Stonex XVS
vSLAM scanner
User Manual

(October 2024)-Ver.4-Rev.0 (XVSapp 2.3.8 - XVSCloud 2.0.1)

Contents

XVS vSLAM Scanner

This manual covers the operation of the XVS vSLAM Scanner, its components, its use and data processing up to the generation of the resulting 3D model. The manual also includes tips for use and how to solve any problems that may be encountered. In any case, please do not hesitate to contact your local dealer if you have any doubts or problems.

1. Legal notice

1.1. Copyrights and trademarks

1.2. Environmental recycling

The cardboard box, the plastic in the package and the various parts of this product must be recycled and disposed of in accordance with the current legislation of your Country.

FOR COUNTRIES IN THE EUROPEAN UNION (EU)

The disposal of electric and electronic device as solid urban waste is strictly prohibited: they must be collected separately.

Contact Local Authorities to obtain practical information about correct handling of the waste, location, and times of waste collection centers. When you buy a new device of ours, you can give back to our dealer a used similar device. The dumping of these devices at unequipped or unauthorized places may have hazardous effects on health and environment.

The crossed dustbin symbol means that the device must be taken to authorized collection centers and must be handled separately from solid urban waste.

FOR COUNTRIES OUTSIDE EUROPEAN UNION (EU)

The treatment, recycling, collection, and disposal of electric and electronic devices may vary in accordance with the laws in force in the Country in question.

2. Safety

⚠

- Do not leave the scanner connected to the tablet when not in use. It may overheat the cameras and damage them. It is not recommended that the cameras remain connected continuously (without interruption, for more than 2 hours at a time). It is recommended to leave them unplugged for 10 minutes every 2 hours of use.
- Do not connect the scanner to ports or connections other than USB-C on the recommended tablet or similar.
- Do not get the scanner and USB-C connection cable wet and avoid getting them dirty with water or liquids.
- Do not let the scanner and USB-C connection cable get in contact with dust.
- Avoid areas with flammable gases when using the scanner.
- Avoid temperatures below 0°C or above 40°C.
- Avoid dropping or bumping the scanner, pulling the cable, or pulling the scanner too far away from the tablet until the cable has stretched. Avoid any form of force or shock to the system, as it could damage the connectors, the housing, the camera lens, or other internal systems.
- Incorrect connection of the charger can cause serious damage to the device. Damage caused by improper use is not covered by the warranty.
- Do not disconnect the USB-C cable from the device while scanning or transferring files. This could cause data loss or damage to the device.
- The scanner and its lid contain magnets. The *American Heart Association* (USA) and the *Medicines and Healthcare products Regulatory Agency* (UK) warn that magnets may affect the operation of pacemakers, cardioverters, defibrillators, insulin pumps or other electromedical devices (collectively referred to as "medical devices") within 15 cm (6 inches). If you are using one of these medical devices, **DO NOT USE THIS DEVICE OR COVER WITHOUT CONSULTING YOUR DOCTOR FIRST**.
- Do not store the device or tablet near magnetic fields. Cards with magnetic strips, such as credit cards, phone cards, passbooks and boarding passes, can be damaged by magnetic fields.
- Content may differ from the device depending on the region, service provider, device vendor, device model specifications or device software.
- Stonex is not responsible for performance problems caused by improper use of the tablet, use of other applications in parallel, excessive occupation of the hard disk, or any other reason that may decrease the normal capacity of the tablet. Even less is it responsible if the tablet is not the one provided or suggested by Stonex.
- Stonex is not responsible for performance problems or incompatibilities caused by changing registry settings or altering operating system software.
- Attempting to customize the operating system may cause the device or applications to malfunction.
- Users are fully responsible for the use of multimedia content and general use of the tablet they use.

- Modifying the device's operating system or installing software from unofficial sources may cause the device to malfunction and damage or loss of data. All actions that the user may take from the tablet are outside the responsibility and warranty of Stonex. Even if, for some reason, cameras may be damaged by the tablet, Stonex is not responsible for this. Therefore, responsible use of the tablet and all its components is suggested.

- Do not turn off the computer or disconnect the USB cable while the device is scanning, processing or being updated.

- While updating the device, do not connect the scanner or other media devices to the computer. This may interfere with the update process. Before performing the update, disconnect any other multimedia devices, including the scanner, from the computer.

- The device is an image scanner; it does not use active sensors such as lasers or projectors. Therefore, it does not harm the eyes or other parts of the body.

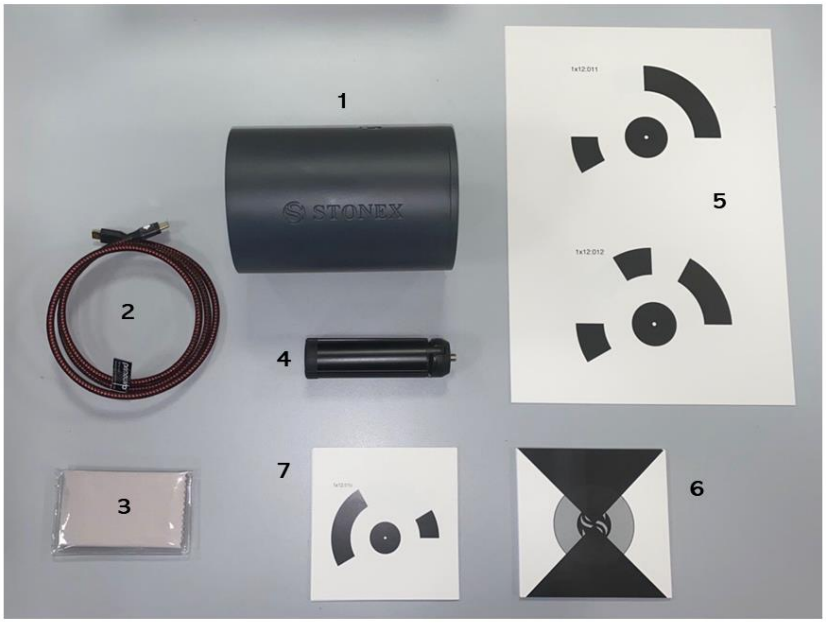
- Stonex in no way guarantees the accuracy or resolution of scanner and processing software results. Achieving good results is affected by parameters such as proper use, application to heterogeneous textures, distance of use, etc. Stonex will try to guide the user through its manuals and directions so that the results are optimal, but in no case can guarantee them, as they vary based on multiple parameters, such as those mentioned above.

3. System Description

3.1. Instrument components

Inside the case there are the following components:

1. XVS VSLAM Scanner.
2. Cable that connects the scanner to the tablet.
3. Cleaning cloth to clean the lens.
4. Handle or tripod for handling the scanner.
5. Stereo-target for scaling small surfaces.
6. Filling targets.
7. Target (Ground Control Points).



3.2. Workflow

The workflow is very simple: **1. Scan** the desired scenario using the tablet and XVS*app* software and save the results. When you want to process them, **2. Process** the project with the XVS*cloud* application and process the desired project(s)*; the application will send the data to the XVS server and the XVS server will process the data automatically. The XVS*cloud* application will use a Stonex dedicated server to send and receive data. You must have an active XVScloud licence to process the data.

