LASERSCANNING
EUROPE

Geo
SLAM

ZEB-REVO

QUICK GUIDE

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1   Introduction

GeoSLAM's ZEB-REVO is a mobile handheld scanner that captures 3D point data in the easiest way. The user walks through the area of interest. The captured data is converted into a 3D point cloud using GeoSLAM's SLAM algorithm via GeoSLAM's uploader.

2   Supplied components

1	ZEB-REVO laser scanner	6	Backpack
2	Battery charger and adapters	7	ZEB-DL2600 download cable
3	ZEB-DL2600 data logger	8	ZEB-REVO mount plate & fixings
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3 Scanning guidelines

- For significant features, the ratio of feature size to distance must be approx. 1:10.

- In difficult environments such as open spaces and smooth walled passageways, you should:
    - add additional features, such as boxes in a corridor or a parked vehicle in an open field.
    - avoid scanning moving objects.

- Start and end your scanning loop in the same position. Choose smaller loops to reduce errors and to enhance accuracy of the resulting point cloud.

- Avoid loops that lead there and back. It is better to do circular loops. Enter and exit floors through different doors, for example.

- Open all doors before you start the scan.

- If you pass doorways, make sure that the scanner had the chance to scan enough points in both rooms. That's why you should move sideways and slowly through doorways.

- The more slowly you move, the more data can be captured. Principally, you can go at a slow walking pace. If you want to capture a feature more in detail, decrease the pace.

- The typical maximum range is 15 to 20m. It is recommended that the range is kept to less than 10m to ensure good point density.

- Each survey should be limited to 30 minutes at a maximum to minimize file sizes. For a larger scan project, you should break the project into several scan missions.

4 Capture data

4.1 Put ZEB-REVO into service

1. Connect the ZEB-REVO main cable (white) to the socket on the side of ZEB-REVO scanner head and ZEB-DL2600 data logger (white socket).

2. To allow current supply of the ZEB-DL2600 data logger, connect it to the external battery via cable.

   ➜ You are ready for scanning now.

4.2 Scan

Please read the scanning guidelines carefully before you start your first scan!

1. Turn the ZEB-REVO on by pressing the on/off button on the ZEB-DL2600 data logger.

   ➜ During system boot up, the LED on the ZEB-DL2600 data logger cycles green, orange and red till the light constantly flashes red.

2. To position the ZEB-REVO scanner, place it on a flat surface.

   ➜ During initialization mode, the LED flashes orange.

   As soon as initialization has ended, the LED flashes green. The scanner is ready for scanning.

   i If initialization failed, the LED flashes red again and a new initialization can be started.

3. Start scanning by pressing the start/stop button on the side of the ZEB-REVO.

   ➜ The scanner head starts to rotate.

4. Walk through the object to be scanned.

5. To complete the scan, return to the position as used for initialization and press the start/stop button on the side of the ZEB-REVO again.

   ➜ Now, the scanner de-initializes. The LED flashes orange.

   *i* If de-initialization fails, the LED flashes green and de-initialization is started once more.

➔ Standby mode is indicated by a pulsing red LED. When the scanner enters standby mode, the LED briefly flashes orange. Meanwhile, the captured data is compressed into a single data file.

6. To start a new scan, rotate the scanner head through 180°.

➔ The LED flashes red again and the sequence starts from step 2 again.

7. Do not turn the ZEB-DL2600 data logger off until the LED is off! To shut down the system, press and hold the start/stop button on the ZEB-DL2600 data logger.

8. When the system is shut down, disconnect ZEB-DL2600 data logger and the external battery.

4.3 Transmit data

1. To download the captured data from the data logger, make sure that the ZEB-DL2600 data logger and the external battery are connected.

2. Turn the ZEB-DL2600 data logger on by pressing the start/stop button.

3. Connect the ZEB-DL2600 download cable (blue) to the AUX socket (with blue socket marker) on the ZEB-DL2600 data logger.

