

LiGrip

Handheld SLAM-Based
LiDAR Scanning System

User Manual V1.0

Table of Contents

User Guide	1.1
Copyright	1.2
1. Safety Precautions	1.3
2. Introduction	1.4
2.1 Technical Parameters	1.4.1
2.2 Hardware Composition	1.4.2
3. Product installation and field operation instructions	1.5
3.1 Product Installation	1.5.1
3.2 Field Operation	1.5.2
4. Data transmission and Processing	1.6
4.1 Data Transfer	1.6.1
4.2 Post-Processing	1.6.2
5. FAQ	1.7
6. Appendix	1.8

Copyright

GreenValley International

LiGrip Handheld Rotating SLAM LiDAR Scanning System

User Manual V1.0

Copyright

File version 1.0

Copyright © GreenValley International Inc. All rights reserved. (GVI) reserves all right for final explanation, and at its sole discretion, to change, modify, and remove portions of this document.

No Part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of GreenValley International Inc.

Website: www.greenvalleyintl.com

Respected User:

Thank you for using the LiGrip Handheld Rotating LiDAR Scanning System. It is our pleasure to provide you with mobile measurement data acquisition and processing services. GreenValley is committed to continuously improving our products. We therefore appreciate your comments and suggestions for improvements to our hardware equipment, post-processing software, training and documentation materials. Please contact us at Info@greenvalleyintl.com for any information or if you have any feedback.

Legal Notes

The LiGrip® is a registered trademark of GreenValley International Ltd. Other trade, company and brand names mentioned in this document may be the trademark property of their respective holders.

all rights reserved

© 2022 GreenValley International Inc.

Printed January 20, 2022

1. Safety Warning

Please read this manual carefully and follow the operating specifications in the manual before using. The manual will be updated in real time as the product technology upgrades. Users can obtain the latest LiGrip hand-held rotating laser scanner through the [Official Website of GVI](#) or technicians.

LiGrip hand-held rotating laser scanner is a high-precision instrument, please take extra care when using, avoid collision and strong vibration. When transporting equipment, ensure that all items are properly placed in the protective box. Do not transport or move any equipment that is not in the protected state.

Note:

- If not to be used for a long time or for long distance transportation, please take the power supply battery out of the multi-function battery box.

In order to avoid damage to the equipment and violation of the warranty terms, please do not disassemble the equipment at will. If the product fails, it must be repaired by qualified maintenance personnel authorized by GVI.

2. Introduction

LiGrip hand-held rotating laser scanner is a new series of products launched by GVI. The product adopts a simple style design, with a compact body, light hand-held, convenient operation and flexible installation; With a variety of sensors, it can quickly capture a wide range of scene data; support multi-platform and multi-mode operations, and combine lidar and SLAM algorithms to achieve indoor multi-scene integrated measurement. With GVI self-developed LiFuser-BP point cloud processing software, the point cloud data can be post-processed quickly.

2.1 Main Technical Parameters

Performance	Parameter
Hand Part Size	270*210*120mm
Battery Box Size	128.5*64*165mm
Hand Part Weight	1.5kg
Laser Sensor	VLP16
Laser Safety Classification	Class 1 Eye-Safe
LiDAR Accuracy	±3cm
Relative Accuracy	3cm
Absolute Accuracy	5cm
Max Range	100m
Wavelength	903nm
Scan Rate	300,000pts/s
Horizontal FOV	0°~280°
Vertical FOV	0°~360°
Point Cloud Data Format	.las,.laz,.ply,.LiData
Storage Space	128GB
Ports Available	USB, Ethernet port
Battery	5870mAh
Operating Time	~4h (single battery)

2.2 Product Components



LiGrip Product Components

1. Handheld device host
2. Handheld device battery case
3. Strap
4. Power cable
5. Data transfer cable
6. Battery
7. Laser scanner protective cover
8. Battery charger
9. Camera
10. Base stand

3. Product Assembly and field operation instructions

Please operate in strict accordance with the following procedures to ensure the normal functions of the device.

3.1 Product Assembly

1. Insert the battery into the battery compartment



Inserting the battery

2. Connect one end of the power cord to the handheld system and the other end to the battery box



Power connection

3.Remove the laser cover



Removing laser cover

3.2 Field Use

1. Power on the device: Press the round button above the battery and release it, then continue to hold the button for 2 seconds, wait for the green indicator on the button and the battery indicator to light up, which means that the battery starts to work and the device is on Electricity.



Power up the device/p>

2. After the device is powered on, the green wave button on the back cover of the main unit will be always on, and the button will turn off after about 40s.