You will then receive an e-mail with a link through which you can download the results.

3.3. Minimum requirements

The scanner requires a tablet with a Windows 10 operating system or higher, i5 processor, 8GB RAM, >128GB SSD storage and WIFI or 4G connection. We recommend the Microsoft Surface Pro 8 Tablet or higher. It is important that the tablet or computer has a direct USB-C connection.

3.4. Setting up

VERY IMPORTANT: Please follow the step-by-step instructions here. It will take a few minutes, but only the first time. Once you have installed the software and the drive application you are using, scanning, and processing will be very quick and easy.

Preliminary steps

- **Install** the XVS*app* and XVS*cloud* applications on the tablet (Section 4).
- **Licensing**. The first time you run the XVS*app* application you will be asked for a licence number. In the XVS*cloud* software you will need to go to *Settings* to view and insert the licence. Please contact us through our ticketing system if available or contact your dealer, to request the license. Copy the UUID number and send it together with the serial number of the scanner. We will send you the key "KEY" quickly so that you can start scanning and processing.
- **Calibration**. Save the calibration file provided by Stonex (available inside the USB flash drive) to a folder on the tablet.

Scanning

- Take the scanner out of the case.
- You can screw the handle (4) to the bottom of the scanner (1) or, if you find it more comfortable, carry the scanner in your hand.
- Switch on the tablet and, once switched on, connect the XVS scanner to the tablet, using the USB-C port, with the mark  connected to the scanner, facing upwards.
- Try not to pull on the cable while scanning.
- Run the software XVS*app* and proceed to start scanning.
- Scan following the advice in the chapter *The 11 scanning rules.*

Process the data

- Open the XVS*cloud* application and in the settings  section indicate the e-mail in which get the results and the path where you have the calibration file. You must also complete here the licence provided by Stonex, after sending the UUID key and the scanner serial number. Choose the convention of the reference system you will use. Once you have configured these settings, you will not have to do this anymore and you will be able to process directly.

- Follow the steps in the graphic interface.

4. Software Installation and Configuration

Both softwares must be installed on the tablet and therefore on the Windows operating system and with the *Minimum requirements*. The XVS*cloud* software can also be installed on a desktop PC running Microsoft Windows operating system.

4.1. XVS*app*

With the purchase of the device, you will the latest version of the *XVSapp* scanning software. The installer will be named XVSappSetup2.3.1.0.msi[1] or higher.

Run the installer and follow the instructions.

To upgrade, run the latest installer and it will automatically upgrade. It will be set to the same language that is set in the Windows language preferences.

Request your Licence

Once XVS*app* is installed, run it and try to connect (click ON). The first time you will be prompted to insert the licence (KEY). Please contact us through our ticketing system if available or contact your dealer, to request the license. Copy the UUID number and send it together with the serial number of the scanner and we will promptly send you a licence "KEY" number so that you can use the software.

4.2. XVScloud

With the purchase of the device, you will receive the XVS*cloud* software with three files: InstallCertification.exe, XVScloud_1.0.6.0_x64.cer and XVScloud_1.0.7.0_x64.msix[1].

1- Install the file **InstallCertification.exe as an administrator**. IMPORTANT: Run as administrator**.**

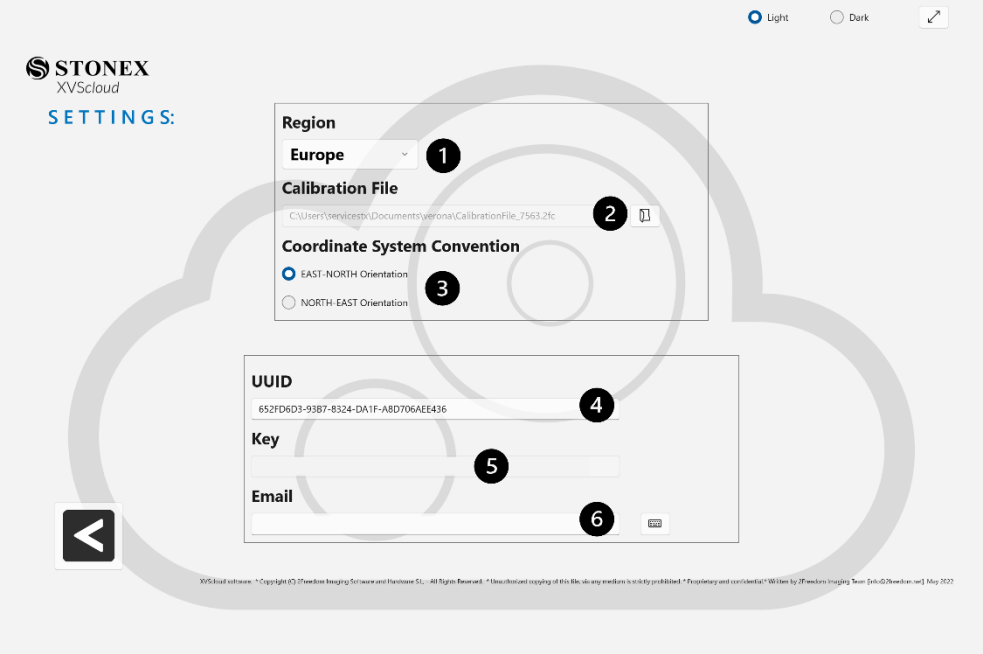
2- **Run** the **XVScloud_1.0.7.0_x64.msix** file and follow the instructions**.**

To upgrade, run the last installer and the upgrade will take place automatically. The same language set in the Windows language preferences will be set.

Open the XVScloud settings page by clicking on the wheel. The settings page shows:

1. Region of the server to be used.
2. Path to the calibration file.
3. Co-ordinating system convention.
4. UUID code.
5. Activation key
6. E-mail for receipt of results.

[1] Updated version number can change



Request your licence

Once XVS*cloud* is installed, start it and go to settings: contact us through our ticketing system or contact your dealer, to request the license. Copy the UUID number (3) and send it along with the serial number of your XVS equipment; we will quickly send you a "KEY" number to paste into the space provided (4) and you will be able to use the software.

Calibration

With the purchase of the equipment, you will receive in the USB device a folder with your personal calibration file for your serial number. Save the file to a local hard drive or folder and indicate the location in the Calibration File field (2).

Coordinates system convention

Select the type of reference system convention you will use to orientate with the control points.

- East-North orientation: reference system convention with X=East and Y=North.
- North-East orientation: reference system convention with X=North and Y=East.

This choice will only influence the cloud in the case of orientation on GPS surveyed control points. Please therefore pay attention to the consistency between choice of convention and points imported into the system.

Processing server region

Select the server region to be used according to your geographical location (1).

E-mail for notification

Indicate the e-mail address to which you wish to receive the processed data (5).

