

Getting Started Part II (Lidar Sensor Sanity Checks)

Approximate Time Investment: 1 hour

Now that we are acquainted with the physical operation of the car and have our workspace set up, we will begin with checking that our Ouster OS2 and three VeloDyne VLP lidars are working correctly. At this point, it is recommended to review the wiring diagram of the vehicle and check that everything is connected.

- [Wiring and Power Diagrams](#)

Ouster OS2 Lidar with Ouster Studio



Figure 1: Ouster OS2 main lidar circled in red

Ouster is one of the few hardware vendors that provide an easy to use and executable Linux program for visualization, so we will start with Ouster Studio first.

1. Download the executable Ouster Studio Appimage for Linux from Ouster's official website and save it to your workspace.
 - a. <https://ouster.com/products/software/ouster-studio>
2. Right click the downloaded Appimage, go to Properties -> Permissions and check the "Allow executing file as program" box. The Appimage will not be executable without this step.

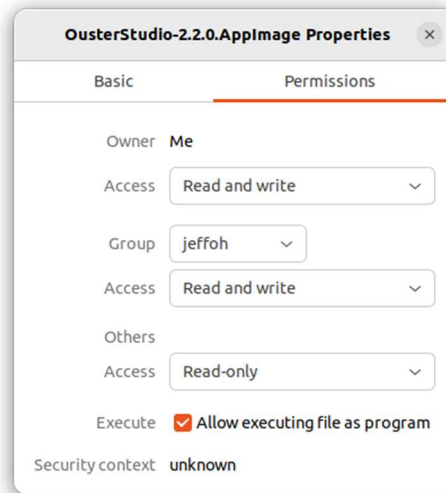


Figure 2: Setting executable as a program permissions

3. Double click the Appimage to run Ouster Studio. The GUI in the following figure will show up. If the Ouster OS2 is connected to the PC correctly, Ouster Studio should detect our OS2 lidar. **If Ouster Studio does not detect our OS2, check the wiring and diagnose.**

