

Scan tutorial

Introduction

This tutorial is to provide a working knowledge of the use of the Riegl LMS-Z210 to take scan data, to use RiSCAN PRO v1.4.2b5 to register multiple scans into a single coordinate system, and to use Geomagic Studio 9 to process the point cloud data and create a surface model.

Required Hardware

To complete this tutorial you will need to have a surveying tripod, laptop computer running RiSCAN PRO, LMS-Z210 terrestrial laser measurement system, serial & parallel to ethernet communication box model IB90-ETH, serial and parallel cables, scanner power cable, communication box power cable with serial connector, a cross over ethernet cable, and a number of cylindrical reflectors.



Initial Communications Setup

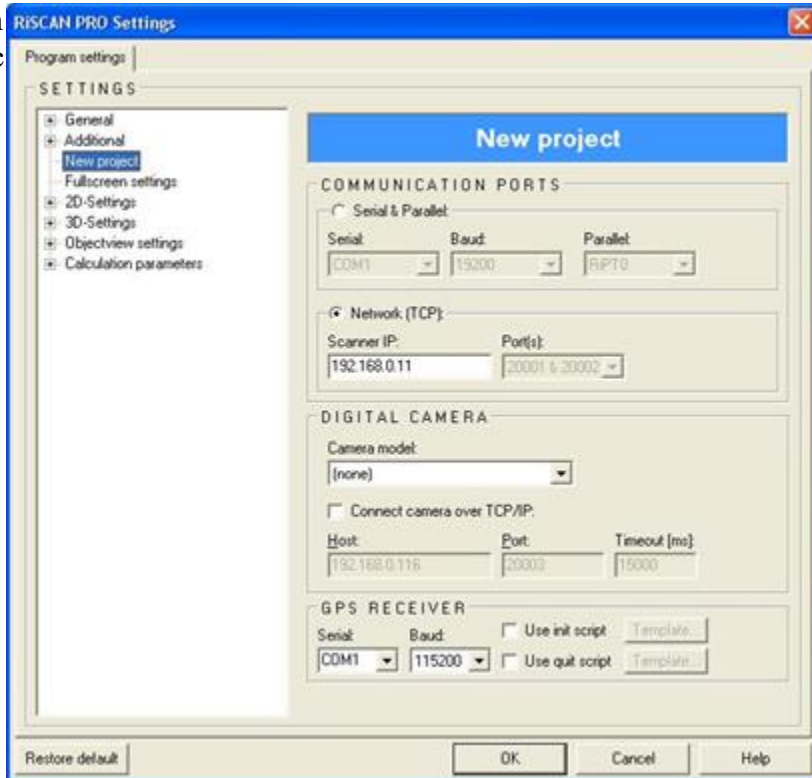
Connect the serial cable from the communication box power cable to a computer using the null-modem cable that usually connects the communication box to the scanner. Use HyperTerminal to log in to the communication box as “root”, the password is “moprala”. Select option ‘1’ to change the IP address of the communication box and note the new address for later use. Next select option ‘b’ to save changes.

```
data - HyperTerminal
File Edit View Call Transfer Help
Riegl LMS -- configuration menu
(Based on the Linux Router Project)
1 ) IP - address: 192.168.0.10
2 ) Network mask: 24
3 ) Hostname : ib90-eth
4 ) Packages
      b) Store permanent
      h) Help
q) quit
-----
Selection:
```

Now you will need to set your computer to use a static ethernet IP address on the same subnet as the scanner (192.168.0.y).



Open a DOS window and ping the new address of the communications box to verify connection. Make sure that RiSCAN is setup properly as in Keith Sevcik's tutorial (<http://www.pages.drexel.edu/~kws23/>) with the exception of the communication settings. Open tools then spec



Scanner physical setup

Screw the tripod mount to the base of the scanner and attach it to the tripod and tighten the setscrew knob.

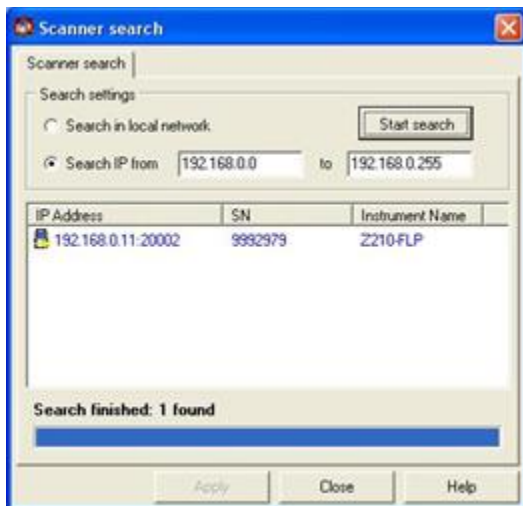


Connect the serial and the parallel cables between the scanner and the communication box, and attach both devices power cords to a 12 volt power source. Connect the cross over ethernet cable between the communication box and the laptop computer.