3. Device initialization: Select an open starting position, keep the device still (it can be placed flat or held normally), press the green wave button, the button will flash first, and the device will rotate one and a half times, waiting for about 20s. After that, the green wave button is always on, and the device rotates stably, that is, the device starts to work normally;

At this time, you need to keep the device in place, let the device stand for about 25s, wait for the device to initialize, and build the base map.

Note: The laser should not be aimed at the wall or the ground, try to aim at an open place

4. Data collection: After the stationary is completed, if the device is placed horizontally, slowly pick up the device and walk directly according to the route planned in advance. During walking, do not make large movements of the arm holding the device. You can move slowly or change hands.

Note:

(1) Equipment collection should not exceed 15 minutes

- (2) Collection speed whilst walking should not exceed 1m/s, and the normal driving speed is sufficient, and should not be too fast
- (3) When collecting indoor scenes, open the door to pass through in advance, and do not move the door during the collection process
- (4) Pay attention planning the route of collection in advance when collecting, and try to use a closed loop where conditions permit.

5. Stop collection: After the data collection is completed, hold the device firmly in place, press the green wave button, and then it will start to flash. After about 15s, the flashing is completed, and the green light is off, which means that the data collection has stopped. At this time, you can hold the device freely.

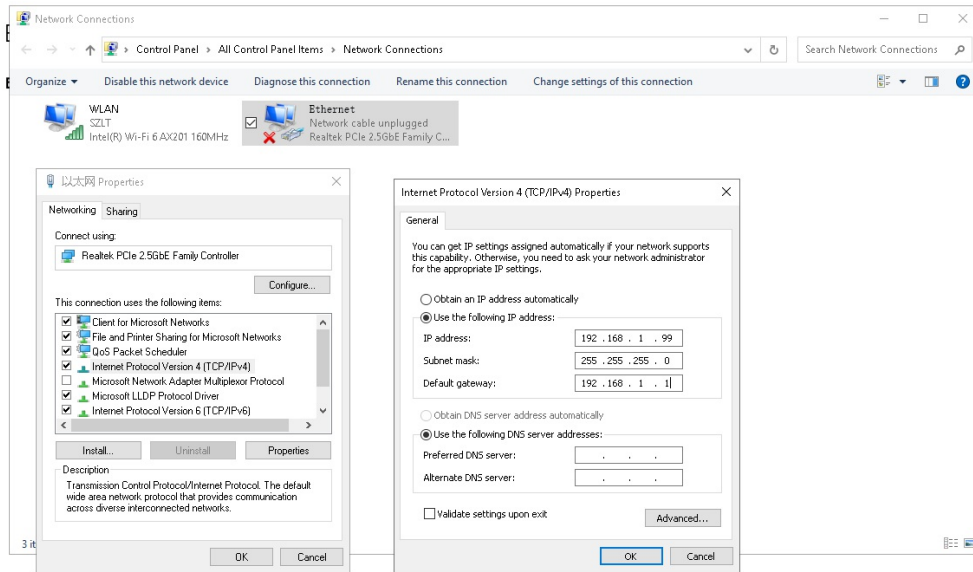
6. Power off the device: If you still need to continue to collect data, start directly from the device initialization in step 3; if the data collection is completed, directly turn off the battery, and the specific operation is the same as turning on the battery.

4. Data transmission and processing

4.1 Data transfer

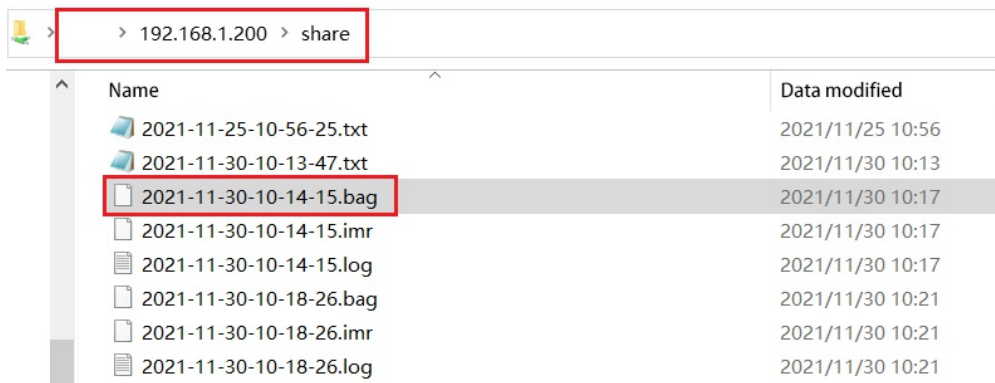
1. When the device is powered on, connect the LEMO port of the data transmission cable to the Lan port above the battery box, and the network port to the computer

2. Set the computer "IP address: 192.168.1.99, subnet mask: 255.255.255.0"



Computer Settings

3. Enter the URL "\\192.168.1.200" in the computer network to enter the internal storage space of the device, open the "share" folder, find the corresponding .bag file according to the collection time, copy it to the computer, and complete data transmission.



