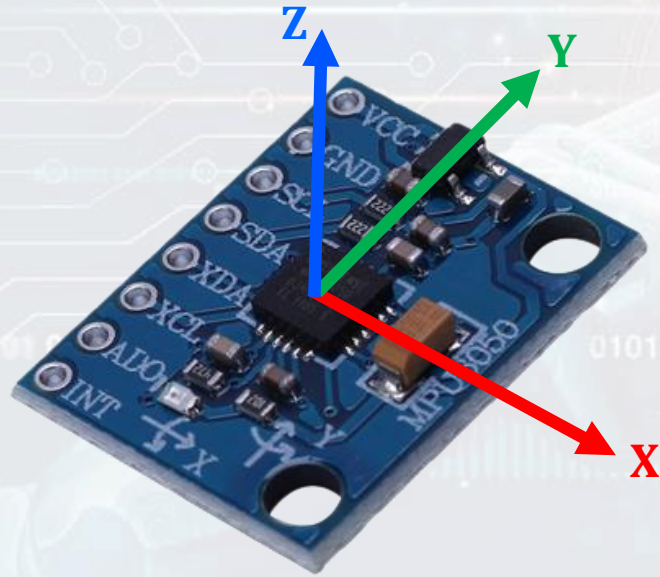


IMU data in **iron-X** By TESR

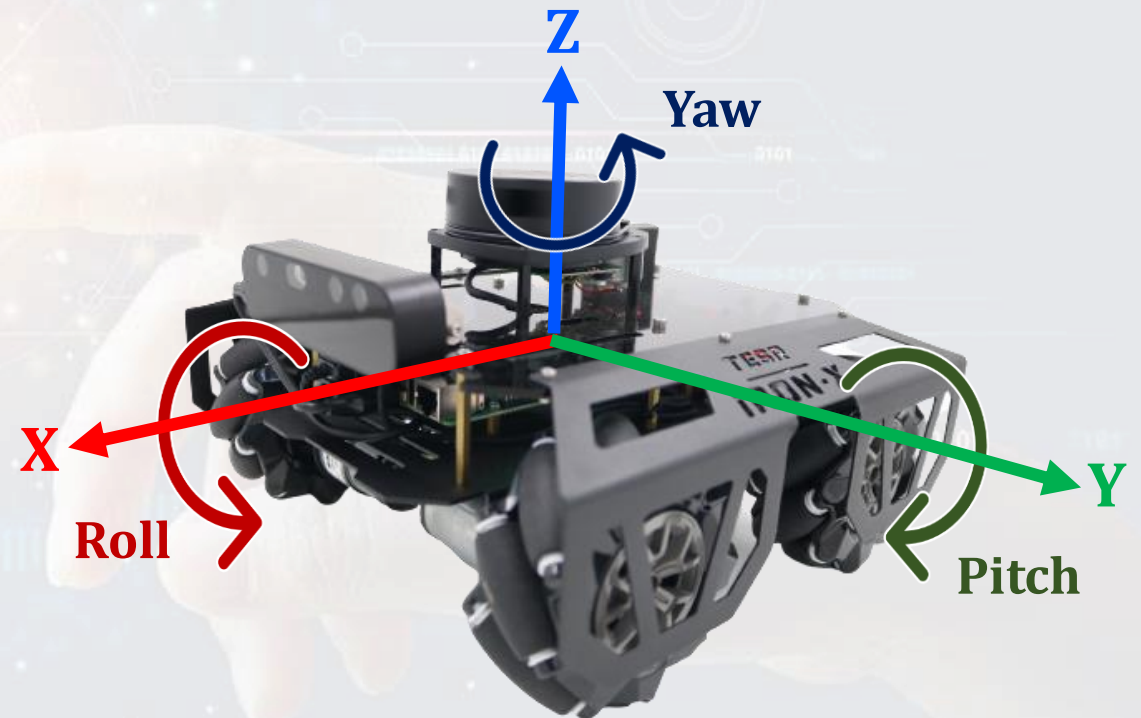
ROS2

IMU: MPU6050

- For localization of the robot, we use data from sensor to provide information to determine the robot's position. So, IMU data is the one of useful data.
- **MPU6050** is provides the data of 3-axis gyroscope and 3-axis accelerometer.