5. Scanning

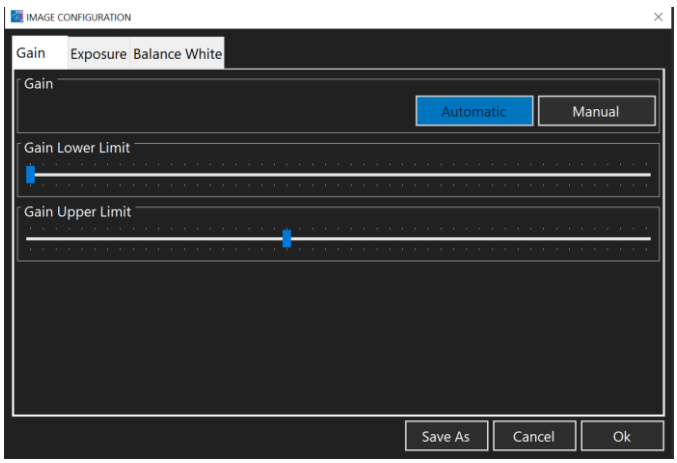
5.1. Scanning software: XVS*app*

1- Connection/disconnection with the scanner. Turning on the high-resolution camera.

2- Start/stop the scan. Launching the visual SLAM takes about 40 seconds. The scan does NOT start until the red dots appear. Move in such a way that the red dots appear.

3- Save the scanning project once finished.

4- Configure the high-resolution image. This must be done after connecting to the scanner (ON) and before scanning (SCAN). Gain, Exposure and White Balance can be configured here. The user can SAVE the settings for use in other sessions, keep the settings without saving them for this session (OK) or cancel the changes made and continue with the automatic mode (CANCEL).



5- Image configuration. The configurations generated in CONFIG (4) and some other default configurations are saved here.

6- Indicates the free disk space in real time.

7- Indicates the scan time.

8- Tracking quality: red indicates that the textures are very homogeneous and tracking cannot be done (the trajectory cannot be calculated and the 3D models, if they have results, may be of poor quality). If the color is orange, the quality is medium, and if it is green, the quality is very good. This color is also accompanied by an acoustic signal: orange and red colors correspond to faster, higher-pitched sounds, and green colors to slower, lower-pitched sounds.

9- Leveling completed. A few seconds after the start of scanning (SCAN), the leveling process begins, in which the user must stop and hold the scanner still and without moving it. In addition, the scanner must be leveled according to the values displayed on the GUI. If the inclination angle is not very critical, the only angle it will ask to move is the curvature angle. Hold the scanner still for 5 seconds, and once leveled, you can continue. If the user does not want to level, they can continue scanning and ignore the leveling messages until they stop appearing.

10- High-resolution image. This image is the one that will be used for the subsequent process of videogrammetry.

11- VisualSLAM camera image. The points detected in real-time tracking are projected onto this image.

12- 3D image of the trajectory followed during the scanning process. This image shows only the calculated frames and the connecting lines between frames.

Leveling

To level the scanner, within a few seconds of starting the scan, the system will ask the user to stop. The user must hold the scanner still for a few seconds.

It is necessary to move it slightly to stay within the leveling intervals (until the balls are both green). If the pitch angle is not very critical, the only angle you will be asked to move is the roll angle. Once you have reached the level, hold the scanner still for 5 seconds, and once you have reached the level, you can continue.

After this process, the user is free to continue scanning. If the user does not want to level, the user can continue scanning and ignore leveling messages until they are no longer displayed.

Tracking. Start of scanning and loss of tracking

Once the scanner is turned on and the SCAN button is pressed, wait about 40 seconds to start the scanning process.

At first, the dots do NOT appear and the user must move the camera to a heterogeneous area to start the process. Until the dots appear, the scan will NOT start**.**

Occasionally there may be difficulties in getting the dots to appear. One suggestion is: find a close (2-4 m) and heterogeneous area, fix the camera and move radially around the object, but keep the focus on the object. If you cannot, place 8 or 10 fill targets (6) in a 2x2 m space and rotate around them, focusing on them until the dots appear. Once the dots appear, walk and move the camera around the object to be scanned.

If one moves too fast, performs an autorotation without displacement, or is on too homogeneous and reflective surface or vegetation, one may lose tracking, and the system alerts with a characteristic visual message and sound. At this point, the user must return to a previous area where he or she has passed and focus on it from the distance and perspective with which he or she passed previously, approximately. Go through the area(s) where they passed previously until tracking is recovered to continue the scanning process.

Use of control points (GCP)

To achieve greater accuracy or to check for deformation and georeference the resulting 3D model, ground control points can be used. 3D coordinates should be assigned to each target using a total station or GNSS system. Targets should be placed in a stable area and should not be moved during the measurement and scanning process.

The 3D model must be calculated considering the coordinates associated with the targets as fixed parameters; therefore, the model must be adjusted and maintain the accuracy and reference system of the tool used to assign coordinates to the targets.

For this purpose, GCP targets (7) must be well distributed on the scanning scenario. At least four targets should be placed and not all of them should be placed on the same plane.

During scanning, the user must approach the target at a maximum distance of 1.5 m to ensure acquisition, and, of course, all positioned targets must be scanned.

When processing data in XVS*cloud* software, you must select the Ground Control Points option and enter a *.txt file with the name of the targets used and the measured coordinates in this format:

Target name X Y Z

```
1x12:01f 0.437477141619 -10.5998287201 -4.4798579216
1x12:01a 6.6345949173 -10.269162178 -4.51753091812
1x12:01d 13.9631767273 -9.60140323639 -4.54882907867
1x12:01e 13.3947238922 -11.4821949005 -4.63405895233
1x12:01b 16.0787906647 -10.593993187 -4.68606805801
1x12:01c 19.658952713 -10.4641466141 -4.63724565506
```

Scale with Stereo-targets

To scale a 3D model, the supplied stereo-targets (5) must be placed separately from each other and well distributed in the scanning area. For areas larger than 900 m^2, it is advisable to use other scaling techniques. You can place 1, 2, 3 or 4 stereo-targets, although it is advisable to use all four.

While scanning, approach each stereo target with the scanner at a maximum distance of 1.5 m to ensure that it is well detected.

In XVS*cloud* processing software, you must indicate that you used stereo-targets. If you process several projects together, there can only be 4 stereo targets in total (1, 2, 3 and 4). In other words, you cannot reuse stereo-targets if they have already been used in previous projects.

Scaling using one or more distances.

Another way of scaling is to use one or more distances. For this purpose, it is necessary to use GCP targets (7). To define a distance, one target is placed at one end of the area to be scanned and the other target at the other end. Scan, being careful to scan each target by standing with the scanner at a maximum distance of 1.5m. You can insert additional targets if you wish to add more distances.

When processing the data in XVS*cloud* software, you should indicate which target you measured from and what the distance is. Note that the precision with which you measure the distance affects the accuracy of the model. We recommend making this measurement with a disto or total station.

No scaling

If you do not want to scale in this application, choose this option and the 3D model will have no scaling or will have arbitrary scaling and will require additional scaling.

