Pypilot 0.35 install using Openplotter-pypilot 3.1.0 beta version 20-SEP-2022

The PyPilot open source free software autopilot has been made available in OpenPlotter 3.0. For this, it is wrapped in an OpenPlotter application that adds user interfaces consistent with other OpenPlotter applications, and automates configuration of various installation steps. This how-to outlines the detailed steps to install this OpenPlotter application.

Whereas pypilot is primarily designed to run on a pizero on the small footprint tinycore linux system, it runs perfectly well under Raspbian, and the OpenPlotter wrapper eases the leaning curve significantly. With the 2022 shortage of pizero hardware, a Raspbian installation seems an opportune alternative.

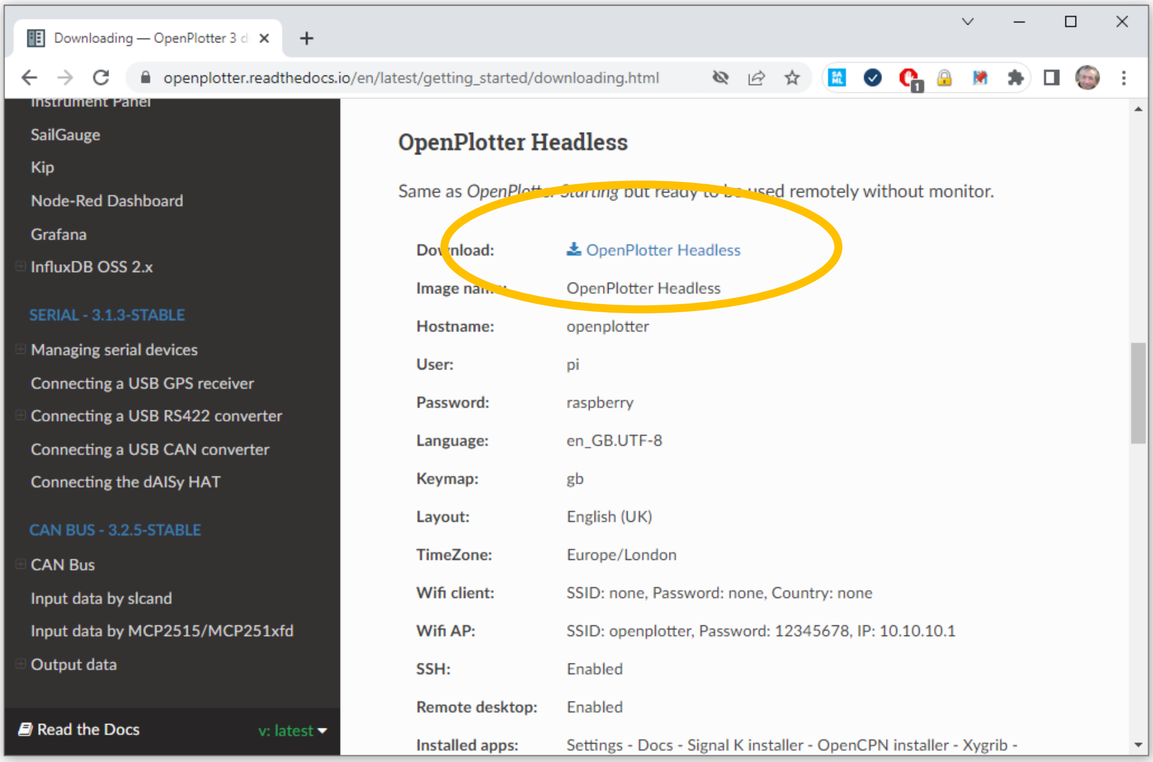
For this how-to, the following hardware was used:

- Raspberry Pi Model 3B+
- IMU from pypilot.org store
- Pypilot Motor controller issue 2019 from pypilot.org store
- Ethernet cable connected to internet router, or
- USB wifi dongle that can be connected to a wifi router

NOTE: the Openplotter-provided application is still in beta, and so is this document.

Installation of OpenPlotter 3.0

1. First, browse to https://openplotter.readthedocs.io/en/latest/getting_started/downloading.html and download the Openplotter Headless image. Since I tested on a raspberry 3b+, I downloaded the 32-bit version. On a raspberry 4, I would do the same.

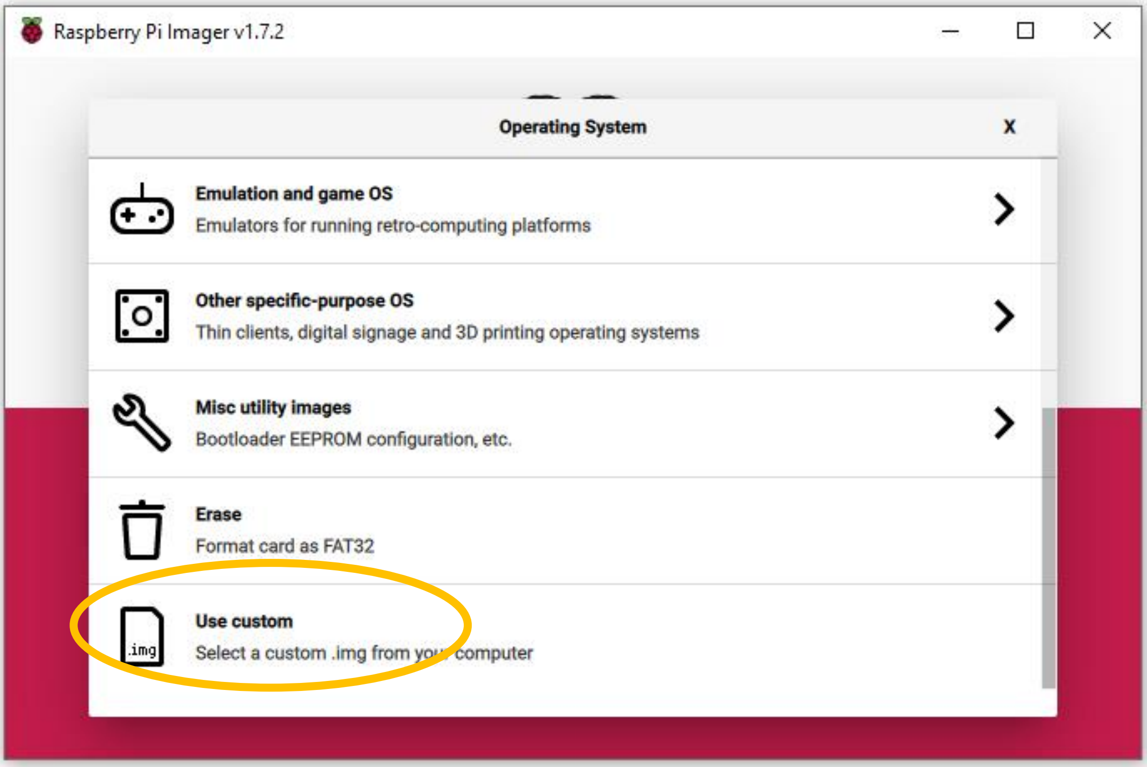

Downloading — OpenPlotter 3 d
openplotter.readthedocs.io/en/latest/getting_started/downloading.html
Instrument Panel
SailGauge
Kip
Node-Red Dashboard
Grafana
InfluxDB OSS 2.x
SERIAL - 3.1.3-STABLE
Managing serial devices
Connecting a USB GPS receiver
Connecting a USB RS422 converter
Connecting a USB CAN converter
Connecting the dAISy HAT
CAN BUS - 3.2.5-STABLE
CAN Bus
Input data by slcand
Input data by MCP2515/MCP251xfd
Output data
Read the Docs
v: latest

OpenPlotter Headless

Same as *OpenPlotter Starting* but ready to be used remotely without monitor.

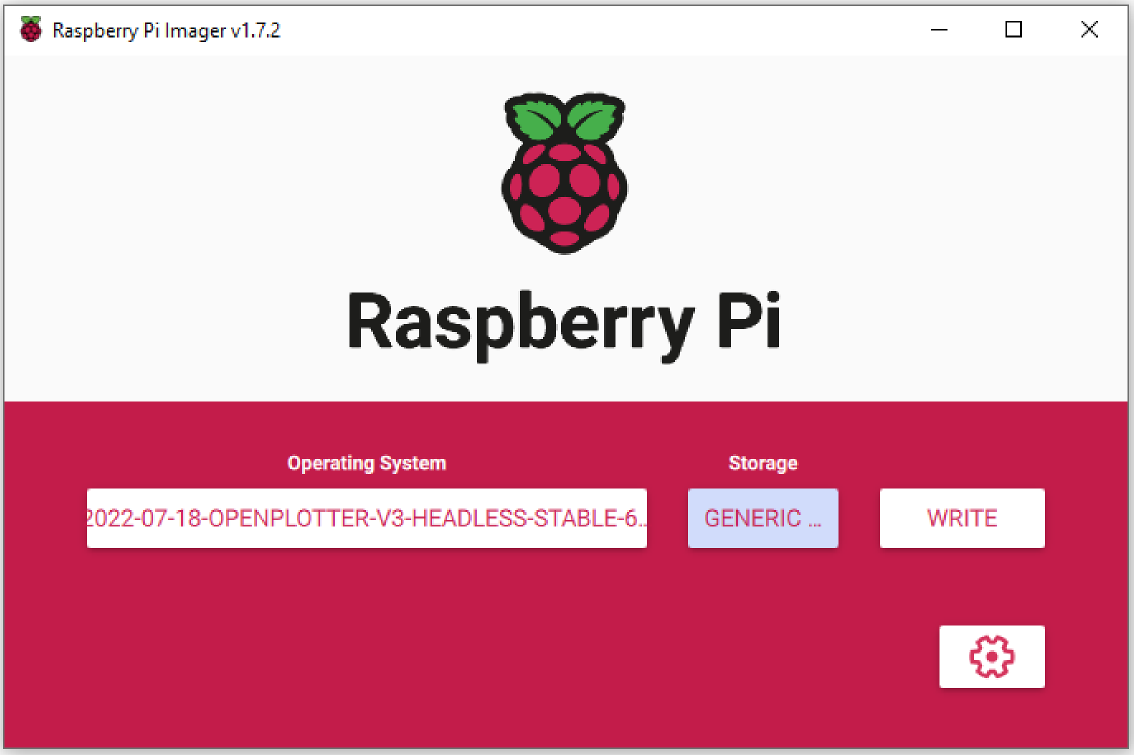
Download:	OpenPlotter Headless
Image name:	OpenPlotter Headless
Hostname:	openplotter
User:	pi
Password:	raspberry
Language:	en_GB.UTF-8
Keymap:	gb
Layout:	English (UK)
TimeZone:	Europe/London
Wifi client:	SSID: none, Password: none, Country: none
Wifi AP:	SSID: openplotter, Password: 12345678, IP: 10.10.10.1
SSH:	Enabled
Remote desktop:	Enabled
Installed apps:	Settings - Docs - Signal K installer - OpenCPN installer - Xygrib -

2. Then, download the raspberry pi imager, click Operating System , scoll to Use Custom, and choose your downloaded image file.