4. Connect the USB memory stick to the other end of the ZEB-DL2600 download cable.

➔ The AUX LED flashes green whilst data is transmitted to the USB memory stick.

i Don't remove the USB memory stick during data transmission!

➔ After the data has been transmitted to the USB memory stick, the AUX LED turns off.

i If there is a problem with the USB memory stick, the AUX LED flashes red.

➔ Now, the USB memory stick contains the single scans as a zip file.
To generate a 3D point cloud, you must use the GeoSLAM Uploader.

4.4 Generate a 3D point cloud with GeoSLAM Uploader V.1.3.0.6

You use GeoSLAM Uploader software to upload captured data to the GeoSLAM server. On the server, the 3D point cloud is generated using the 3D SLAM algorithm.
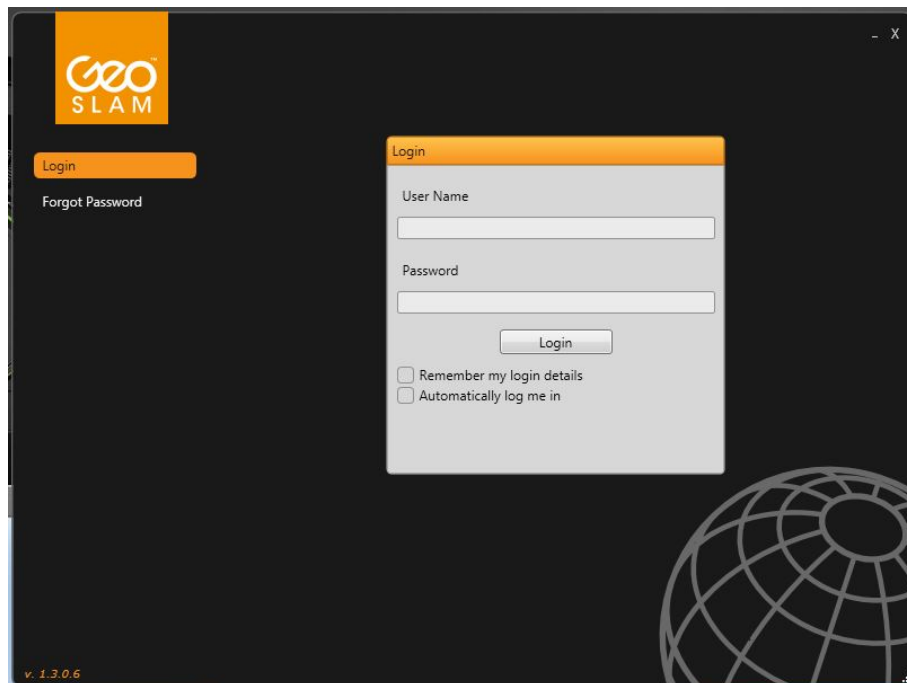
As soon as your user account for GeoSLAM Uploader has been created by Laserscanning Europe GmbH, you receive a mail with login information and a download link for the latest GeoSLAM Uploader software.

1. Install and run the software.

2. To log on, enter your account login details received by mail and click on **LOGIN**.

➔ The Upload page pops up.

The software provides the following pages which can be accessed via the menu on the left side of the window:


   ➢ Upload   Upload scanning data to the server
   ➢ My Files   Shows already processed data, sharing option
   ➢ Current Uploads   Shows currently running uploads
   ➢ Current Downloads   Shows currently running downloads
   ➢ My Account   Set account details, such as company name, mail address.
                         Change login password