5.2. The 11 scanning rules.

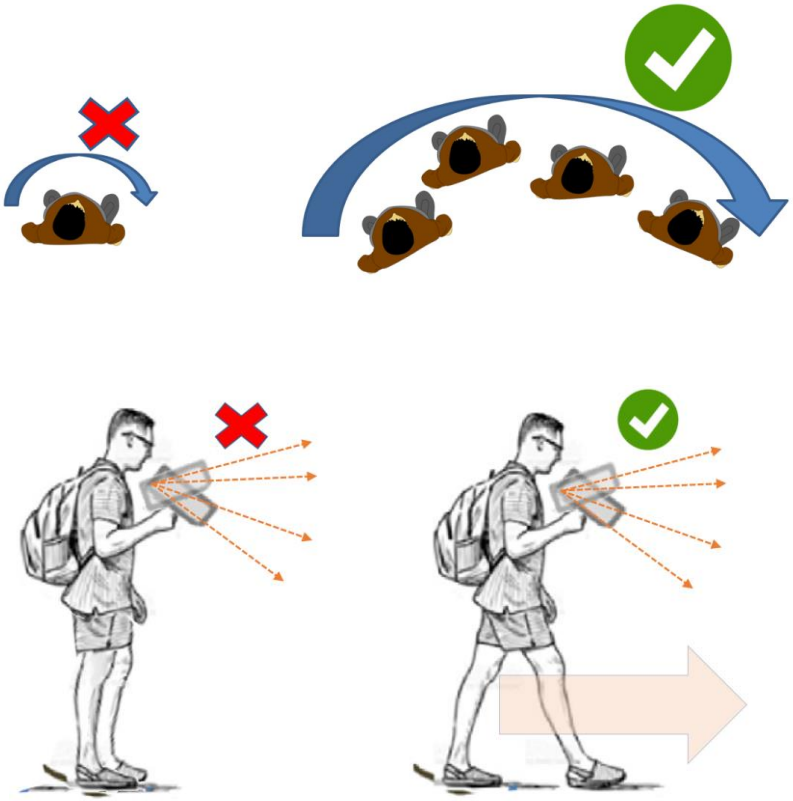
- **RULE 1. Avoid homogeneous and reflective textures.**

We call **heterogeneous texture** (left) a texture that has features that the system can use as references. For example: stones, bricks, earth, exterior facades, etc.

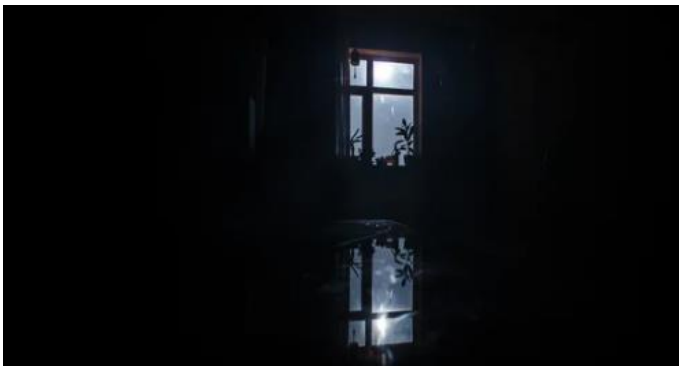
A **homogeneous texture** (right) is one that usually consists of only one color and has no obvious features within it. For example: walls or floors of a single color and without images or decorations of any kind, glass or reflective surfaces.

- **RULE 2. Avoid rotating the scanner WITHOUT moving.**

If you intend to rotate the scanner on itself, you must walk while doing so.



- **RULE 3. Illuminate dark areas.**



- **RULE 4. The minimum scanning distance is 40 centimeters, the maximum recommended scanning distance is 40 meters.**

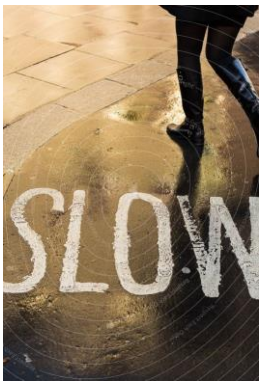
Do not scan small objects or objects smaller than 40 cm.

- **RULE 5. Adjust the viewing angle and camera distance according to the object to be scanned.**

- **RULE 6. Avoid scanning your own shadow.**

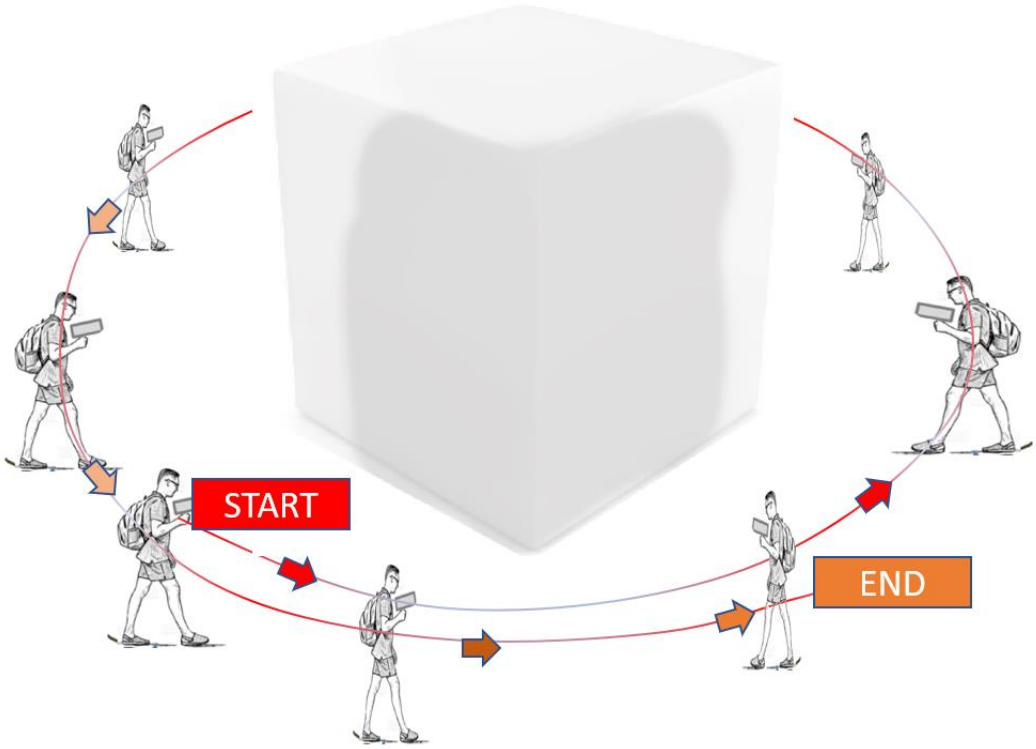
- **RULE 7. Avoid the frontal sun.**

- **RULE 8. Walk slowly while scanning.**



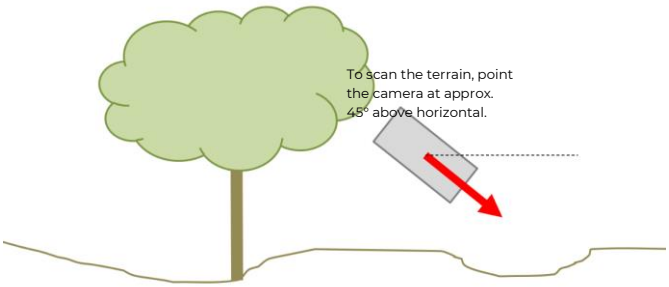
- **RULE 9. Go through the same point more than once and close the path, if you can, at the point where you started (closing the loop). This will improve accuracy.**

To make it easier for the software to identify that it is the same area, it is necessary that when you pass through **the same place** you passed through before, you do it for several meters and with the **same perspective and position** as before.

