Week 12 - Creating a Lanelet2 Vector Map Using Tier IV's

Tier IV's Vector Map Builder Tool: https://tools.tier4.jp/feature/vector_map_builder_ll2/

Creating Vector Map Overview

Creating Vector Map - Lanelet2

Now that we have a 3D pointcloud map of our driving area in the form of a .pcd file, we need to vectorize it with driving lanes, traffic lights, stop lines, stop signs, etc. We will use Tier IV's online vector map builder. This tool is purely online and does not require any software. In the event this tool is taken down, Autoware's vector map overview provides references to other software available. This tool is not only good for vectorizing maps, but it is great for spot checking the quality of the map.

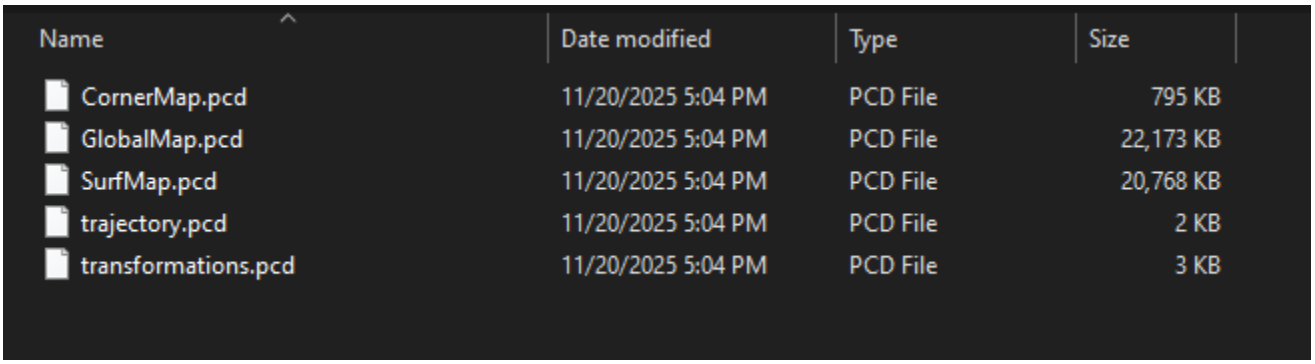

Figure 1: Saved maps from the LIO-SAM service call output

TIER IV's Online Vector Map Builder (linked above) is what we will use to create Lanelet2 maps that work in conjunction with our pointcloud maps for lanes, stop lines, and general environment setup for autonomous driving.