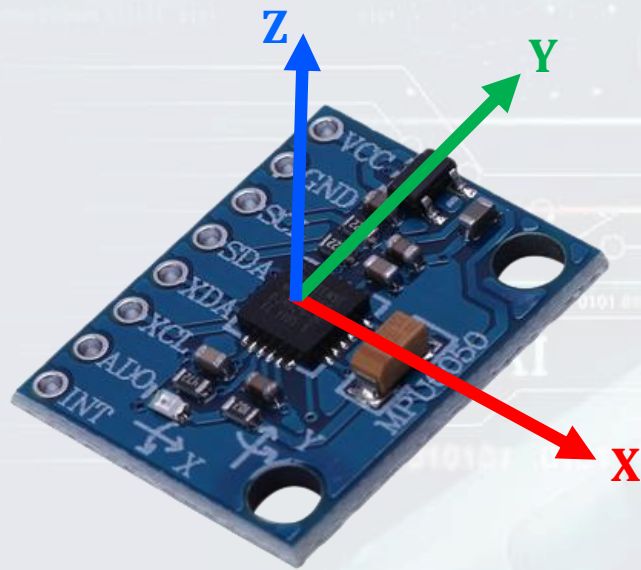


MPU6050



IMU implement in **iron-X**

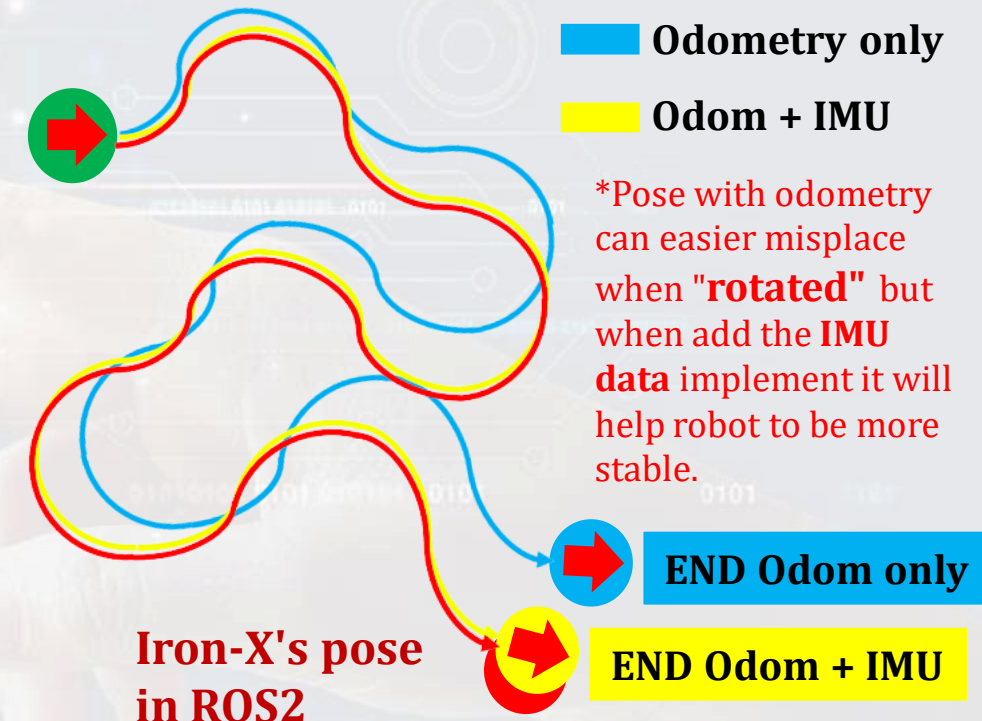
- In iron-X, we use the gyroscope data to implement with odometry from motor's encoder to determine the robot's pose **more accurate and precise.**



MPU6050



Iron-X's trajectory



Odometry only

Odom + IMU

*Pose with odometry can easier misplace when "**rotated**" but when add the **IMU data** implement it will help robot to be more stable.