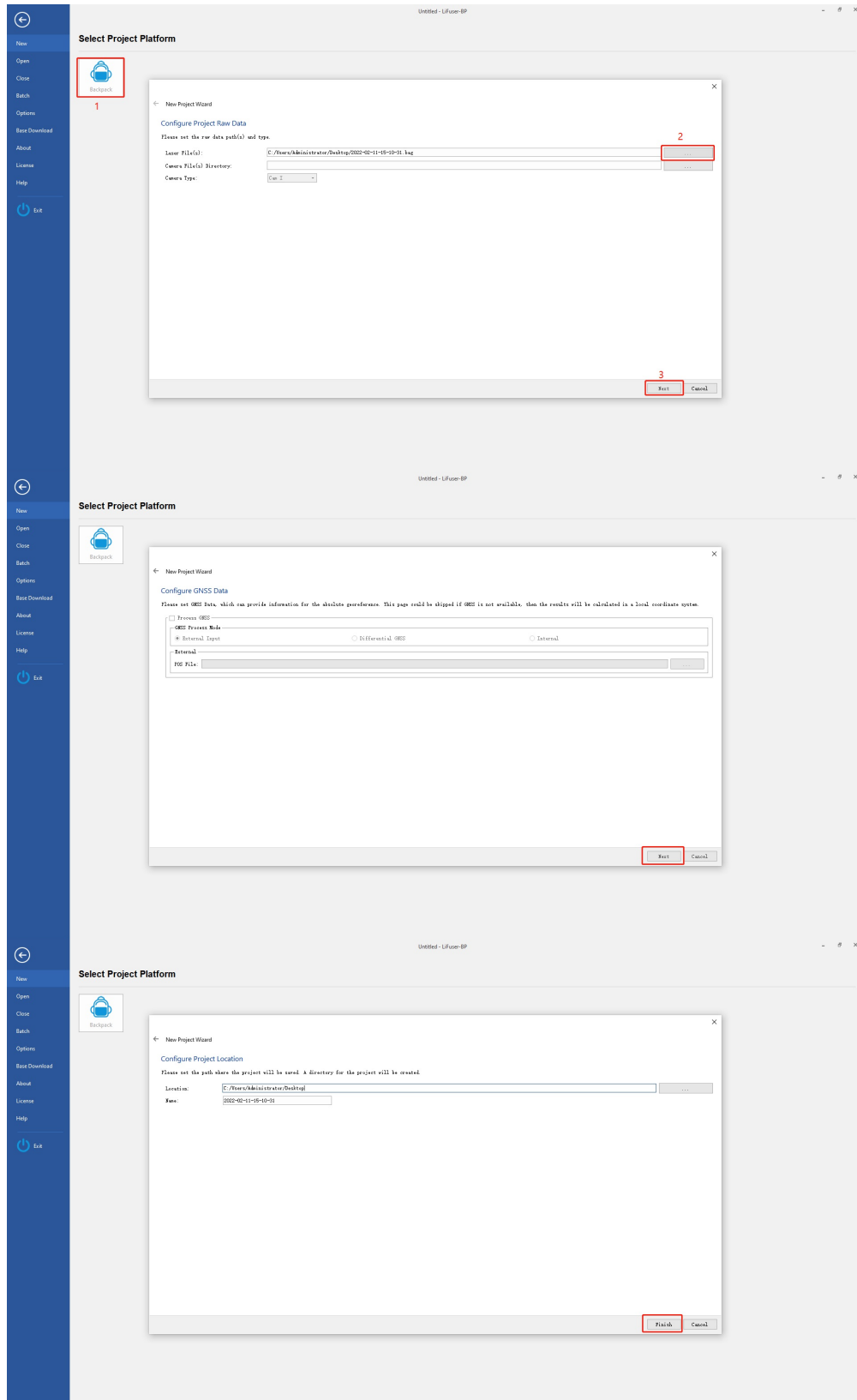
Data Transfer

Note: When connecting to the computer of our company's equipment for the first time, a pop-up box for entering network credentials may pop up, where the user name is: share, and the password is: 111111