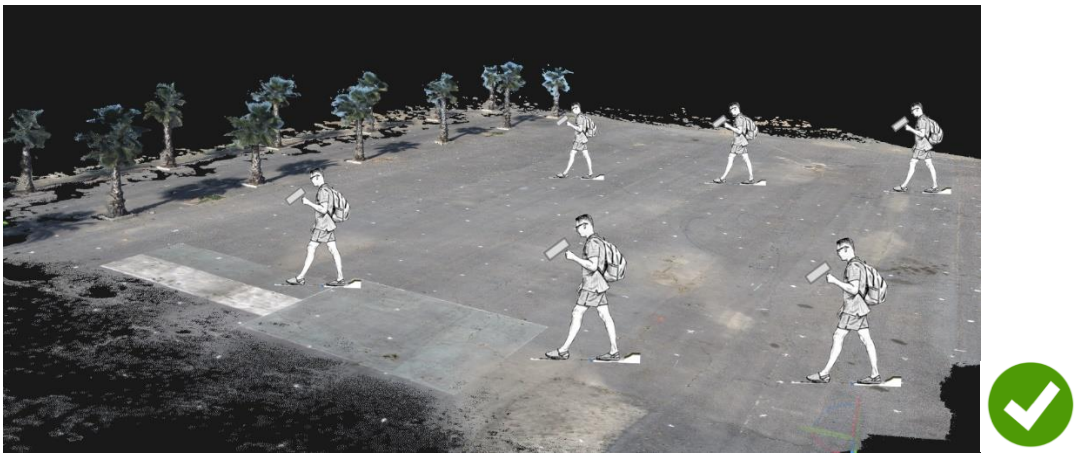


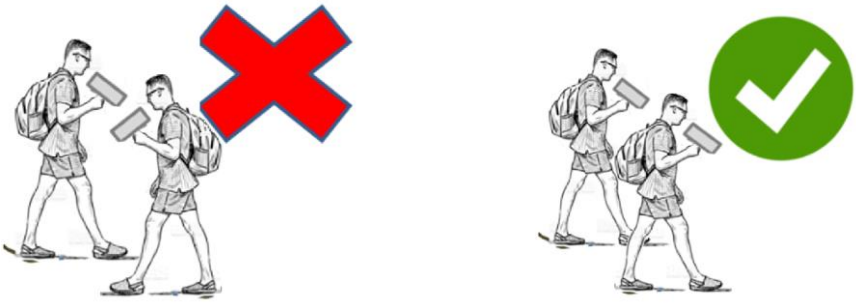
- **RULE 10. For ground-based acquisition, scan at a minimum of 45° and maintain the direction**.

For ground captures, it is recommended to hold the scanner at 45° to the horizontal.



Maintain orientation. When capturing on the ground, maintain orientation throughout the capture. This will make it easier to find common points on different trajectories.





- **RULE 11. Avoid scanning through vegetation.**

5.3. Examples

Example 1: Terrain scanning. Topography.

Move from one side of the ground to the other while maintaining the orientation of the scanner (when possible). Choose an orientation in which your shadow does not appear and always maintain it until the end of the acquisition.

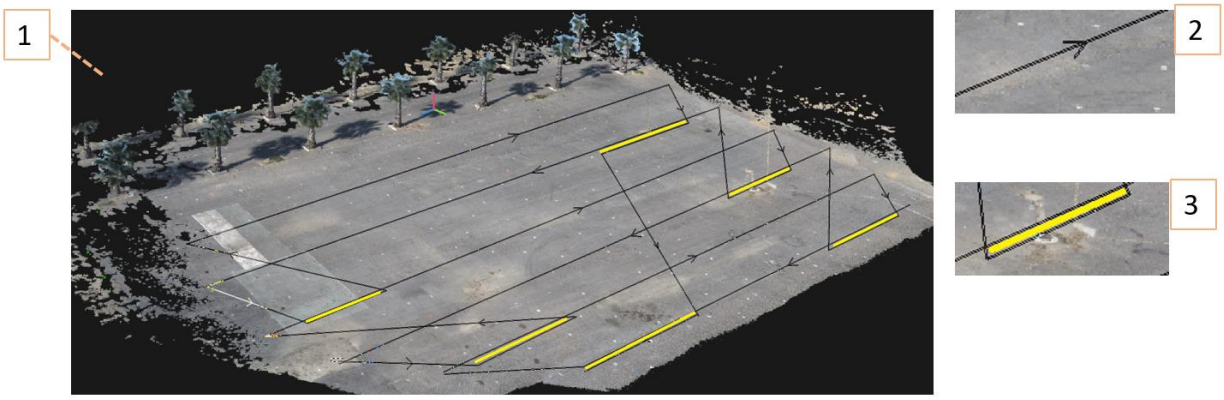
In this case, the scanner orientation was 45° from the ground.

Frequently pass through previous positions (at the same point and from the same perspective) and close at the point where the scanning started (closing the circle), creating partial and total trajectory adjustments.

1- Scheme of the terrain scanning path.

2- Direction of the path.

