

# **Orientation and Manual registration**

## **USER'S GUIDE**

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#### I. Introduction

These 2 plugins will make you save time when orienting your scans and setting the origins.

They can also help you in case target based or cloud to cloud registration aren't possible.

#### II. Installation

Copy the .fpp file into the App folder of Scene / Scene LT (5.3 and above). Then, open Faro Scene and go into tools – Apps, and install the fpp package.

#### III. Using the plugin

a- General

The plugin is represented by 2 blue icons :

- R : registration
- O : orientation and coordinates transformation

First of all, when the plugin is started, you'll be asked to choose the unit (meters or feet). Indeed, the internal unit in Scene is always the meter, even if feet are set in the options table.

R D

Once the unit is set, it will be used for this plugin during the whole work session. To change it, you'll have to close / open Scene, or to deactivate / activate the plugin.

#### **b-** Orientation

This plugin allows the orientation of the scans along the x or y axis. It can be applied on a single scan, a selection of scans, on the folders, or on the whole project.

To orient the scans, 2 points have to be created. These points can be created in 2 different scans.

The following screenshot shows a wall with 2 points that will be used to orient the scan along the x axis :



Points that are used to orient the scan(s)

/Scans/Retour_Scan_046/Point1		/Scans/Retour_Scan_046/Point2
Point Properties General	_	Point Properties General
Global Coordinates:		Global Coordinates:
Position: -21.70080 6.5517941 4789 [m]		Position: -0.90204 6.551794 2 027359 [m]
Add GPS Position		Add GPS Position
	1	
Liet Apply OK Cancel	J	Cancel

The scan is now oriented along the x axis (y value is constant)

#### c- Coordinates transformation

Create a point, add it, and give a new value (x, y, or z). The transformation can be applied on a single scan, on a selection of scans, on a folder, or on the global project.

	✓ Global	Selection (Scan/Folder)
ture     4 X     Retour_Scan_046       Vorkspace     Scans     Pointspace       Scans     Scanshanger     Scanshanger       Retour_Scan_046     Scansfit     Scansfit       AutoFeatures     AutoFeatures     Scansfit       It Point1     It Point2     It Point2       It Point2     It Point2     It Point2       It Point2     It Point2     It Point2       It Point2     It Point2     It Point2       It Retour_Scan_052     Retour_Scan_053       Retour_Scan_059     Retour_Scan_061       Measurements     Models	ORIENTATION  Reference axis Y Point sel Reference axis Y Reference P Reference P New coord Z	ection int 1 Point1 int 2 Point2 Apply pint pint Point3 linate : 10 Apply

	/Scans/Retour_Scan_046/Point3	X
-	Point Properties General	
	Global Coordinates: 📝 Position: 108645502 1.848136 [m]	
*	Add GPS Position	
*	Get Apply OK Cancel	]

Now the x coordinate of the selected point gets the new value

#### d- Manual registration

Sometimes, either target based or cloud to cloud registration aren't possible. This can happen if you need to go back on a site that changed very much. And sometimes you don't have nice walls to create planes.

This feature allows to register 2 scans by giving one direction and 3 coordinates.

**Important :** please scan with the inclinometer switched on.

For good results, the reference scan has to be correctly oriented along the x,y axis first (walls or geometry parallel to the xy axis).

Start the plugin with the icon « R ».

Choose a reference scan and a scan to register.

In each scan, create 2 points that will be used for the direction. Please use the same point ordering to avoid to get 2 different orientations. Create 3 points for the coordinates. Then, add these points in the plugin interface and click on apply : the scan to place will be rotated and moved to match the reference scan.

As it is a purely manual registration, you won't get any report or traffic light here.

#### Example :

Let's take a warehouse under construction. The first scan was done very early during the construction. Some checkerboards were left on the walls, in order to prepare the next scanning.

But some weeks later, most of the walls were insulated : no more targets, the cloud to cloud was impossible, and there was no nice planar surfaces.

But the insulation sheet still has the same direction as the wall, and there are still some concrete parts on the openings sides. The concrete slab is the same. So, we have a direction and some reliable areas.



First scan : no insulation, and some checkerboards



Second scan done a couple of weeks later in the same area: all the walls are insulated and the checkerboards are now hidden

• The first step is to orient the reference scan along the x or y axis (if not done previously). Use the orientation plugin to do this.



First scan : main wall and columns. Creating of 2 points on the columns front face. These points will be used to orient the scan along the x axis, and also to give a direction for the registration.

Chapelle	Orientation and Origins
Chapelle Chateau Entrepot C Scan_001 C ScanFit C AutoFeatures C Checkerboard3	Orientation and Origins
	Reference axis     Point selection       Y     Point 1       Point 2     Point2
Tank Indus Neasurements Nodels	ORIGINS Coordinate X Point Y New coordinate : 0 Z Apply

1st step - Orient the reference scan

• Then, create 2 orientation points in the scan to register. We choose the same columns as in the first scan, even if we are now clicking on the insulation sheet.



