

X-Pad Ultimate – Pic Point



Pic Point – Equipment

Necessary equipment:

- XPAD 3.0 onward
- XPAD PicPoint module
- PicPoint camera kit
- GeoMax GNSS receiver/TPS



What is the Pic Point?

- PicPoint is a GeoMax system which, when used with a GNSS receiver or a TPS prism, allows to take measures from pictures
- The system is able to determine 3D points from multiple photos taken with appropriate criteria, to obtain the coordinate of points in the same coordinate system as the survey
- PicPoint is a system which includes a camera and the XPAD PicPoint module for Android. It need to be used together with a surveying instrument (TPS or GNSS)



GNSS Configuration

GNSS configuration

- GeoMax Zenith receiver
- Pole
- MPR Camera
- Android tablet
- XPAD Field GNSS
- XPAD PicPoint Module



TPS configuration

- 360 Prism
- Pole
- MPR Camera
- Android tablet
- XPAD Field TPS
- XPAD PicPoint Module



How it works?

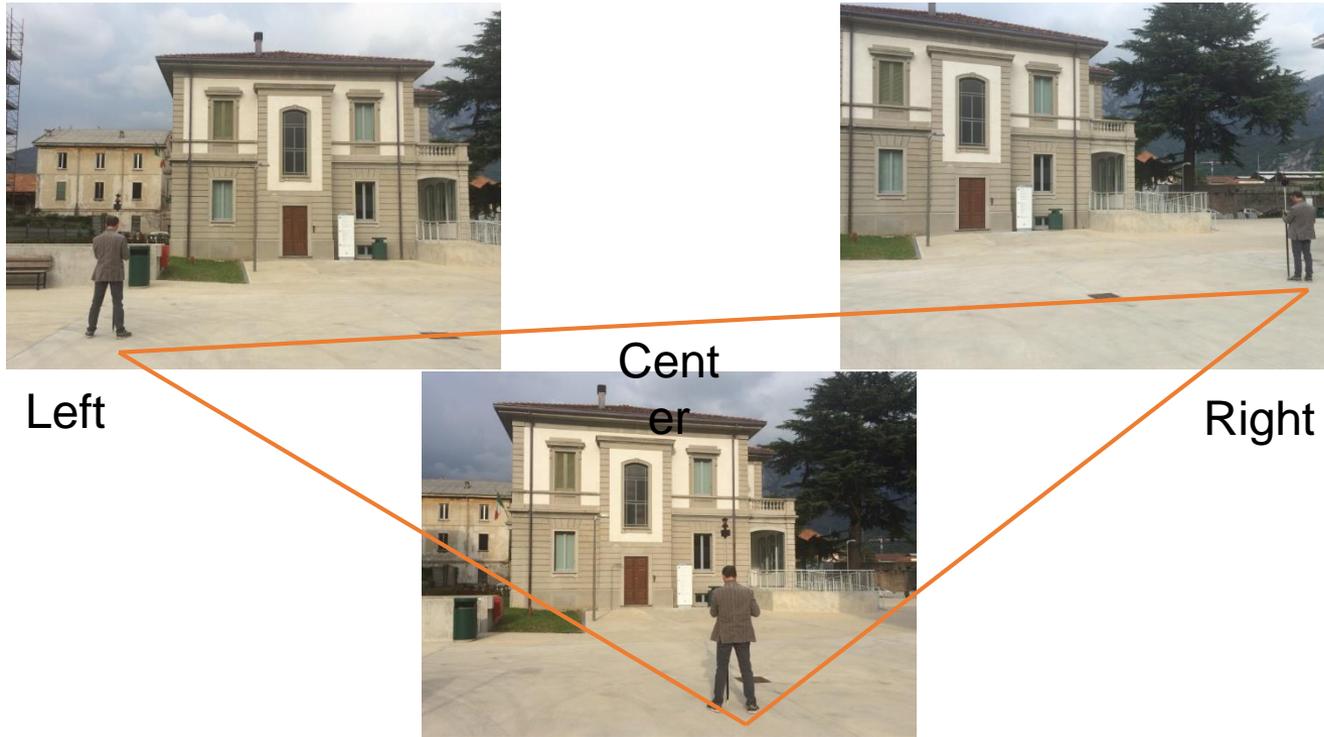
GNSS configuration

- XPAD PicPoint manages simultaneously the GPS and the camera
- GPS is connected by bluetooth
- Camera is connected by Wi-Fi
- When a picture is taken, at the same time the system stores the coordinate together with the picture



How it works?