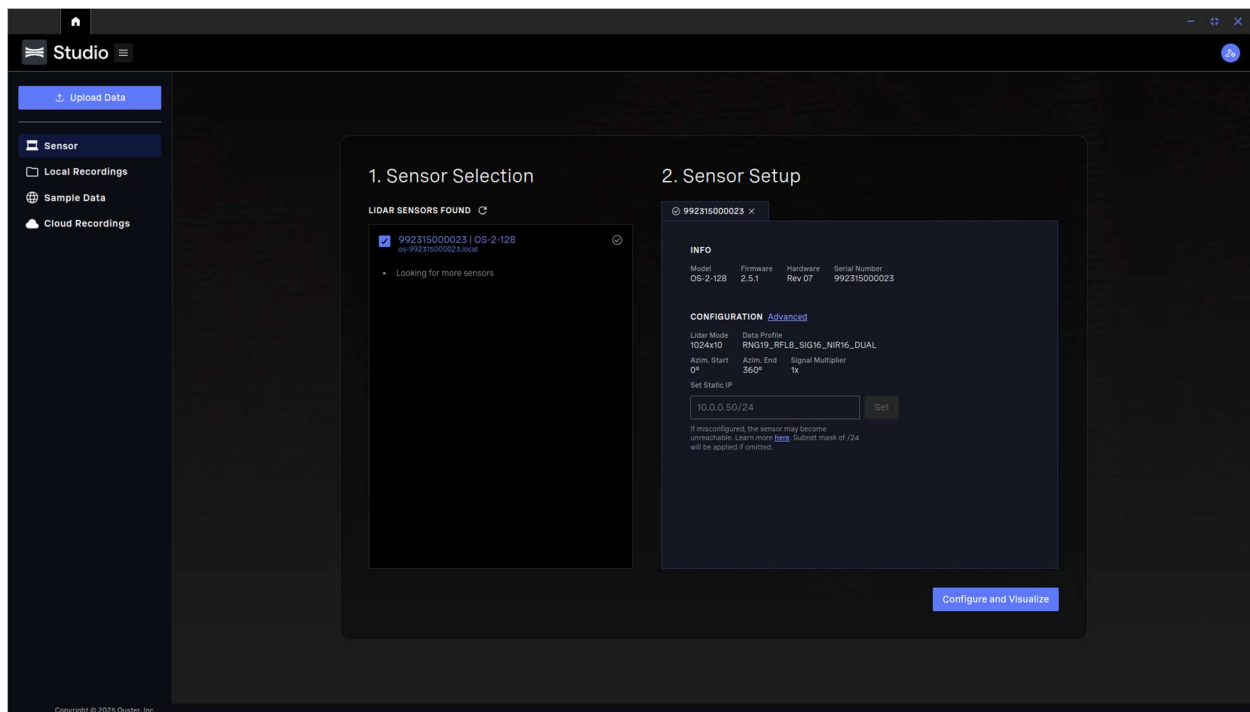


Figure 3: Ouster Studio launched and populated with our OS2

4. Select our OS2 sensor and continue by clicking “Configure and Visualize”. The visualization screen for the OS2 will show up (see figure 13). Our sanity check is complete. Our OS2 is working correctly.
 - a. You will notice that the serial number for our OS2 is 992315000023. This will be important for working with the OS2 with ROS2 later so it is a good idea to write this down and store it somewhere.

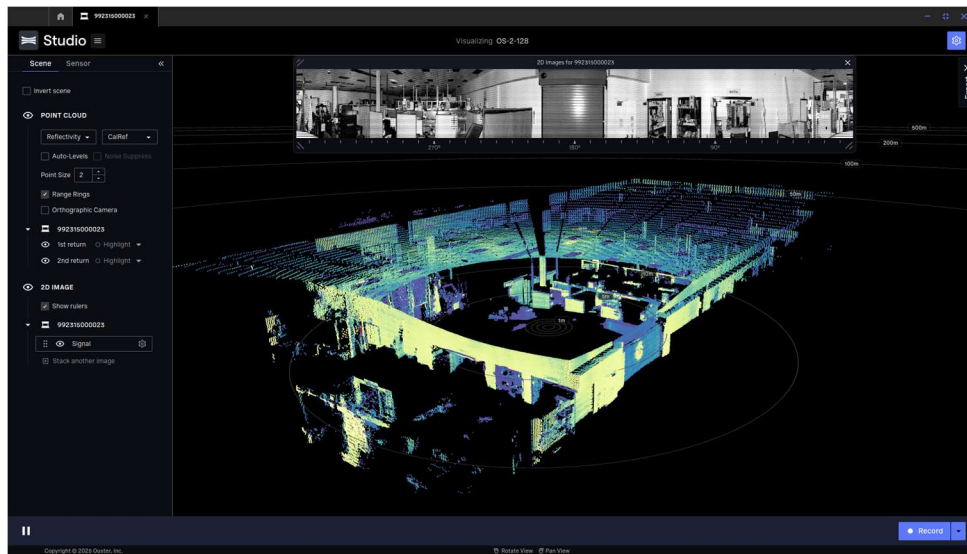


Figure 4: Ouster OS2 visualization

5. Explore within Ouster Studio.
 - a. Within Ouster Studio, you can change the point cloud data (Range, Signal, Reflectivity, Near IR), stack 2D images, adjust point size and so on. It is recommended to explore these options Ouster Studio to get a better understanding of the capabilities of the OS2.

