

Speed bump

Behavior velocity planner's [speed bump module](#) plans velocity to slow down before speed bump for comfortable and safety driving. In order to operate that, we will add speed bumps to our lanelet2 map.

Creating a speed bump element

In order to create a speed bump on your pointcloud map, please follow these steps:

1. Select `Linestring` from Lanelet2Maps section.
2. Click and draw polygon for speed bump.
3. Then please disable `Linestring` from Lanelet2Maps section.
4. Click `Change to Polygon` from the `Action` panel.
5. Please select this Polygon and enter `speed_bump` as the type.
6. Then, please click lanelet which speed bump to be added.
7. Select `Create General Regulatory Element`.
8. Go to this element, and please enter `speed_bump` as subtype.
9. Click `Add refers` and type your created speed bump polygon ID.

You can see these steps in the speed bump creating demonstration video:

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Testing created the speed bump element with planning simulator

After the completing of creating the map, we need to save it. To that please click `File --> Export Lanelet2Maps` then download.

After the download is finished, we need to put lanelet2 map and pointcloud map on the same location. The directory structure should be like this:

```
+ <YOUR-MAP-DIRECTORY>/  
+ └─ pointcloud_map.pcd  
+   └─ lanelet2_map.osm
```

If your .osm or .pcd map file's name is different from these names, you need to update autoware.launch.xml:

```
<!-- Map -->  
- <arg name="lanelet2_map_file" default="lanelet2_map.osm" description="lanelet2  
map file name"/>  
+ <arg name="lanelet2_map_file" default="<YOUR-LANELET-MAP-NAME>.osm"  
description="lanelet2 map file name"/>  
- <arg name="pointcloud_map_file" default="pointcloud_map.pcd"  
description="pointcloud map file name"/>  
+ <arg name="pointcloud_map_file" default="<YOUR-POINTCLOUD-MAP-NAME>.pcd"  
description="pointcloud map file name"/>
```

Note

The speed bump module not enabled default. To enable that, please uncomment it your [behavior_velocity_planner.param.yaml](#).

Now we are ready to launch the planning simulator:

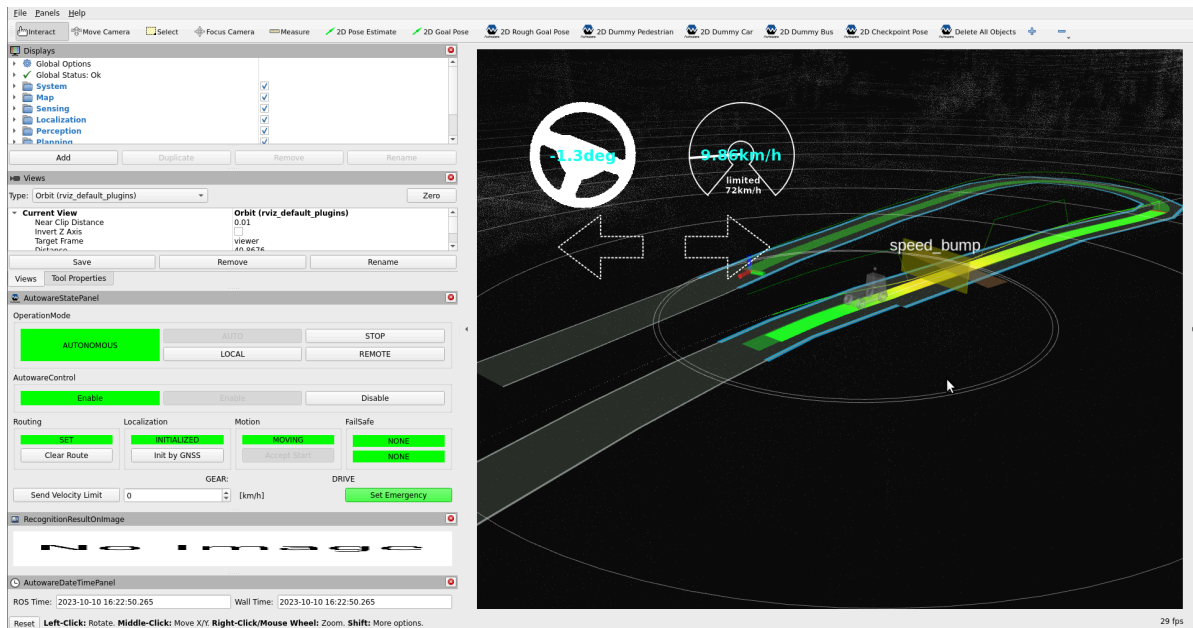
```
ros2 launch autoware_launch planning_simulator.launch.xml map_path:=<YOUR-MAP-  
FOLDER-DIR> vehicle_model:=<YOUR-VEHICLE-MODEL> sensor_model:=<YOUR-SENSOR-KIT>
```

Example for tutorial_vehicle:

```
ros2 launch autoware_launch planning_simulator.launch.xml  
map_path:=$HOME/Files/autoware_map/tutorial_map/ vehicle_model:=tutorial_vehicle  
sensor_model:=tutorial_vehicle_sensor_kit vehicle_id:=tutorial_vehicle
```

1. Click **2D Pose Estimate** button on rviz or press **P** and give a pose for initialization.
2. Click **2D Goal Pose** button on rviz or press **G** and give a pose for goal point.
3. You can see the speed bump marker on the rviz screen.

Speed bump markers on rviz:



Speed bump test on the created map.

You can check your speed bump elements in the planning simulator as this demonstration video:

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