The system requires minimum 3 photos



How it works?

- After the photo alignment, done in the field, it is possible to measure the coordinate of the points on the photo
- Accuracy is about 5cm



How it works?

- Allows to measure inaccessible points while working with the GPS
- Compatible with all GeoMax GNSS receiver
- Measured points are in the same coordinate system as the GNSS receiver (WGS84 and local/cartographic coordinates)
- Results directly in the field



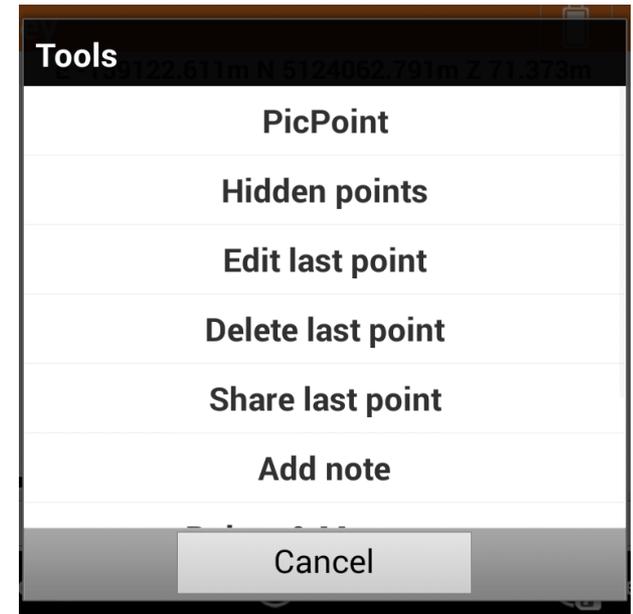
1_License Activation

XPAD PicPoint module is an Android optional module

The procedure to activate the module is:

1. Install the PicPoint module in the controller with the same procedure used for the other optional modules

2. After the module is activated open XPAD > Survey Points -> Tools -> PicPoint



2_Calibration Files

- Each camera is calibrated before the shipping
- The calibration file is stored in the USB Stick you can find in the case
- Copy the calibration files you find in the folder XPAD/_data/Config on the controller




PicPoint Calibration

Camera serial number e model: MPR15003 - Sony QX10

SSID: DIRECT-nRQ0#DSC-QX10

Password: xBz1YSvr

Certificate:

We hereby certify that the product described has been tested in accordance with internal procedures defined by GeoMax. The following parameters are the result of the calibration measurements:

Camera calibration	
Focal (pixel)	F _x 1924.01
	F _y 1927.87
Principal point (pixel)	C _x 1289.58
	C _y 952.434
Radial distortion	K ₁ 0.00083622
	K ₂ -0.0313989
	K ₃ 0.0381958
Tangential distortion	P ₁ -0.00186814
	P ₂ -0.00171818
Accuracy	RMS 0.633841

System calibration	
PC (m)	X -0.00383252
	Y -0.135747
	Z 0.0102318
PCB (m)	X 0.00049349
	Y 1.36399
	Z 0.0406172
Accuracy (m)	RMS 0.288462

For any information or questions, please contact:
support@geomax-positioning.com

Date: 24/11/2015

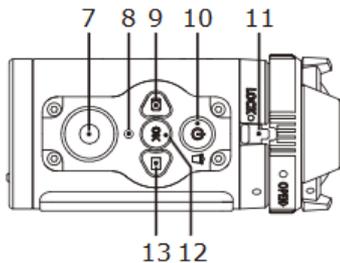
Central phone : +39 071 917386
 E-Mail : info@geomax-positioning.it
 Web : www.geomax-positioning.it