END Odom only

END Odom + IMU

iron-X real pose

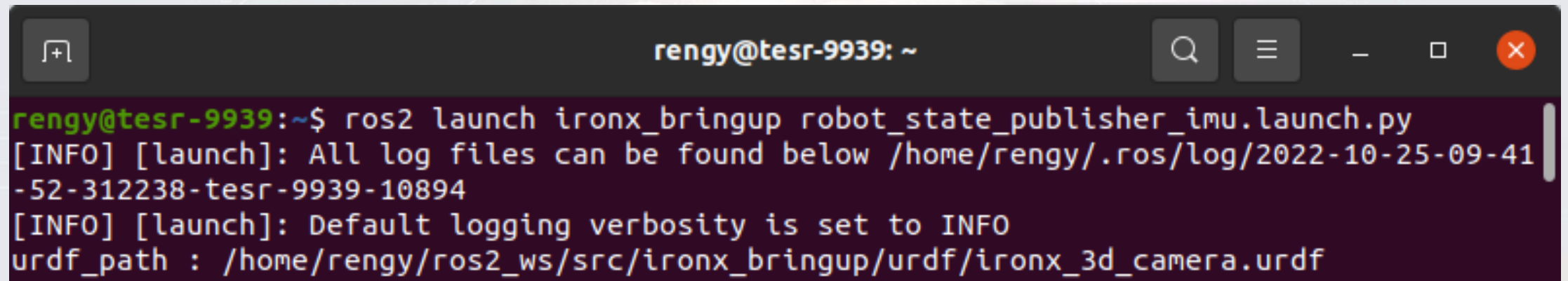
IMU data in ROS2

- For the example, you can launch example launch to show imu to iron-X using:
 - Secure shell to iron-X's terminal

```
ssh pi@<iron-X's IP-address>
```

- And then, launch ironx_imu to see how imu data effect to iron-X's model:

```
ros2 launch ironx_bringup robot_state_publisher_imu.launch.py
```

A terminal window titled 'rengy@tesr-9939: ~' with standard window controls. The terminal shows the execution of 'ros2 launch ironx_bringup robot_state_publisher_imu.launch.py'. The output includes information about log file locations and logging verbosity, followed by the 'urdf_path' parameter.

```
rengy@tesr-9939: ~  
rengy@tesr-9939:~$ ros2 launch ironx_bringup robot_state_publisher_imu.launch.py  
[INFO] [launch]: All log files can be found below /home/rengy/.ros/log/2022-10-25-09-41  
-52-312238-tesr-9939-10894  
[INFO] [launch]: Default logging verbosity is set to INFO  
urdf_path : /home/rengy/ros2_ws/src/ironx_bringup/urdf/ironx_3d_camera.urdf
```