Second scan : the walls and the columns are insulated. But the direction is still the same. So, we create 2 points on the same columns.

• Then, create 3 points in both scans that will give a X, a Y, and a Z value. We have to choose areas where X or Y are constant in the reference scan. This way, even if the points aren't created at the same location in both scans, we'll still keep the same coordinate with a good accuracy.



First scan : point created on an concrete opening. The face is along the x axis (y is constant). This point will be used to set the Y value



Second scan : create a point in the same area as in the first scan. As this area is along the x axis, the y value doesn't change very much (we should stay within 1-2mm)

• Do the same along the y axis, to set a X value :



Same for the y axis in the first scan



Same for the y axis in the second scan

• Finally, we create a point to set a Z value :



First scan : creation of a point on the ground to set the Z value



Same in the second scan

So, now we have defined a direction, and also 3 coordinates created in similar areas in both scans.

• Start the plugin and add the points. Make sure that the point ordering is the same for the orientation. When all the points are added, click on « apply » :

Registration			×
Reference Scan		Scan to place	
Reference Scan	C6_Scan_001	Scan to place	C8_Scan_005
Orientation 1	Point6	Orientation 1	Point1
Orientation 2	Point7	Orientation 2	Point2
x	Point10	x	Point5
Y	Point9	Υ	Point4
Z	Point8	Z	Point3
			Apply

#### Important :

At the end of the calculation, <u>you have to go in the transformation table</u> (properties\transformation) of the registered scan. Just enter the transformation screen and click on « ok ». Indeed Scene has a small refreshing issue when applying the calculation, and displaying this table solves it.

Operation       Operation       Scannerst       Color         Scan       General       Transformation       Scan Area       Sensors         X       Y       Z         Position:       [m]       -117.54112       29.76631       1.95096         Increments:       +/-       1       ✓       Z         Rot Angle:       [']       359.913353       0.032078       312.808518         Axis snap:       +/-       45       ✓          Axis snap:       +/-       45       ✓       Auto Apply:	/Scans/Entrepot/C8_Scan_005
Scan       General       Transformation       Scan Area       Sensors         X       Y       Z         Position:       [m]       11754112       29.76631       1.95096         Increments:       +/-       1       ✓       ✓         Rot Angle:       [']       359.913353       0.032078       312.808518         Axis snap:       +/-       45       ✓       ✓         Axis snap:       +/-       45       ✓       ✓         Auto Apply:       ✓       ✓       ✓       ✓	Operation Operation Scanner Into Scanner Settings Color
X       Y       Z         Position:       [m]       117.54112       29.76631       1.95096         Increments:       +/-       1       -       -         Rot Angle:       [']       359.913353       0.032078       312.808518         Axis snap:       +/-       45       -       -         Axis on prime       +/-       45       -       -         Axis on prime       -       -       -       -         Olobal Coordinates:       ✓       -       -       -         Auto Apply:       ✓       -       -       -	Scan General Transformation Scan Area Sensors
Position: [m] 117.54112 29.76631 195096 Increments: +/- 1 ▼ Rot Angle: ['] 359.913353 0.032078 312.808518 Axis snap: +/- 45 ▼ Global Coordinates: ▼ Auto Apply: ▼	× × 7
Position. [iii] 17.34112 23.70031 1.3330 Increments: +/- 1 ↓ X Y Z Rot Angle: ['] 359.913353 0.032078 312.808518 Axis snap: +/- 45 ↓ Global Coordinates: ✓ Auto Apply: ✓	
Increments: +/- 1 → X Y Z Rot Angle: ['] 359.913353 0.032078 312.808518 Axis snap: +/- 45 → Global Coordinates: ✓ Auto Apply: ✓	
Increments: +/- 1	
X       Y       Z         Rot Angle:       [']       359.913353       0.032078       312.808518         Axis snap:       +/-       45       -       -         Axis snap:       +/-       45       -       -         Global Coordinates:       ✓       -       -       -         Auto Apply:       ✓       -       -       -	Increments: +/- 1 💌
Rot Angle: ['] 359.913353 0.032078 312.808518 Axis snap: +/- 45 Global Coordinates: Auto Apply:	X Y 7
Axis snap: ++ 45 Axis snap: Axis	Ret Apolo: [1] 359 913353 0.032078 312 808518
Axis snap:	
Axis snap:	
Global Coordinates: <section-header></section-header>	Axis snap:
Global Coordinates: 🗹 Auto Apply: 🔽	
Auto Apply: 🗹	Global Coordinates: 📝
	Auto Apply: 📝
Get Apply OK Cancel	Get Apply OK Cancel

Because of a small screen refreshing issue, please enter the transformation table of the registered scan and click on « ok ».



The registered scan (yellow) and the reference scan (grey)

#### IV. Known issues

It's important to enter the transformation properties table of the registered scan at the end of the calculation. Otherwise, the 3D view will still show a scan that is not registered. e-mail : <a href="mailto:support@liber-d.fr">support@liber-d.fr</a>

#### V. Updates

Revision 1 – 16 Nov. 2015