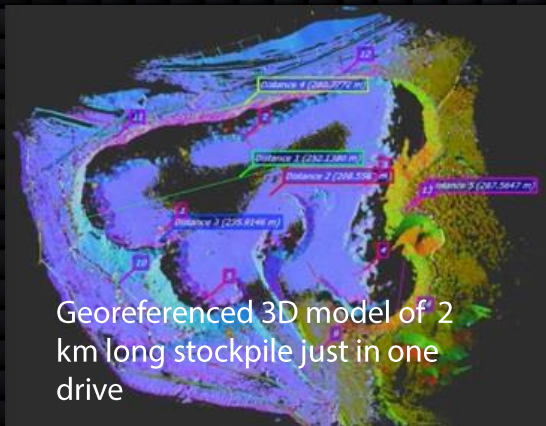


- **LiBackpack DGC50**

- LiBackpack DGC50 is the flagship model in GVI's LiBackpack Series. This system features dual LiDAR sensors and a panoramic camera that allow users to capture RGB information and generate the colored point cloud. The device's SLAM technology enables it to be used in GNSS-denied zones that are commonly found beneath forest canopies. With LiBackpack DGC50, users can scan the mine pile with smaller volume rapidly and freely (no need to consider the restriction of UAV flight).



Usage For Stockpile Calculations

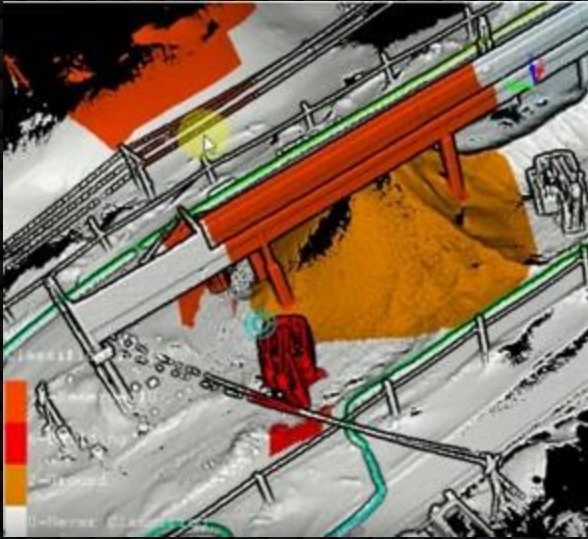


Data collected by LiAir V70

- Stockpiles volumes tend to change continuously during the production process and are subject to regular and precise measurements. The process must be stable and well managed based on objective and correct data.
- One of the most efficient methods of obtaining such data is the use of portable laser scanners enabling just one surveyor to walk thru objects of interests and map them on the move with LiBackpack DGC50.
- When the piles are too large to be scanned by LiBackpack efficiently, it is highly recommended to use the UAV-based device, LiAir, to scan the piles. LiAir system can scan ~0.5 to 1.5 km² each flight.
- A good example of a 200 m long raw material stockpile survey taking 15 minutes only. Correct volume calculation took 15 minutes. As a result, a lined-up detailed point cloud has been delivered to display the whole site.
- Any surveyor upon a day of training can scan such stockpiles to produce this 3-5 cm sharp 3D model, calculate its volume correctly to use the data further for managing the production process.
- LiBackpack/LiAir is an ideal measurement tool for mining, easy to use and fast to deploy.



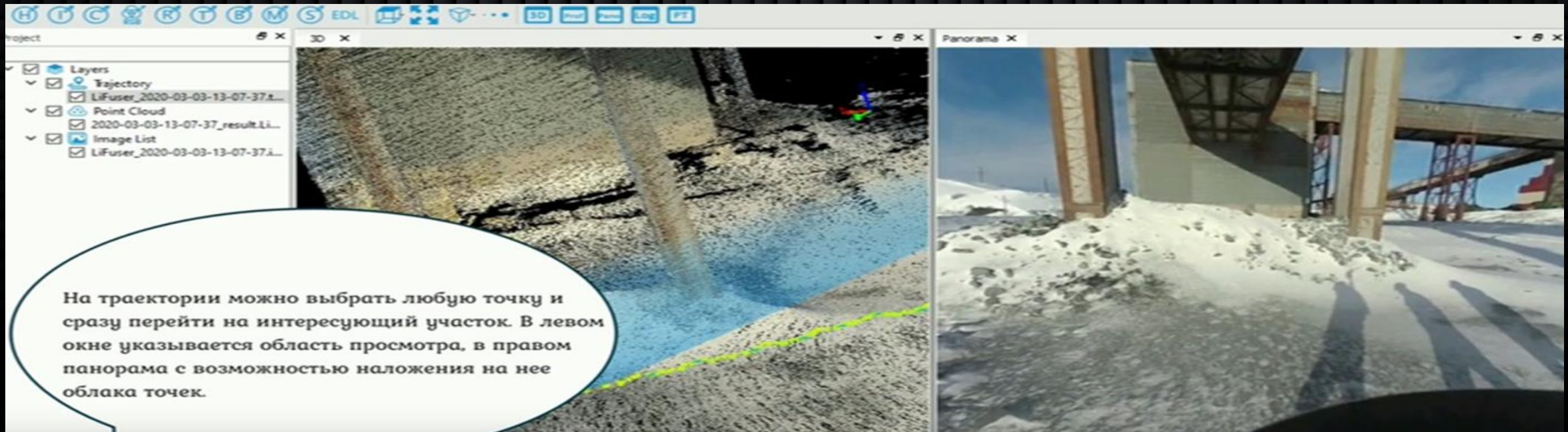
LiAir/LiBackpack Survey Of Mining Facility



