State Estimation Setup Notes

If running on a real robot, launch state estimation module and the system side by side. Use the command below to launch the system.

roslaunch vehicle_simulator system_real_robot.launch

If playing bagfiles, make sure to set '*use_sim_time = true*'. In a terminal,

roscore

In another terminal,

rosparam set use_sim_time true

After launching the state estimation module and the system, play bagfiles with '*--clock*' flag (change '*filename*' in the command line),

rosbag play --clock filename.bag

Adjust '*obstacleHeightThre*' in '*src/local_planner/launch/local_planner.launch*' to account for terrain cloud thickness.

LOAM

Notes: Use '*loam_interface*' package as is to bridge over the state estimation output.
Code: https://github.com/cuitaixiang/LOAM_NOTED
Reference: J. Zhang and S. Singh. LOAM: Lidar Odometry and Mapping in Real-time. Robotics: Science and Systems Conference (RSS). Berkeley, CA, July 2014.

A-LOAM (lidar only without IMU)

Notes: In *'src/loam_interface/launch/loam_interface.launch*', set *'stateEstimationTopic = /aft_mapped_to_init_high_frec*', '*flipStateEstimation = false*', and *'flipRegisteredScan = false*'.
Code: https://github.com/HKUST-Aerial-Robotics/A-LOAM
Reference: N/A

LeGO-LOAM

Notes: In '*src/loam_interface/launch/loam_interface.launch*', set *'registeredScanTopic = /registered_cloud*'.
Code: https://github.com/RobustFieldAutonomyLab/LeGO-LOAM
Reference: T. Shan and B. Englot. LeGO-LOAM: Lightweight and Ground-Optimized Lidar Odometry and Mapping on Variable Terrain. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Madrid, Spain, Oct. 2018.

LIO-SAM

Notes: In *'src/loam_interface/launch/loam_interface.launch*', set *'stateEstimationTopic = /lio_sam/mapping/odometry*', '*registeredScanTopic = /lio_sam/mapping/cloud_registered*', *'flipStateEstimation = false', and 'flipRegisteredScan = false*'.

Code: https://github.com/TixiaoShan/LIO-SAM

Reference: T. Shan, B. Englot, D. Meyers, W. Wang, C. Ratti, and D. Rus. LIO-SAM: Tightly-coupled Lidar Inertial Odometry via Smoothing and Mapping. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS). Las Vegas, Nevada, Oct. 2020.

LIO-mapping

Notes: In '*src/loam_interface/launch/loam_interface.launch*', set *'stateEstimationTopic = /lio_map_builder/aft_mapped_to_init*', *'registeredScanTopic = /lio_map_builder/cloud_registered*', '*flipStateEstimation = false*', and '*flipRegisteredScan = false*'.

Code: https://github.com/hyye/lio-mapping

Reference: H. Ye, Y. Chen, and M. Liu. Tightly Coupled 3D Lidar Inertial Odometry and Mapping. IEEE Intl. Conf. on Robotics and Automation (ICRA). Montreal, Canada, May 2019.

FAST-LIO2

Notes: In *'src/loam_interface/launch/loam_interface.launch'*, set *'stateEstimationTopic = /Odometry'*, *'registeredScanTopic = /cloud_registered', 'flipStateEstimation = false'*, and *'flipRegisteredScan = false'*.

Code: https://github.com/hku-mars/FAST_LIO

Reference: W. Xu, Y. Cai, D. He, J. Lin, and F. Zhang. FAST-LIO2: Fast Direct LiDAR-Inertial Odometry. IEEE Transactions on Robotics. vol. 38, no. 4, pp. 2053–2073, 2022.

Faster-LIO

Notes: In 'src/loam_interface/launch/loam_interface.launch', set *'stateEstimationTopic = /Odometry'*, *'registeredScanTopic = /cloud_registered'*, *'flipStateEstimation = false'*, and *'flipRegisteredScan = false'.*

Code: https://github.com/gaoxiang12/faster-lio

Reference: C. Bai, T. Xiao, Y. Chen, H. Wang, F. Zhang, and X. Gao. Faster-LIO: Lightweight Tightly Coupled Lidar-Inertial Odometry Using Parallel Sparse Incremental Voxels. IEEE Robotics and Automation Letters. vol. 7, no. 2, pp. 4861–4868, 2022.