> ➤ Logout   Log out from software

3. To select the desired data, navigate to the location of the scan data file from within the Upload page.
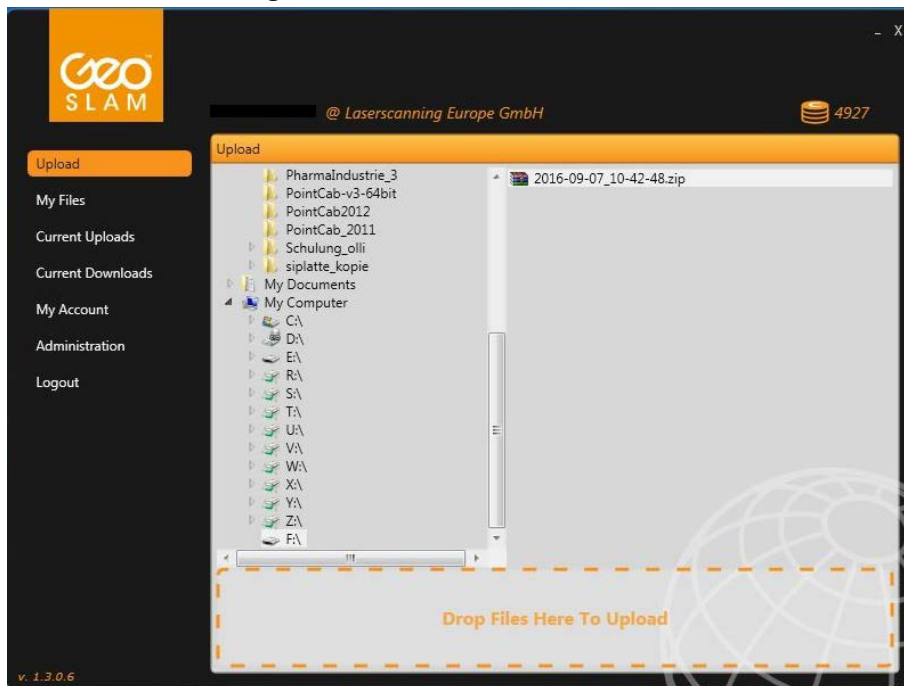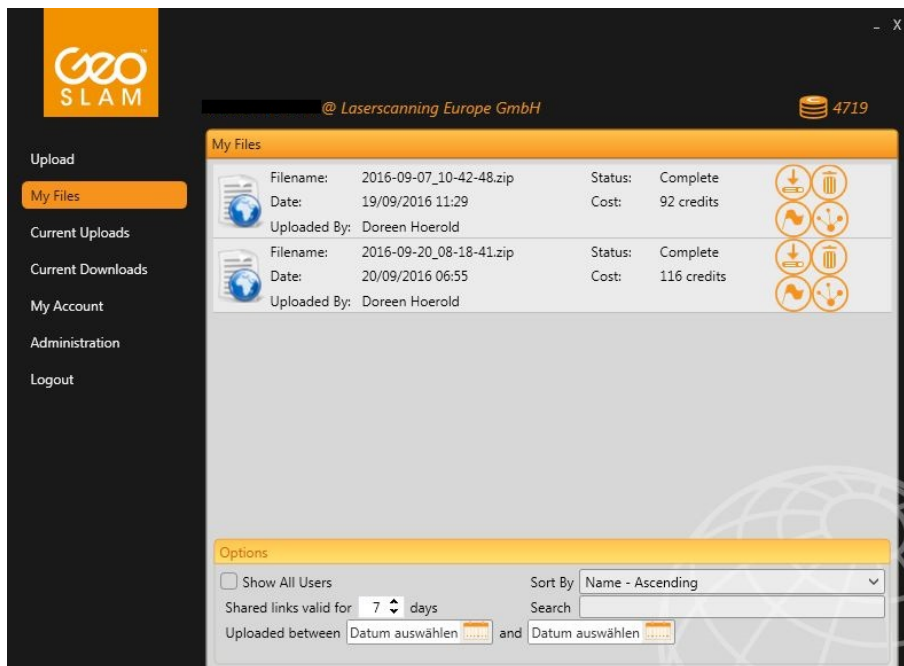

