Pre-requisites.

OS Windows 10 or above
Python 3.10. Installation guide:
https://www.digitalocean.com/community/tutorials/install-python-windows-10

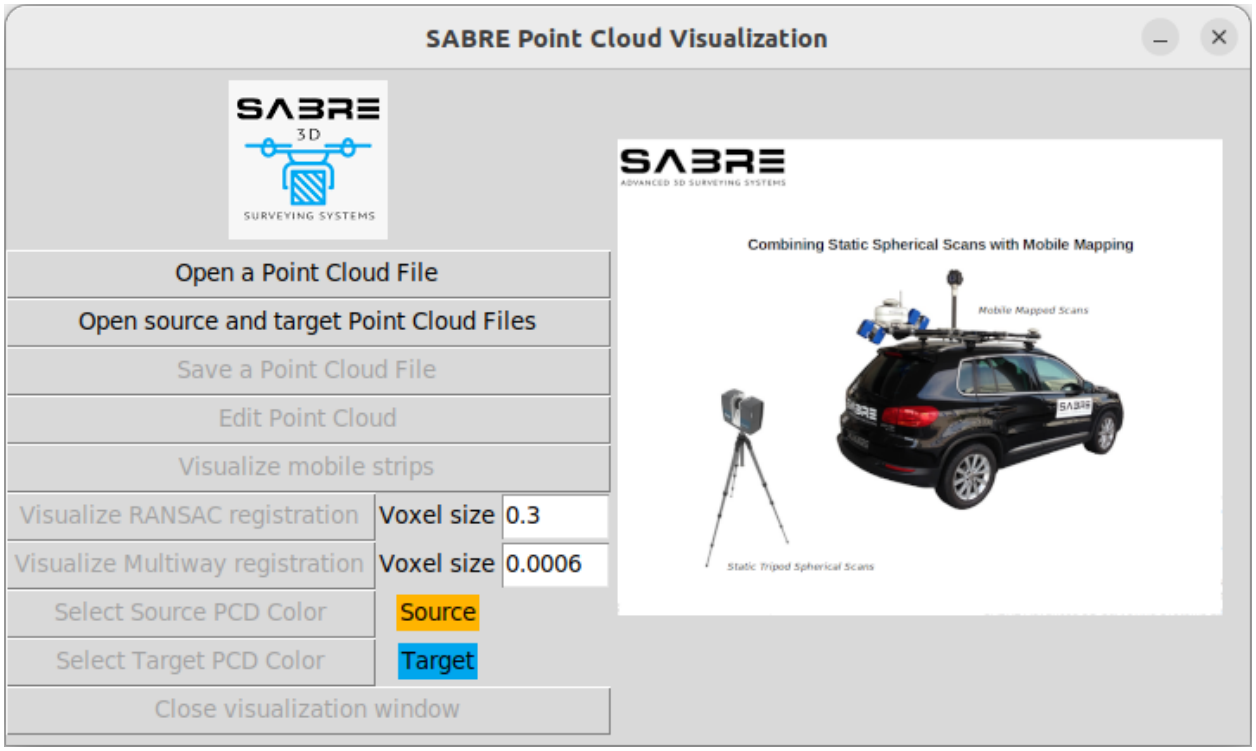
Installation Process.

After the prerequisites are fulfilled.

1. Run the cmd with administrator rights
2. Go into the application main folder using cd command.
   Example: cd some_folder\SABRE_app\
3. run app_installation.bat from the application main folder, this file installs all necessary libraries for the application and needs to be launched only once.

Now we are ready to launch our application,
launch file: viz_run.bat

Main interface.