GeoMax srl
 Via G. Ferraris 86/4
 68015 Fagnanora Montemore (AO)
 Italia



3_Connect the camera

- Before using the PicPoint module, the camera must be connected to the tablet by WiFi
1. On the camera press button 9 to select [AP Settings] and press button 12 [OK] to enable wireless connection



7	Video Recording Button / Shooting Button
8	Status Indicator
9	Menu Button / Direction Button (Upper)
10	Power Button / Delete Button
11	Lens Cover Buckle
12	OK Button
13	Playback Button / Direction Button (Lower)



3_Connect the camera

2. On the camera you can read the WiFi network name (SSID) and the password



3. Open the WiFi settings on the Android tablet and connect to this WiFi network (PIXPRO-SP1_1234 in this example)
4. Input the password displayed on the camera (12345678 in this example)
5. The tablet connects to the camera by WiFi



Next time will not be needed to enter the password again, just connect to the WiFi network



4_Start PicPoint function

1. Open XPAD Survey point
2. Click on TOOLS -> PICPOINT to open the PicPoint module
3. XPAD connects to the camera



4_Start PicPoint function

4. To obtain a good accuracy the 3 photos must be taken correctly. The 3 photos must stay «on a triangle»



4_Start PicPoint function

5. A minimum of 3 photos must be taken. It is recommended at least 60% overlap between photos. Photos must be made perpendicular to the object, not converging



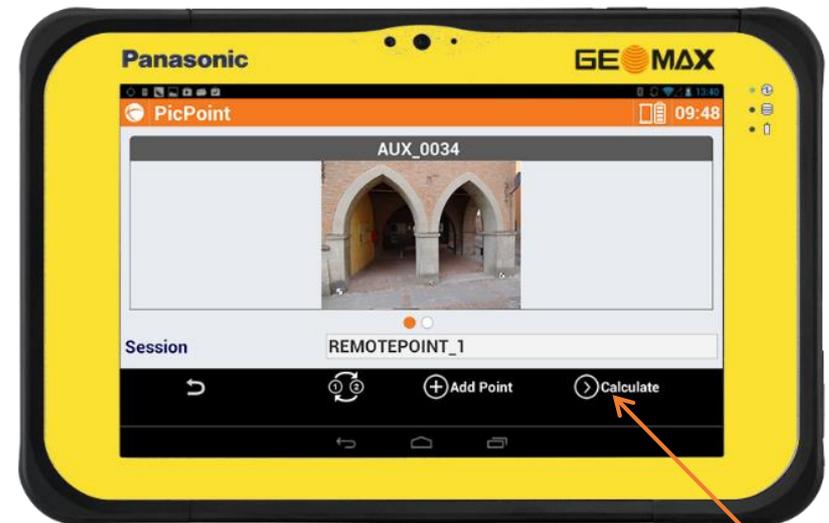
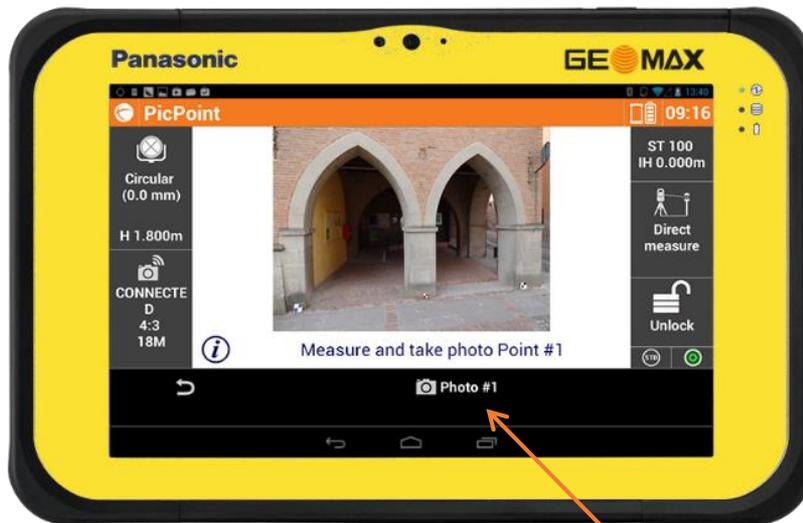
4_Start PicPoint function