4. Add the zipped file via "Drag & Drop" to the area named "Drop Files Here To Upload" or start the upload by double-clicking on the zipped file.
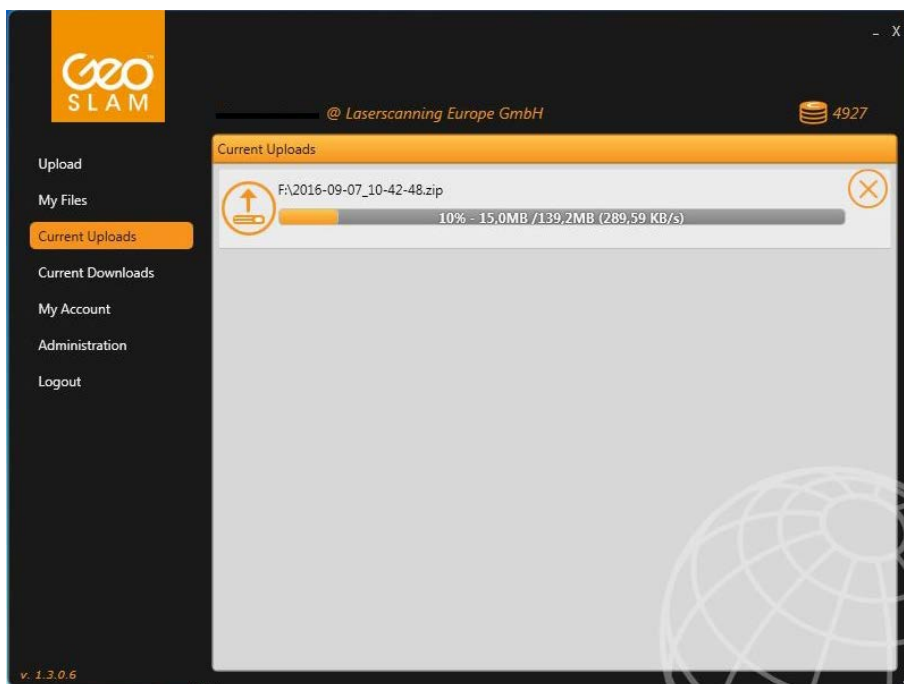
➔ The upload is started; a progress bar shows the upload progress in the "Current Uploads" page.

➔ You can cancel the upload by clicking on the ⊗ icon.

5. When the upload is completed, the file is displayed on the "My Files" page.

i Each file has a status level - "Processing", "Complete" or maybe "Error":

- ➢ Processing   The data is currently being processed to a 3D point cloud on the GeoSLAM sever.
- ➢ Complete   Processing of the data is completed; the data is ready for download.
- ➢ Error   There has been a problem during processing. Do not re-upload the data. The GeoSLAM support team will inform you about the source of error by mail.

6. When the status level is "Complete", the Pay icon and Delete icon are displayed.

- ➢ Pay icon   To being able to download, you previously have to pay using so-called Credits that can be purchased from Laserscanning Europe GmbH. 500 Credits cost 232.00€. The higher the volume of data, the higher the costs. The number of Credits currently available on your user account is displayed in the top right-hand corner of the Uploader window.
- ➢ Delete icon   Using the Delete icon, you can delete the file in the "My Files" page anytime.

7. After you have paid processing of the uploaded files, the "Download" icon is displayed.

➔ Now, you can download the 3D point cloud via this icon.

i Moreover, the "Share data" icon is displayed. You use this icon to create a link that can be inserted

into a mail using the key sequence **STRG + V**. This way, you can transfer your data to third parties.

