



SCENE

VERSION 5.0
RELEASE NOTES
MARCH 2012

SCENE Version 5.0
Release Notes

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1. Introduction

FARO® is pleased to announce the release of SCENE 5.0, SCENE LT 5.0, and SCENE WebShare 5.0, and would like to thank all users who gave valuable input for the improvement of the former release and during the beta test phase. With this release we deliver a new version of the FARO Laser Scanner software that will improve your ability for productivity, your mobility and ease of use in many directions.

2. Differences Between the Members of the SCENE Software Family

2.1. SCENE

SCENE is a comprehensive 3D point cloud processing and managing software tool for the professional user. It is specially designed for the viewing, administration, and working with extensive 3D scan data obtained from high resolution 3D laser scanners like the FARO Focus^{3D}. SCENE processes and manages scanned data both highly efficiently and easily by offering a wide range of functions and tools, like filtering, automatic object recognition, scan registration and positioning as well as automatic scan colorization. Once SCENE has prepared the scan data, you can commence evaluation and further processing right away. For this, it offers functions from simple measuring to 3D visualization through to meshing and exporting your scan data into various point cloud and CAD formats. With SCENE WebShare your scan projects can then be published on the Internet and viewed with a standard Internet browser.

2.2. SCENE LT

SCENE LT is a free point cloud viewing software to provide to your partners together with your scan data. It is specifically designed for all FARO laser scanner scan data and allows viewing and evaluating scanning projects which have been prepared with SCENE. Also importing CAD models in VRML format in order to compare them with the scan points, exporting scan data into various point cloud formats as well as the Draw-To-CAD link to FARO Cloud for AutoCAD are available. SCENE LT may also be used to view 3D point clouds which have been downloaded from SCENE WebShare over the Internet. SCENE LT doesn't offer functionality to filter scans, to perform scan placement, to colorize scan points, to administer scan projects, or to export your scan data to SCENE WebShare.

2.3. SCENE WebShare

After creating WebShare data from your scan project in SCENE, the SCENE WebShare software allows you to provide your data on a web server in order to share your scanning work with partners, contractors and customers. WebShare allows you to view scan projects within any Internet browser that has the Adobe® Flash® player installed. It allows viewing the scans in panoramic scan images, performing measurements, or downloading the workspace and the scans to your local hard disk.

3. New Features

This is a list of the most important new features of SCENE 5.0. For more detailed descriptions, please refer to the user manual or the online help of SCENE.

3.1. SCENE

3.1.1. Scan Project Concept

SCENE 5.0 is further extending the concept of scan projects to handle scans and related data.

Scan projects offer an easy way of working with the scan data. A scan project is a central storage which contains all the shared data of a project. It consists of the project workspace (the hierarchical structure of scans and objects as defined during scanning and throughout the registration process) and all the point data of the project.

With the introduction of the scan project concept, SCENE offers tools for collaborative work, change management, sharing and publishing data. As a powerful tool for data handling, a scan project is offering revisions and a project history. Revisions allow for sharing a state of work with other users of the same project. If there have been changes made to a project mistakenly, they may be undone by reverting the project to an older revision.

In addition to the shared project data, private and non-shared data owned and maintained by individual users can be maintained. This is done by the means of local workspaces which are linked to the related scan project. When working collaboratively on a scan project, modifications are typically first done on the basis of the local workspace. From time to time these local modifications may then be shared with the centrally provided scan project and thus among all project collaborators. Each sharing of local modifications will update the project workspace and the scans or point clouds maintained in the scan project and will create a new revision of the scan project.

3.1.2. Support for Compass and Altimeter

The new compass and altimeter which have been introduced with the latest Focus^{3D} scanner models is now supported by SCENE 5.0. The information recorded during scan time may be used for scan placement.

The related switches to control the use of the new sensors may be found at **Tools > Options > Matching**.

Please note that the measurement accuracy of the compass is easily affected by disturbing sources of magnetism, like electronic devices, power lines or magnets. To get reliable compass readings when capturing the scans, please make sure to position the scanner far enough away from such disturbing sources (one to two meters should be sufficient, depending on the strength of the magnetic interference).

3.1.3. Support for GPS Coordinates

With SCENE 5.0 you may now add GPS coordinates, e.g. measured by a GPS device, to certain reference objects in the scans. This information will then be used for correspondence search and scan placement.