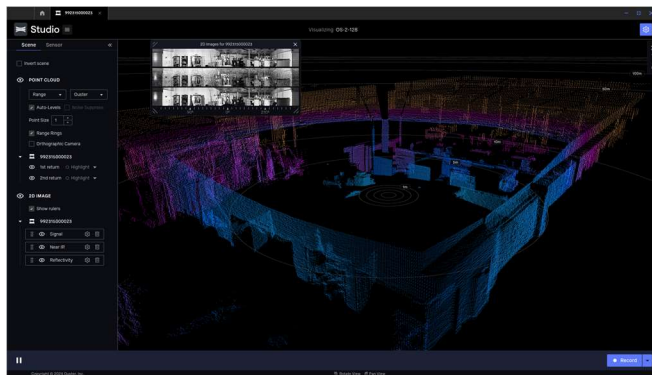


Figure 5: Visualization of range with point size 1

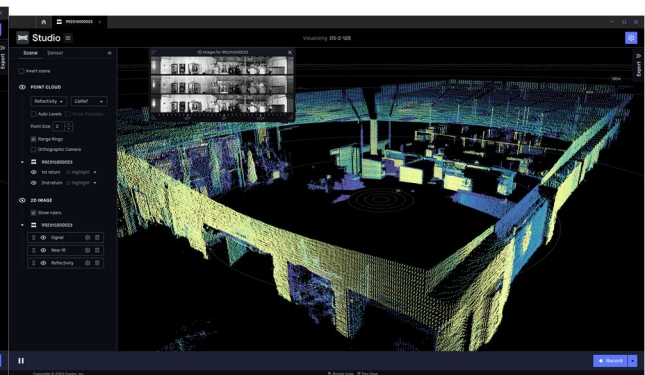


Figure 6: Visualization of reflectivity with point size 2

VeloDyne VLP-16 and VLP-32C Lidars

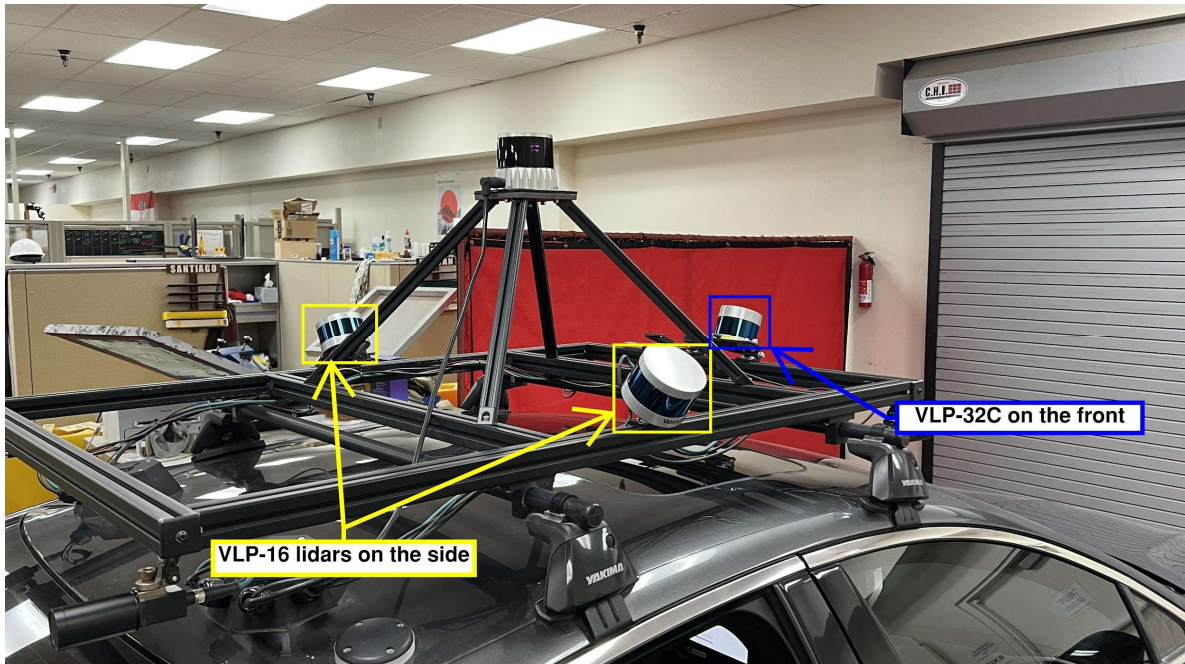


Figure 7: Callouts to VLP lidars equipped on car

The two VLP-16 and one VLP-32C lidars serve to compensate for the blindspots of the Ouster OS2 due to its inherent 22.5° vertical field of view. VeloDyne also provides an executable program with a user interface that we can use to check that our VLPs are working.

1. Download the official VeloView executable program from ParaView.
 - a. <https://www.paraview.org/veloview/>
 - b. As of 9/12/2025, the latest version is 5.1 for VeloView.
2. The downloaded file is in the form of tar.gz which is a compressed archive file similar to .zip files you would see on a Windows PC. Open the tar.gz file and extract the contents to your workspace. I have kept it in the standard Downloads folder for this exercise.