4.2 Data Processing

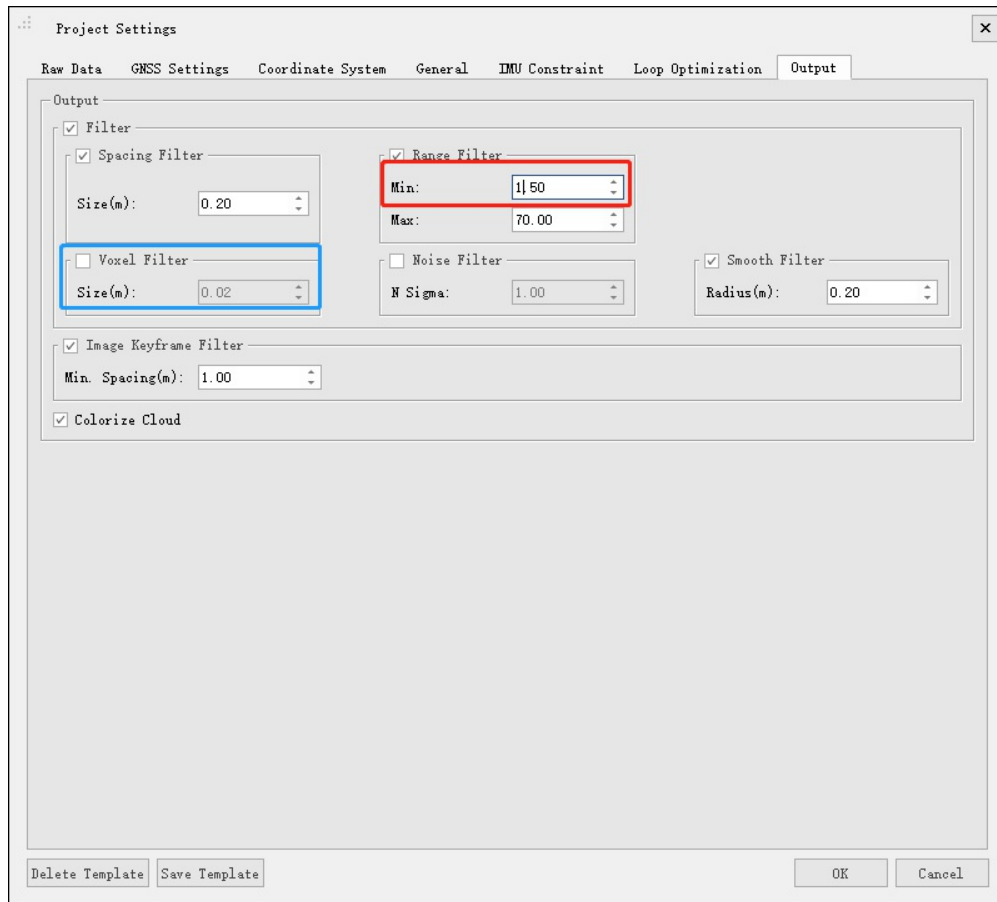
The handheld data calculation uses the LiFuser-BP post-processing software developed by GreenValley. The specific operations are as follows:

1.New project: Open the solution software, click "Backpack" to create a new project, select the copied .bag file in the laser file column, go directly to the next step, and finally click Finish.



New Project

2. Modify parameters: in the project settings, output, change the minimum distance filter to 1.5, and the voxel filter size to 0 or uncheck the box, click OK to save the changes.



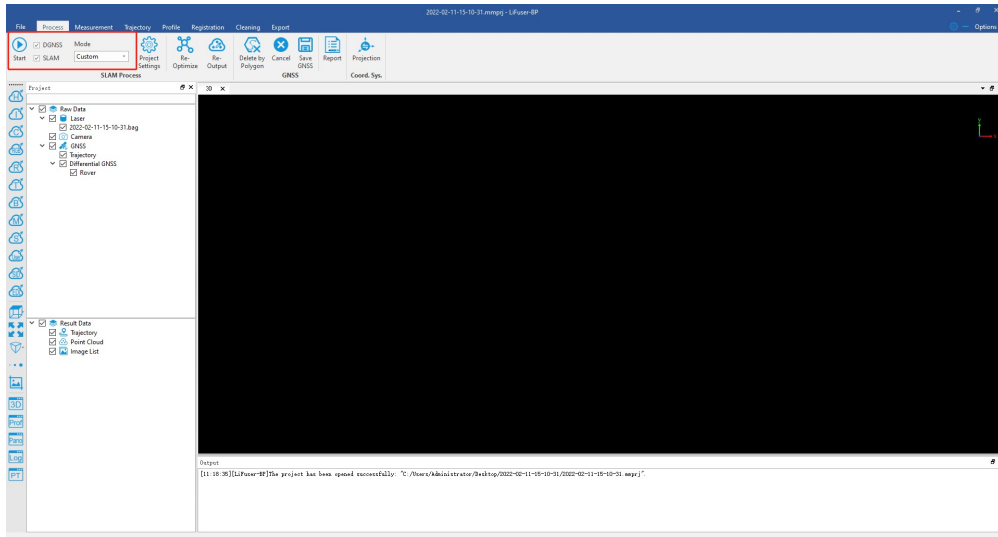
Parameter Configuration

Note:

(1) Voxel filtering: If you keep the default, the density of the point cloud after the solution is relatively sparse, about 3000-5000 points/square meter. Therefore, set the value to 0, or uncheck the box, to achieve point cloud density above 10000 points/square meter;

(2) Distance filtering: The setting can be adjusted according to the height of the field collector to the ground when holding the device, and the shadow can be filtered out directly

3. Point cloud calculation: Under the processing column, click "Start" to directly perform point cloud calculation.



Start Post-Processing

5.FAQ

Why does the system not power on?

- Please check:

(1) Whether the battery power is sufficient;

(2) Whether the battery connection cable is connected.

- Be careful not to regularly over-discharge the battery to avoid damage to the battery.
- It is recommended to stop the collection operation when the power is below 30%, replace the battery or fully charge the battery. Also ensure that the power cable is disconnected when the device is turned off.

How long is does the LiGrip work on one battery cycle?

A fully charged battery can support up to 4 hours of uninterrupted data collection.

What safety precautions should i be aware of when using the LiGrip?

LiGrip devices have an IP65 IEC rating, meaning the LiGrip offers protection provided by mechanical casings and electrical enclosures against intrusion, dust, accidental contact, and water. Thus, the system is safe to operate in most day-to-day environments.

Is the laser used by the LiGrip system safe?

The lasers used in LiGrip have a safety class of 1: Safe for the human eye.

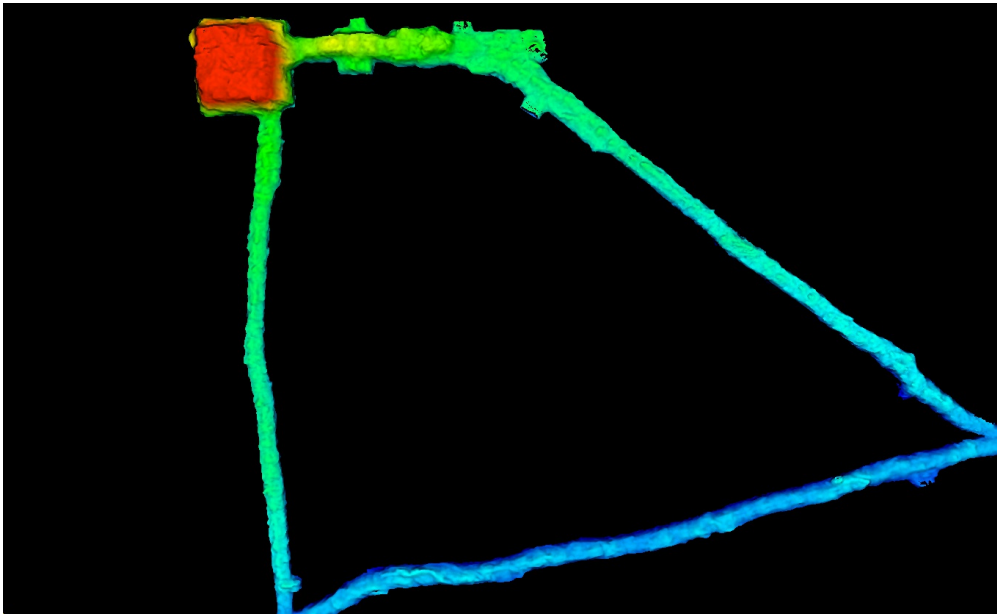
Is the data collected by LiGrip kept private to me?

All data collected by LiGrip is only stored in the device internally and is not uploaded to any network. The scanned data is only copied through the network cable, and can be deleted at any time after copying.

