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**LidarCollect**

Command-line tool for performing scans using Riegl lidar scanners

**Using LidarCollect**

LidarCollect connects to and communicates with Riegl scanners from the command-line. Users can query the scanner for information, set scanner parameters, and perform scans. Various levels of logging and command-line output are available.

The following flags are used to perform scans:

* [--frame](https://github.com/FRF-Remote-Sensing/LidarCollect/wiki/Scans#--frame) - Performs a frame scan
* [--frameseq](https://github.com/FRF-Remote-Sensing/LidarCollect/wiki/Scans#--frameseq) - Performs a sequenced frame scan
* [--line](https://github.com/FRF-Remote-Sensing/LidarCollect/wiki/Scans#--line) - Performs a line scan

**Supported Scanners**

The following scanners have been tested with LidarCollect:

* [VZ-1000](http://www.riegl.com/nc/products/terrestrial-scanning/produktdetail/product/scanner/27/)

Although, most VZ model scanners should work with this code as they all rely on RiVLib

# Connecting

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# Connecting to the scanner

LidarCollect connects to the scanner through RDTP/IP (Riegl Data Transfer Protocol). To connect to a scanner, only the IP address needs to be provided using the following flag:

##--ip

Defines the IP address of the scanner

##### Usage

--ip [ip address]

##### Options

* **[ip address]** - The IP address of the scanner

##### Details

Pretty self explanatory...this flag defines the IP address of the scanner. It is the only required flag when running LidarCollect

##### Examples

> ./LidarCollect --ip 192.168.0.13

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**Compilation**

* I've only been able to compile using 32-bit libraries... RiVLib doesn't seem to be compatible with 64-bit
* Was getting a 'missing "bits/c++config.h"' error when trying to compile on my machine. Turns out I didn't have 32-bit headers included with gcc/g++ and running sudo apt-get install g++-multilib solved the problem

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## System Requirements

* [RiVLib](http://www.riegl.com/index.php?id=224) - Riegl's libraries for communicating with scanners

##### Linux

* [GNU Make](http://www.gnu.org/software/make/) - Used for compilation
* A C++ compiler such as gcc or g++ (must be C++11 compatible)

## Downloading

To download using git:

git clone <https://github.com/FRF-Remote-Sensing/LidarCollect.git>

To download directly: Download [zip](https://github.com/FRF-Remote-Sensing/LidarCollect/archive/master.zip) of master

## Compiling

##### Linux

Enter the following commands to compile:

> cd /path/to/LidarCollect

> mkdir build

> cd build

> cmake .. -DCMAKE\_PREFIX\_PATH=/path/to/rivlib/

> make

All executables will be created in the /path/to/LidarCollect/build directory.

##### Windows

Coming soon.

# Scans

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# Scans

Flags used to perform scans. Currently only a single scan per call to LidarCollect is supported. To perform multiple scans, make multiple calls to LidarCollect.

## --frame

Defines the field of view and resolution of a framescan.

##### Usage

--frame [program] [θstart] [θend] [θincrement] [φstart] [φend] [φincrement] [file identifier]

##### Options

* **[program]** - The measurement program. Must be one of:
  + **0** - 1400m (70kHz)
  + **1** - 1200m (100kHz)
  + **2** - 950m (150kHz)
  + **3** - 450m (300kHz)
  + **4** - Reflector
* **[θstart]** - Start vertical scan angle
* **[θend]** - End vertical angle
* **[θincrement]** - Vertical angle increment
* **[φstart]** - Start horizontal angle
* **[φend]** - End horizontal angle
* **[φincrement]** - Horizontal angle increment
* **[file identifier]** - (optional) A string that will be included in the scan's filename

##### Details

Sets the field of view and resolution of a framescan. Theta angles are in the vertical plane in the scanner's coordinate system (changed by spinning the mirror in the scanner), and phi angles are in the horizontal plane in the scanner's coordinate system (change by rotating the scanner head). The optional file identifier will be added to the resulting .rxp filename. The string .frame. is always included in the filename.

##### Examples

Perform a frame scan:

> ./LidarCollect --ip 192.168.0.13 --frame 0 30 130 0.1 0 360 0.1

Perform a finer resolution framescan, and put the string .fine. in the filename

> ./LidarCollect --ip 192.168.0.13 --frame 0 30 130 0.01 0 360 0.01 fine

## --frameseq

Defines the field of view, resolution, and number of scans of a sequenced framescan.

