New system setup:

Ros noetic - official site

Gazebo 9 installation

Mavros -(https://github.com/mavlink/mavros/blob/master/mavros/README.md#installation)

Ardupilot sitl-(https://ardupilot.org/dev/docs/git-clone.html)/
https://www.elucidatedrones.com/posts/how-to-set-up-ardupilot-sitl-on-linux/

Mission Planner https://ardupilot.org/planner/docs/mission-planner-installation.html

Firmware Plugins : https://dev.px4.io/v1.10_noredirect/en/setup/building_px4.html
Follow these instructions but don't do git checkout step
Firmware Plugin : we are using plugins by PX4
https://github.com/JdeRobot/BehaviorMetrics/pull/612/commits/161a0dd44e40dbca0686ba81bcec358e0b112051?short_path=93771c9#diff-93771c934403de2e0af7f2987265e93a1f9d33cd9af0e74eaaf8896b36aa1906
Follow PX4 installation and don't forget to set gazebo path
echo $GAZEBO_PLUGIN_PATH
/usr/lib/x86_64-linux-gnu/gazebo-11/plugins::/home/cintlab/PX4-Autopilot/build/px4_sitl_default/build_gazebo-classic:/home/cintlab/PX4-Autopilot/build/px4_sitl_default/build_gazebo-classic

There is command to set $GAZEBO_PLUGIN_PATH
Plugin for lidar and camera
https://classic.gazebosim.org/tutorials?tut=ros_installing&cat=connect_ros

Bash script for whole installation might work not tried:
https://github.com/yanhwee/helium/blob/master/docs/install.bash

Full Installation commands(ubuntu 20.4)

Disclaimer: Don't just blindly run the commands, observe what is happening in what directories of the system and keep track of the packages you download and the versions of the softwares that we are using.

--->Installing Ardupilot and MAVProxy Ubuntu 20.04

-->Clone ArduPilot:

```
cd ~
sudo apt install git
git clone https://github.com/ArduPilot/ardupilot.git
cd ardupilot
```

-->Install dependencies:

```
Tools/environment_install/install-prereqs-ubuntu.sh -y
```

-->reload profile

```
. ~/.profile
```

-->Checkout Latest Copter Build

```
git config --global url.https://.insteadOf git://
git checkout Copter-4.3.3
git submodule update --init --recursive
```

-->Run SITL (Software In The Loop) once to set params:

```
cd ~/ardupilot/ArduCopter
sim_vehicle.py -w
```

--->Install Gazebo [20.04]

-->Setup your computer to accept software from http://packages.osrfoundation.org:

sudo sh -c 'echo "deb http://packages.osrfoundation.org/gazebo/ubuntu-stable `lsb_release -cs` main" > /etc/apt/sources.list.d/gazebo-stable.list'

-->Setup keys:

wget http://packages.osrfoundation.org/gazebo.key -O - | sudo apt-key add -

-->Reload software list:

sudo apt update

-->install gazebo

sudo apt-get install gazebo11 libgazebo11-dev

-->Install Gazebo plugin for APM (ArduPilot Master) :

cd ~
git clone https://github.com/khancyr/ardupilot_gazebo.git
cd ardupilot_gazebo

-->build and install plugin

mkdir build
cd build
cmake ..
make -j4
sudo make install
echo 'source /usr/share/gazebo/setup.sh' >> ~/.bashrc

-->Set paths for models:

echo 'export GAZEBO_MODEL_PATH=~/ardupilot_gazebo/models' >> ~/.bashrc
. ~/.bashrc

--->Install ROS and Setup Catkin

-->Install ROS

-->Setup your computer to accept software from packages.ros.org.

sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'

-->Set up your keys

sudo apt install curl # if you haven't already installed curl

curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add

sudo apt update
sudo apt install ros-noetic-desktop-full

-->Environment setup

source /opt/ros/noetic/setup.bash
echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc
source ~/.bashrc

-->Set Up Catkin workspace

sudo apt-get install python3-wstool python3-rosinstall-generator python3-catkin-lint python3-pip python3-catkin-tools
pip3 install osrf-pycommon
mkdir -p ~/catkin_ws/src
cd ~/catkin_ws
catkin init

-->Dependencies installation

cd ~/catkin_ws
wstool init ~/catkin_ws/src

rosinstall_generator --upstream mavros | tee /tmp/mavros.rosinstall
rosinstall_generator mavlink | tee -a /tmp/mavros.rosinstall
wstool merge -t src /tmp/mavros.rosinstall
wstool update -t src
rosdep install --from-paths src --ignore-src --rosdistro `echo $ROS_DISTRO` -y

catkin build

echo "source ~/catkin_ws/devel/setup.bash" >> ~/.bashrc

-->update global variables

source ~/.bashrc

-->install geographiclib dependancy

sudo ~/catkin_ws/src/mavros/mavros/scripts/install_geographiclib_datasets.sh

-->Clone IQ Simulation ROS package

cd ~/catkin_ws/src
git clone https://github.com/Intelligent-Quads/iq_sim.git

-->run the following to tell gazebo where to look for the iq models

echo
"GAZEBO_MODEL_PATH=${GAZEBO_MODEL_PATH}:$HOME/catkin_ws/src/iq_sim/models"
>> ~/.bashrc

-->Inside catkin_ws, run catkin build:

cd ~/catkin_ws
catkin build

-->update global variables

source ~/.bashrc

-->Open NEW Terminal
-->Install Intel® RealSense™ ROS from Sources

mkdir -p ~/realsense_ws/src
cd ~/realsense_ws/src/

catkin_init_workspace
cd ..
catkin_make clean
catkin_make -DCATKIN_ENABLE_TESTING=False -DCMAKE_BUILD_TYPE=Release
catkin_make install

-->Source the camera node

echo "source ~/realsense_ws/devel/setup.bash" >> ~/.bashrc
source ~/.bashrc

--->To start the camera node in ROS:

roslaunch realsense2_camera rs_camera.launch

-->PX4-autopilot installation and build

git clone --recursive https://github.com/PX4/PX4-Autopilot.git -b v1.11.3

bash ./PX4-Autopilot/Tools/setup/ubuntu.sh

cd ~/PX4-Autopilot

DONT_RUN=1 make px4_sitl_default gazebo-classic_typhoon_h480
echo 'source ~/PX4-Autopilot/Tools/simulation/gazebo-classic/setup_gazebo.bash
~/PX4-Autopilot ~/PX4-Autopilot/build/px4_sitl_default' >> ~/.bashrc

echo 'export
ROS_PACKAGE_PATH=$ROS_PACKAGE_PATH:~/PX4-Autopilot/Tools/simulation/gazebo-cla
ssic/sitl_gazebo-classic' >> ~/.bashrc

source ~/.bashrc

-->Install Missionplanner

https://firmware.ardupilot.org/Tools/MissionPlanner/archive/MissionPlanner-1.3.75.zip
cd MissionPlanner-1.3.75
mono MissionPlanner.exe

-->Download the files in below link and move them to Downloads

https://drive.google.com/drive/folders/12aUnPyofPkIpvZe09AXKKhl9b3XeJrfV?usp=drive_li
nk

-->everyday running commands

-->Run sitl in new terminal

cd ~/ardupilot/build/sitl/bin
./arducopter --model gazebo-iris

-->Run mavros in new terminal

roslaunch mavros apm.launch fcu_url:=tcp://127.0.0.1:5760

-->Run gazebo simulation in new terminal

cd ~/Downloads
gazebo --verbose field.world

-->Run Missionplanner in new terminal

cd ~/MissionPlanner-1.3.75
mono MissionPlanner.exe