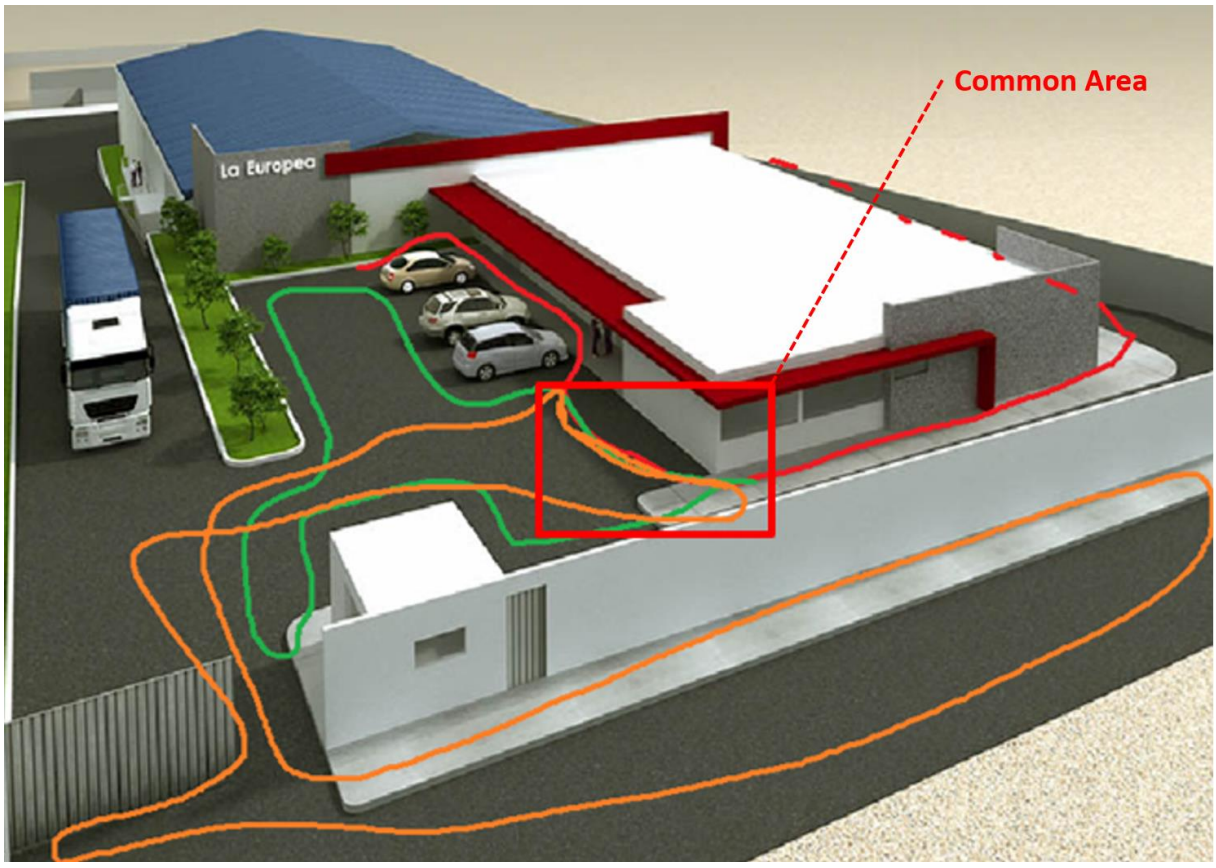
3- Loop closure: area of closure or coincidence. Must pass through the same point and with the same perspective to close the trajectory and minimize error.



Example 2: A big project: divide by areas.

Divide a big project into several smaller projects with one or more common areas. Then **process all projects together** in XVS*cloud* software.

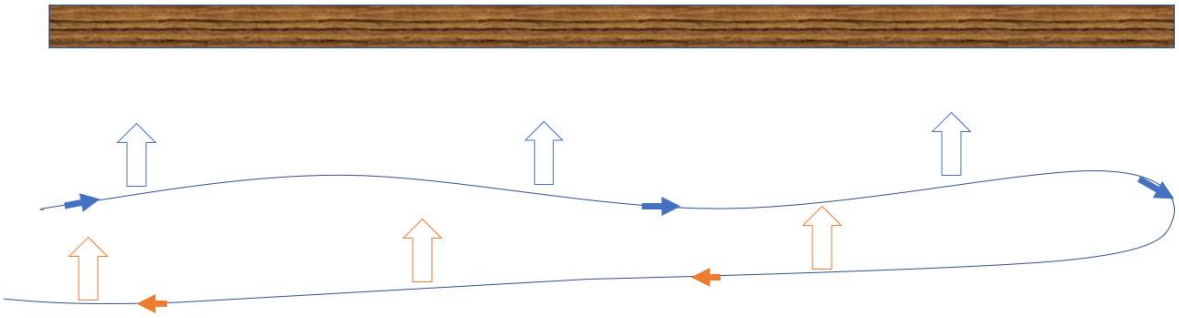
Make sure that the common area between the projects is large (several meters) and that the common area capture was done in all cases with the same perspective or camera position.



In this example, there are three different projects (green, orange, and red) that are part of a large common project. For this purpose, all trajectories are passing through a common area (red rectangle) which, once processed together, will result in a single 3D model.

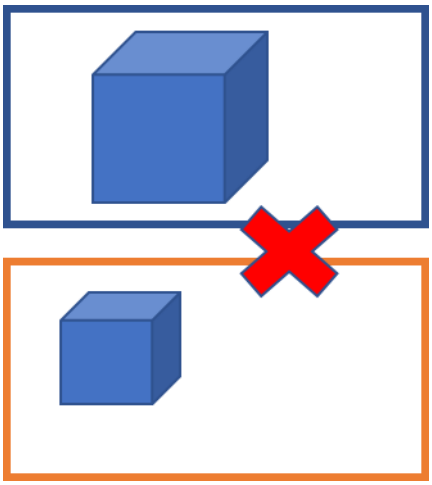
Example 3: Shots at different distances

When you want to scan the same area from different points or distances, you must pay attention to the trajectory you follow. One mistake you might run into is following two parallel paths, without overlapping, as in the image below.



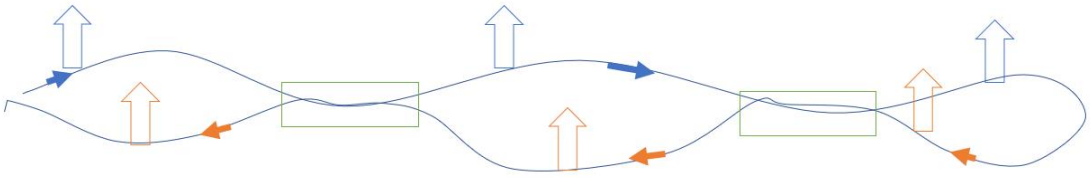
Outward (blue) and return (orange) follow the same route, BUT:

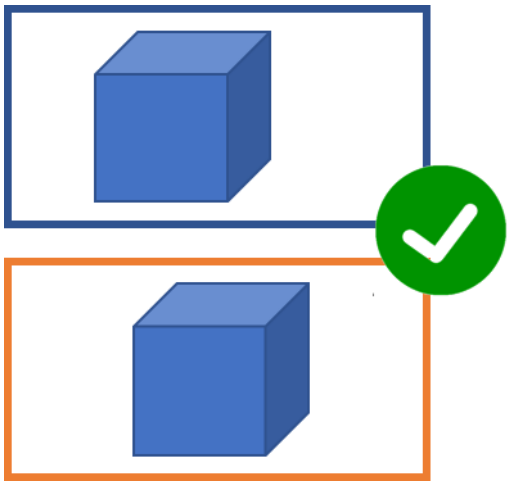
- If the path length is too long, the error accumulates.
- Even if you think you see the same object, the images of the two paths do not correspond sufficiently, as you will see the object at different scales (this is why the error accumulates).



- If both paths lose alignment accuracy, they project textures with this error and generate blurred areas.

To avoid these errors, if you coincide shots from the same position every 7 to 9 metres, focusing on the same space and maintaining the same position for a few metres, the software will recognise that these shots are coincident and you will not accumulate errors. In this way you will improve accuracy and texture projection.