1. Create an account on the website and you will be met with the following page:

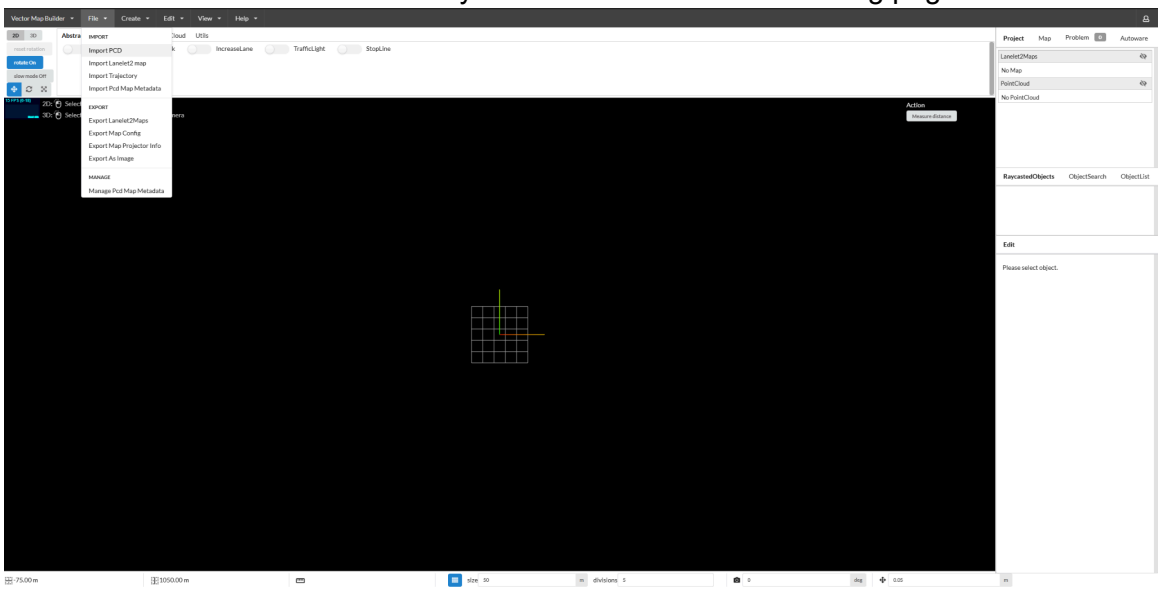

Figure 2: Main screen on Tier IV's Vector Map Builder Site

2. Import a .pcd map that you created earlier in Week 11. For this demonstration, the northLot map will be imported. In figure 2, you will see the File button at the top and the option to import PCD will be there.

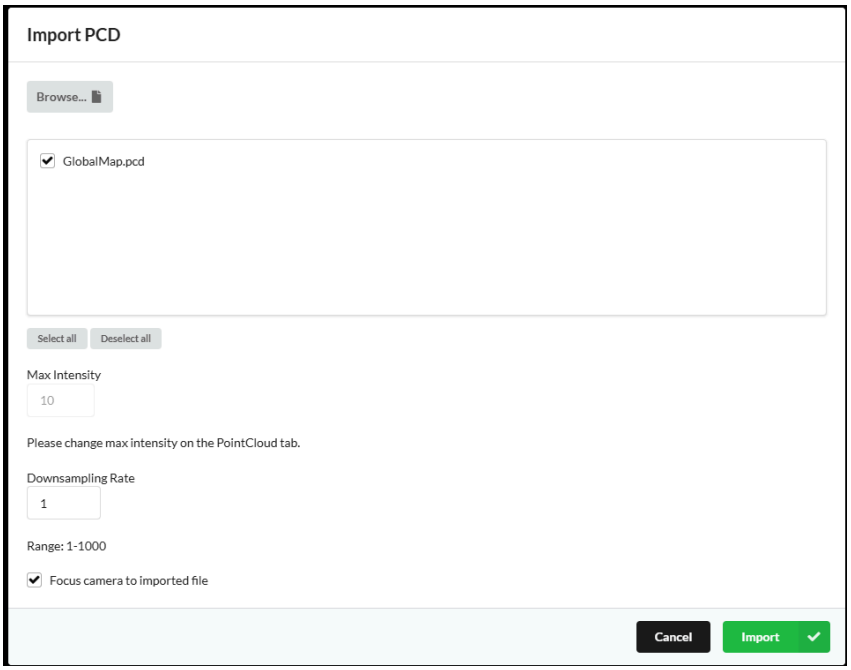

Figure 3: Import PCD screen.

During the import process, there will be an option to downsample the map. We have downsampled the map using LIO-SAM earlier, however if the map file exceeds 300 MB, experiment with the downsampling rate to reduce the size to below 300 MB.

