PCL Colorize: Point Cloud, Velodyne Point and Statistical Operations for Surveys

The PCL Colorize is an application that allows the use of uploading single or multiple point cloud files (.pcd) and velodyne point (.pcap) properly transformed. Below in Figure 1 the general interface at launch. Important characteristics of the software are the axis color shown as XYZ that shows according to the color the intensity of the point. In particular for surveys the Z axis is the most important.

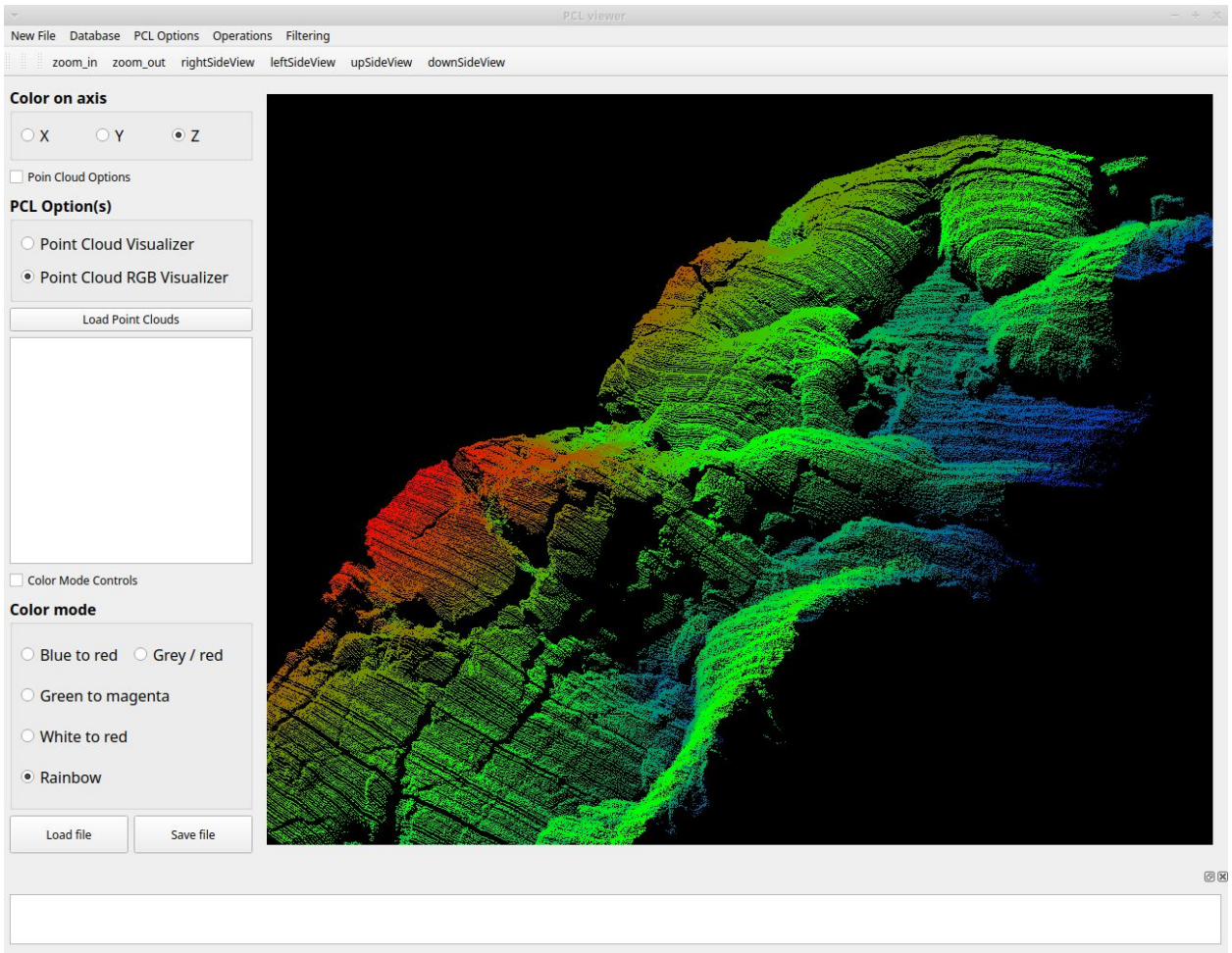

Figure 1: PCL Colorize

A color mode is also available and is particularly suitable for any type of survey. A rainbow choice will show the highest point as red intensity and the deepest point as a blue intensity.