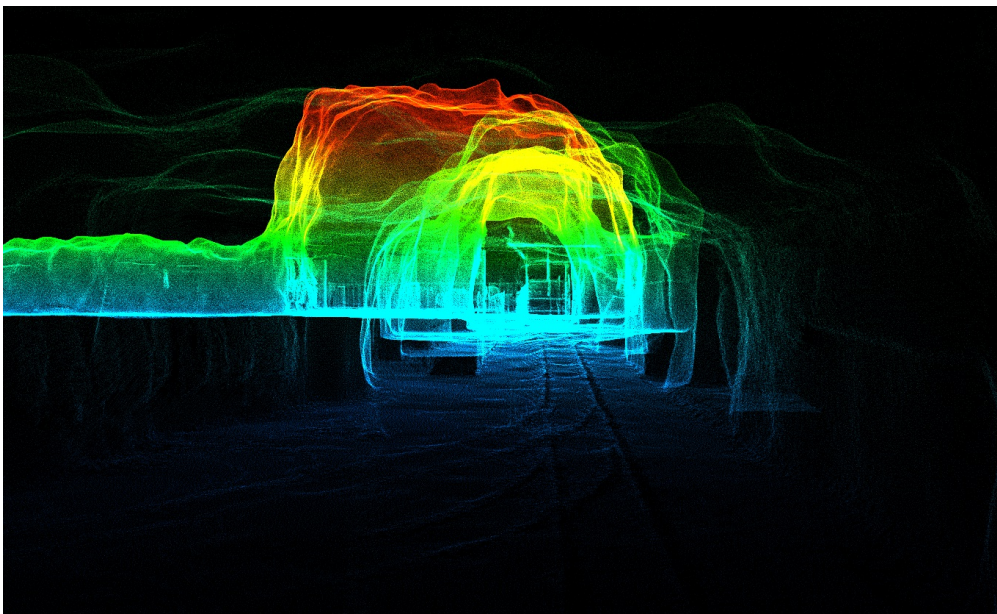
6. Appendix

LiGrip results in different Environments and Applications

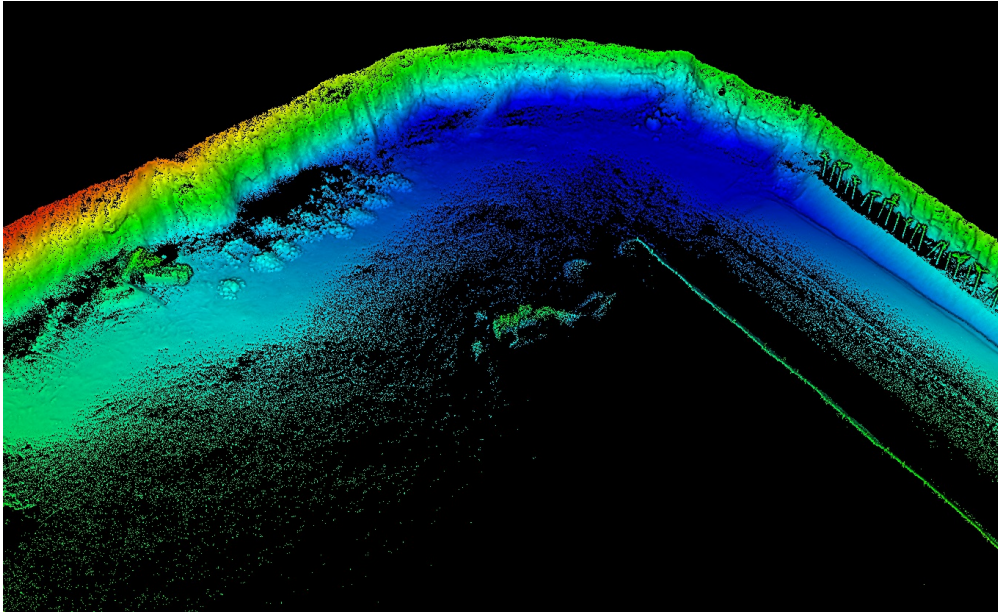
The LiGrip can be widely used in mining, forestry, power construction, surveying, 3D mapping and other fields. The collected data results are seamlessly compatible with GreenValley's cutting edge pre-processing and post-processing softwares. The data shown below uses LiDAR360 software. The software not only provides conventional display modes such as elevation, intensity, category, and echo times, but also provides EDL and GLASS special effects display, which can improve the data display effect.