Dynamic survey of the industrial site all year round to create a digital model for designing and monitoring of:

- Production buildings and structures
- Transportation network, roads and railways
- Power, supply lines
- Location and distribution of machinery and transportation.

The combination of the data set acquired by LiAir V70 and LiBackpack DGC50 will ensure the complete structure of the mining facility can be obtained and modeled by point cloud. Furthermore, the point cloud data can be used as the base map for the BIM and/or security & protection tasks.





LiAir/LiBackpack Usage At Mining Facility



LiAir V70, a UAV-based LiDAR system, can be mounted on the commonly used DJI UVA platforms, e.g., DJI M300, DJI M600 pro. With the help of the UAV system, LiAir V can map a large area with the mining facility rapidly and accurately.

LiBackpack DGC50 has integrated GNSS module for proper positioning on site. It is an ideal tool for creating a basic digital twin of a production or a service mining facility and its upgrade whenever needed.



LiAir V70 and LiBackpack DGC50 are designed to be deployed in a tough industrial environment to collect comprehensive 3D metric data of complex and extended mining facilities both outside and inside, in the air and on the ground.

The industrial GVI mapping solutions are well protected to use effectively under low temperatures and in tough mining environment of Siberia and Polar areas.

3D Underground Data Acquisition/Process



- To conduct the process, one operator is needed only. The job can be done by walking thru a mine or a stockpile or by driving a vehicle moving with a speed of up to 20 km/h.
- To access hazardous locations (cavities, explosion areas and hard to access dumping locations) a telescopic pole with a turning unit is used to ensure operator's safety and fast acquisitions.
- Surveys are done without GNSS signals, geo-reference is done by geotags on the walls and the tunnel roof.
- SLAM technology is ideal in tough mining environment of high temperatures, humidity, low light or darkness, confined locations with unusual configuration.
- To control the acquisition process, the operator uses a rugged tablet to ensure the area of interest is scanned properly and snappy to reduce his presence on the operation site to a min time (15 times shorter than by static means).
- The LiBackpack achieved deliverables include a comprehensive point cloud of the whole site of scan, movement trajectory and image data. The LiFuser-BP soft enables the user to filter the achieved results, make point clouds georeferenced and processed for uploading into GGIS Micromine, Surpac, Credo 3D Scan Mineframe platforms in .dxf and .las formats or use for further data processing, results evaluation and reporting, etc.



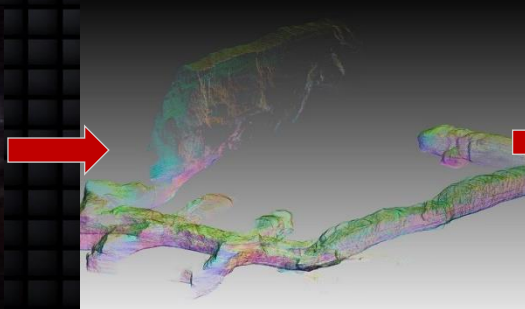
LiBackpack Underground Mine Samples

Usage:

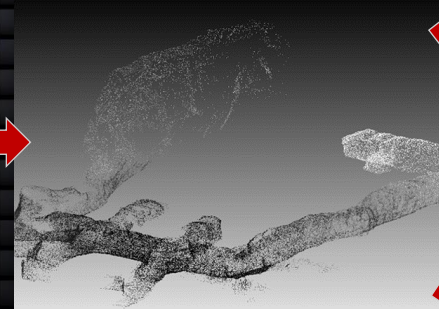
- Tunnel cross sectioning
- Underground mine digital models for planning, equipment, sensors location and placement
- Change detection, safety control
- 3D data collection for GIS, SAP



