

Ubuntuのインストール

1. <https://www.ubuntulinux.jp/News/ubuntu1604-ja-remix>
2. `sudo apt update`
3. `sudo apt upgrade`

ROSのインストール

1. `sudo apt update`
2. `sudo apt install git`
3. `sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'`
4. `sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654`
5. `sudo apt update`
6. `sudo apt install ros-kinetic-desktop-full`
7. `sudo rosdep init`
8. `rosdep update`
9. `echo "source /opt/ros/kinetic/setup.bash" >> ~/.bashrc`
10. `source ~/.bashrc`
11. `roscore`
12. `sudo apt install python-catkin-tools`
13. `mkdir -p ~/bebop_ws/src && cd ~/bebop_ws`
14. `catkin build`
15. `source devel/setup.bash`
16. `echo "source ~/bebop_ws/devel/setup.bash" >> ~/.bashrc`
17. `source ~/.bashrc`

Bebop2専用パッケージのインストール

1. `git clone https://github.com/AutonomyLab/bebop_autonomy.git src/bebop_autonomy`
2. `git clone https://github.com/ros-teleop/teleop_tools.git src/teleop_tools`
3. `rosdep update`
4. `rosdep install --from-paths src -i`
5. `catkin build`

演習1.ROSコマンドを体験する

1. `roscore`
2. `sudo apt install ros-kinetic-usb-cam`
3. `roslaunch usb_cam usb_cam_node`
4. `roslaunch image_view image_view image:=/usb_cam/image_raw`
5. `roslaunch bebop_driver bebop_node.launch`
6. `roslaunch image_view image_view image:=/bebop/image_raw`
7. `rosgrep`
8. `sudo apt-get install ros-kinetic-rqt`
9. `sudo apt-get install ros-kinetic-rqt-common-plugins`
10. `rqt_graph`
11. `rostopic list`
12. `rostopic type /bebop/image_raw`
13. `rostopic echo /bebop/image_raw`

演習2.既存パッケージを試す

1. `roslaunch bebop_driver bebop_node.launch`
2. `sudo apt install ros-kinetic-teleop-twist-keyboard`

3. `roslaunch teleop_twist_keyboard teleop_twist_keyboard.py cmd_vel:=/bebop/cmd_vel`
4. `rostopic pub --once /bebop/takeoff std_msgs/Empty`
5. `rostopic pub --once /bebop/land std_msgs/Empty`
6. `rostopic pub --once /bebop/reset std_msgs/Empty`

演習3.飛行プログラムを作る

1. `cd ~/bebop_ws/src`
2. `catkin_create_pkg seminar roscpp rospy std_msgs`
3. `cd ~/bebop_ws/`
4. `catkin build`
5. `source devel/setup.bash`
6. `rospack find seminar`
7. `cd ~/bebop_ws/src`
8. `git clone https://github.com/ros-teleop/teleop_twist_keyboard.git seminar/src`
9. `mkdir -p ~/bebop_ws/src/seminar/scripts`
10. `cp ~/bebop_ws/src/seminar/src/teleop_twist_keyboard.py seminar/scripts/ros_example_1_3.py`
11. `gedit ~/bebop_ws/src/seminar/scripts/ros_example_1_3.py`
12. `cd ~/bebop_ws/src`
13. `mkdir -p ~/bebop_ws/src/seminar/launch`
14. `cp bebop_autonomy/bebop_driver/launch/bebop_node.launch seminar/launch/ros_example_1_3.launch`
15. `gedit ~/bebop_ws/src/seminar/launch/ros_example_1_3.launch`
16. `roslaunch seminar ros_example_1_3.launch`