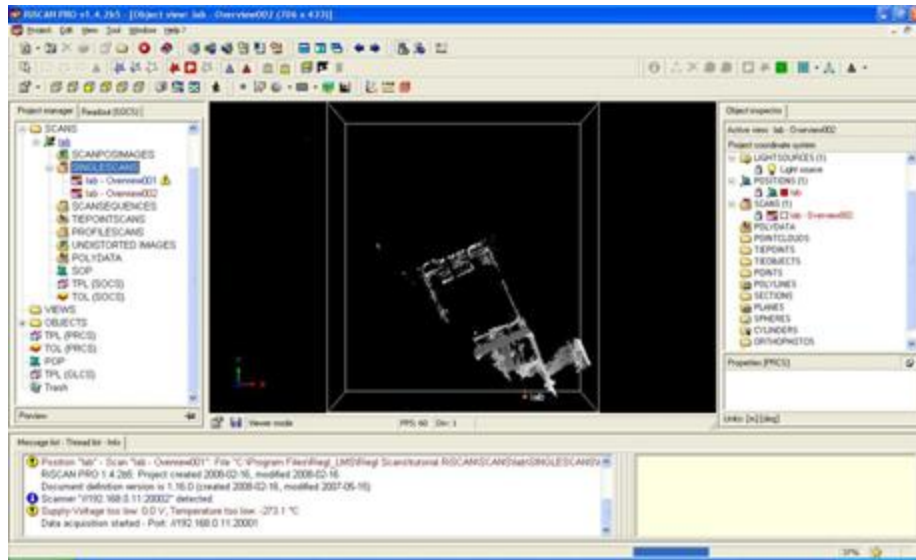


How to connect with Ethernet

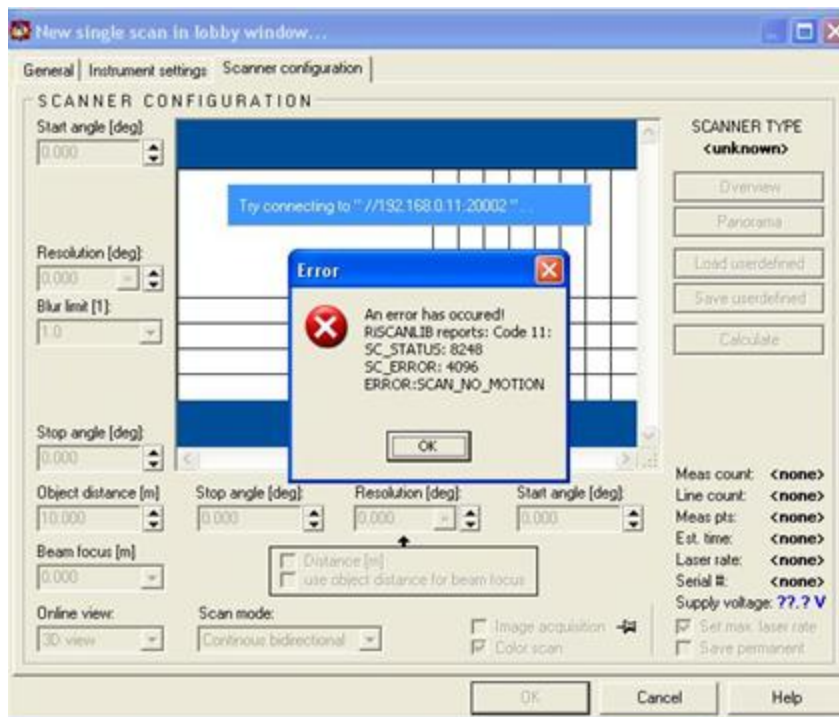
Open RiSCAN, Under Tools select "Scanner Search...", and search for the scanner in the appropriate range of IP addresses.



Open a new project in RiSCAN, create a new “scanposition”, and start a new “singlescan”. If you get an error saying “Supply-Voltage too low: 0.0 V, Temperature too low: -273.1 C” and the scan does not start within 30 seconds restart RiSCAN, reopen the project and scan position, and start a new single scan. This time you may still see the same error message as before but the scan should work properly.



Each time the setup is broken down to move to a new location RiSCAN must be closed and restarted to allow another scan to be taken successfully. If you are given the error shown below power cycle the scanner and the communication box then restart RiSCAN.



Performing scans

Now that you have both the hardware and software setup properly you are ready to start scanning your location. It is important to think carefully about your scan positions. You should pick locations

that will show the most detail with the fewest separate scans. After you decide where each scan position will be place the cylindrical reflectors where they will be visible from as many positions as possible. You should try to have at least 4 reflectors in common between each two scan positions. The reflectors will be used later to provide common points used to register the scans and combine all the points into a single coordinate system.