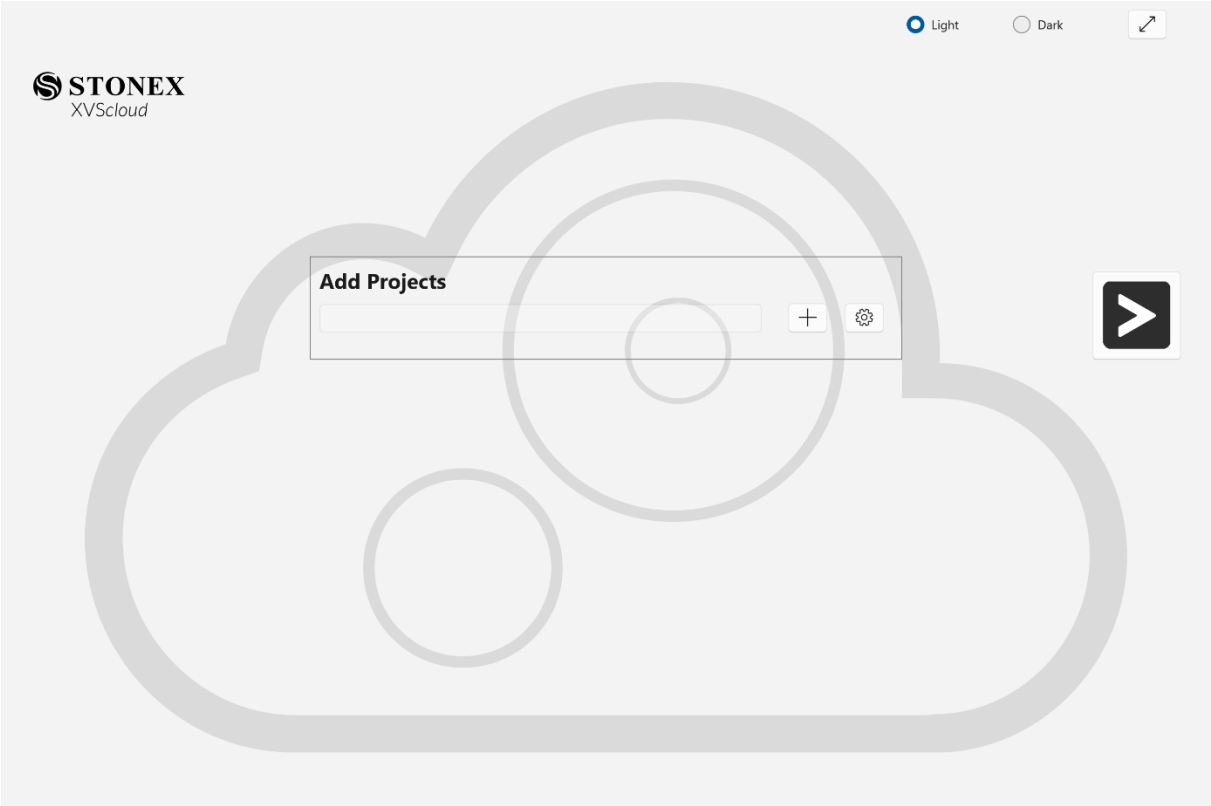
6. Process the data

6.1. Software for data processing: XVS*cloud* tool

Once the data have been scanned with XVS*app* software, they will be processed with XVS*cloud* software. For the installation and configuration of XVS*cloud*, see *XVScloud*.

6.1.1. Select one or more projects.

Open the XVS*cloud* application and configure the settings in Settings . If the Settings section is already configured, return to the main screen and choose one or more common projects by pressing . If more than one project is chosen, these projects must have a common part (see *Example 2: A big project: divide by areas.*).



6.1.2. Import videos taken from drones or other cameras

From version 1.0.37 of XVScloud, it is possible to upload and supplement the scan data with XVS with videos taken from a drone or from the ground with video cameras. The format of the videos must be **.mp4** in order to be processed by the system.

Click the button and select, together with the XVS project, the video you want to process.

To be able to integrate video data, it is necessary:

- Have a common area between the XVS scan and the video. The common area must be at least 5 to 6 metres long.
- It is not necessary to have targets or stereo-targets. If you decide to use them, they must be in the same positions for both the XVS scan and the video shot. Therefore, do not move the targets between shots.

- When processing the video, the same workflow for XVS photos, will be applied to the video frames.
- There are no restrictions on the quality of the video. Obviously, using a poor-quality video will result in a lower quality 3D model.

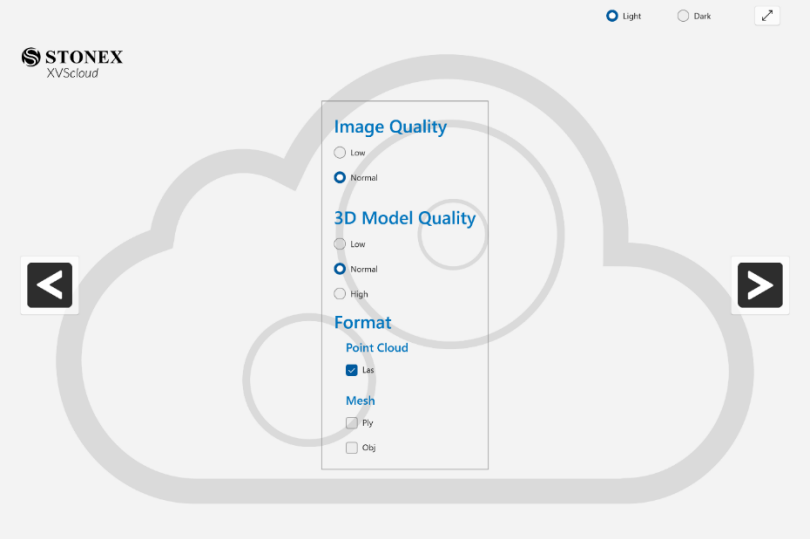
6.2. Parameters of 3D model.

Choose the desired parameters:

Image quality: "Low" option slightly decreases quality and increases processing speed.

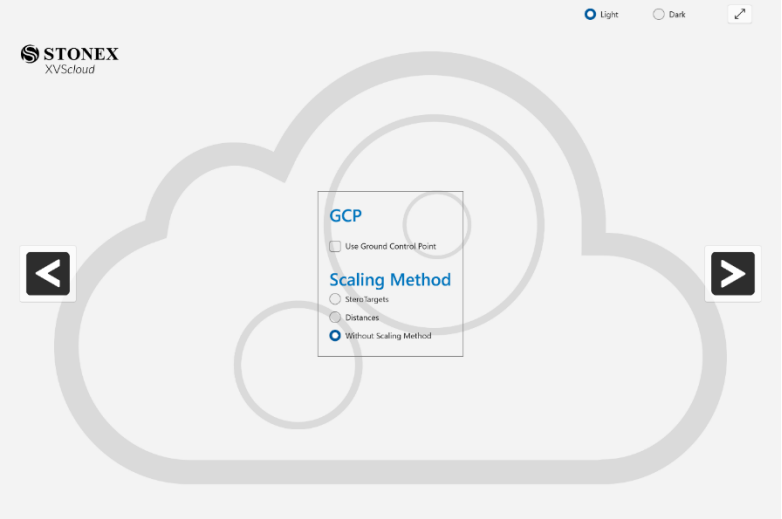
3D model quality: low quality tends to have too much deformation for most applications. We recommend Normal or High, although the latter takes longer to process.

Format: you can choose for the resulting model to be a point cloud in *.las format or a mesh with texture in *.ply or *.obj format. You can choose all options at once, and you will get three files, one in each format.