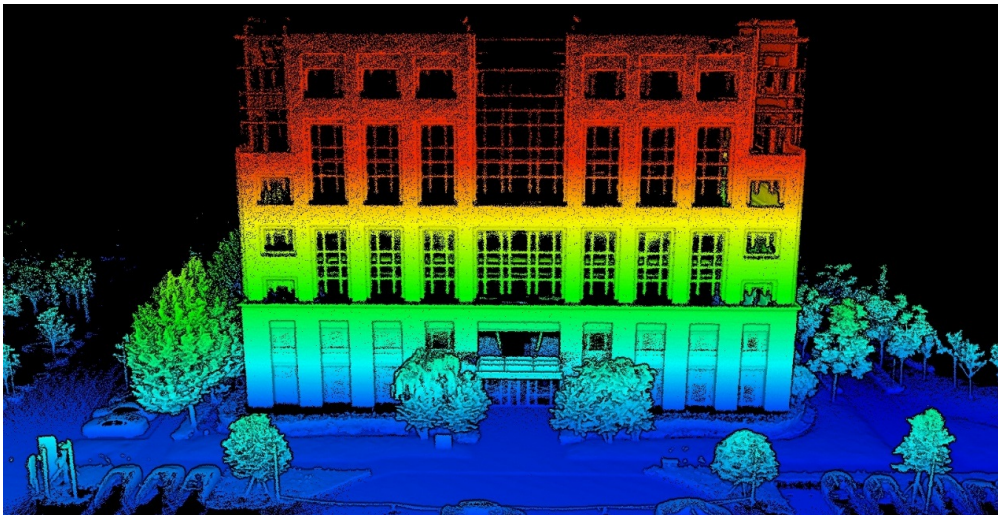
Mine Tunnel



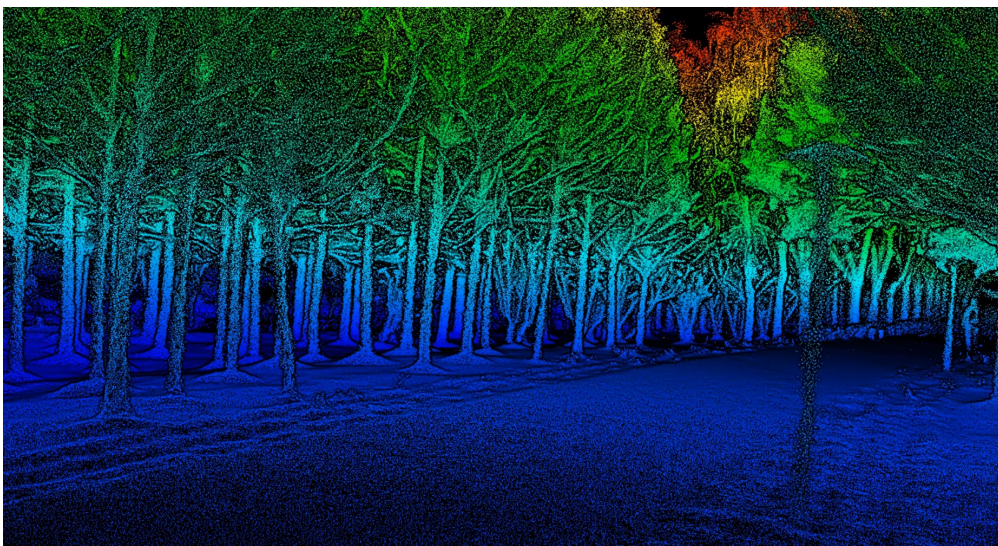
Mine tunnel



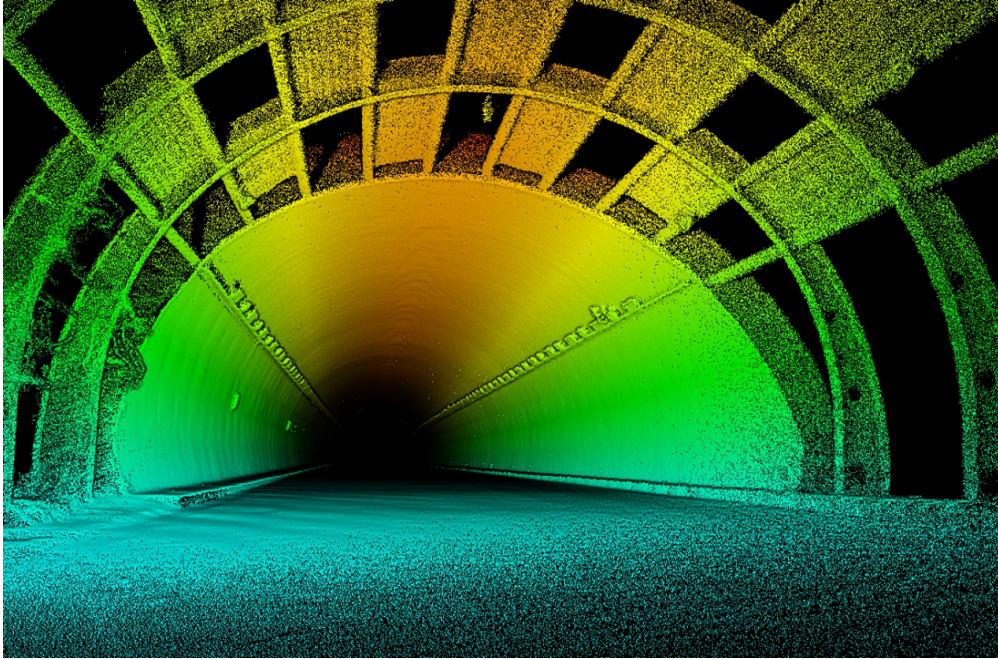