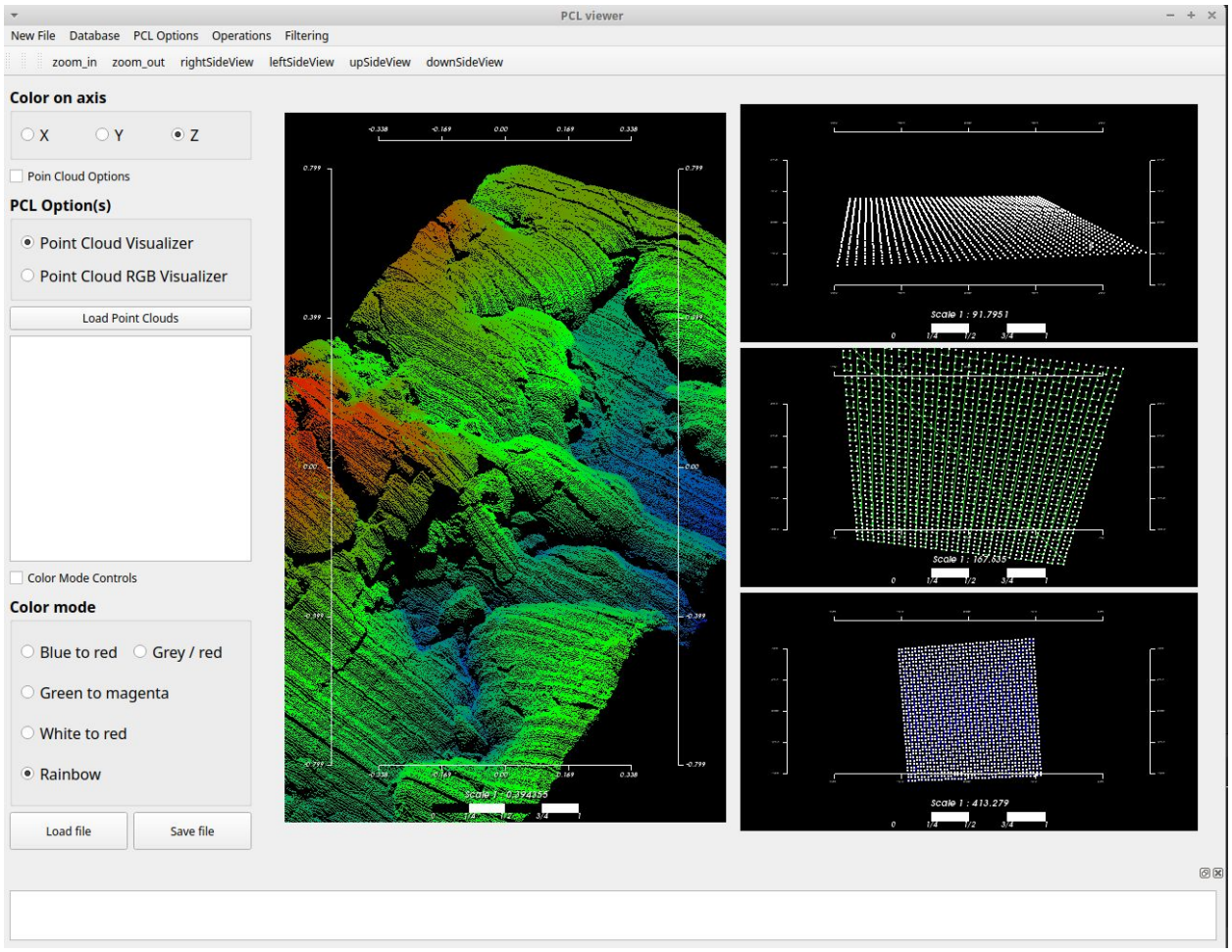

Figure 2: PCL Colorize Visualizer with 4 views

If choosing the Point Cloud Visualizer, the view will be as shown above and the main view will be inherited from a QVTKWidget and displayed in a bigger view as shown in Figure 2. In addition 3 different views will be available representing the XYZ view grid. A measurement tool is shown in Figure 2 for each of the views. While zooming in/out the measurement will adjust accordingly. The grid represented in XYZ is a point cloud grid (or a Velodyne grid). Point cloud registration operations are available.
Figure 3 below shows the intensity level of the survey together with a proper color bar on the bottom of the view. The higher the density of the cloud, the more red is the cloud, the lower the density is, the more blue the cluster becomes.
There is availability of showing the origin of the axis as well as changing background for better visualization purposes. Frame Per Second (FPS) tool is also available in case is needed to record a precise frame at a specific time.