6.3. GCP and scaling

The system allows scaling in several ways: using control points, stereo-targets or distances. Or you cannot scale at all. Let's see below what each option means and how to proceed.



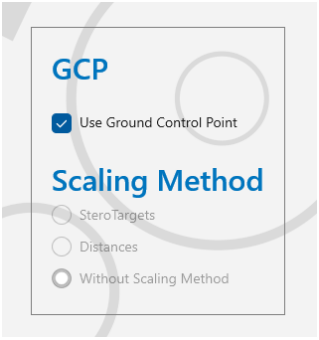
Use of Control Points (GCP)

To achieve greater accuracy or to check for deformation and georeference the resulting 3D model, ground control points can be used. 3D coordinates should be assigned to each target using a total station or GNSS system. Targets must be placed in a stable area and must not move during the measurement and scanning process.

The 3D model must be calculated considering the coordinates associated with the targets as fixed parameters; therefore, the model must be adjusted and maintain the accuracy and reference system of the tool used to assign coordinates to the targets.

For this purpose, GCP targets (7) are well distributed on the scanning scenario. At least four targets need to be placed, and not all of them need to be placed on the same plane.

During scanning, the user must approach the target at a maximum distance of 1.5 m to ensure acquisition, and, of course, all positioned targets must be scanned.



When processing the data in XVS*cloud* software, it is necessary to select the Ground Control Points option and enter a file with a *.txt extension with the name of the targets used and the measured coordinates in this format (columns are separated by blankspaces):

Name of Target X Y Z

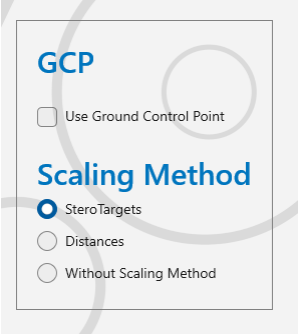
```
1x12:01f 0.437477141619 -10.5998287201 -4.4798579216
1x12:01a 6.6345949173 -10.269162178 -4.51753091812
1x12:01d 13.9631767273 -9.60140323639 -4.54882907867
1x12:01e 13.3947238922 -11.4821949005 -4.63405895233
1x12:01b 16.0787906647 -10.593993187 -4.68606805801
1x12:01c 19.658952713 -10.4641466141 -4.63724565506
```

Scaling with stereo-targets

To scale a 3D model, the supplied stereo-targets must be placed separately from each other and well distributed in the scanning area. For areas larger than 900 m^2, other scaling techniques should be used. It is possible to place 1, 2, 3 or 4 stereo-targets, although it is advisable to use all four.

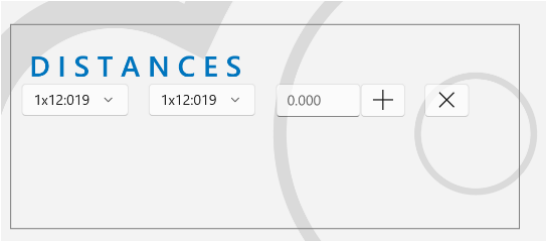
When scanning, approach each stereo target with the scanner at a maximum distance of 1.5 m to make sure it is well detected.

In XVS*cloud* processing software, you must indicate that you used stereo targets. If you process several projects together, there can only be 4 stereo targets in total (1, 2, 3 and 4). In other words, you cannot reuse stereo targets if they have already been used in previous projects.



Scaling with distances

Another way of scaling is to use one or more distances. For this purpose, it is necessary to use GCP targets (7). To define a distance, one target is placed at one end of the area to be scanned and the other target at the other end. Scan, taking care to scan each target at a maximum distance of 1.5m. Additional targets can be placed if you wish to add more distances.



When processing the data in XVS*cloud* software, you should indicate from which target you measured and what the distance is. Note that the precision with which you measure this distance affects the accuracy of the model. It is recommended that you make this measurement with a disto or total station.

Without scaling

If you do not want to scale in this application, choose this option and the 3D model will have no scaling or will have arbitrary scaling and require additional scaling.

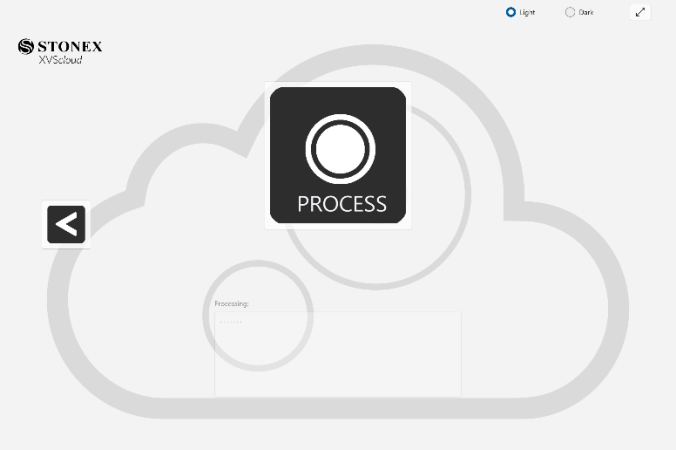
6.4. Processing and results

Once you have chosen the model quality, output format, and georeferencing and/or scaling method, you enter the processing screen. This screen is very simple and has only one central button. The XVS*cloud* software initially processes the projects and places the files in a dedicated server. The data will be synchronized with the server and processed automatically.

At the same time, when the process is completed, the user will receive an e-mail notifying them of the completion of the process and a link for model downloading.

Make sure of the following:

- In order to be processed, the project must have been processed by XVS*cloud*.
- If there are any errors or problems during processing, you will be notified by the Stonex service.



6.5. Processing report

Together with the available results, you can find the processing report in the Model folder. The report will contain the following information:

- Project location: where the project is saved
- Number of inputs: the number of images inserted
- Number of components: the number of internal groups generated during the photogrammetric process.
- Number of models: the number of internal 3d models generated. Normally there are small groups of 1 or more loose images.
- Count of registered images: number of used images
- Points' count: number of points identified in images
- Count of used control points: the number of points
- Count of used constraints: number of used distance constraints
- Number of models: the number of modes generated (point cloud or mesh)
- Total projections: how many times are 3D points seen in images. You get this value by multiplying Average track length by Points' count.
- Average track length: the number of images, in average, in which a point appears. When you divide Total projections value by Points count, you get Average track length number. The higher the number, the better the connections among images.

- Maximal, median, and minimal error: they are basic statistics for a projection error. In simple terms, a projection error is the difference in the position in terms of pixels between a point in a photo and the projection of the corresponding 3D point in the same photo.
    - Maximal reprojection error [pixels]: it is the maximal value of a point projection error
    - Median reprojection error [pixels]: it is the middle value of all projection errors saying that half of the projection errors are smaller than this value, and half of the projection errors are bigger (median in the same sense as in statistics)
    - Mean reprojection error [pixels]: it is the average projection error.
- Geo-referenced: if the model is oriented or not.
- Metric: the model is in metric system.
- Alignment time.
- Feature detection time.
- Registration time.

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