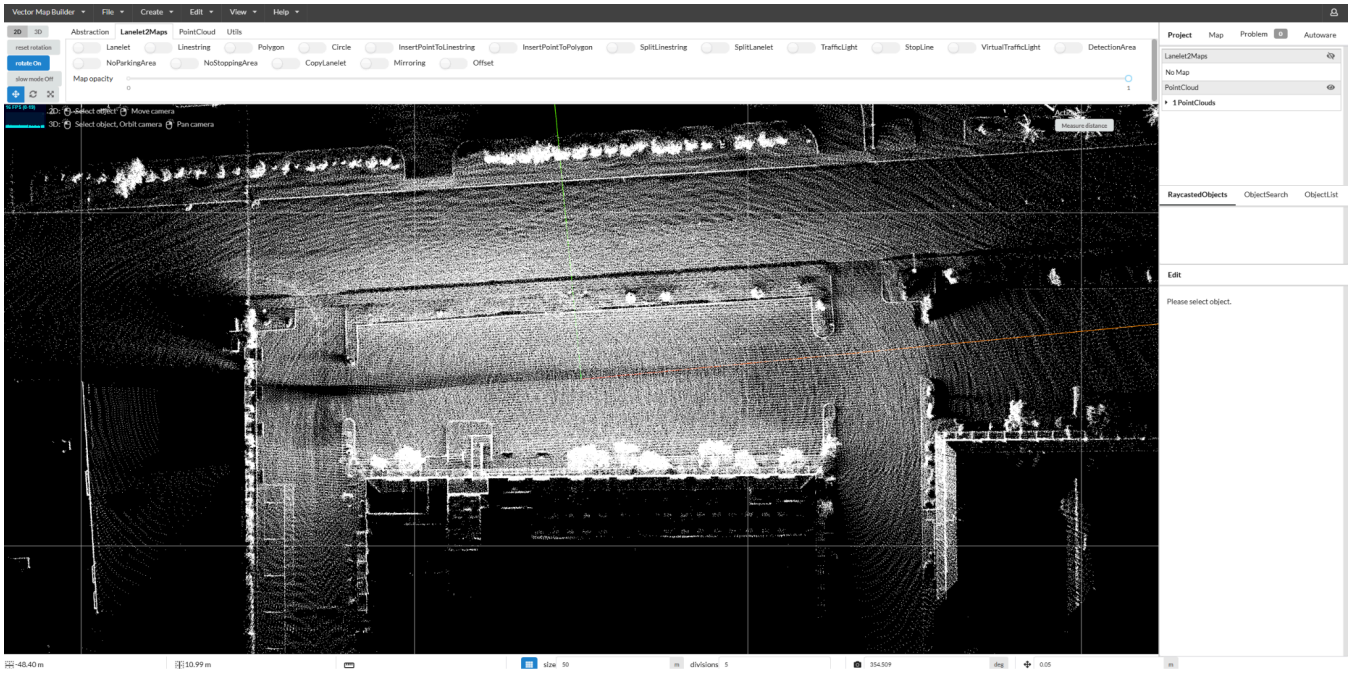

Figure 4: PCD map imported into Vector Map Builder tool

3. Create lanelets, stop lights, traffic signals, and any infrastructure in the area using the tool.

To create our Lanelet2 map, we must hit “Create Lanelet2Map” under the Create tab. See Figure 5