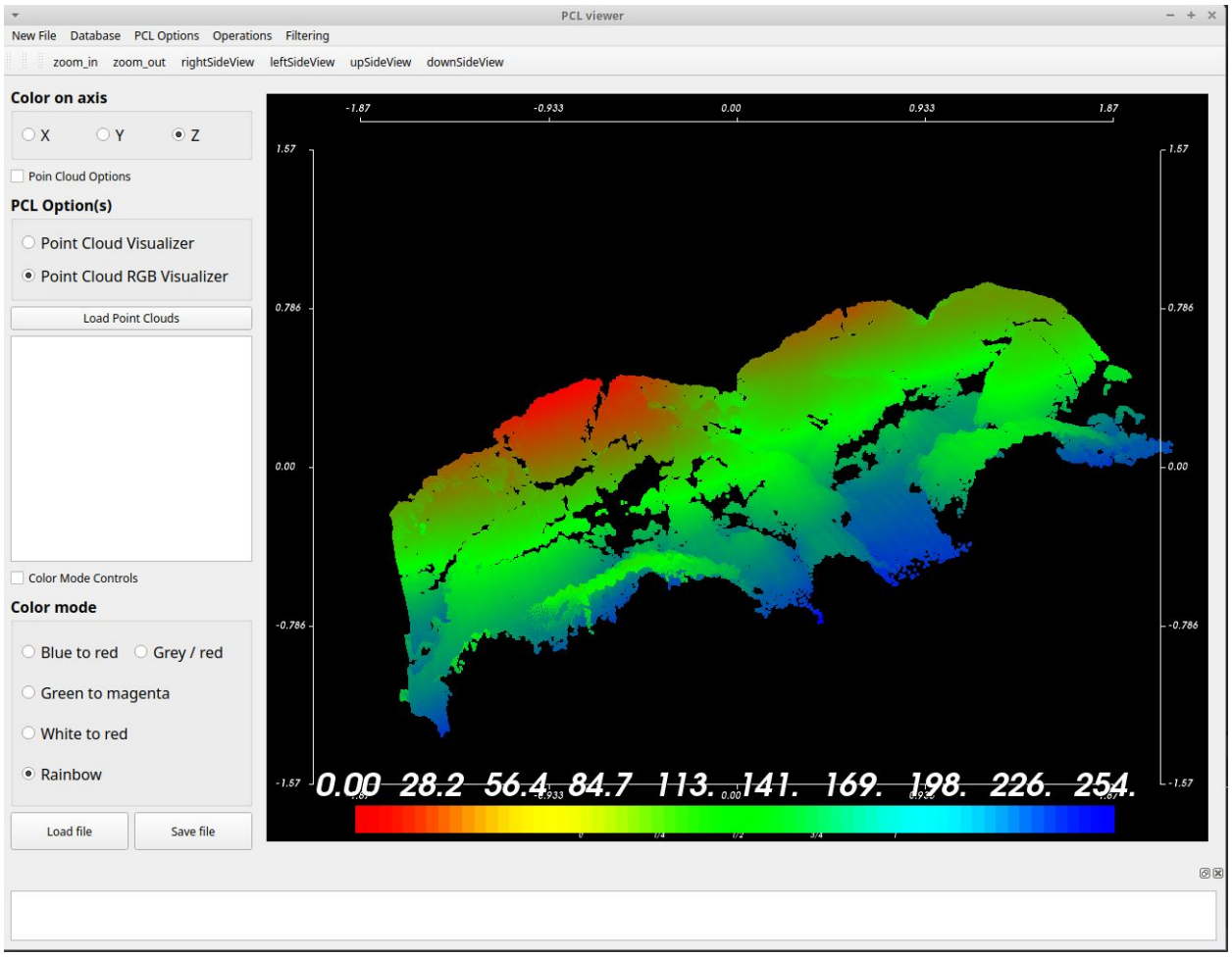

Figure 3: PCL Colorize colorbar and point cloud density

Shown in Figure 4 below is the combination of colorbar, 4 views, measurement tool. It is possible to increase and decrease the size of the point cloud to make it more visible or less depending on the current situation. Print screen of the viewer is also available.
It is possible to see in Figure 5 the origin of the axes colored in RGB, where X is Green, Y is Red and blue is Z.

Current Development of this software are: a) connection with ROS platform for real time data analysis; b) storage of the resulting point for a quick statistical analysis; c) Volume calculation between before and after a survey is conducted; d) implementation of geo-reference system to increase precision of the measurements and e) template creation for additional sensors such as IMU, GPS, DVL and USBL positioning systems.