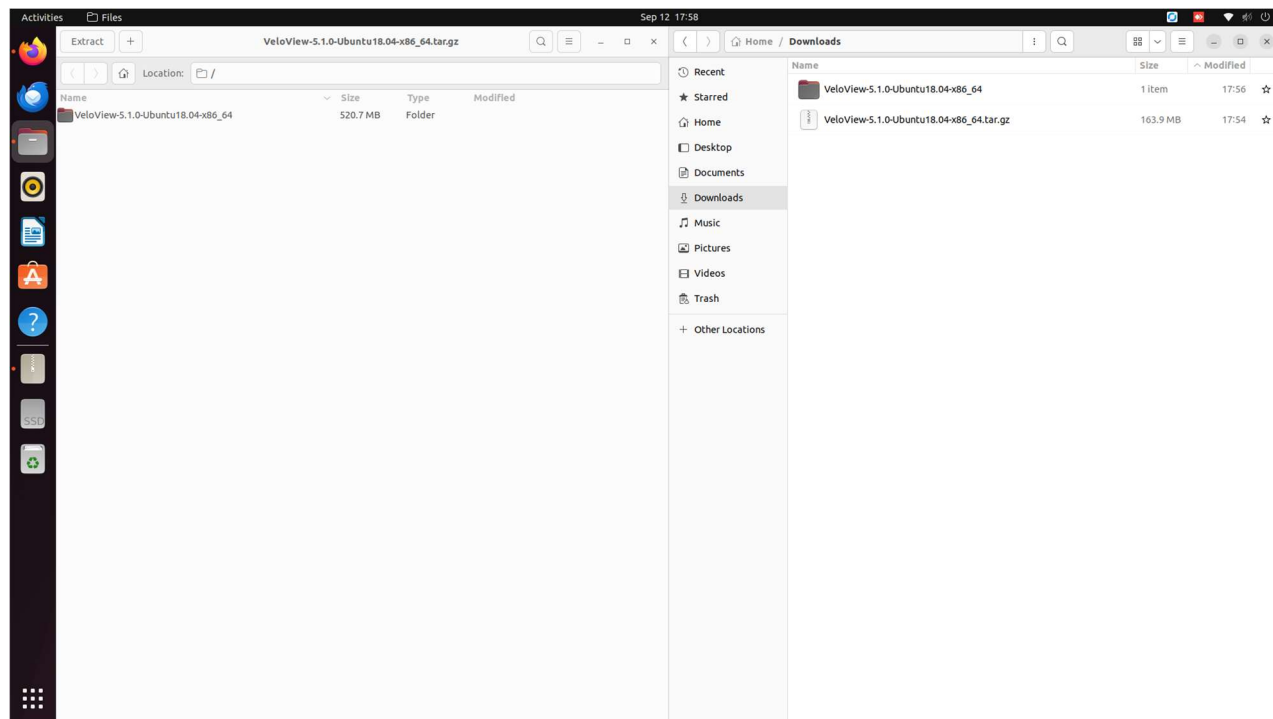


Figure 8: Veloview tar.gz file on left, extracted content on the right

3. Within the extracted VeloView5.1.0 folder, navigate to bin and you will see the VeloView executable file. Apply the same executable permissions as we did before for Ouster Studio.

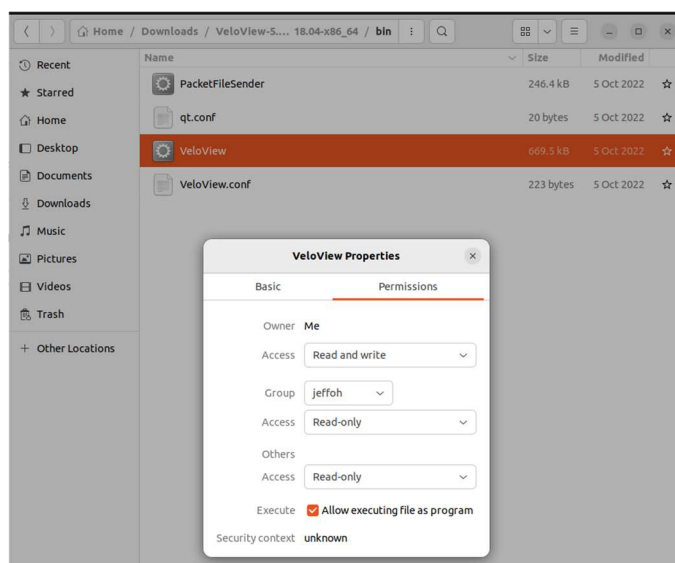


Figure 9: Setting executable as program permission again for VeloView

4. Unplug all but one VLP lidar. (Important)

- a. This VeloView program can be ran just like Ouster Studio but there is a **caveat**. VeloView has bandwidth and/or intersecting lidar point collision issues when all the VLPs are connected and running. For proper visualization of the VLPs, we will check them one by one, hence only one VLP should be connected. Refer to the wiring diagram.

[Wiring Diagram](#)

5. With one VLP plugged in, open VeloView and select the sensor. For this exercise I am checking the VLP-32C at the front of the vehicle.

