# Velodyne Real-Time Distance Estimator

The Real Time Distance Estimator (RTDE) is an application that allows a real time distance calculation of a target from the reference frame of the Velodyne system. The RTDE is shown via open source platform ROS (Robotic Operating System) integrated into its visualizer RViz (open source). RTDE is an extremely versatile system that can be applied for real time distance calculation of vessels and cars. RTDE receives point cloud messages sent by the Velodyne in simulation mode. Below in Figure 1 it is possible to see the sensor displayed in ROS (it is shown a Velodyne HDL-32). The integration works both on 16 and 32 channels. RTDE uses the point cloud library as the main library source. After defining a distance message (custom RS message) it was possible to differentiate three different messages based on the distance of the point cloud. Refresh rate is half a second, but it is possible to achieve even better results introducing proper parallel processing libraries.


In this example, given the size of the platform where the Velodyne was mounted, and considering the origin XYZ of the reference frame on the Lidar, it is possible to establish the distance of any cloud cluster of any rectangular shape on a real time basis. The application can be both for automotive and marine applications. In order to give freedom to the final user, it is possible to manually put the size of the platform and by updating the configuration the Lidar will calculate the new settings. The general interface is composed by a launching user interface that will start the ROS core systems (e.g. all the sensors involved and RViz) and the final user graphical interface that has an embedded RViz visualizer and additional LCD controls to make sure the real-time distance is measured and visible.

To be sure that the algorithm processes the correct message, all points are properly rotated (yaw angle) and after that, processed. It is possible to change the position of the Velodyne, and, therefore, save the current configuration.

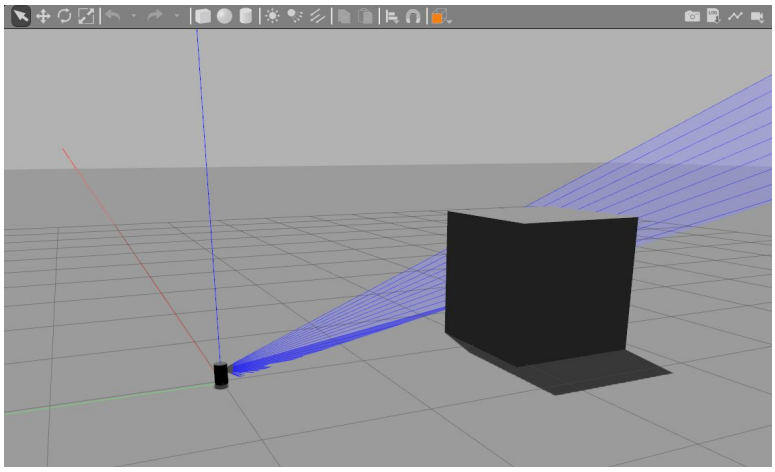

Figure 1: Velodyne HDL-32 integrated in ROS

Saved configurations are on a JSON file to be loaded at a second time if needed. All ROS parameters are properly set in a specific launch file but could be changed real-time on the interface so to see the settings change and the consequent behavior of the whole system.

Below in Figure 2 a sample of the RTDE system that launches both the ROS core (visible on the left side of the sample image) and the final user interface (visible on the right).

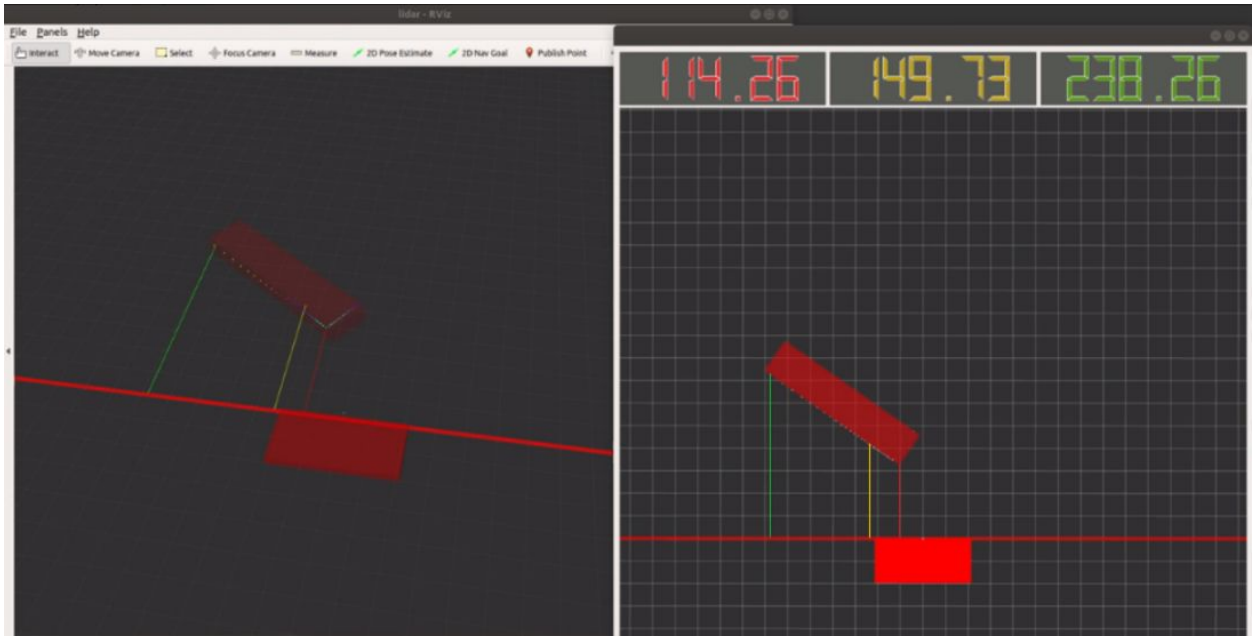


Figure 2: ROS core and user interface sample

It is possible to to zoom in/out and pan all around the visualizer. In case the user loses the view, there is also a reset view button at the end of the interface (not visible in the current sample).