3.1.4. Automatic Feature Recognition

There have been numerous internal modifications to improve the performance of SCENE when working with natural features for the scan placement instead of artificial features (like spheres or checkerboard targets).

The quality of feature detection has been improved to avoid too many detected features.

With former versions of SCENE, repeating structures like tiled floors or ceiling liners could have resulted in a large number of detected features which may have led to ambiguous situations for the scan placement algorithms. To relax this kind of situations, SCENE 5.0 is searching for repetitive patterns and is not creating features in such areas.

3.1.5. Fine Registration

Fine Registration is a new functionality to further improve the quality of scan placement. In particular with the automatic detection of natural features one faced the fact that the same object is seen differently by the scanner looking at it from different positions. This leads to the effect that the automatically detected features in different scans might not reside on the exact same position on the scanned object. These differences may have led to not satisfying remaining tension during the scan placement procedure.

The new fine registration is an addition to the usual registration calculations and meant to overcome this problem.

During the fine registration, SCENE is using pairs of corresponding features. Around each feature a predefined volume of scan points is taken from the 2 scans. These sets of scan points are used to determine the transformation which would be required to achieve a best fit of the scan point samples. The determined transformation is finally used to move one of the features into a position which will lead to an improved scan placement result.

This process is carried out for all corresponding features of the current scan cluster.

The fine registration is an iterative process which will stop automatically as soon as an additional iteration would not result in an improvement of the scan placement. After a given maximum number of iterations SCENE will stop as well in case there is no minimum deviation achievable.

Although fine registration is primarily meant to optimize the scan placement when using natural features, it may also be applied for spheres and checkerboard targets.

The evaluated radius of scan points as well as the maximum number of iterations may be defined at **Tools > Options > Matching**.

3.1.6. Point Clouds

Point Clouds are a new way of storing scan data in SCENE 5.0. Unlike the scan files as they come from the scanner, a point cloud uses a spatial approach to store the scan data. This makes it much faster in accessing points at a certain spatial position. The scan points of a point cloud are automatically loaded and visualized on demand based on camera position and point visibility.

Point clouds can be created for single scans and for the entire project.

The main means of data handling in SCENE 5.0 is the so-called *Project Point Cloud* which contains all scan points from all scan positions. This will allow a user to view a

certain portion of the scanned area without the need to know in which scans the area of interest has been captured.

In terms of the over-all workflow, creating the project point cloud will be the last step in the process. Before that, the scans need to be placed correctly, filtered and colorized. Thus the project point cloud will be the final deliverable for the majority of scanning projects.

Modifying the project point cloud is possible, but due to the necessary time effort, it is recommended to avoid frequent updates.

3.1.7. 3D Viewing Improvements

As 3D viewing is becoming a main access to 3D scan data, there have been a set of improvements made to the 3D view.

SCENE 5.0 is now providing dedicated buttons in the 3D view tool bar to determine the point size and turning on/off the clear view as well as the gap filling feature. Additionally there are tools to align the view to a certain surface and to move the view camera to a specific position in the point cloud. Furthermore there is a variable grid (orthogonal and radial) which can be shown in the 3D view and allows the user to quickly estimate dimensions and areas.

Some of the new features in 3D view may only apply to point clouds while others may be used for point clouds and conventional scan data.