6. The system is designed for objects up to a maximum distance of 25 meters



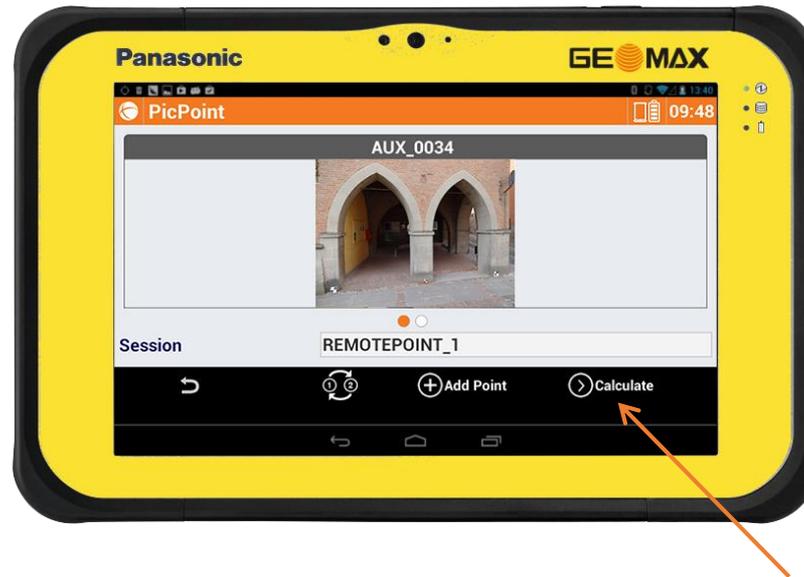
4_Start PicPoint function

7. To take the photo, click on the Photo button in XPAD
8. After the first shot, the software asks to move to the second position, and then to the third position



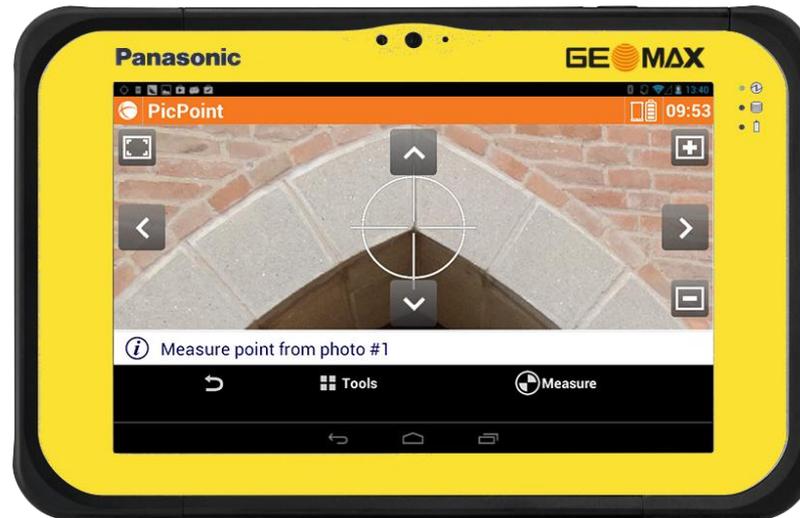
4_Start PicPoint function

9. After 3 photos the system is able to perform the calculation for aligning the pictures. Click on Calculate to start
10. Depending on the tablet it can take different time (about 1 min)