Raspberry Pi Imager v1.7.2
Operating System
X
Emulation and game OS
Emulators for running retro-computing platforms
Other specific-purpose OS
Thin clients, digital signage and 3D printing operating systems
Misc utility images
Bootloader EEPROM configuration, etc.
Erase
Format card as FAT32
.img
Use custom
Select a custom .img from your computer

3. Stick an SD card adapter with an SD card in your USB port, then for Storage, choose the SD card.



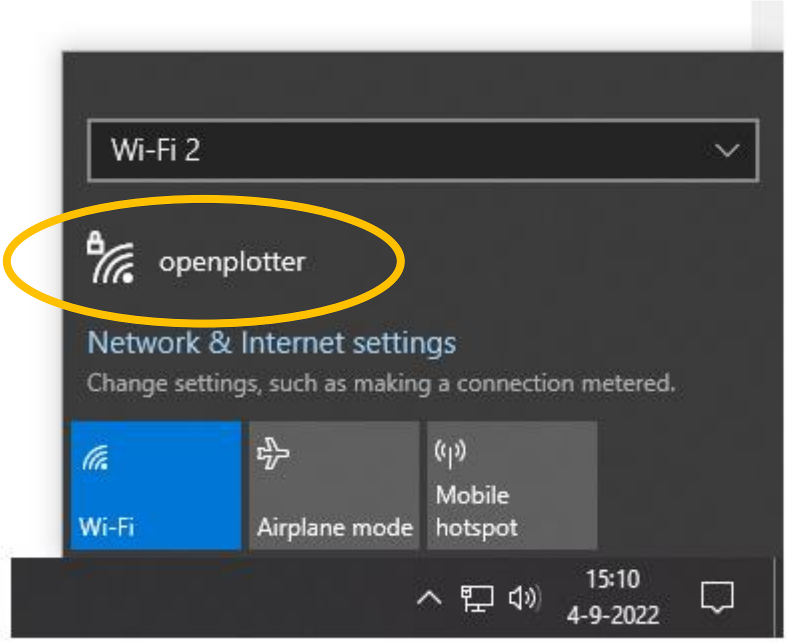
Operating System: 2022-07-18-OPENPLOTTER-V3-HEADLESS-STABLE-6...

Storage: GENERIC ...

4. Click Write to burn the image on your SD card.

5. When ready, stick the SD card in your raspberry and turn on the raspberry.

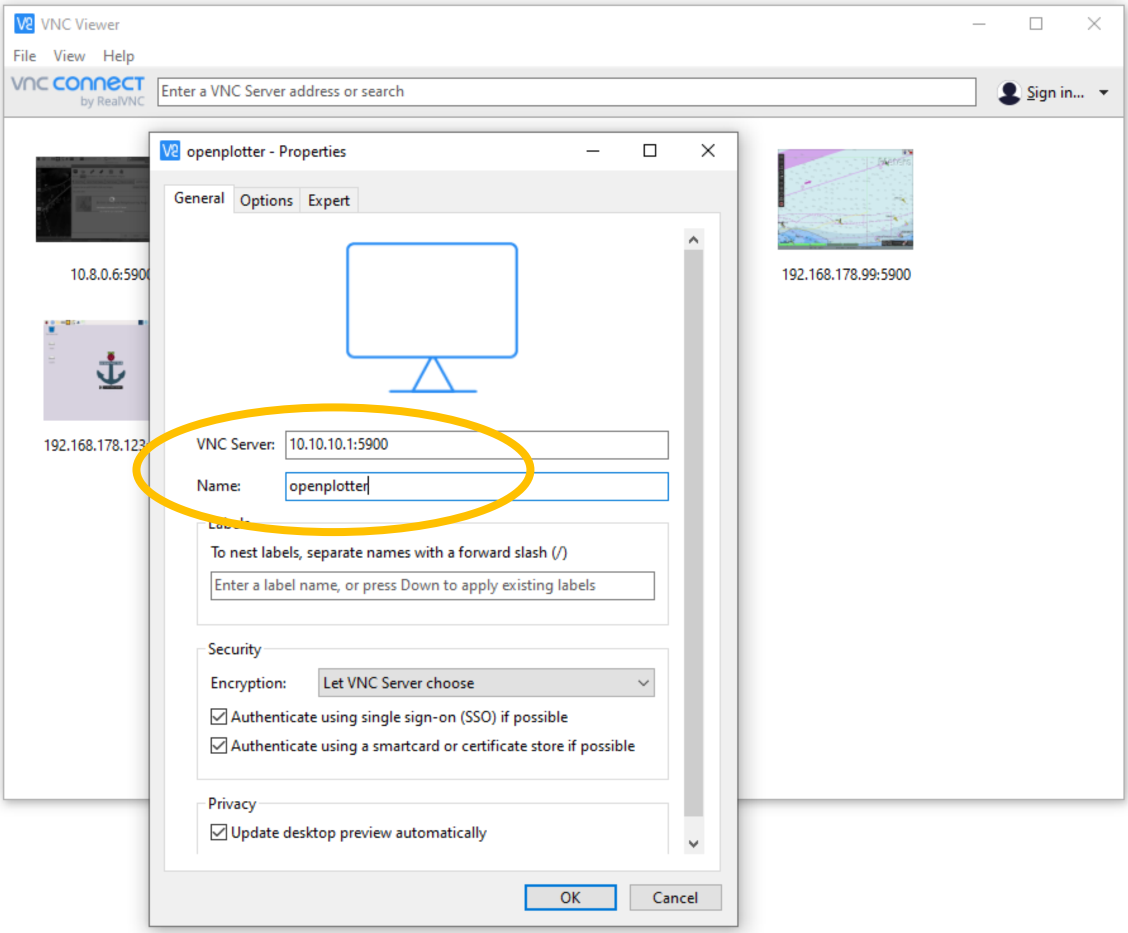
6. After a while, you should see a wifi station appear called openplotter. Connect to it. The wifi passphrase is 12345678.
7. Note: if you have connected before, and/or have problems connecting, it might help to Forget the device credentials.



Wi-Fi 2
openplotter
Network & Internet settings
Change settings, such as making a connection metered.
Wi-Fi
Airplane mode
Mobile hotspot
15:10
4-9-2022

Note: if you have no internet connection to the raspberry (see later) the wifi connection might disconnect after a few seconds. Reconnect to it. You should get a 10.10.10.0 ip address.

8. Download a vnc viewer from the internet. In this example, RealVNC Viewer is used. Make a new connection with File → New Connection. Select 10.10.10.1:5900 for VNC Server:



openplotter - Properties

VNC Server: 10.10.10.1:5900

Name: openplotter

Labels

To nest labels, separate names with a forward slash (/)

Enter a label name, or press Down to apply existing labels

Security

Encryption: Let VNC Server choose

☑ Authenticate using single sign-on (SSO) if possible

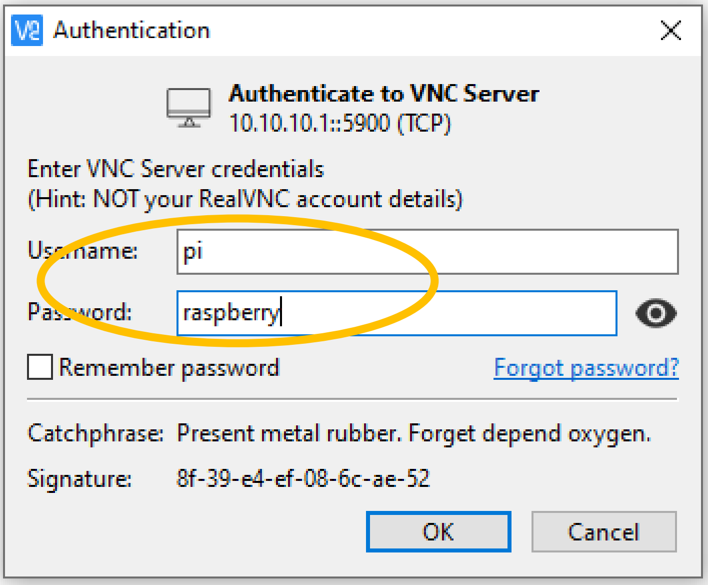
☑ Authenticate using a smartcard or certificate store if possible

Privacy

☑ Update desktop preview automatically

9. Press ok and the connect to the machine.

10. Default credentials to be used are the unix credentials of the pi user, in this case pi and raspberry as indicated below:



Authentication

Authenticate to VNC Server
10.10.10.1::5900 (TCP)

Enter VNC Server credentials
(Hint: NOT your RealVNC account details)

Username: pi

Password: raspberry

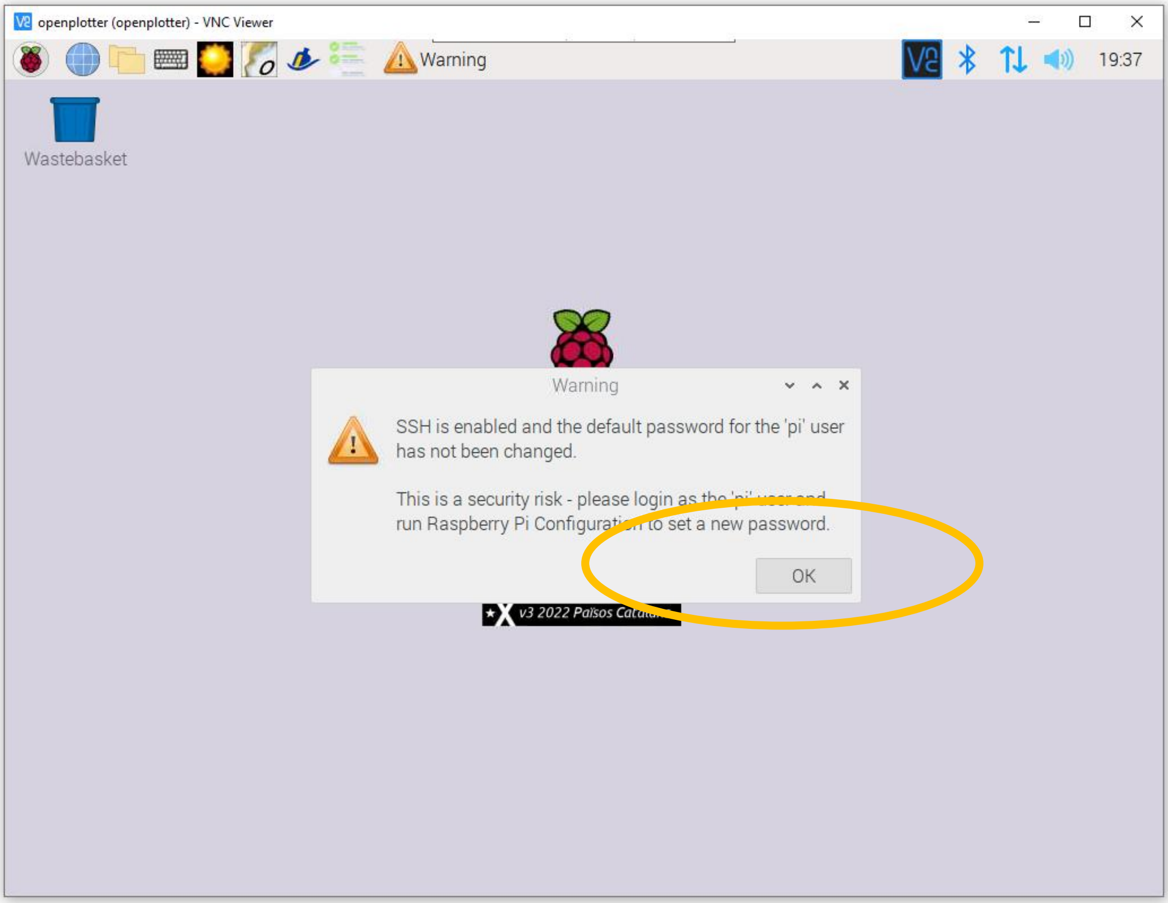
□ Remember password

Forgot password?