##### Usage

--frame [program] [θstart] [θend] [θincrement] [φstart] [φend] [φincrement] [num scans] [file identifier]

##### Options

* **[program]** - The measurement program. Must be one of:
  + **0** - 1400m (70kHz)
  + **1** - 1200m (100kHz)
  + **2** - 950m (150kHz)
  + **3** - 450m (300kHz)
  + **4** - Reflector
* **[θstart]** - Start vertical scan angle
* **[θend]** - End vertical angle
* **[θincrement]** - Vertical angle increment
* **[φstart]** - Start horizontal angle
* **[φend]** - End horizontal angle
* **[φincrement]** - Horizontal angle increment
* **[num scans]** - Number of times to repeat scan
* **[file identifier]** - (optional) A string that will be included in the scan's filename

##### Details

Sets the field of view, resolution, and number of scans of a framescan. Theta angles are in the vertical plane in the scanner's coordinate system (changed by spinning the mirror in the scanner), and phi angles are in the horizontal plane in the scanner's coordinate system (change by rotating the scanner head). The scanner will scan the field of view [num scans] times. If [num scans] is 0, the scanner will scan indefinitely. The optional file identifier will be added to the resulting .rxp filename. The string .frameseq. is always included in the filename.

##### Examples

Perform a framescan, and scan the area 5 times:

> ./LidarCollect --ip 192.168.0.13 --frame 0 30 130 0.1 0 360 0.1 5

Perform a finer framescan, scan the area 3 times, and put the string .fine. in the filename:

> ./LidarCollect --ip 192.168.0.13 --frame 0 30 130 0.01 0 360 0.01 3 fine

## --line

Defines the field of view and resolution of a linescan.

##### Usage

--frame [program] [θstart] [θend] [θincrement] [φ] [duration] [file identifier]

##### Options

* **[program]** - The measurement program. Must be one of:
  + **0** - 1400m (70kHz)
  + **1** - 1200m (100kHz)
  + **2** - 950m (150kHz)
  + **3** - 450m (300kHz)
  + **4** - Reflector
* **[θstart]** - Start vertical scan angle
* **[θend]** - End vertical angle
* **[θincrement]** - Vertical angle increment
* **[φ]** - Horizontal angle
* **[duration]** - Duration of the scan in seconds
* **[file identifier]** - (optional) A string that will be included in the scan's filename

##### Details

Sets the field of view and resolution of a linescan. Theta angles are in the vertical plane in the scanner's coordinate system (changed by spinning the mirror in the scanner), and the phi angle is in the horizontal plane in the scanner's coordinate system (change by rotating the scanner head). The scanner head will point towards the defined phi angle and scan for [duration] seconds. If [duration] is 0, the scanner will scan indefinitely. The optional file identifier will be added to the resulting .rxp filename. The string .line. is always included in the filename.

##### Examples

Perform a 30 second line scan:

> ./LidarCollect --ip 1.1.1.1 --line 0 30 130 0.2 180 30

Perform a 60 minute line scan and put the string .long. in the filename:

> ./LidarCollect --ip 1.1.1.1 --line 0 30 130 0.2 180 3600 long

Settings

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**Settings**

**Printing Values**

**Setting Values**

**Options List**

The following scanner properties can be used with LidarCollect

**Settable and Gettable Values**

* **--exposure\_mode** [mode] - Camera exposure mode
  + 1 - Manual
  + 2 - Automatic
* **--exposure\_time** [time seconds] - Camera exposure time
* **--gps** [mode] - GPS mode
  + 0 - None
  + 1 - Internal GPS
  + 2 - External GPS (RS232)
  + 3 - External Pulse
  + 4 - External GPS (UDP)
  + 6 - External GPS (On Top)
* **--humidity** [percent humidity] - Atmospheric humidity
* **--lens\_aperture** [aperture] - Camera aperture
* **--near\_range\_enabled** [true/false] - Enable near range measurements
* **--pressure** [pressure mbar] - Atmospheric pressure
* **--reduced\_quality\_enabled** [true/false] - Enable reduced quality measurements
* **--temperature** [temperature celcius] - Atmospheric temperature
* **--white\_balance** [mode] - Camera white balance mode
  + 2 - Automatic
  + 4 - Daylight
  + 5 - Fluorescent
  + 6 - Tungsten
  + 7 - Flash

**Gettable Values**