3.1.8. Measurements in 3D

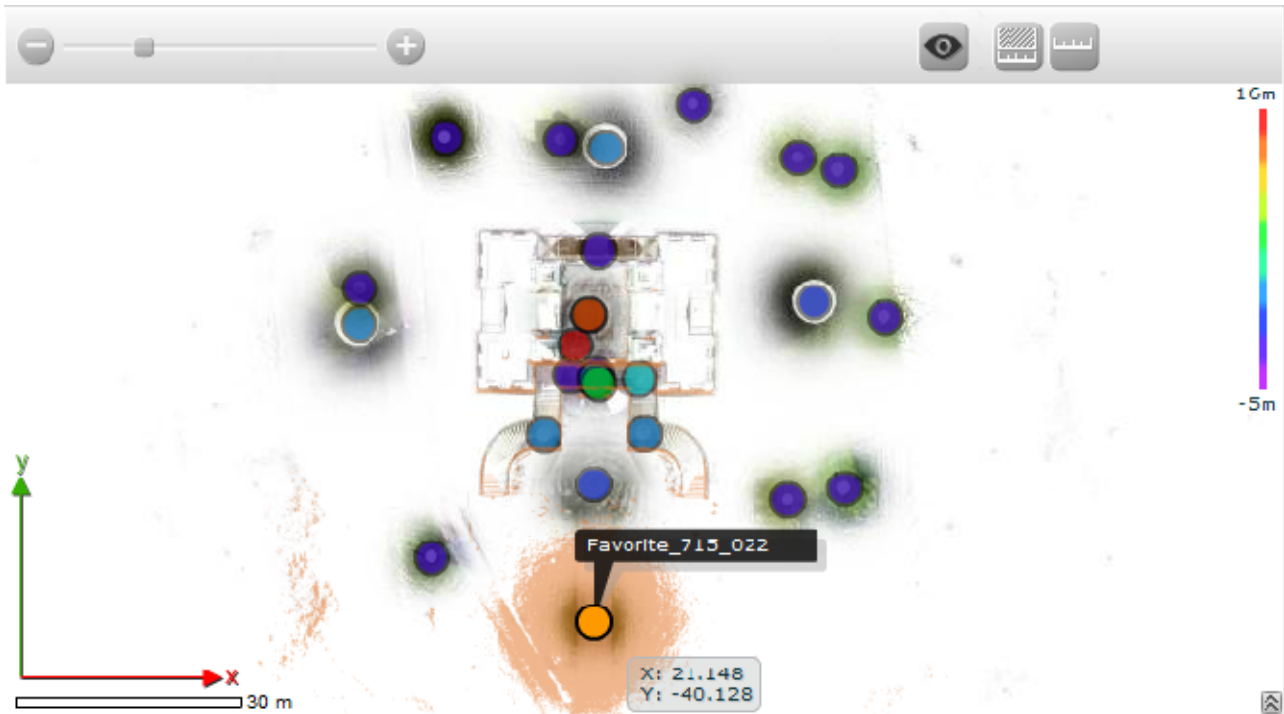
SCENE 5.0 is now supporting point-to-point and object measurements in the 3D view. Previously, this was limited to the planar view and the quick view. Measurements made in the 3D View are only visible in the 3D View. They are not linked to any individual scan.

3.1.9. Stereo Vision

Provided your computer is equipped with a capable graphics card (for example NVIDIA Quadro® or better), it is now possible to render the 3D view for stereo vision. To use this ability a suitable viewing device, like a modern 3D TV set or a 3D projector is required as well.

3.1.10. Overview Map

The overview map in SCENE 5.0 provides an overview of your complete scan project and helps orient you in it. The overview map is available in SCENE as soon as WebShare data has been created for your scan project.



The overview map in SCENE has nearly the same functionality as the overview map you might already know from SCENE WebShare. For example, it also supports Point-to-point measurements and area measurements. Measurements created in the overview map of SCENE are added as a child to the “Overview Map” object in the structure view of the workspace. The circular icons represent the various scanner positions. Double-clicking these icons will open the quick view of the related scans.

3.1.11. Auto Save

SCENE 5.0 has now an auto save functionality that helps to recover unsaved changes which have been lost due to an unplanned application exit such as an application or system crash or a power outage. Changes, like scan registration, object operations or project structure changes are covered by the auto save functionality. Auto save does not cover changes to the point data itself, like deleting scan points, filtering or colorization. Therefore you should use the regular save command in frequent intervals in order to preserve all the changes you have applied to your current workspace.

3.1.12. E57 File Format Support

SCENE 5.0 is supporting the import and export of scan data using the so-called E57 file format. This file format has been defined as ASTM 2807 standard in 2010 and is meant to become a standard exchange format for point cloud data.

For further details on this new file format, please refer to <http://libe57.org/>.

3.1.13. Export of Intensity and Color Values

When exporting scan points to different file formats, you may now select to export color (RGB) and intensity values for each scan point. RGB and intensity export is available for the file formats E57, XYZ text, POD (Pointools), PTX and PTS.