4_Start PicPoint function

11. After the calculation you have an estimation on how the calculation was good
12. If everything is ok, the measurement window allows the selection of the points you want to measure



5_Measure with PicPoint

1. To measure with PicPoint, the first operation to do is to check the area where is recommended to measure
2. Click on Tools -> Show align points to display the green area where it is recommended to measure



5_Measure with PicPoint

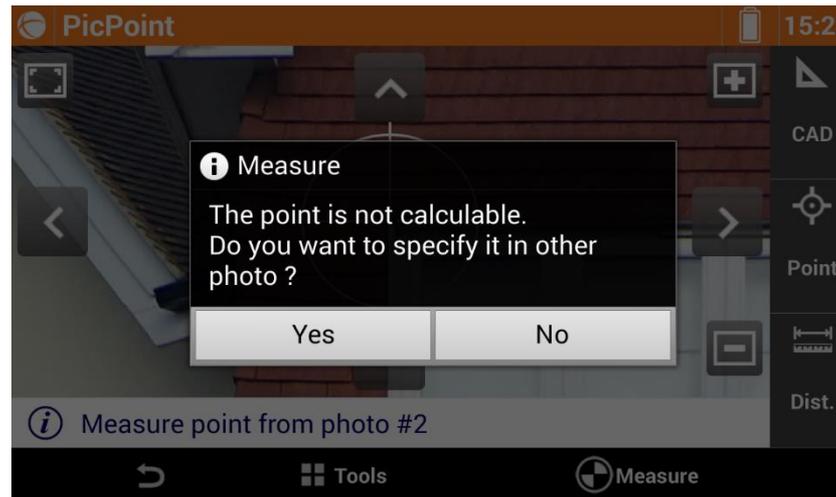
3. To measure on the image, just move the target to identify the point and press Measure
4. The point is measured in the same coordinate system as the instrument used in the system. For example if a GPS was used, the point is saved in WGS84 coordinatesmeasure

Store point		15:19
DATA	SKETCH	RESULT
E		-999814.598m
N		5932113.057m
Z		80.523m
Latitude		N 51°29'33.7298"
Longitude		W 0°44'22.3720"
Height		80.523m



5_Measure with PicPoint

5. If the point cannot be measured in the first photo, the system asks to specify the point on a second photo
6. With the same method specify the point in another photo



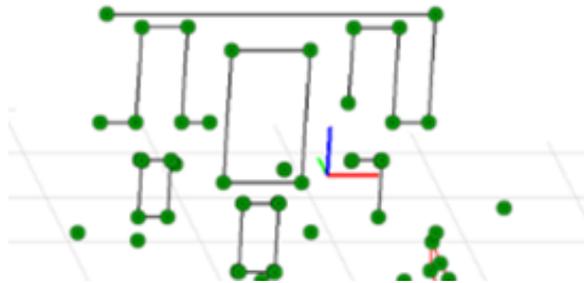
5_Measure with PicPoint

7. These operations can be done in the field, but also later on
8. Open Measures page, click on the REMOTEPOINT session and click on Measure with PicPoint to use the PicPoint in the office



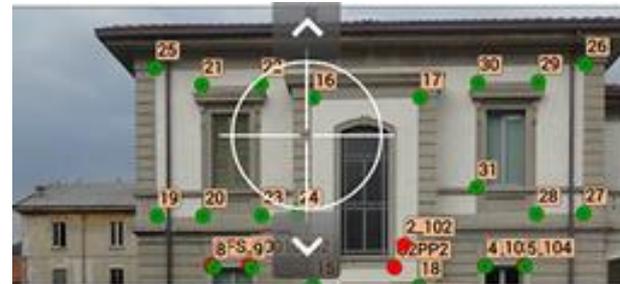
6_System Accuracy

Relative accuracy



Measures distances between two points on pictures
~5mm compared with the real measure

Absolute accuracy



The accuracy in absolute position is ~2cm if we use TPS,
~5cm when we use GPS