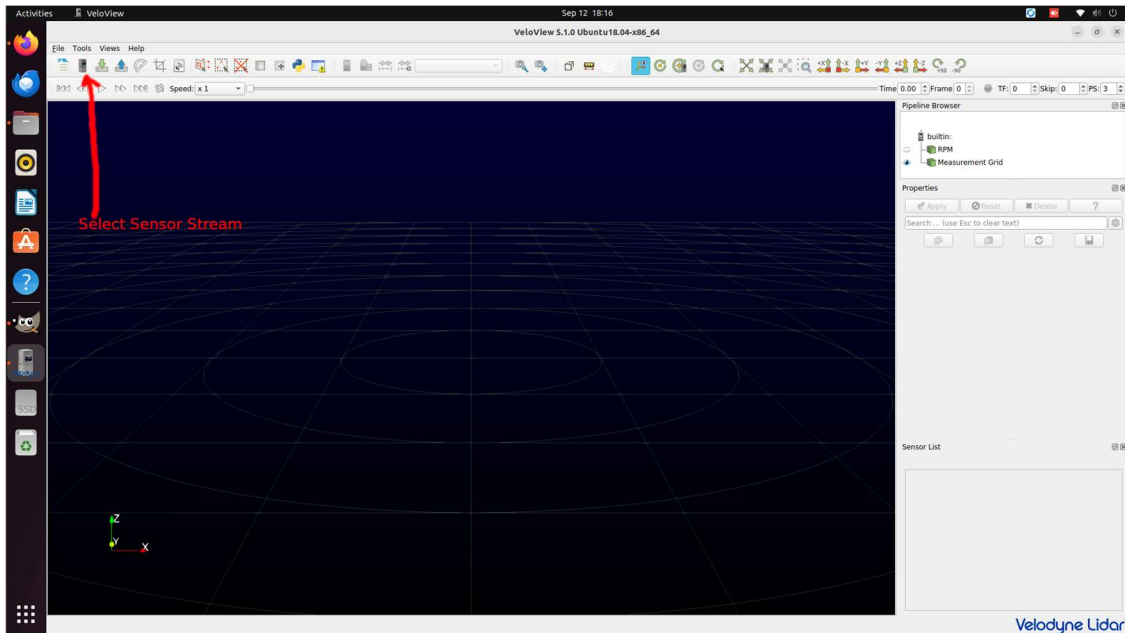


Figure 10: VeloView launch screen. Callout to “Select Sensor Stream” button

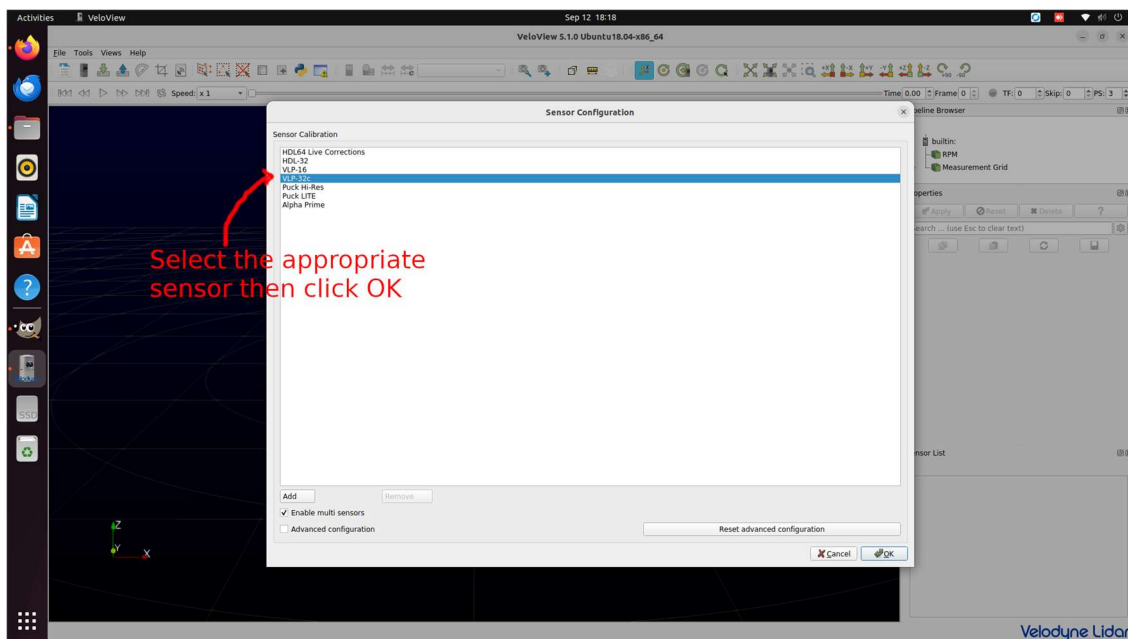


Figure 11: Sensor select screen popup after clicking “Select Sensor Stream”