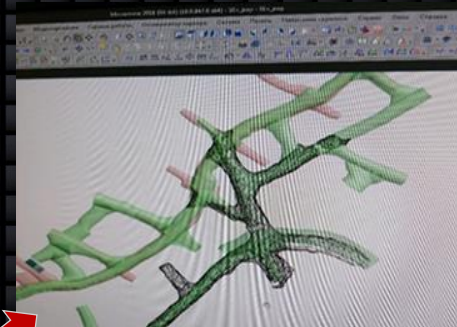
During the acquisition, control points are georeferenced in the local coordinate system of the mine.



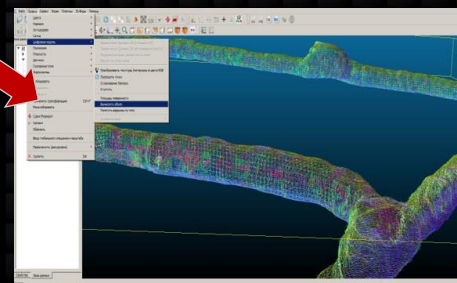
Initial point cloud processed in LiFuser BP and ready for export into the local coordinate system. Once at least three control points are done, the system provides a report on actual accuracy. (LiFuser BP)



Final filtered to be sparse digital model (point cloud) in .las format is ready to upload into GIS Micromine, Autocad, Surpac, etc.



Actual mesh of the underground mine as shown in GGIS Micromine for volumes analysis and layout conformity



Complimentary volumetric calculation in LiDAR360



LiGeoreference Software

LiGeoreference is supplied as a standard software of LiAir, permanent license

- Process the data acquired by LiAir V70 efficiently and accurately.
- PPK the trajectory data with the built-in LiNav module. No need to purchase any other third-party software to PPK the trajectory data.
- Perform strip alignment automatically to correct the data for better accuracy in the software.
- Generate the colored point cloud with the RGB camera information.
- Export the point cloud in a variety of data format, which ensures the data can be recognized by the third-party software (LiDAR360 as well) as many as possible.



LiFuser-BP Software

LiFuser-BP is supplied as a standard software of LiBackpack, permanent license

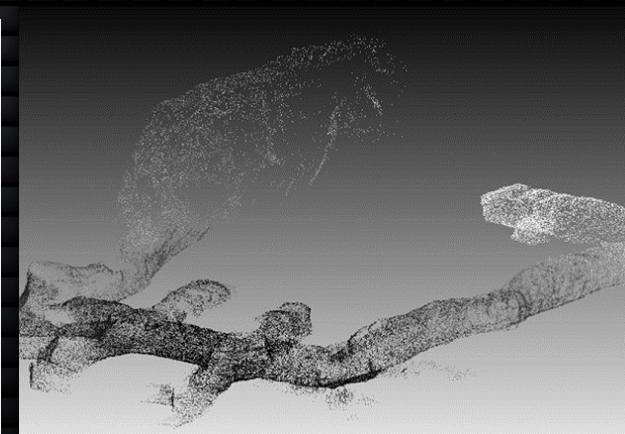
- Auto processing of trajectory data
- Automatic alignment of point clouds
- Automatic filtering of point clouds
- Colorization of point clouds (for models LiBackpack C50, LiBackpack DGC50)
- Synchronized operation on point clouds, trajectory and panoramic images
- Fine filtering of point clouds
- Geo-referencing in the user local coordinate system with geotags
- Mine cross sections and profiles creation
- Easy metric measurements of lengths, areas, volumes, cross sections, angles, etc.
- Export of point clouds in .las format to GGIS Micromine, Credo 3D Scan Mineframe, Surpac etc.