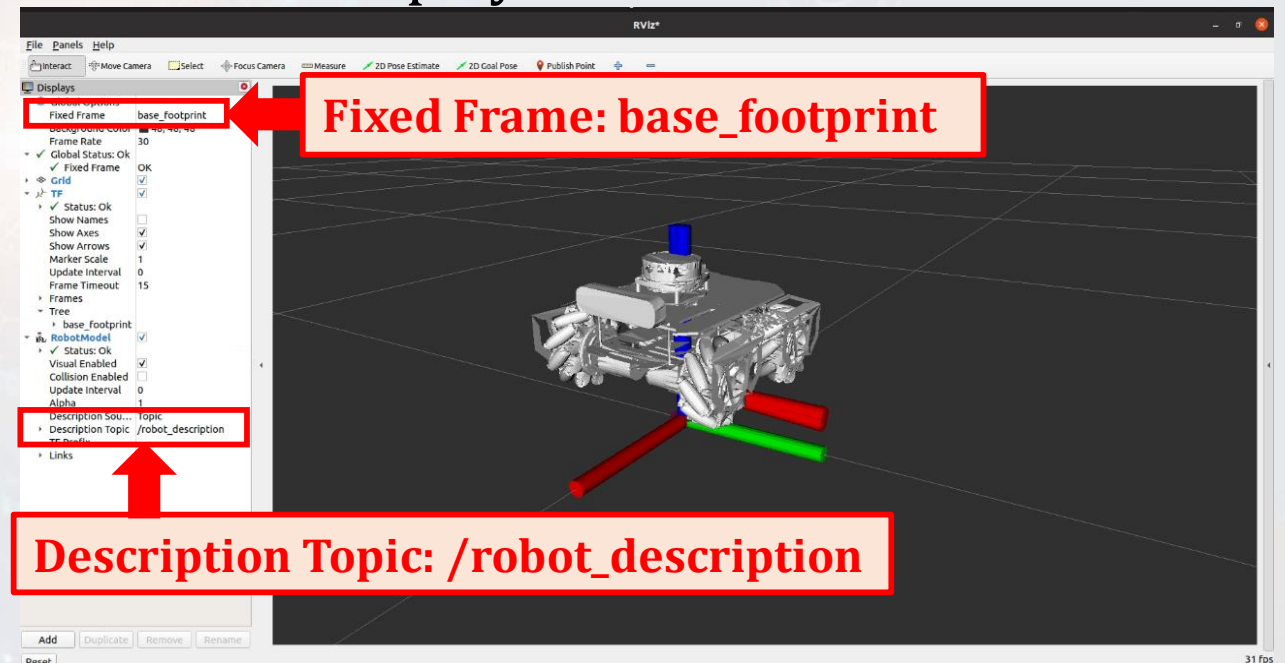
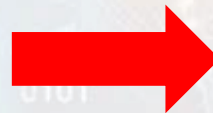
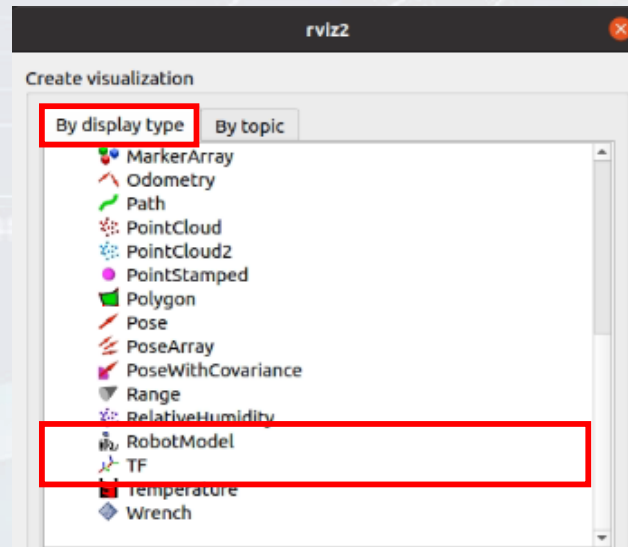

IMU data in ROS2

- Open new terminal on PC/Laptop terminal and run Rviz using:

rviz2

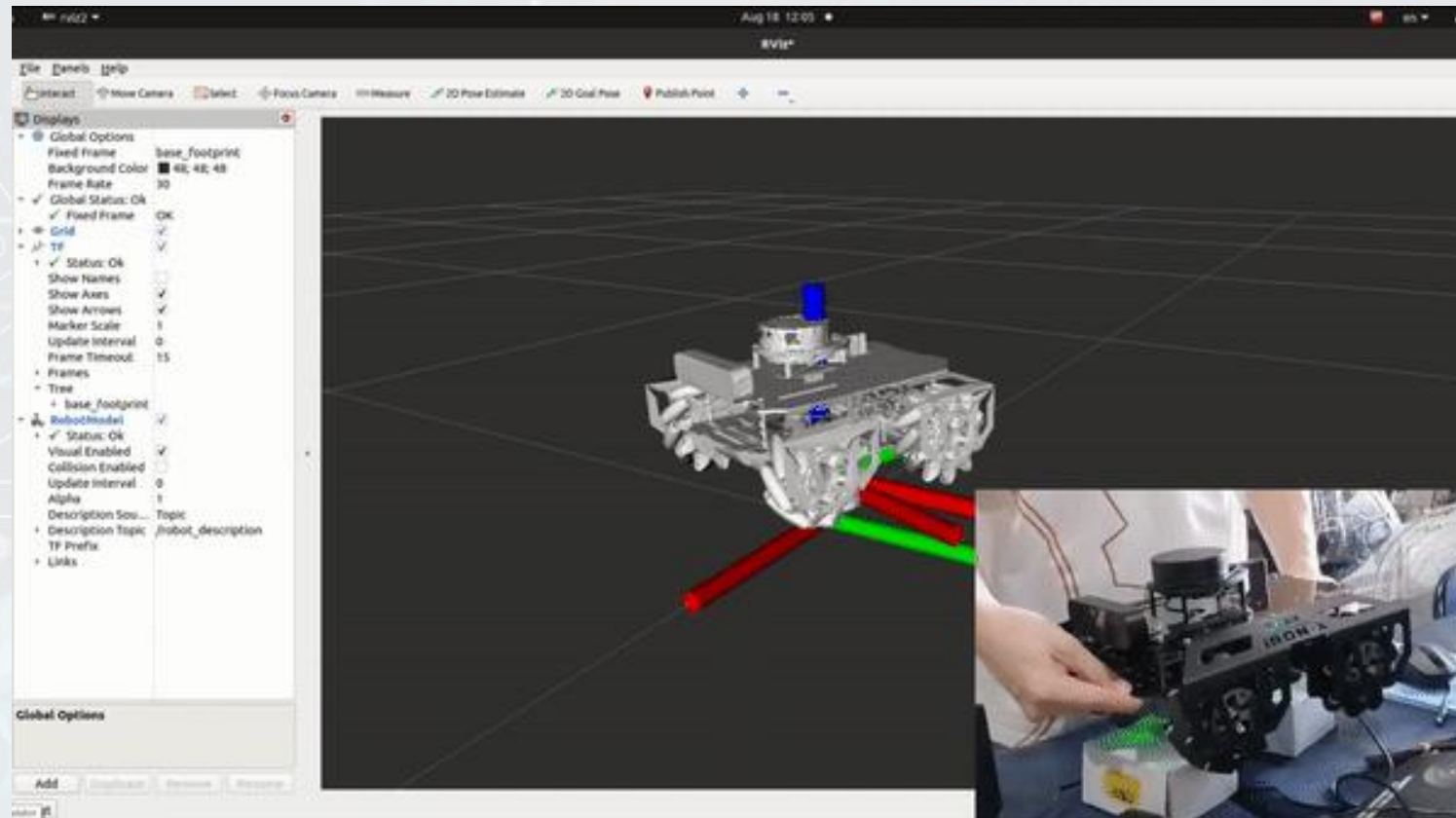
- And then, Add the "**RobotModel**" and "**TF**" to display on Rviz:

- Add > By display type > RobotModel
- Add > By display type > Tf



IMU data in ROS2

- The iron-X model's pose will move as same as the real according to imu data.

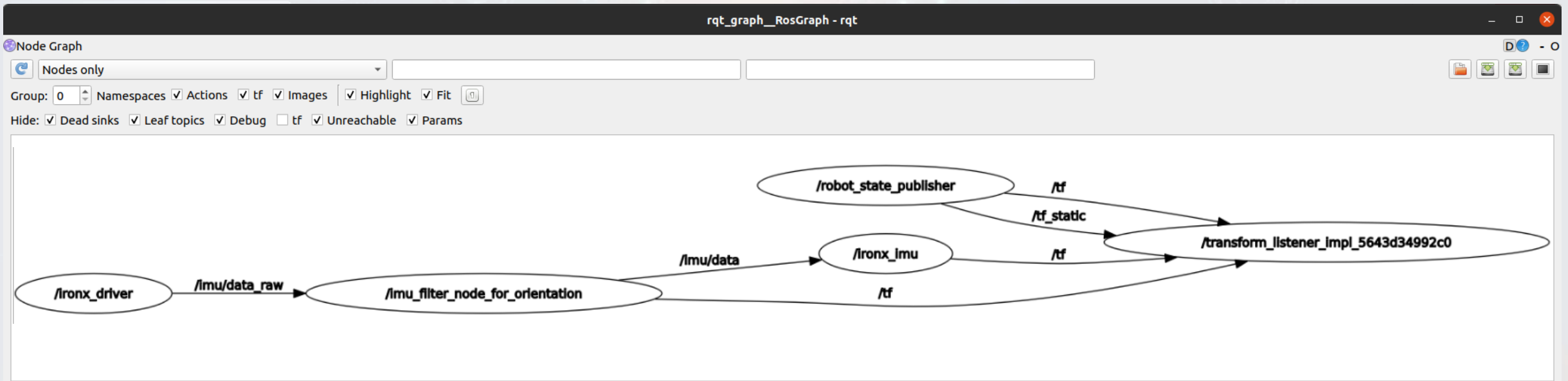


RosGraph of IMU data in ROS2

- You can show the RosGraph of imu data by rqt_graph using:

rqt_graph

- RosGraph show imu/data_raw published from /ironx_driver pass through node to node.



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