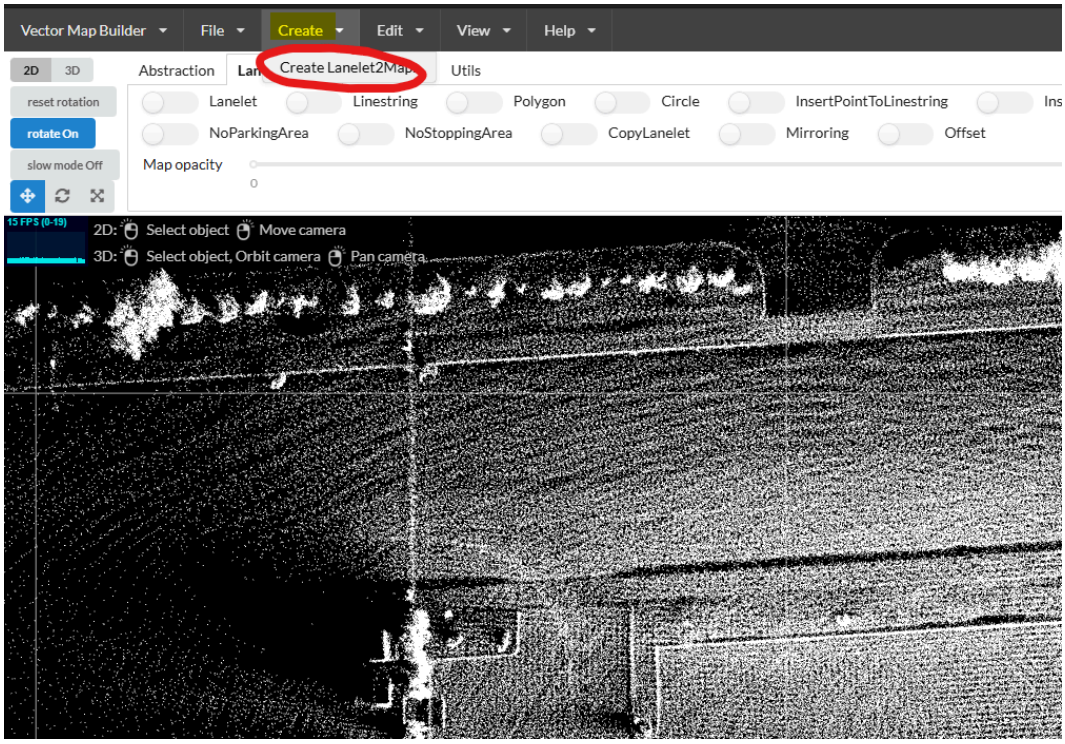

Figure 5: Creating Lanelet2Map button

Using this tool, we can add our lanes, stop lines, stop signs, no parking areas, street lights and so on. Figure 6 shows basic lanes added to the northLot map.

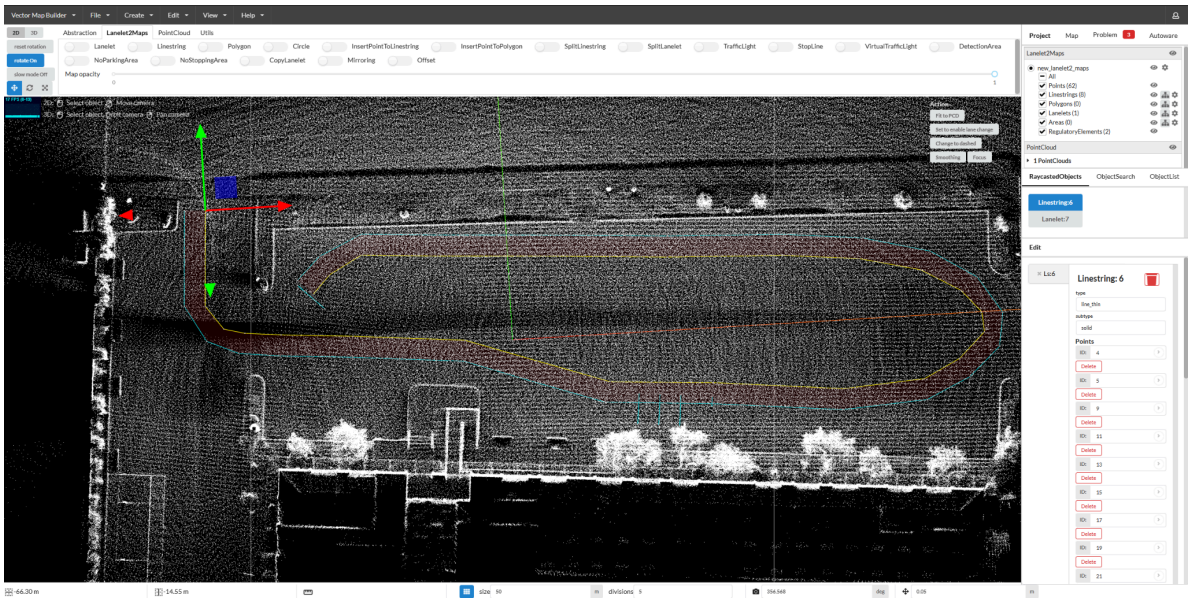

Figure 6: Lanelet2 map created for our northLot PCD map

4. Once we are done vectorizing our PCD map, we will export it as a Lanelet2 map. At the top left under File, we have an option to Export Lanelet2Maps. The tool has a built in debugger and conflict list, so be wary of any issues that the tool may find.