Catchphrase: Present metal rubber. Forget depend oxygen.

Signature: 8f-39-e4-ef-08-6c-ae-52

11. If all is right, this screen should show up. Read the message and click ok:

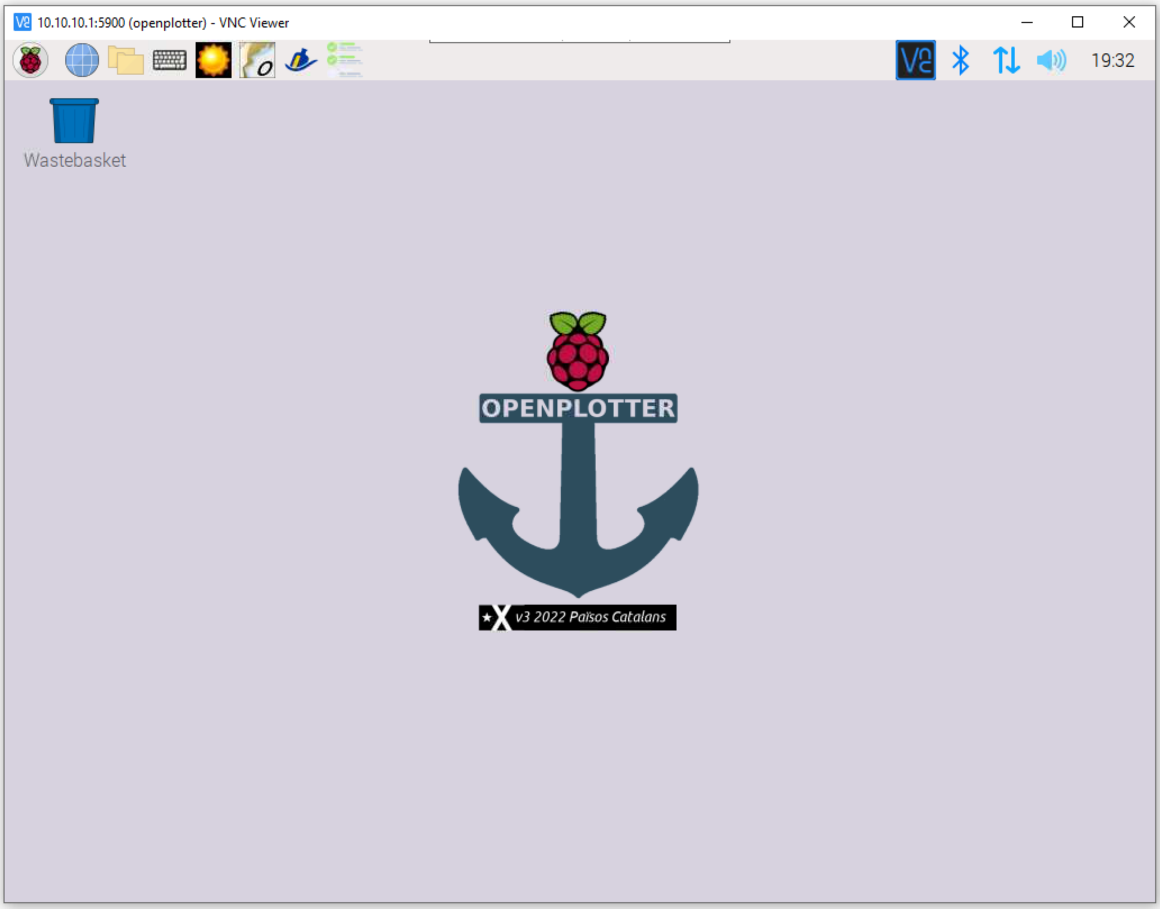


Warning

SSH is enabled and the default password for the 'pi' user has not been changed.

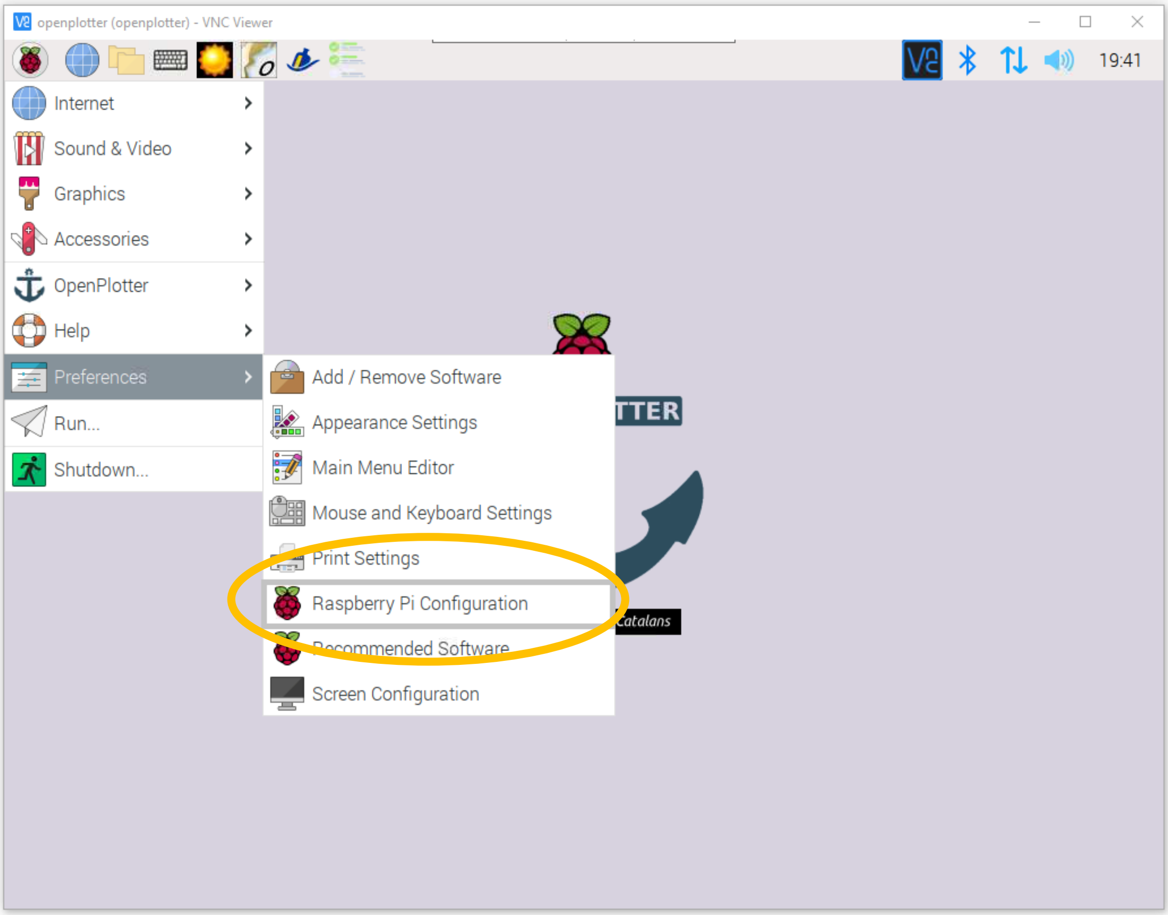
This is a security risk - please login as the 'pi' user and run Raspberry Pi Configuration to set a new password.