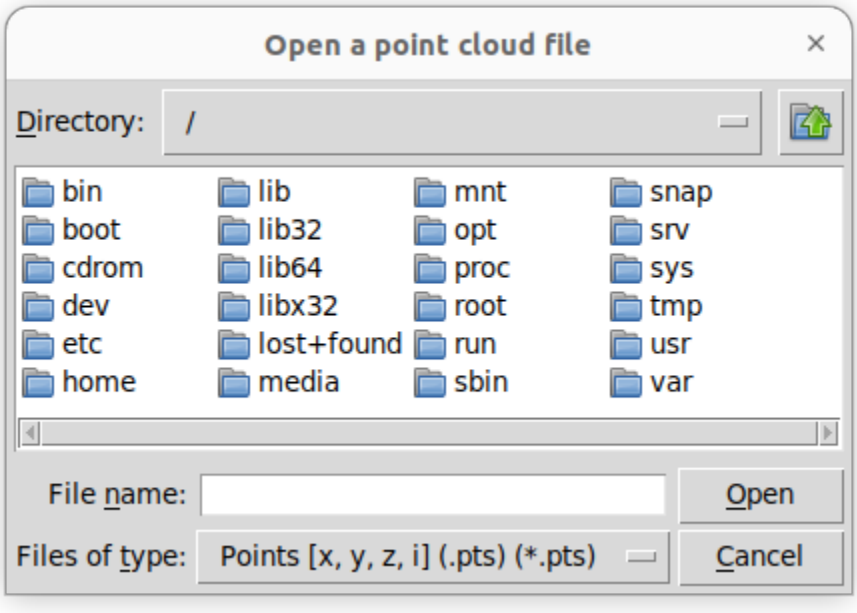


Start working with the application by loading point cloud data for point cloud editing (the topmost button) or for 2 point clouds registration (the second button from the top). The rest of the buttons are greyed out and not available until the point cloud(s) is(are) loaded.

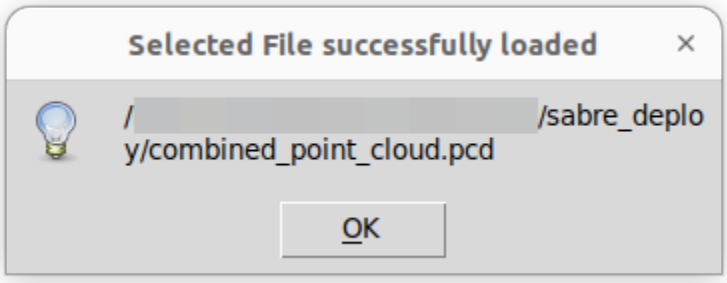
Point Cloud file formats the app can work with:

1. .pts files with xyz coordinates, xyz coordinates and intensity, xyz coordinates and rgb colors (inhouse built loader)
2. .e57 point cloud format (pye57 library)
3. .xyz, .xyzn, .xyzrgb, .ply, .pcd (open3d library)
4. .las, .laz files (laspy library)
5. .ply, .stl, .fdx, .obj, .off, .gltf, .glb Triangle mesh files (open3d library, Not tested!!!)

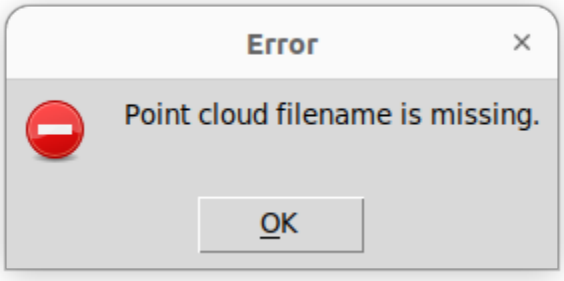
The Point Cloud file can be selected from the 'Open Point Cloud' dialogue menu.



When the point cloud for editing is loaded the corresponding message is displayed.