LiDAR360 For Specific Mining Applications

Usage:

- Fast volume calculation
- Tunnel cross sectioning
- Underground mine digital models for planning, equipment, sensors location and placement
- Change detection, safety control
- 3D data collection for GIS, SAP

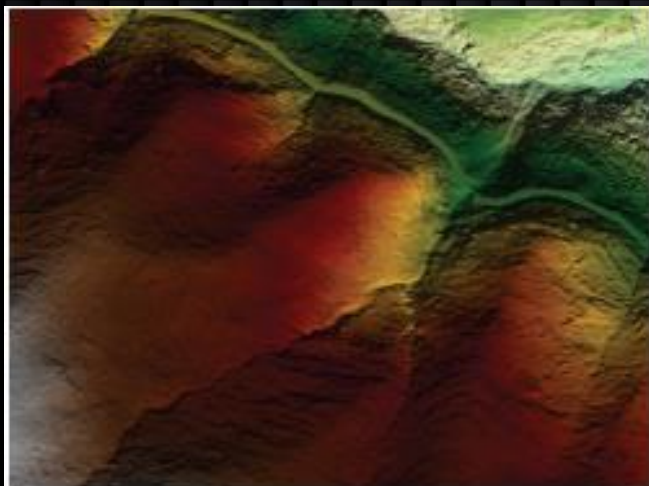


Final filtered to be sparse digital model (point cloud) in .las/.dxf and other universal format is ready to upload into GIS Micromine, Autocad, Surpac, etc.



LiDAR360 For Terrain Products

The terrain model provides a series of automatic and manual-editing tools for classifying ground points from LiDAR point clouds. It also provides a set of GIS tools for interpolating surface models (e.g., digital elevation model/DEM, digital surface model/DSM), and visualizing and editing them in 3D. Additionally, it contains tools for repairing surface models from spikes and holes. Furthermore, It allows users to analyze the terrain model to generate derivatives from the surface models, e.g. slope, aspect, and roughness. In the latest version, the change detection and deviation analysis functions to better support users' needs in different fields, e.g., disaster monitoring, land-use change analysis.



DEM



Hillshade



Contour Lines

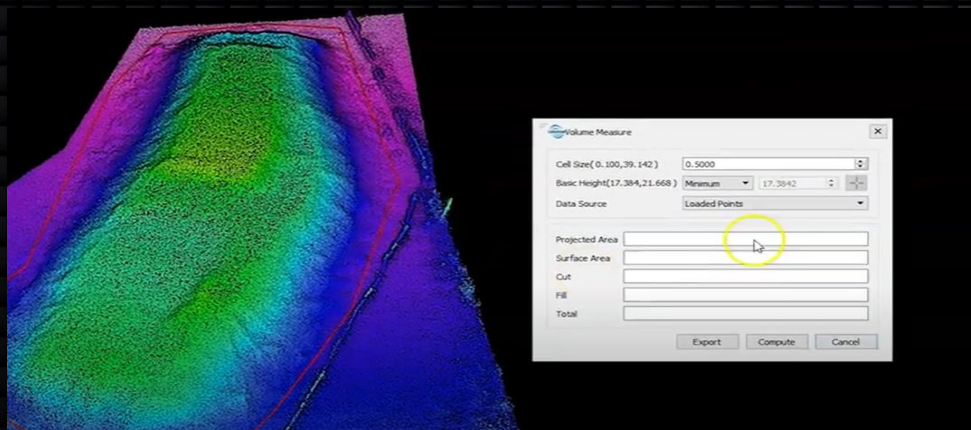


LiDAR360 For Volume Calculation

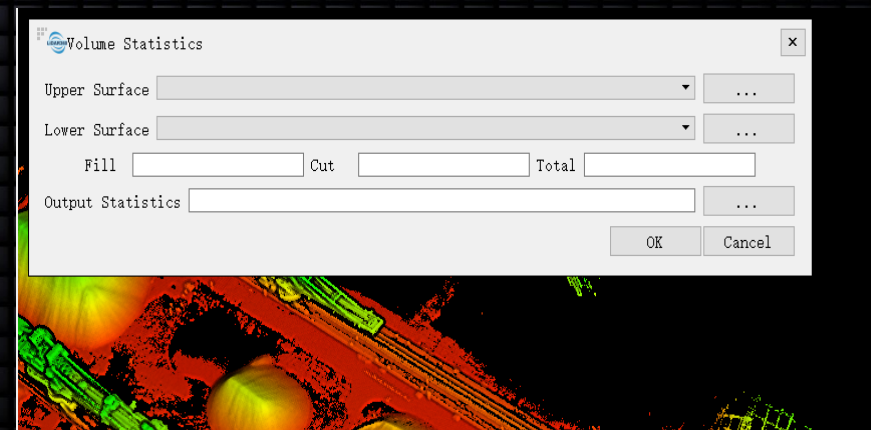
Volume Calculation through LiDAR360

Through Volume Measurement or Volume Statistics function of LiDAR360, we can get the volume

- Fast and Accurate
- Able to Measure the Volume even some data is missing (Volume Statistics).



Volume Measurement



Volume Statistics



THANKS

GreenValley International