OK

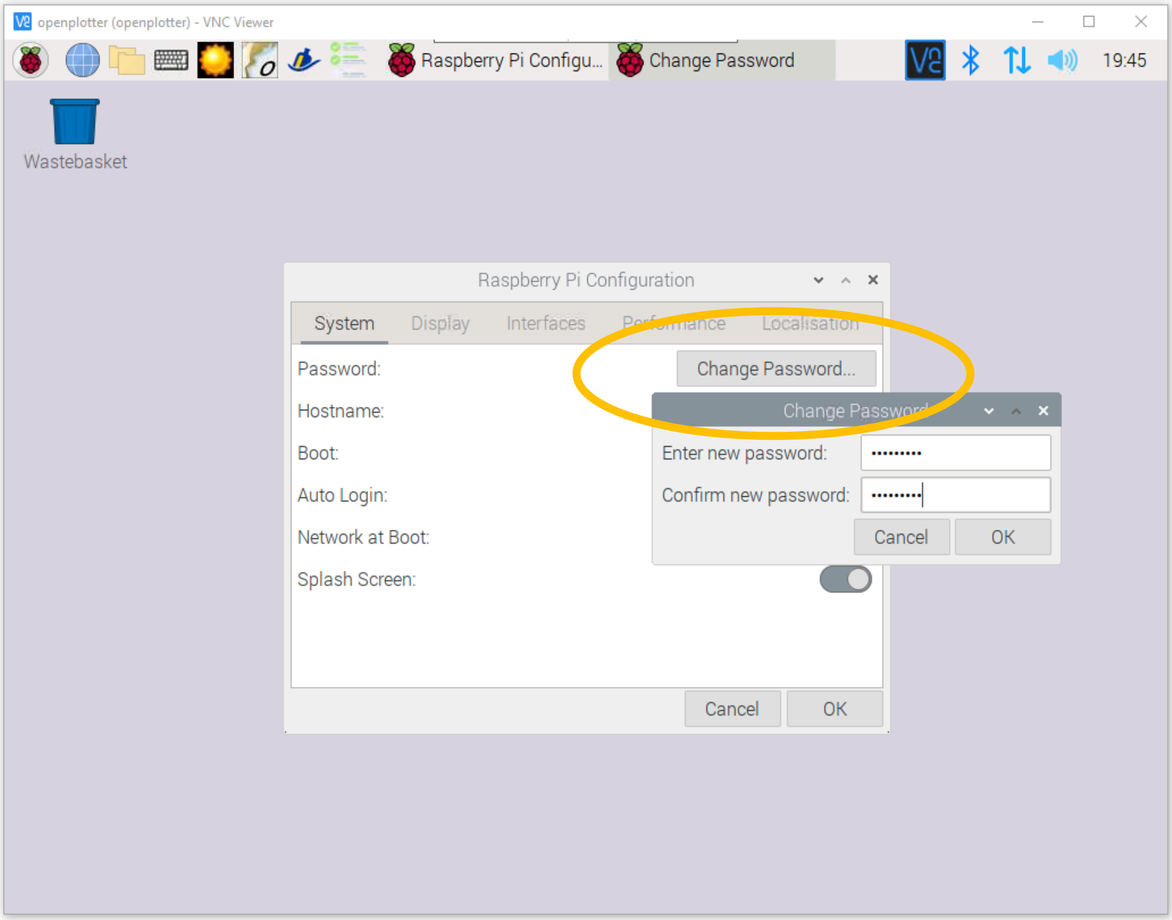


10.10.10.1:5900 (openplotter) - VNC Viewer

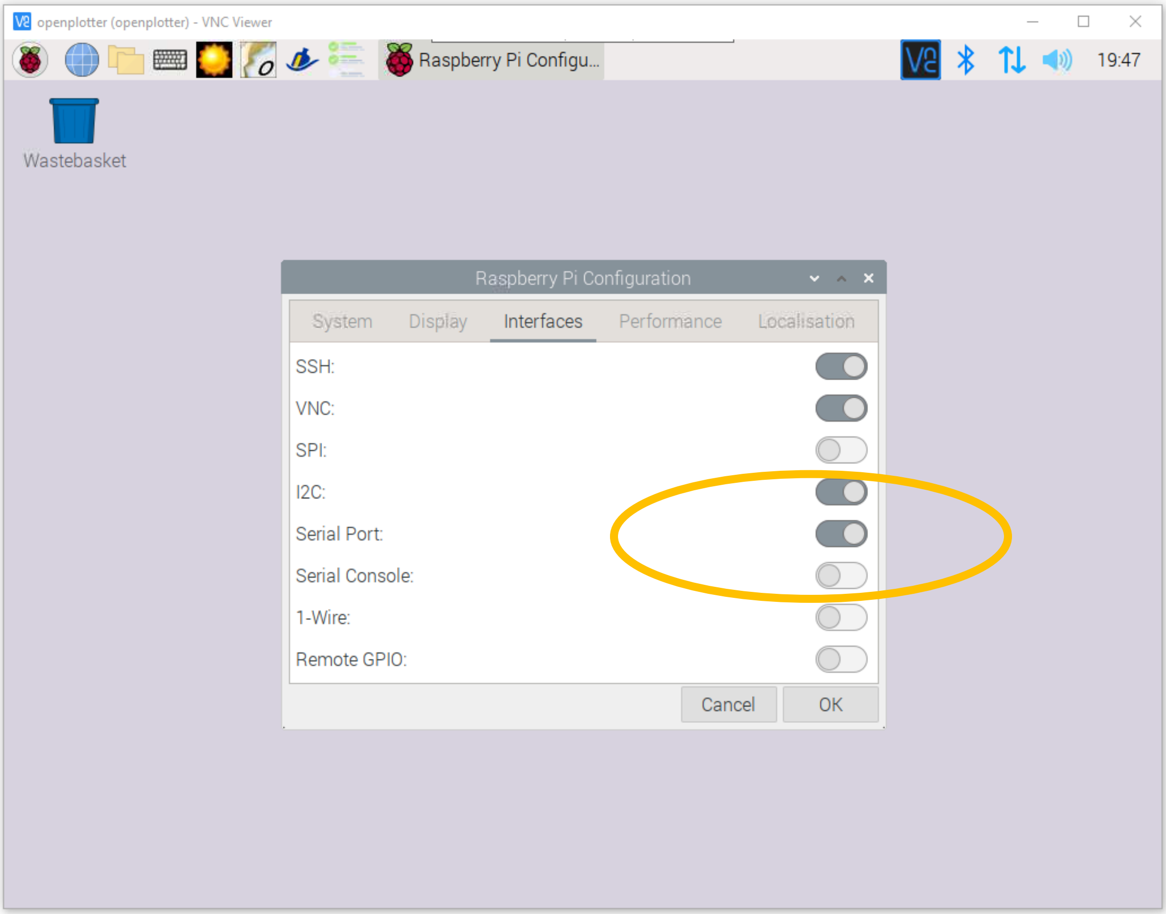
12. Let's first respond to the message you just clicked away: choose Raspberry → Preferences → Raspberry Pi Configuration:



13. Click Change Password and then enter a new password and ok:

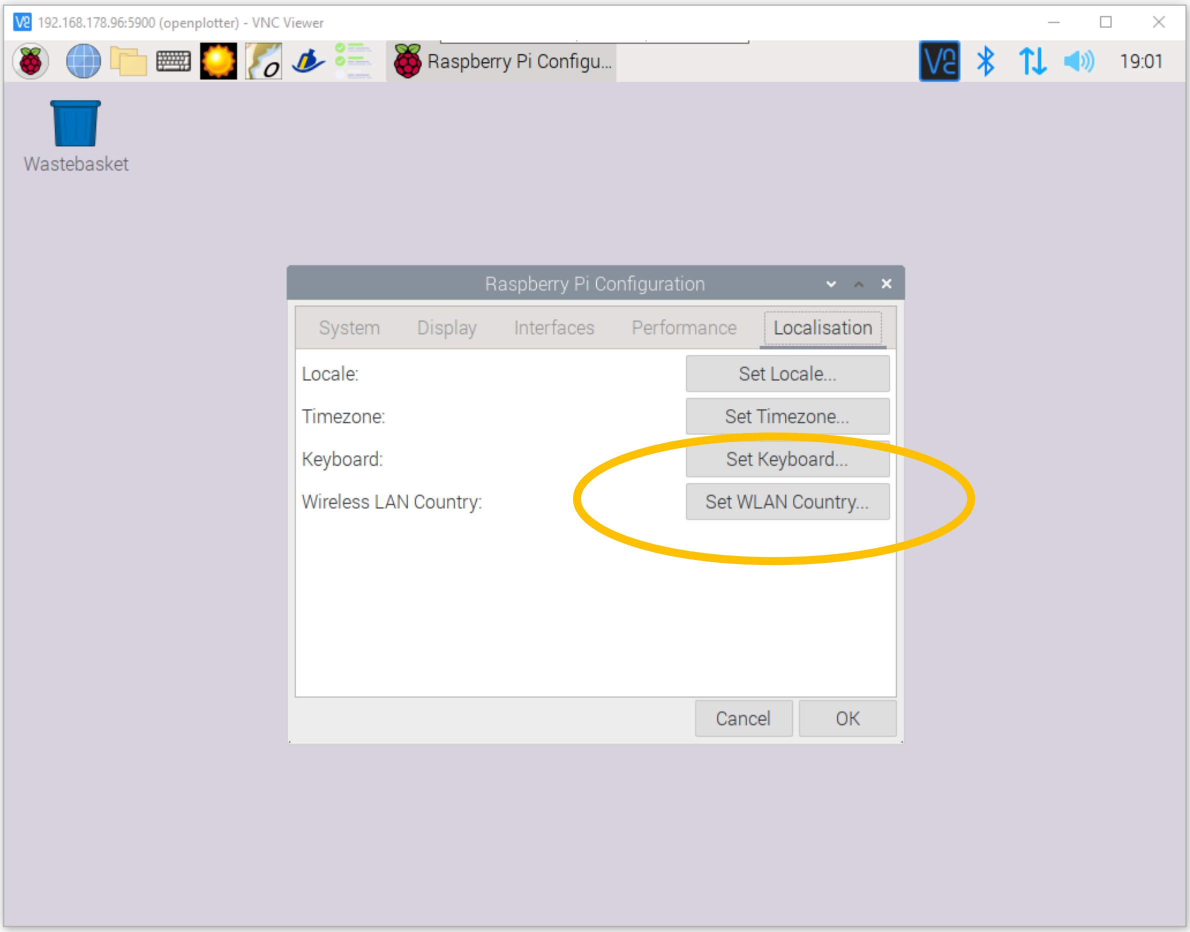


14. Now prepare the raspberry for pypilot operation: click the third tab Interfaces, enable I2C, enable Serial Port and disable Serial Console.



SSH: ●
VNC: ●
SPI: ○
I2C: ●
Serial Port: ●
Serial Console: ○
1-Wire: ○
Remote GPIO: ○

15. Then go to Localization, and choose Set WLAN country.



192.168.178.96:5900 (openplotter) - VNC Viewer

Raspberry Pi Configuration

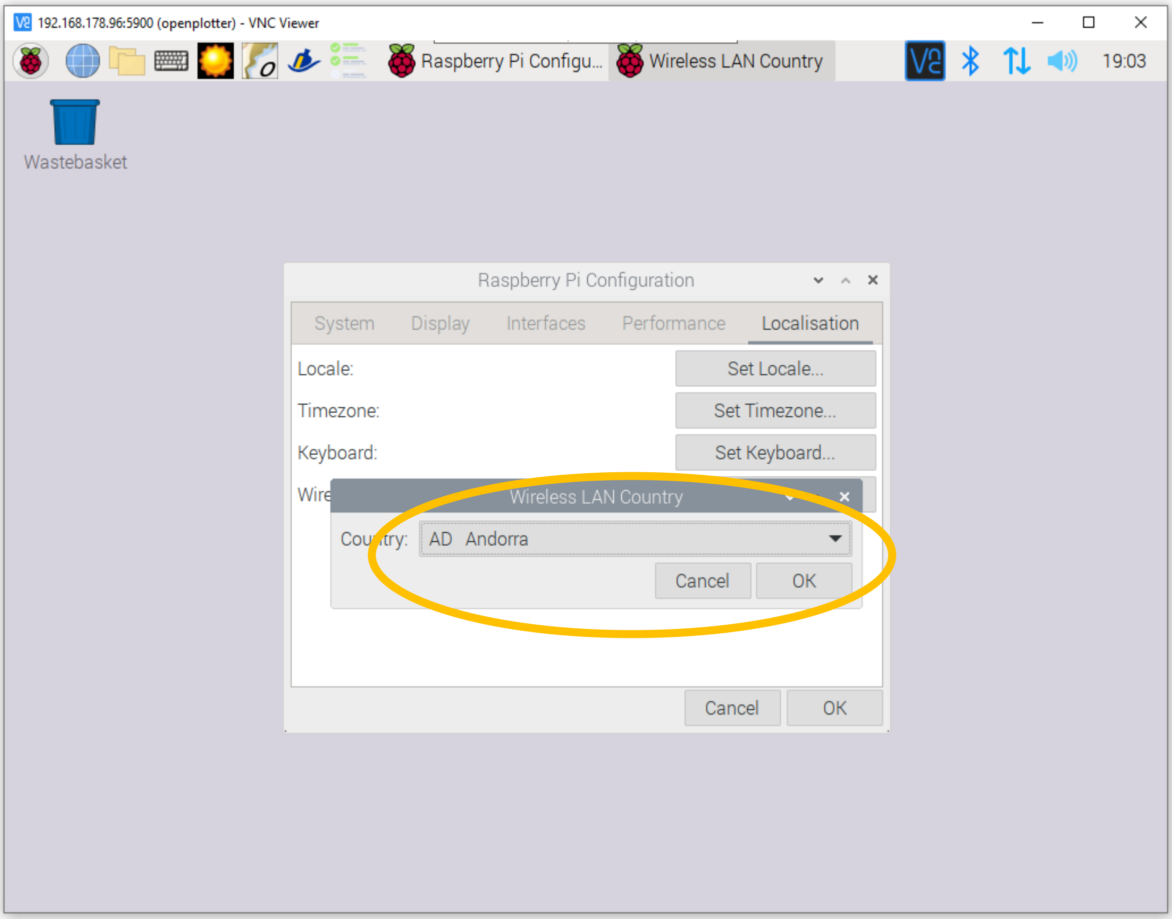
Locale: Set Locale...

Timezone: Set Timezone...

Keyboard: Set Keyboard...