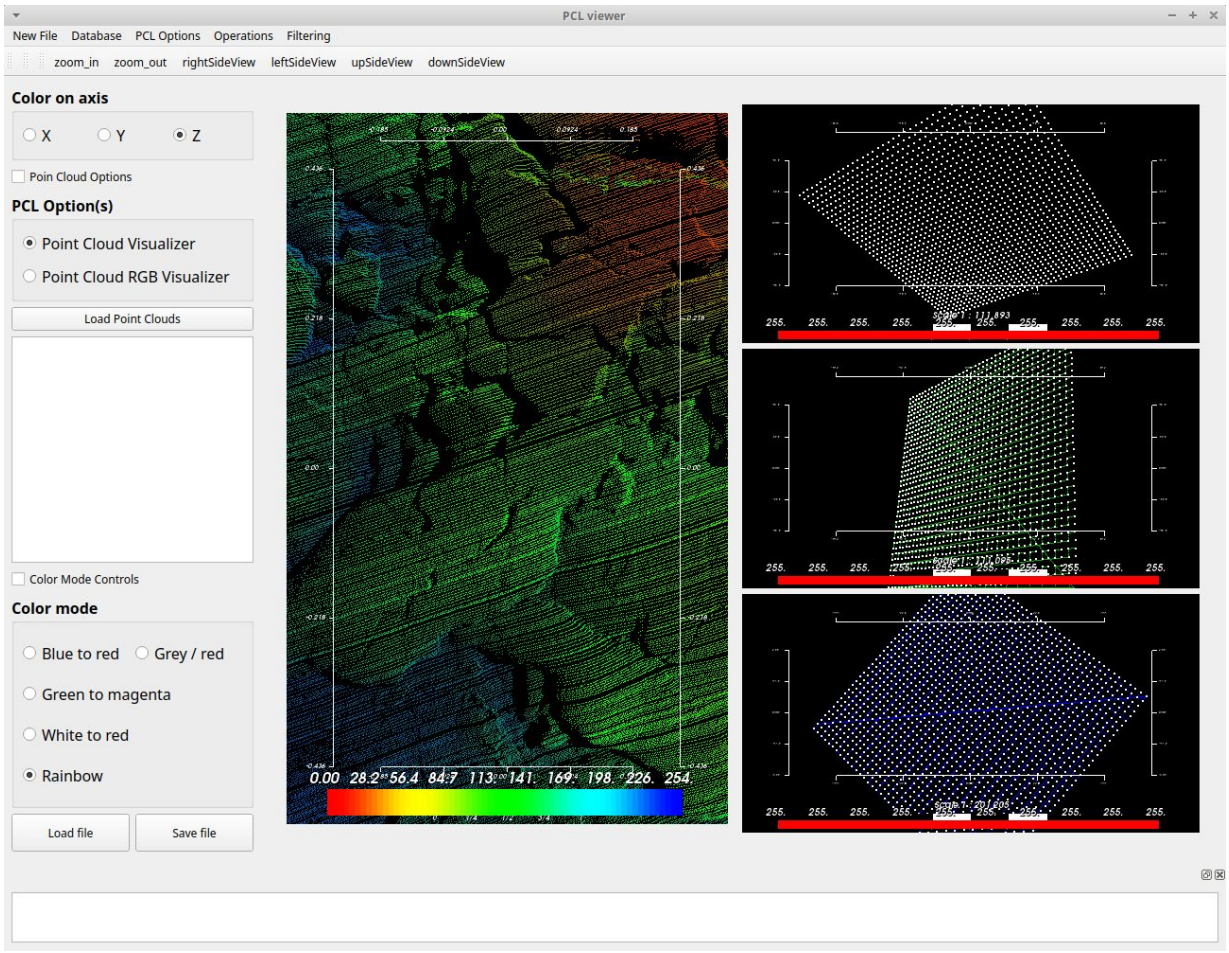

Figure 4: PCL Colorize with measurement, colorbar, 