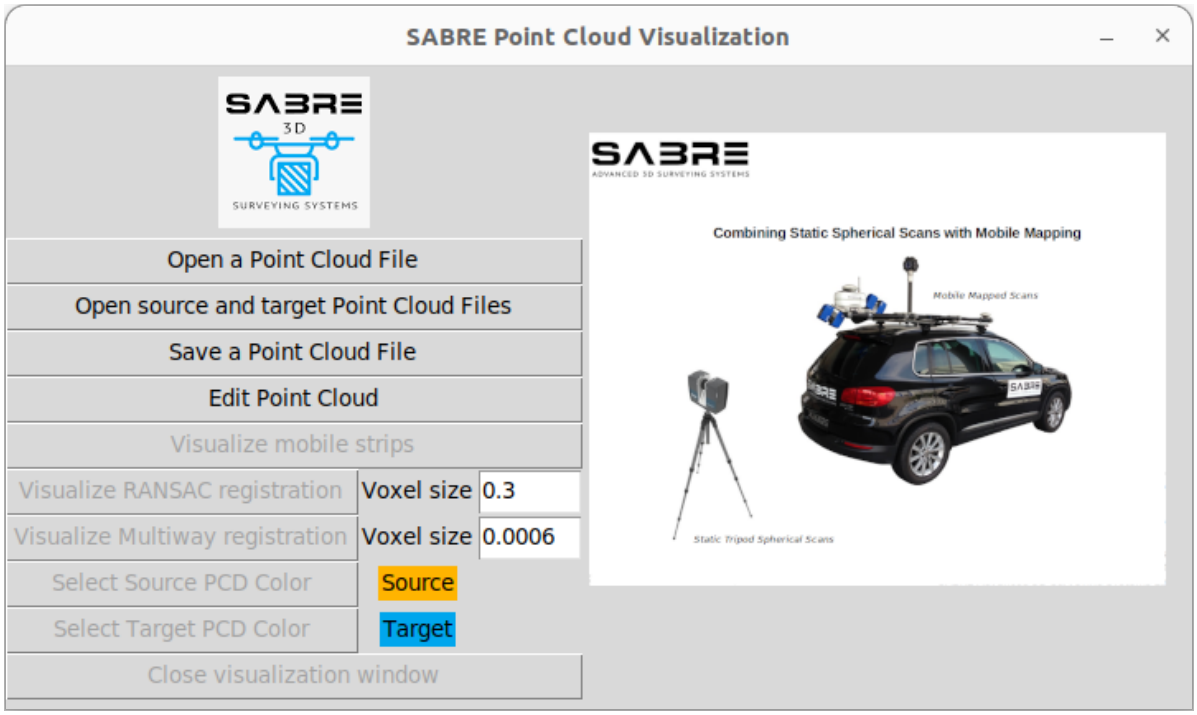
When the load file is cancelled the information error message is displayed.



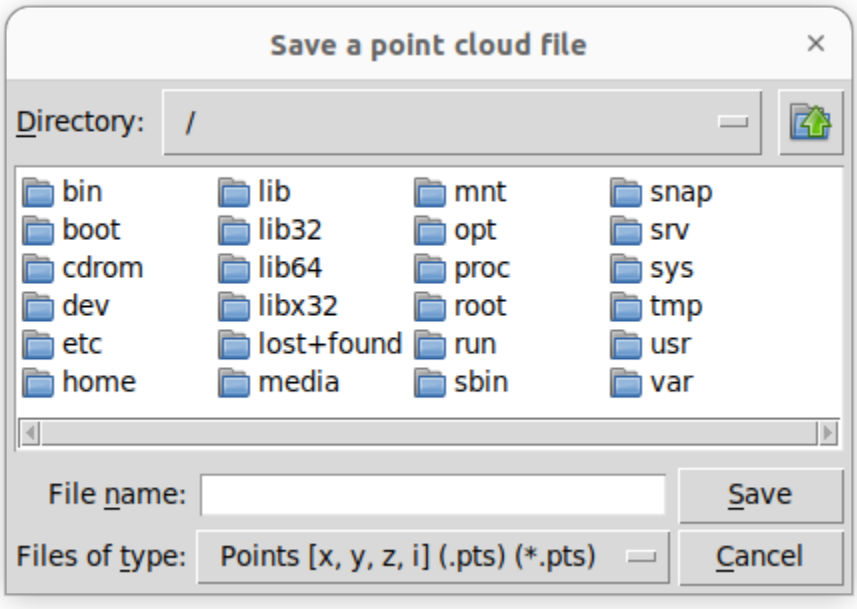
After the point cloud data is loaded in the terminal user can see the message:

[Info] Successfully read /home/…/sabre_deploy/combined_point_cloud.pcd
-------PCD:
 PointCloud with 36071743 points.

This message informs the user that the point cloud file was read successfully and information on the point cloud amount of points.
The new options ‘Save point cloud file’ and ‘Edit Point Cloud’ become available from the main menu after the file is loaded.