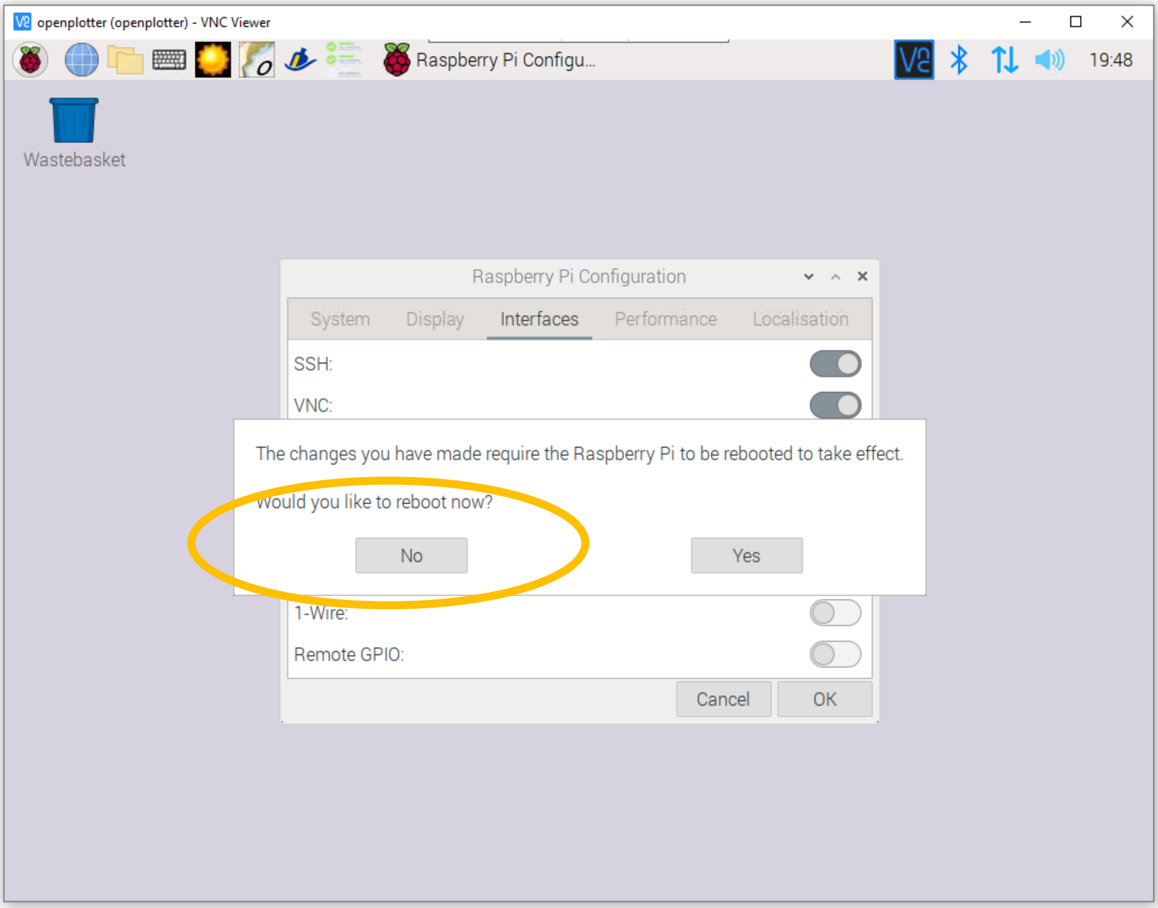
Wireless LAN Country: Set WLAN Country...

16. Choose your own country if you care to scroll there all the way, or select the first one in the list:



Country: AD Andorra

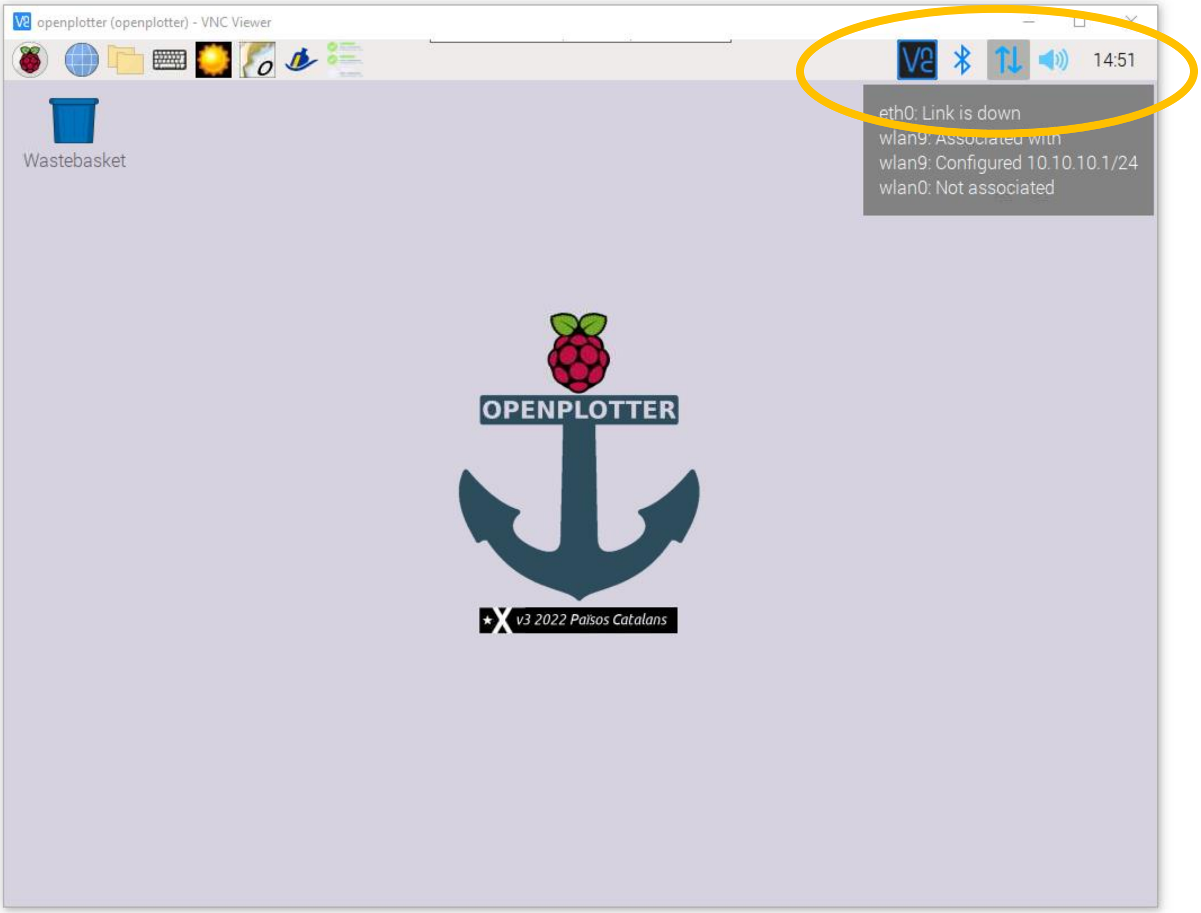
17. Then press OK. Raspberry begs for a reboot, but say No for now:



The changes you have made require the Raspberry Pi to be rebooted to take effect.

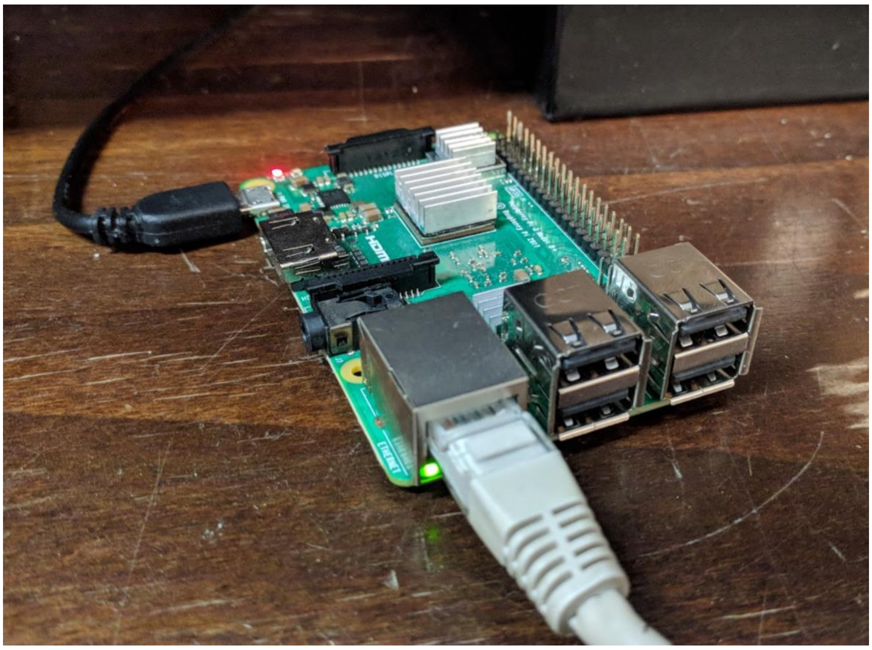
Would you like to reboot now?

18. Let’s first establish internet connection. Hovering over the up and down arrow shows the network interfaces.

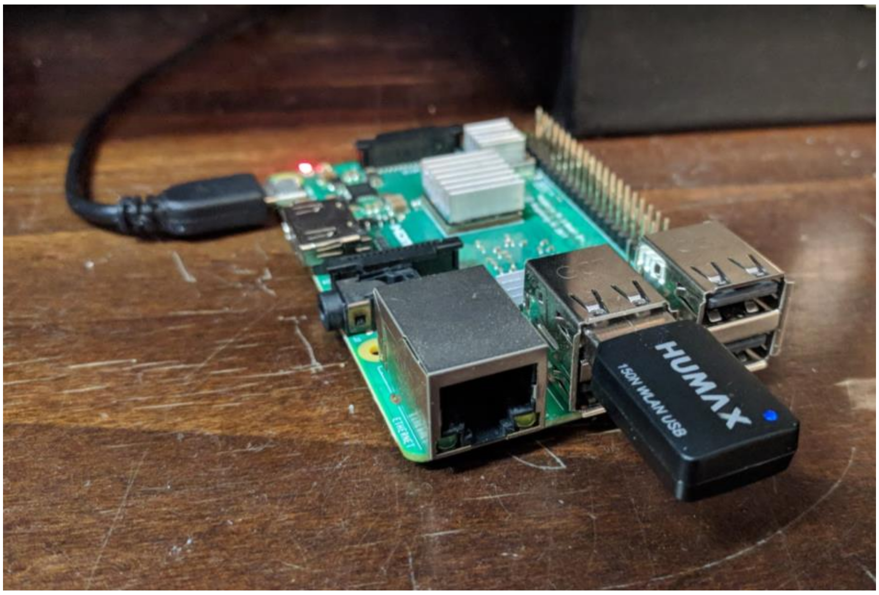


eth0: Link is down
wlan9: Associated with
wlan9: Configured 10.10.10.1/24
wlan0: Not associated