i If you find an error in your data, you can inform GeoSLAM by using the "Flag for support" icon. The
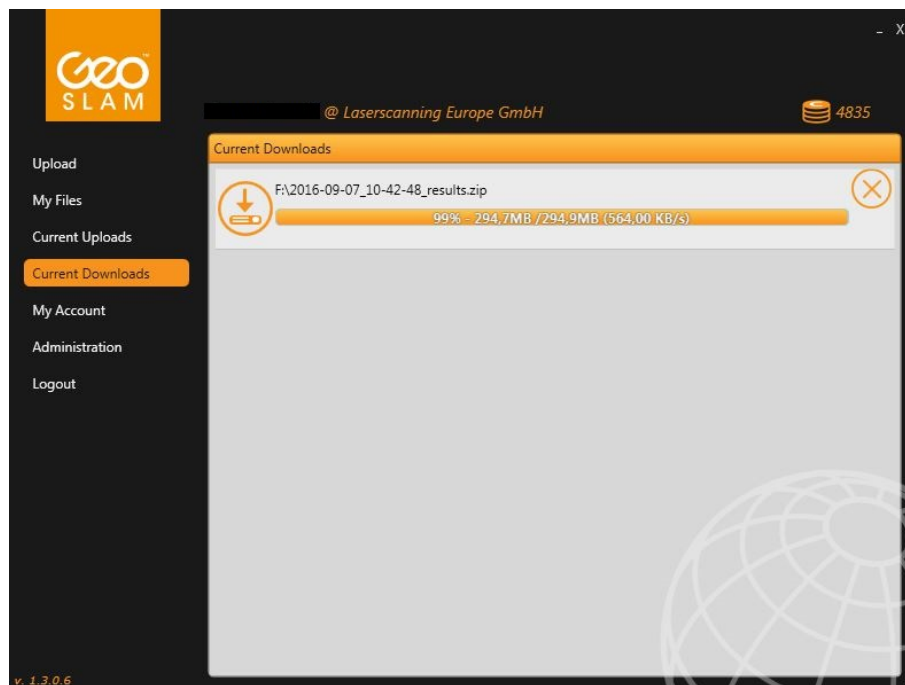
GeoSLAM support team will contact you by mail.

8. Start the download.

➔ A progress bar appears in the "Current Download" page.

i The download can be canceled by clicking the den "Cancel" icon ⊗.

➔ When the download is completed, the "Open Containing Folder" icon is displayed in the "My Files"

page.

9. Click on the "Open Containing Folder" icon to open the file where the data was saved.

5   File naming

For each scan, a new file is automatically created. Files are named in accordance with the date and the time the scan was started.

If the scan was started on 20 September 2016 at 8:18, the file is named:
2016-09-20_08-18-41.zip

6   Output files

The zipped file, which you have downloaded, contains the following data files:

filename.laz	All data points
filename_9pct_cond.ply	Every 11th point, colored by condition of point cloud registration Blue = good condition/matching of points Red = poor condition/matching of points
filename_9pct_shaded.ply	Every 11th point, grey scale shaded
filename_9pct_timecolored.ply	Every 11th point, colored by time of capture This is useful for assessing closed loop accuracy.
filename_traj_cond.ply	Trajectory of the scan, colored by condition of point cloud registration Blue = good condition/matching of points Red = poor condition/matching of points
filename_traj2.ply	Trajectory of the scan

The *.ply files can be displayed in following free point cloud viewers:

> MeshLab   http://meshlab.sourceforge.net/
>
> CloudCompare   http://www.cloudcompare.org/

CloudCompare opens *.laz files, too.

MeshLab allows export to:

*.ply, *.stl, *.obj, *.off, *.wrl, *.dxf, *.dae, *.ctm, *.xyz, *.gts, *.json, *.m, *.u3d, *.idtf and *.x3d.

CloudCompare v2.8.beta allows export to:

*.bin, *.txt, *.asc, *.neu, *.xyz, *.pts, *.csv, *.las, *.laz, *.e57, *.ply, *.vtk, *.shp, *.pn, *.pv, *.pov, *.dp and *.pcd

The *.laz file can also be loaded in PointCab software which allows export to *.dxf and *.dwg.

7 Contact information

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