6. Visualize the VLP's lidar sensor stream and explore, just like we did with the Ouster OS2 and Ouster Studio.

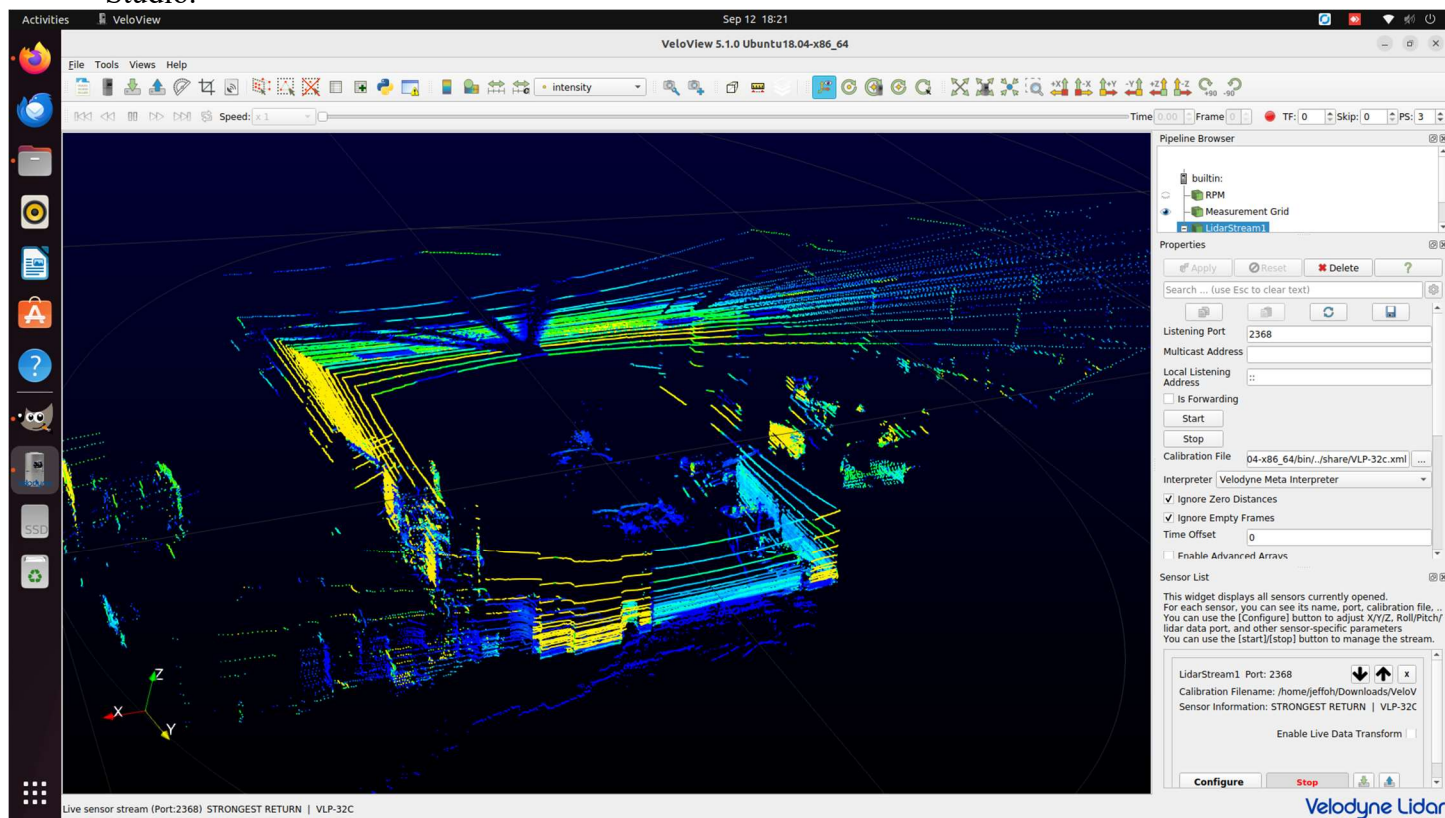


Figure 12: Lidar visualization with VeloView VLP lidar

7. Repeat the steps with the other two VLP lidars.