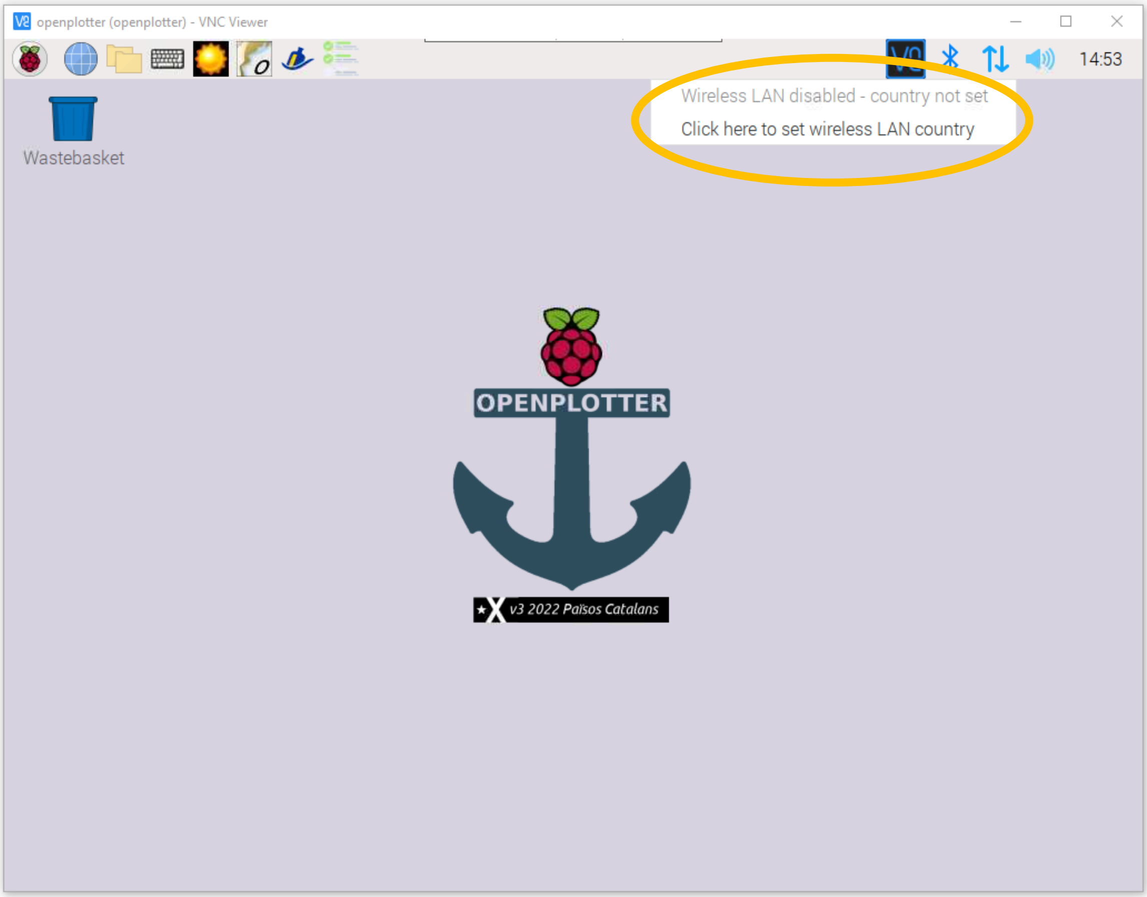
19. If you have stuck in an ethernet cable that comes from your home modem, the eth0 will be set and you are probably set up ok.



20. If you have stuck a wifi dongle in your raspberry, there is something to be done.



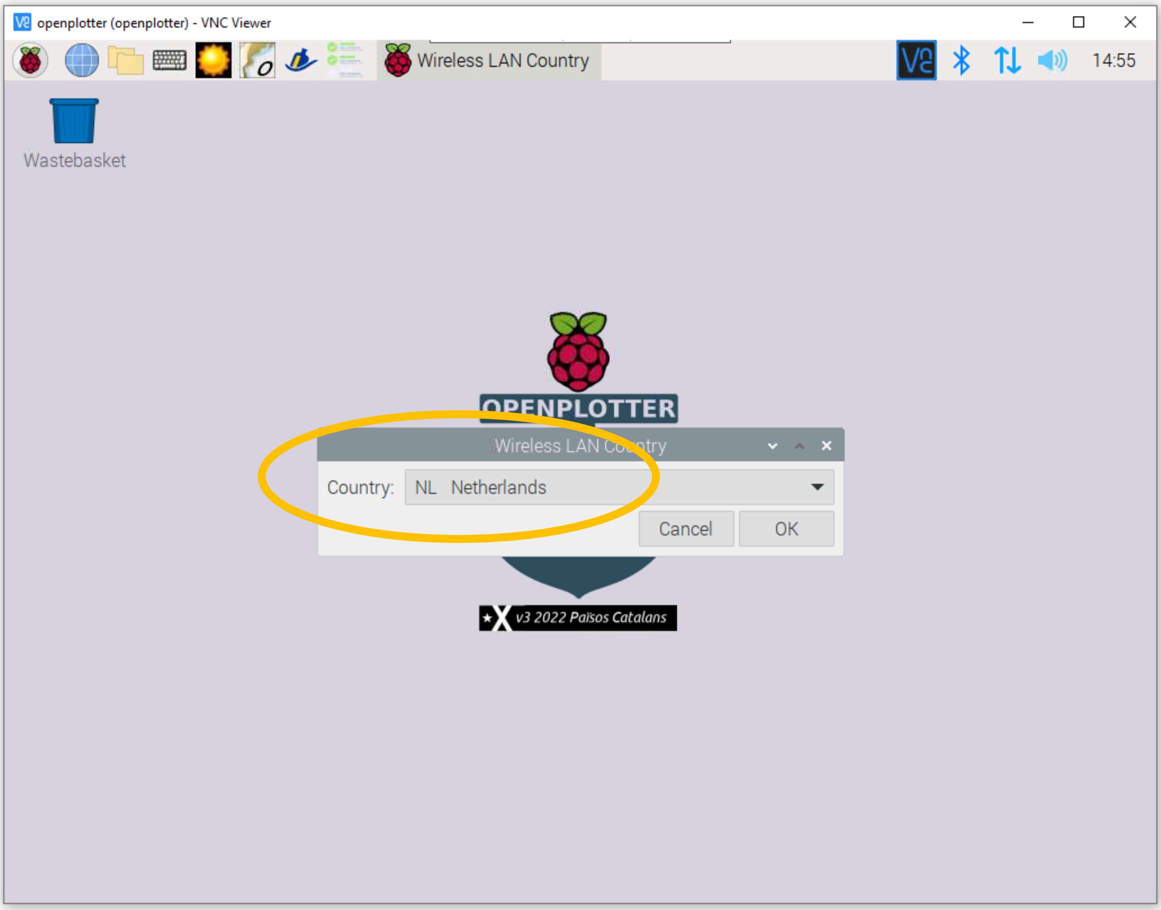
21. If you have not already done so in the previous step, you first have to set your ‘WLAN’ country. Choose your country to enable WIFI? Long story, don’t ask.



Wireless LAN disabled - country not set

Click here to set wireless LAN country

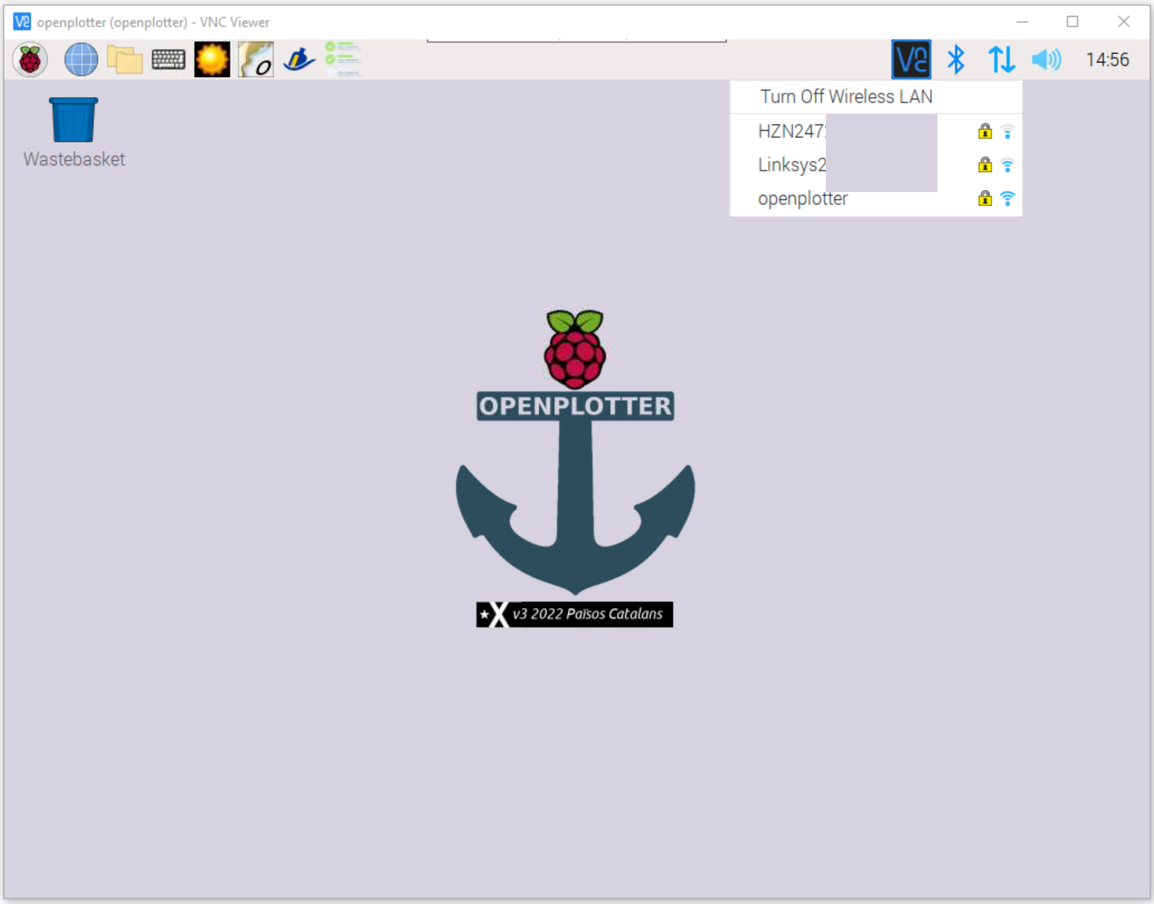
22. Use page down to scroll to the long list, select your country and press ok.



