

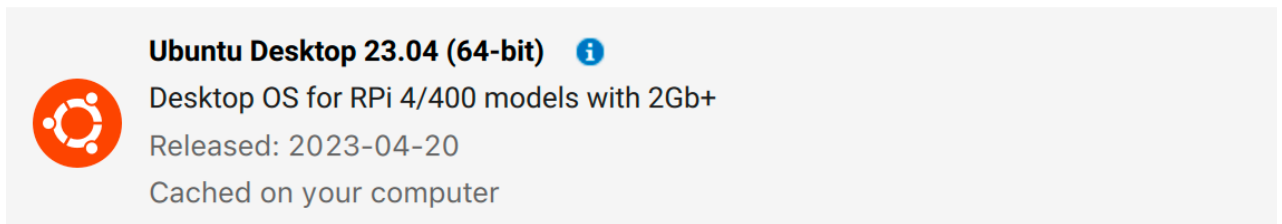
## User Guide for the Autonomous Bomber project

Below is a step-by-step guide on how to run the project on a Raspberry Pi 4.

### Required Equipment:

- Monitor
- HDMI to microHDMI cable
- Raspberry Pi power supply
- Mouse
- Keyboard
- MicroSD Card

- 1) Install the Raspberry Pi Imager ([link](#)) onto your computer and flash your MicroSD with the latest Ubuntu OS



- 2) Install MicroSD Card into the Raspberry Pi 4
- 3) Power up the Raspberry Pi 4 using the power supply. Attach microHDMI, keyboard, and mouse to Raspberry Pi 4.
- 4) Set up the Raspberry Pi. Use this [link](#) for assistance.
- 5) Connect the Raspberry Pi 4 to wifi.
- 6) Open the command line interface on the Pi and type "ifconfig". Note the IP address for future use.
- 7) Install all dependencies using pip. Pip and Python will already be installed on the Pi with the latest Raspberry Pi OS.
  - socket (version 1.0.0)
  - pickle-mixin (version 1.0.2)
  - os (standard library)
  - keyboard (version 0.13.5)
  - time (standard library)
  - jsonlib (version 1.6.1)
  - scipy (version 1.8.0)
  - matplotlib (version 3.5.1)
  - dronekit (version 2.9.2)
  - pymavlink (version 2.4.29)
  - python-math (version 0.0.1)
  - psutil (version 5.9.0)

- copy (standard library)
  - numpy (version 1.22.3)
  - argparse (version 1.4.0)
  - gpiozero (version 1.6.2)
  - opencv-python (latest version)
  - EXAMPLE: pip install scipy=1.8.0
  - You don't need to pip install the standard libraries as they come with the Python installation
- 8) Install MavProxy onto the Pi using this [link](#).
  - 9) Git clone the repository into the home directory. [Link](#) to repository.
  - 10) Shut down the Pi and mount to the payload.
  - 11) Connect the camera using USB to the Pi
  - 12) Connect the autopilot and Pi using a USB cable.
  - 13) Power the Pi from the batteries.
  - 14) Wait for a minute and attempt to SSH into the Pi.
  - 15) Change directories to ECE592-Autonomous-Bomber/final-deliverables/TeamA22/src/rpi
  - 16) Run python waypoints.py after altering the necessary IP addresses for socket connections where noted in the code within waypoints.py and GCS\_with\_GSD.py.

Running the custom GCS on a Windows machine.

- 1) Open the command line interface on the computer and type "ipconfig". Note the IP address for future use.
- 2) Install all dependencies using pip. Python (3.8.5) and Pip must be installed on the machine before this step.
  - socket (version 1.0.0)
  - keyboard (version 0.13.5)
  - matplotlib (version 3.5.1)
  - jsonlib (version 1.6.1)
  - numpy (version 1.22.3)
  - pickle-mixin (version 1.0.2)
  - sys (standard library)
  - EXAMPLE: pip install matplotlib=3.5.1
  - You don't need to pip install the standard libraries as they come with the Python installation
- 3) Git clone the repository. [Link](#) to repository.
- 4) Change directories to ECE592-Autonomous-Bomber/final-deliverables/TeamA22/src/gcs

- 5) Run change the following lines of code to match the GCS IP address and Pi IP address

```
# Set RPI ip address and port
rpi_ip = "172.20.15.100"
rpi_port = 5555
# IP Address is the device running the SERVER
ip = "172.20.7.164"
port = 4444
```

- 6) Run python GCS\_with\_GSD.py