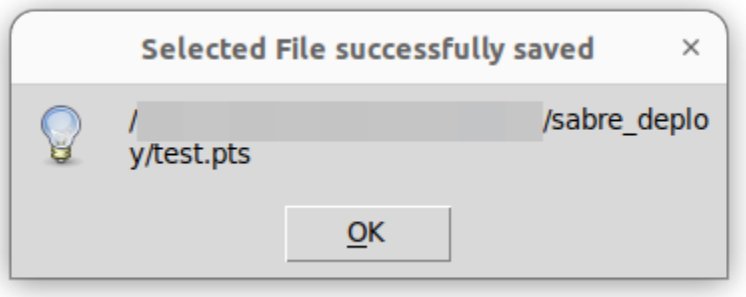


The ‘Save Point Cloud’ button gives the user access to the Save Point Cloud dialogue menu

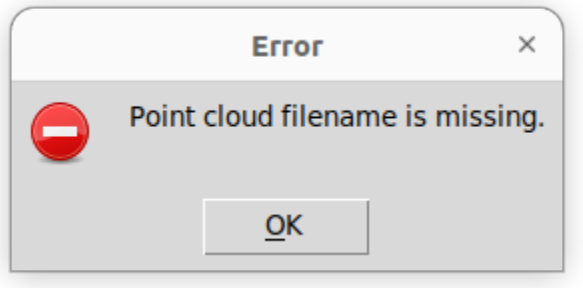


This dialogue menu gives the user to choose the location and format of the saved point cloud file. The format choice is available from open3d library: .txt, .pts, .xyz, .xyzn, .xyzrgb, .ply, .pcd, triangle mesh files .ply, .stl, .fdx, .obj, .off, .gltf, .glb (mesh files are not tested!!!)

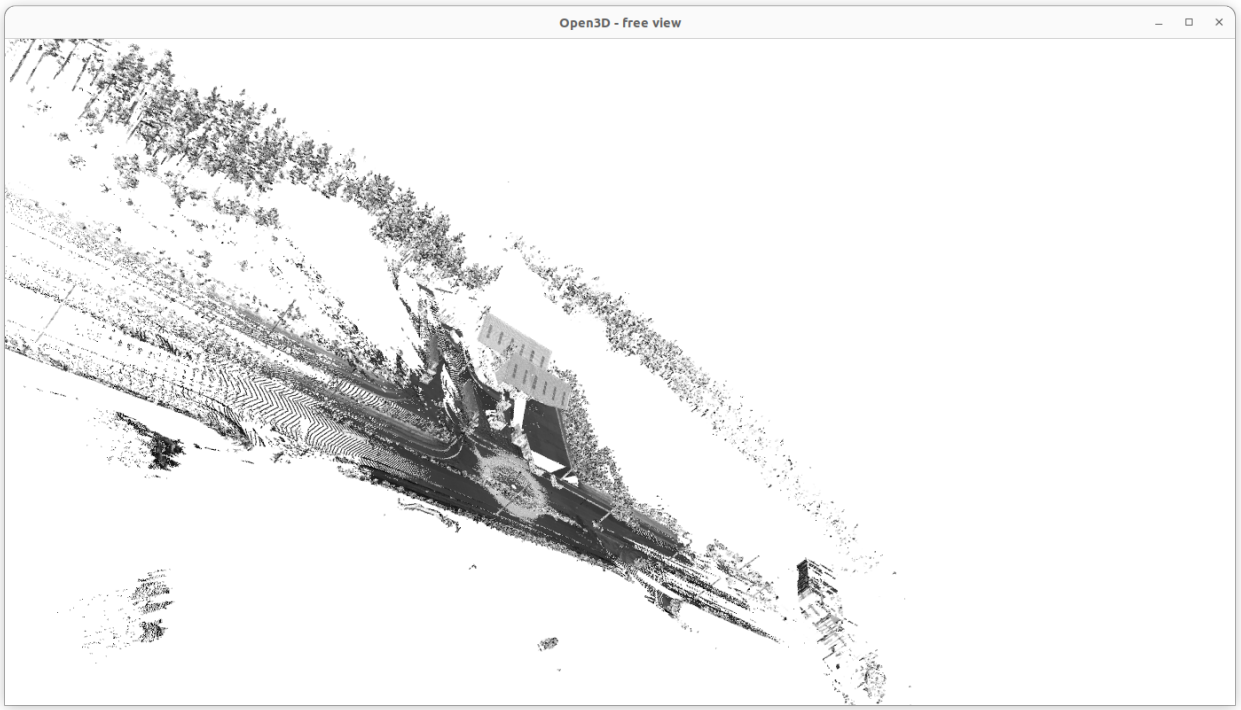
Save confirmation message.



When the save file is cancelled the information error message is displayed.