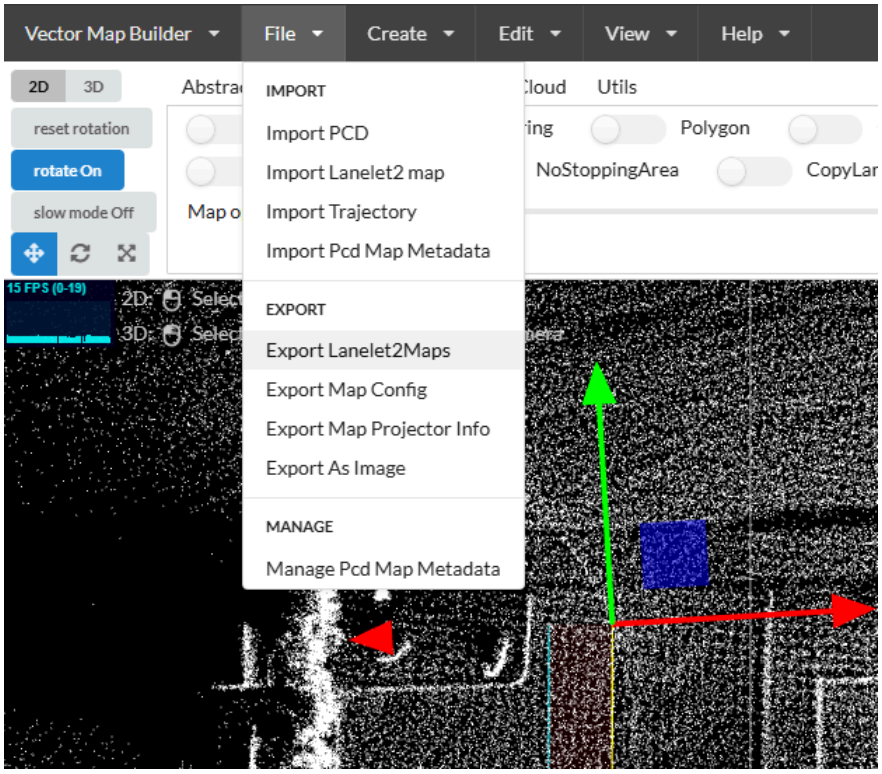

Figure 7: Exporting Lanelet2 Map

The Lanelet2 vector map will be exported as an .osm file. When launching a map in Autoware, it will automatically look for an .osm file with the same file name as the .pcd map, so it is good practice to save the Lanelet2 map as the same name as the PCD map. See figure 8.

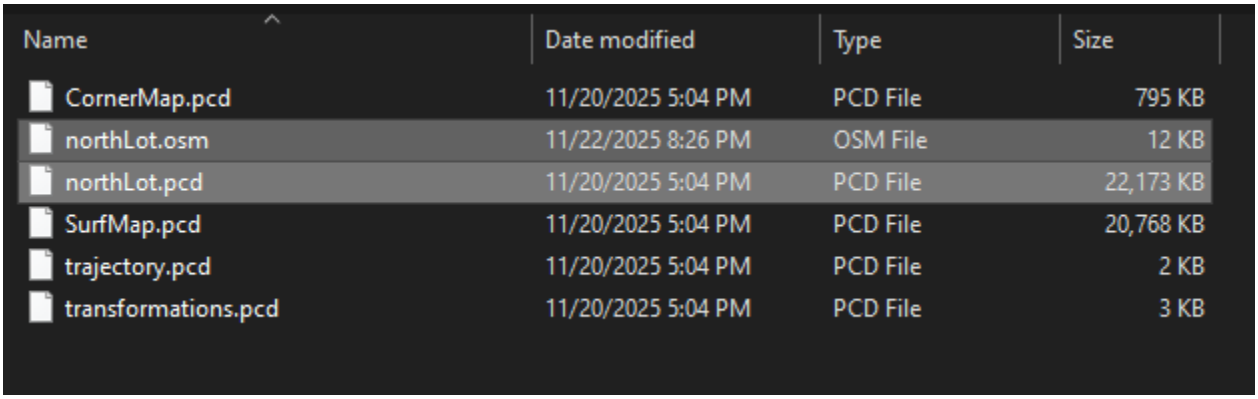

Figure 8: Exported .OSM Lanelet2 map with same name as .PCD map