Open Pit



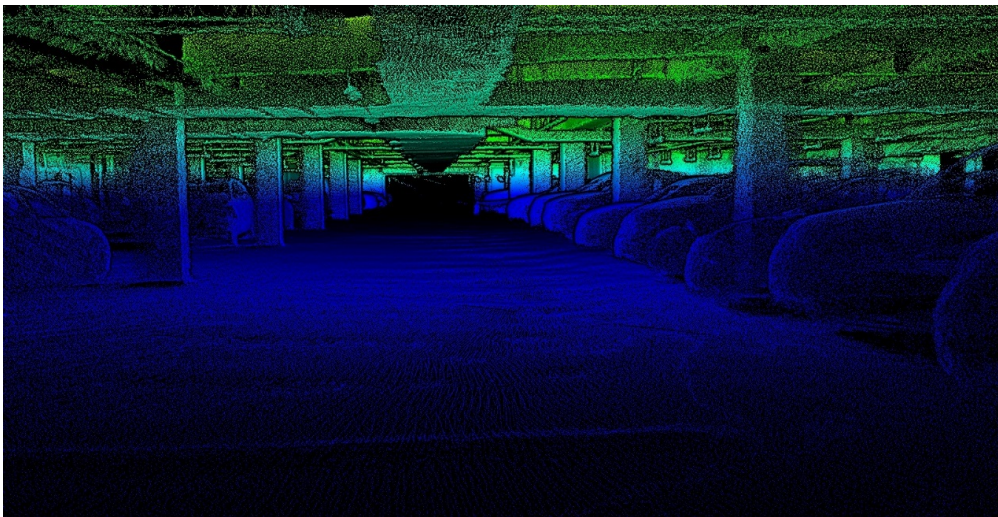
Buildings



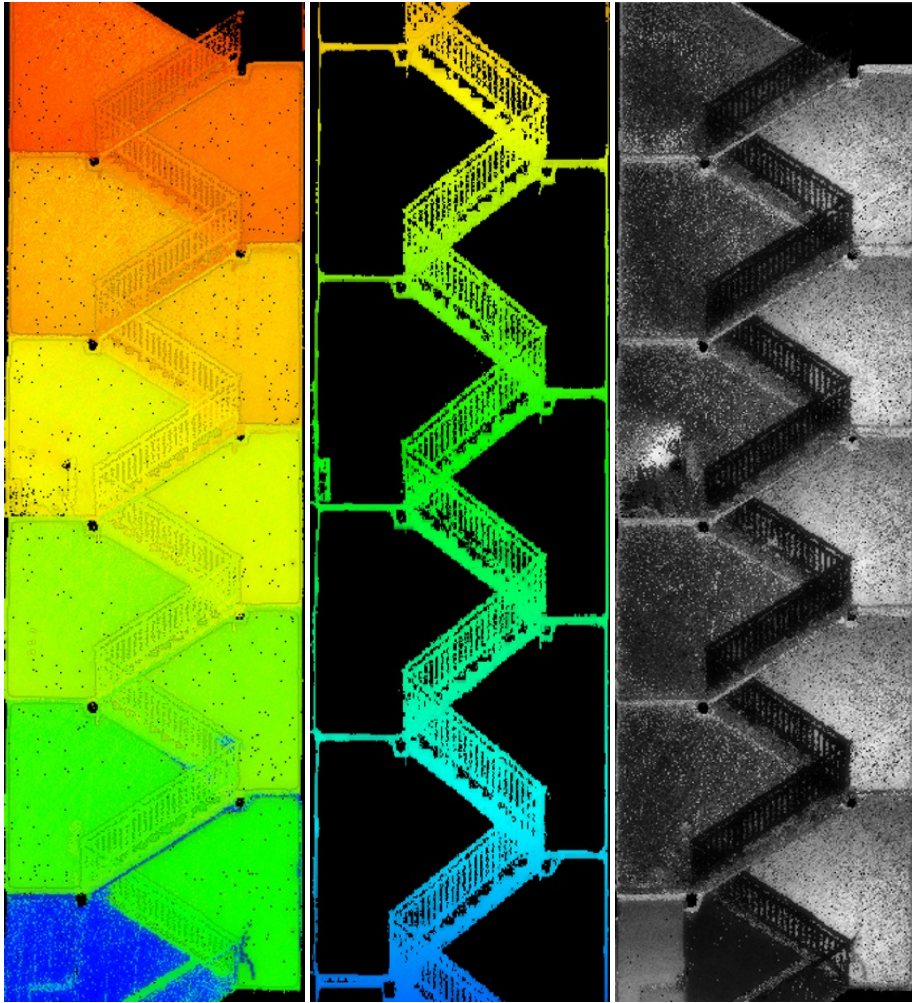
Fores



Tunnel



Parking Lot



Stair Case