3.1.14. Apps

SCENE 5.0 is offering an application programming interface (API). This interface provides the opportunity to integrate your own functionality into SCENE. This API allows anyone to create custom applications (Apps) which integrate seamlessly into

the SCENE user interface. Developers are free to share their Apps with others (for free or for sale), so that everybody can benefit from them.

3.1.15. WebShare Upload

Once WebShare data has been created from your scan project, you may now use the WebShare upload which has been integrated into SCENE 5.0 to transfer this data to a WebShare server. You may find the WebShare upload under **View > View > Upload View**.

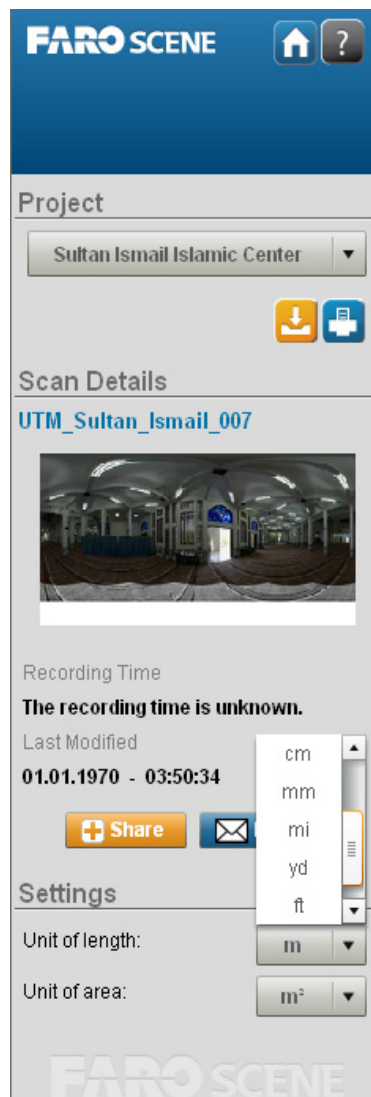
3.2. SCENE WebShare

3.2.1. Improved Visualization of Panoramic Images

With SCENE WebShare 5.0 the mapping accuracy of the panoramic images has been improved. In particular, this should eliminate the problem of straight lines appearing as wavy lines in the pole regions.

3.2.2. Units of Length and Units of Area

Users of SCENE WebShare 5.0 may now change the displayed units of length and units of area in the control panel on the left.



4. Computer System Recommendations

Processing scan data is a demanding task for both the software and the computer system. To allow SCENE 5.0 to act as a high performance system, the computer hardware needs to comply with these requirements.

Although SCENE 5.0 is able to work on 32-Bit versions of Windows with low performance but it is not recommended. FARO recommends the following hardware specifications:

- 64-Bit operation system. Windows 7 is preferred.
- At least 8 GB of RAM
- SSD mass storage for the current project data
- Conventional HDD mass storage for archiving projects
- Dedicated graphics card with at least 512 MB memory and OpenGL2.0 support and ability to control a 3D output device.

5. Known Issues

- There may be issues with the 3D view when using certain AMD/ATI graphics cards. In case you observe a strange behavior of the 3D view and you are using an AMD/ATI graphics card, you may check whether disabling the **Offscreen Rendering** option, which is enabled by default, solves this problem. The **Offscreen Rendering** option can be disabled in the **Tools > Options > View** dialog.
- Sometimes, the progress bar dialog might appear in the background behind the main SCENE window. Especially, when performing time-consuming processes, e.g. creating a project point cloud, this may lead to confusion because it seems as if SCENE is not responding anymore. In such cases, please do not force SCENE to close and wait until the process is complete.
- There is a known issue with the performance of the 3D views when working on a system with NVIDIA Quadro FX Drivers. Users running NVIDIA QuadroFX and QuadroFx Mobile graphics cards may encounter performance issues in 3D views. To avoid this problem, please set the NVIDIA Quadro driver profile to "*3D App – Game Development*". The driver profile options can be found in the NVIDIA Control Panel. All users running QuadroFX hardware should compare 3D view performance with and without the profile set to "*3D App – Game Development*" to make sure SCENE can deliver 3D view content at maximum performance.
- Due to compatibility reasons, customers who would like to control the Focus^{3D} scanner with their self-developed applications based on the FARO LS SDK 5.0 need a scanner firmware upgrade. This upgrade will be available soon. Please contact customer service for more information.

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