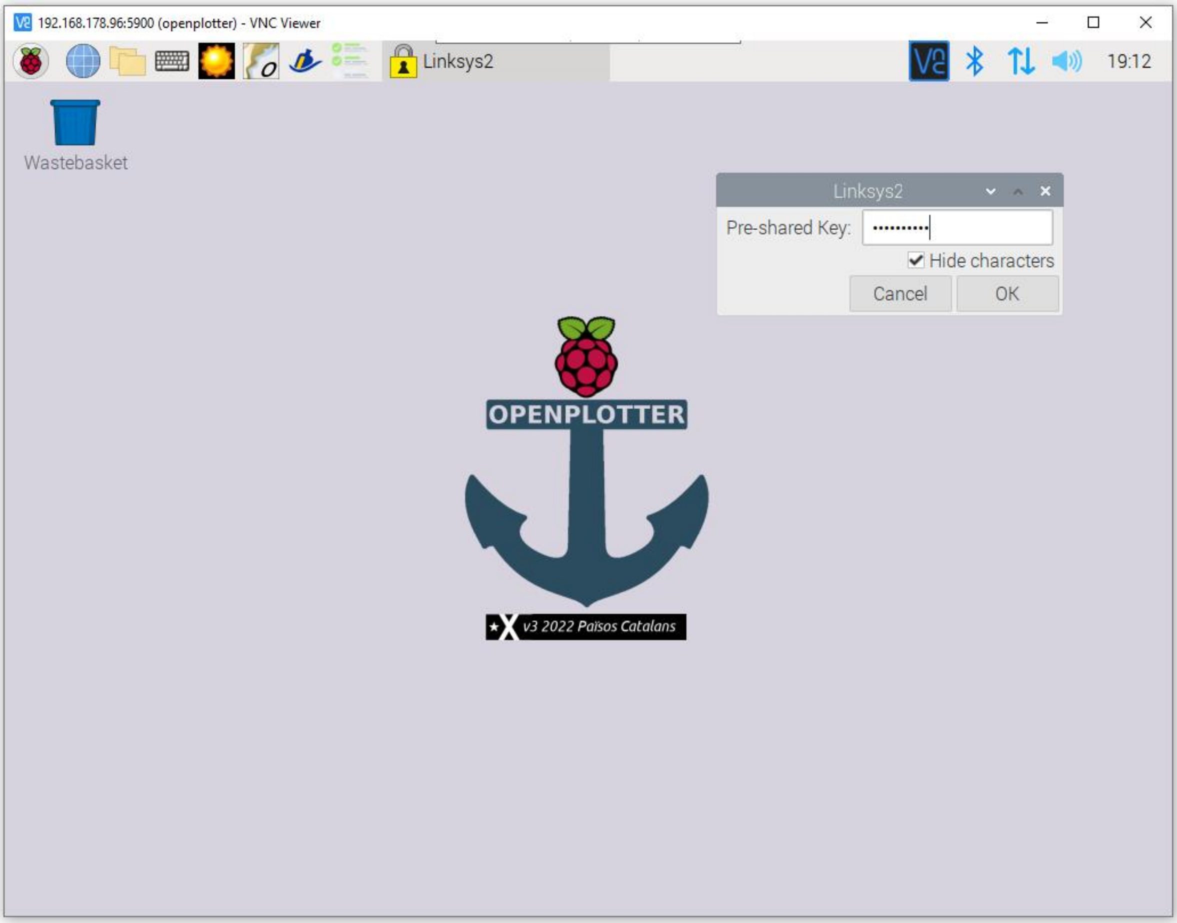
Wireless LAN Country

Country: NL Netherlands

23. Choose your home wifi connection:



24. Give your home wifi password:



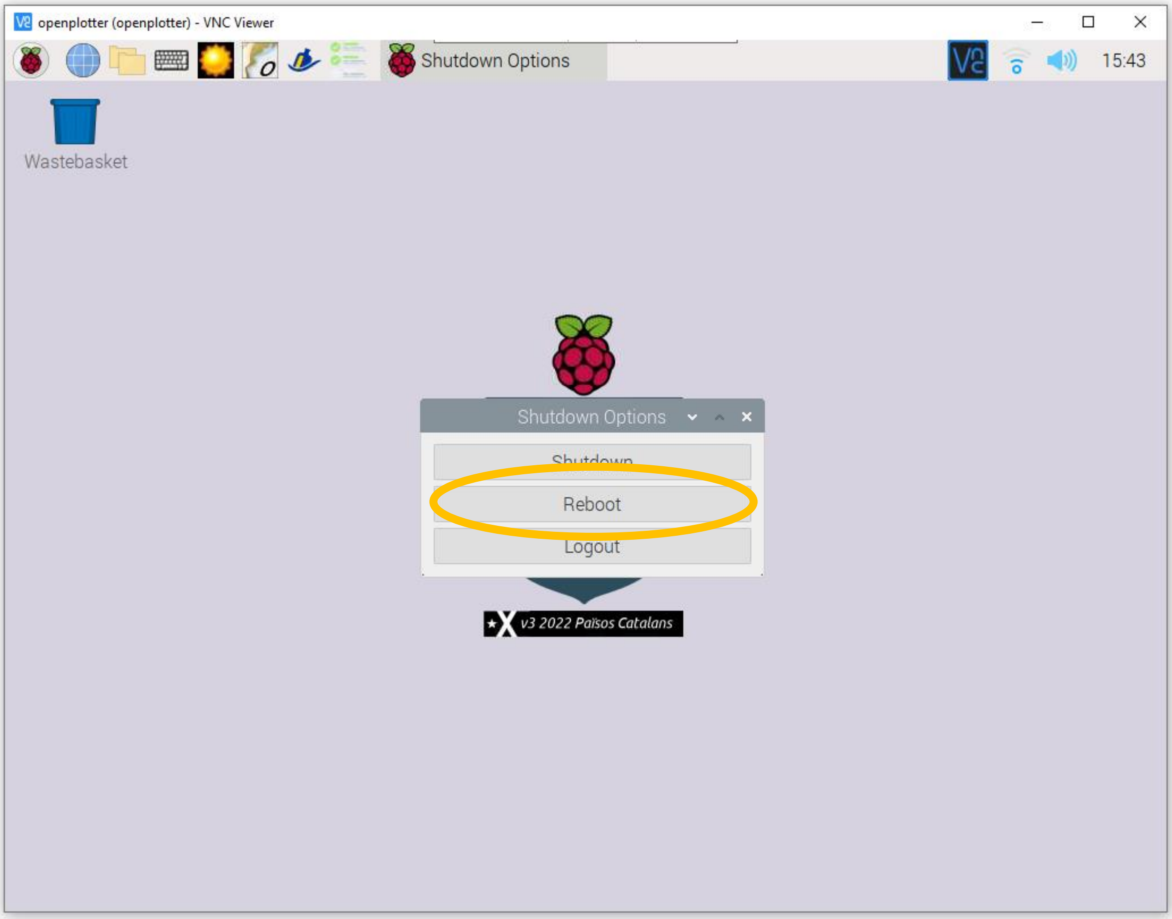
192.168.178.96:5900 (openplotter) - VNC Viewer

Linksys2

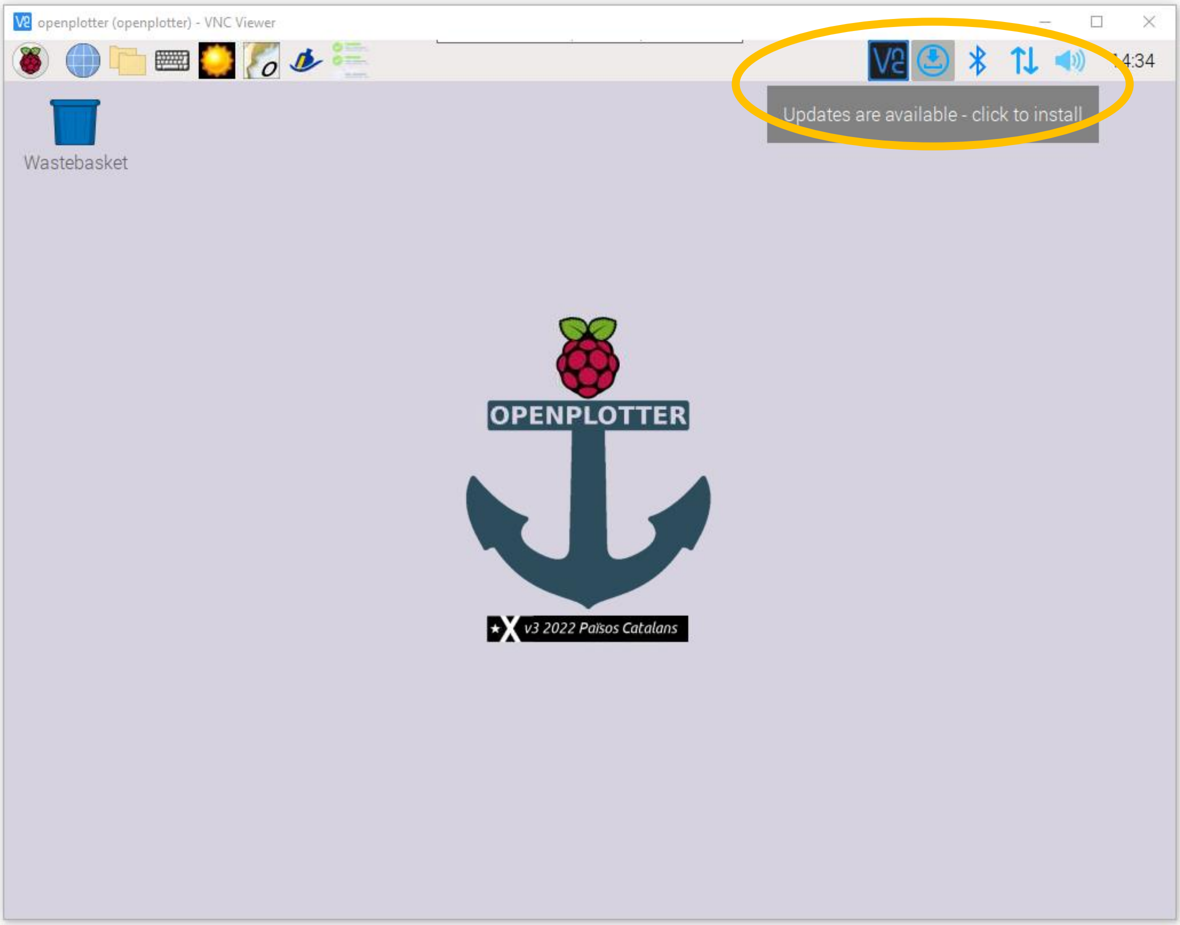
Pre-shared Key: ••••••••••

☑ Hide characters

25. Now reboot:

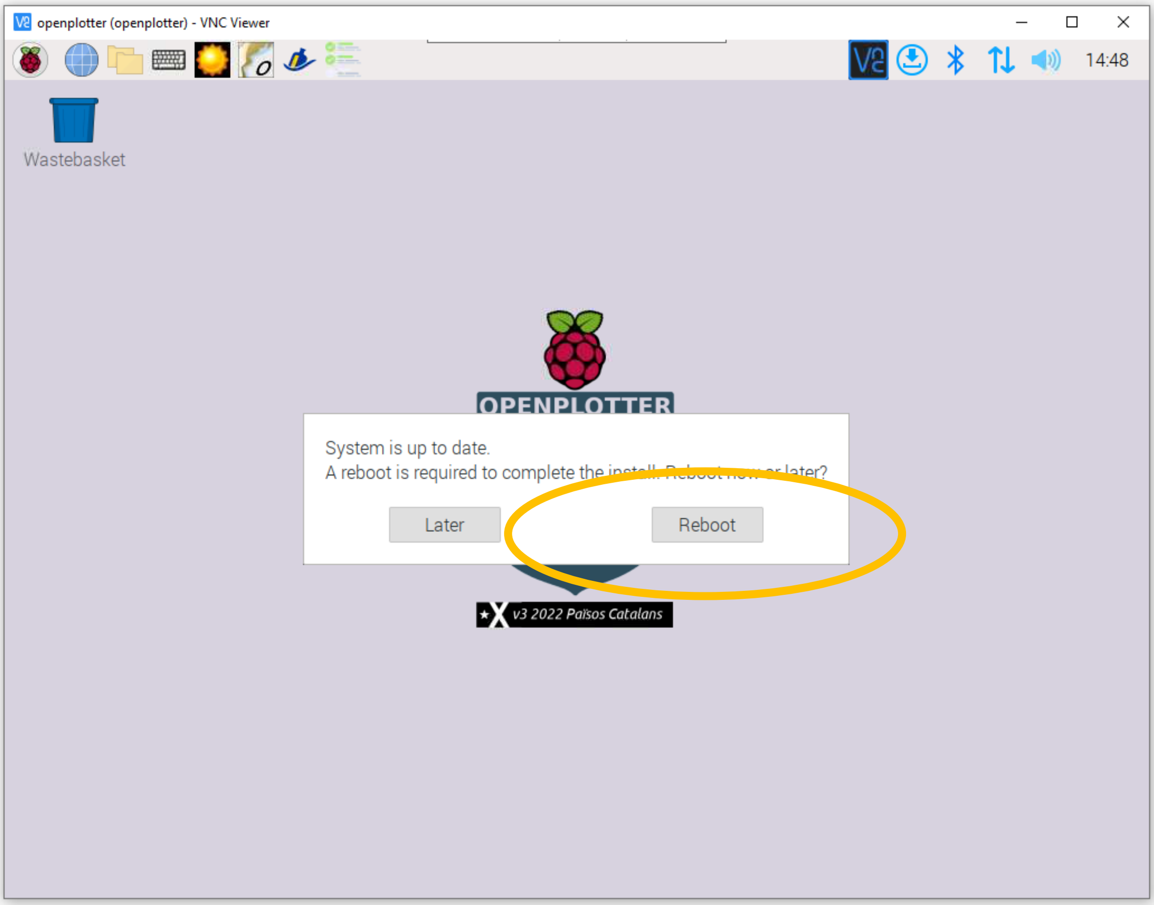


26. When you reconnect to the raspberry, you will see that there are updates available. Install them. This can take quite a while, as in, enough time to get yourself a hot drink.