Edit Point Cloud Visualisation screen



Edit screen keys:

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[Open3D INFO]   -- Mouse view control --
[Open3D INFO]     Left button + drag         : Rotate.
[Open3D INFO]     Ctrl + left button + drag  : Translate.
[Open3D INFO]     Wheel button + drag        : Translate.
[Open3D INFO]     Shift + left button + drag : Roll.
[Open3D INFO]     Wheel                      : Zoom in/out.
[Open3D INFO]
[Open3D INFO]   -- Keyboard view control --
[Open3D INFO]     [/]          : Increase/decrease field of view.
[Open3D INFO]     R            : Reset view point.
[Open3D INFO]     Ctrl/Cmd + C : Copy current view status into the clipboard.
[Open3D INFO]     Ctrl/Cmd + V : Paste view status from clipboard.
[Open3D INFO]
[Open3D INFO]   -- General control --
[Open3D INFO]     Q, Esc       : Exit window.
[Open3D INFO]     H            : Print help message.
[Open3D INFO]     P, PrtScn    : Take a screen capture.
[Open3D INFO]     D            : Take a depth capture.
[Open3D INFO]     O            : Take a capture of current rendering settings.
[Open3D INFO]     Alt + Enter  : Toggle between full screen and windowed mode.
[Open3D INFO]
[Open3D INFO]   -- Render mode control --
[Open3D INFO]     L            : Turn on/off lighting.
[Open3D INFO]     +/-          : Increase/decrease point size.
[Open3D INFO]     Ctrl + +/-   : Increase/decrease width of geometry::LineSet.
[Open3D INFO]     N            : Turn on/off point cloud normal rendering.
[Open3D INFO]     S            : Toggle between mesh flat shading and smooth shading.
[Open3D INFO]     W            : Turn on/off mesh wireframe.
[Open3D INFO]     B            : Turn on/off back face rendering.
[Open3D INFO]     I            : Turn on/off image zoom in interpolation.
[Open3D INFO]     T            : Toggle among image render:
[Open3D INFO]                    no stretch / keep ratio / freely stretch.
[Open3D INFO]
[Open3D INFO]   -- Color control --
[Open3D INFO]     0..4,9       : Set point cloud color option.
[Open3D INFO]                    0 - Default behavior, render point color.
[Open3D INFO]                    1 - Render point color.
[Open3D INFO]                    2 - x coordinate as color.
[Open3D INFO]                    3 - y coordinate as color.
[Open3D INFO]                    4 - z coordinate as color.
[Open3D INFO]                    9 - normal as color.
[Open3D INFO]     Ctrl + 0..4,9: Set mesh color option.
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[Open3D INFO] 0 - Default behavior, render uniform gray color.
[Open3D INFO] 1 - Render point color.
[Open3D INFO] 2 - x coordinate as color.
[Open3D INFO] 3 - y coordinate as color.
[Open3D INFO] 4 - z coordinate as color.
[Open3D INFO] 9 - normal as color.
[Open3D INFO] Shift + 0..4 : Color map options.
[Open3D INFO] 0 - Gray scale color.
[Open3D INFO] 1 - JET color map.
[Open3D INFO] 2 - SUMMER color map.
[Open3D INFO] 3 - WINTER color map.
[Open3D INFO] 4 - HOT color map.
[Open3D INFO]
[Open3D INFO] -- Editing control --
[Open3D INFO] F : Enter freeview mode.
[Open3D INFO] X : Enter orthogonal view along X axis, press again to flip.
[Open3D INFO] Y : Enter orthogonal view along Y axis, press again to flip.
[Open3D INFO] Z : Enter orthogonal view along Z axis, press again to flip.
[Open3D INFO] K : Lock / unlock camera.
[Open3D INFO] Ctrl + D : Downsample point cloud with a voxel grid.
[Open3D INFO] Ctrl + R : Reset geometry to its initial state.
[Open3D INFO] Shift + +/- : Increase/decrease picked point size..
[Open3D INFO] Shift + mouse left button : Pick a point and add in queue.
[Open3D INFO] Shift + mouse right button : Remove last picked point from queue.
[Open3D INFO]
[Open3D INFO] -- When camera is locked --
[Open3D INFO] Mouse left button + drag : Create a selection rectangle.
[Open3D INFO] Ctrl + mouse buttons + drag : Hold Ctrl key to draw a selection polygon.
[Open3D INFO] Left mouse button to add point. Right mouse
[Open3D INFO] button to remove point. Release Ctrl key to
[Open3D INFO] close the polygon.
[Open3D INFO] C : Crop the geometry with selection region.
[Open3D INFO]