4 views

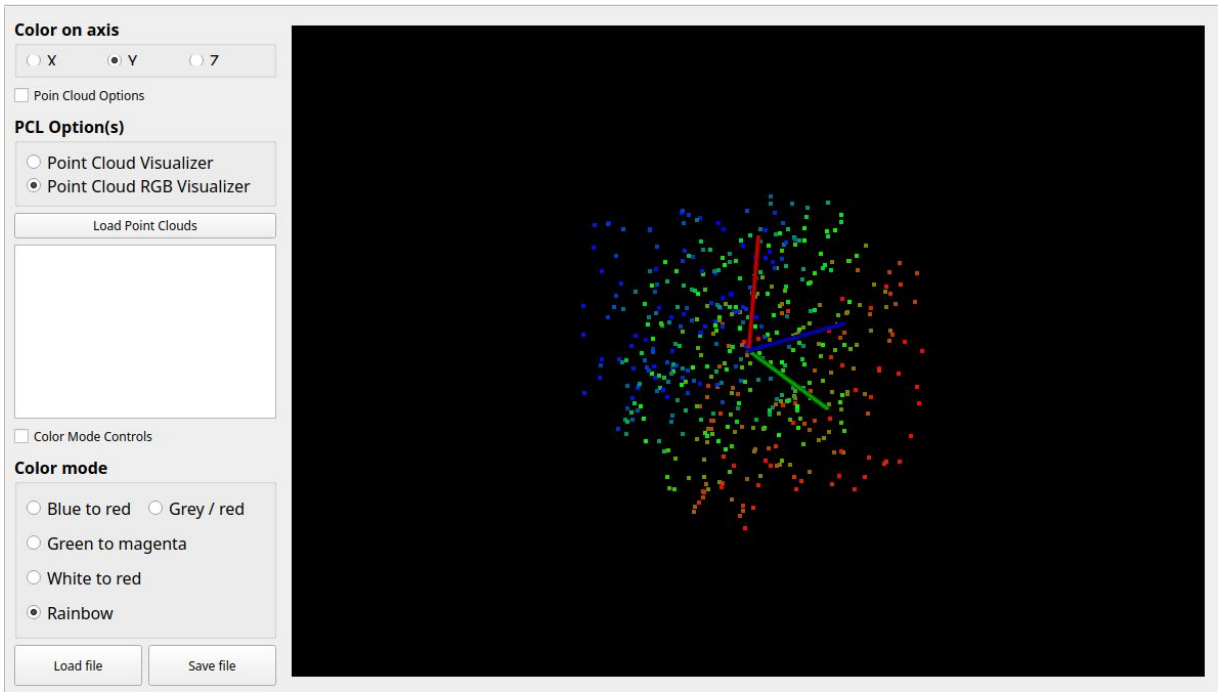

Figure 5: Show Origin in RGB