Updates are available - click to install

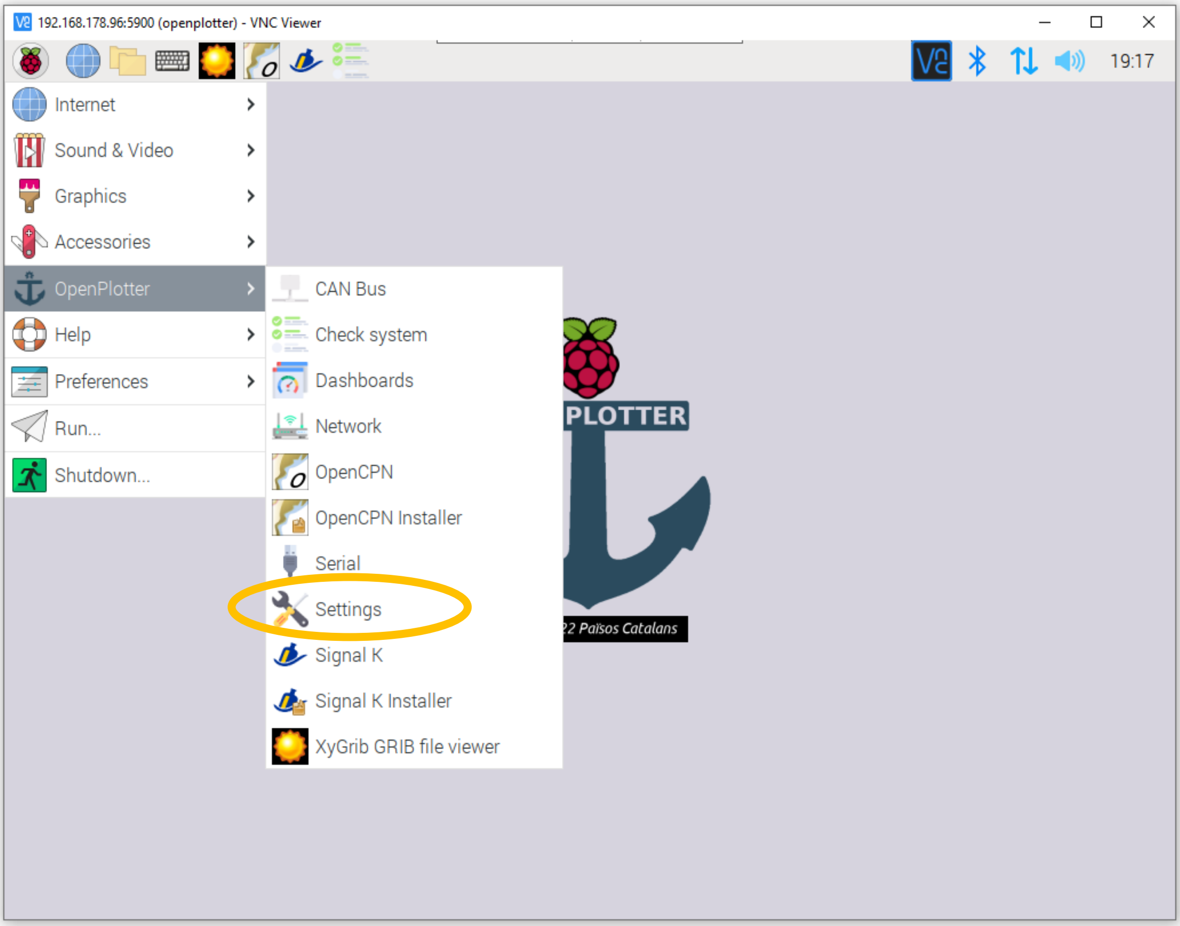
27. Reboot when the system is up to date:



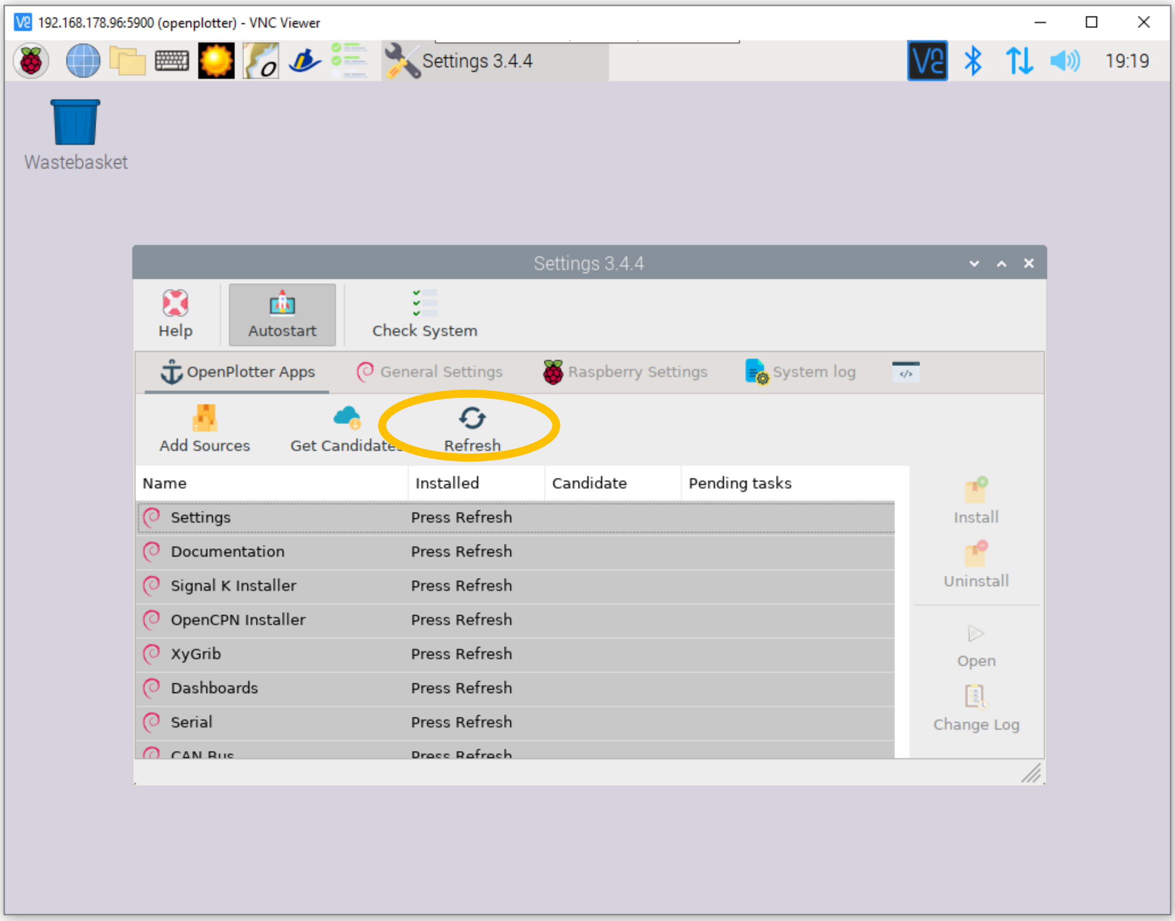
System is up to date.
A reboot is required to complete the install. Reboot now or later?

Installation of openplotter-pypilot 3.1.0 beta

28. Now we are ready to install openplotter-pypilot. Choose Raspberry → OpenPlotter → Settings:

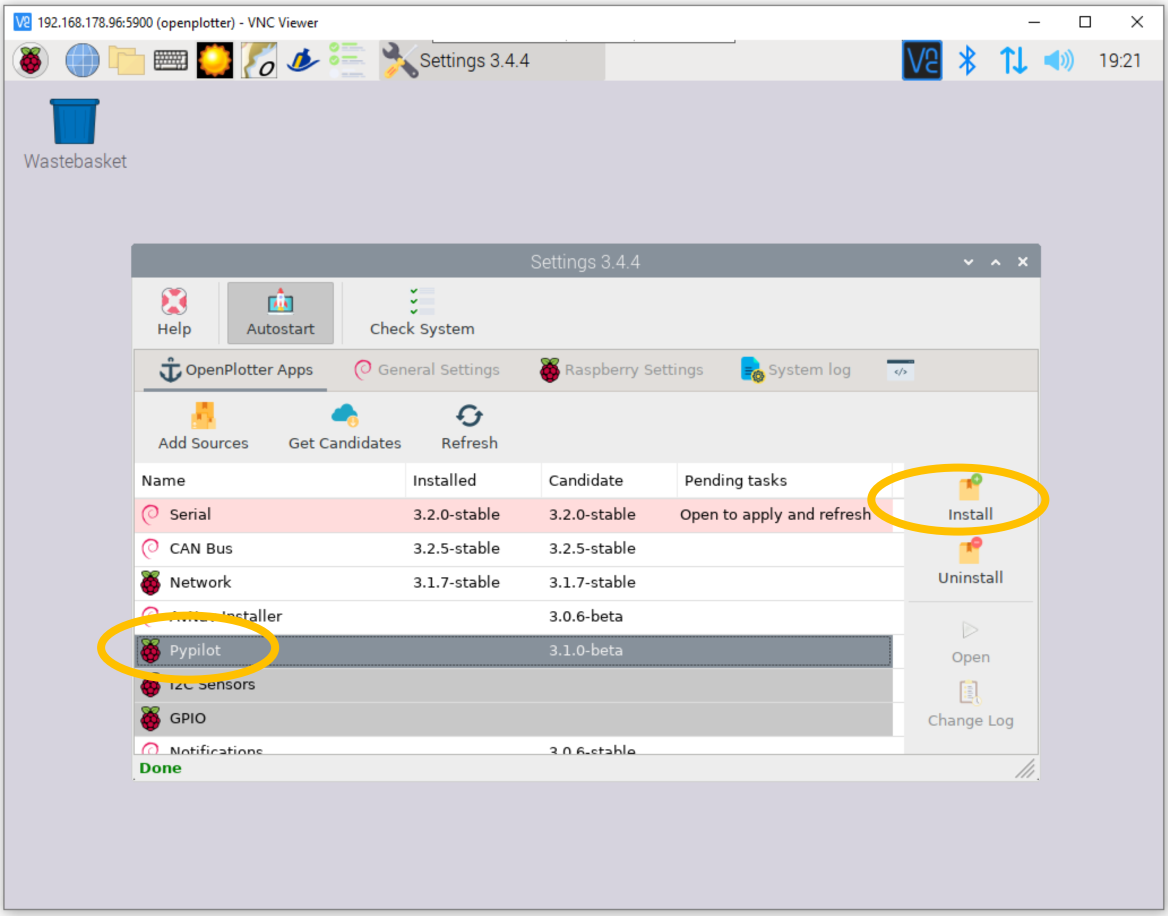


29. There, hit Refresh:



Name	Installed	Candidate	Pending tasks
Settings	Press Refresh		
Documentation	Press Refresh		
Signal K Installer	Press Refresh		
OpenCPN Installer	Press Refresh		
XyGrib	Press Refresh		
Dashboards	Press Refresh		
Serial	Press Refresh		
CAN Bus	Press Refresh		

30. Then Scroll down, dlick on PyPilot, hit Install, and answer Yes to confirm:



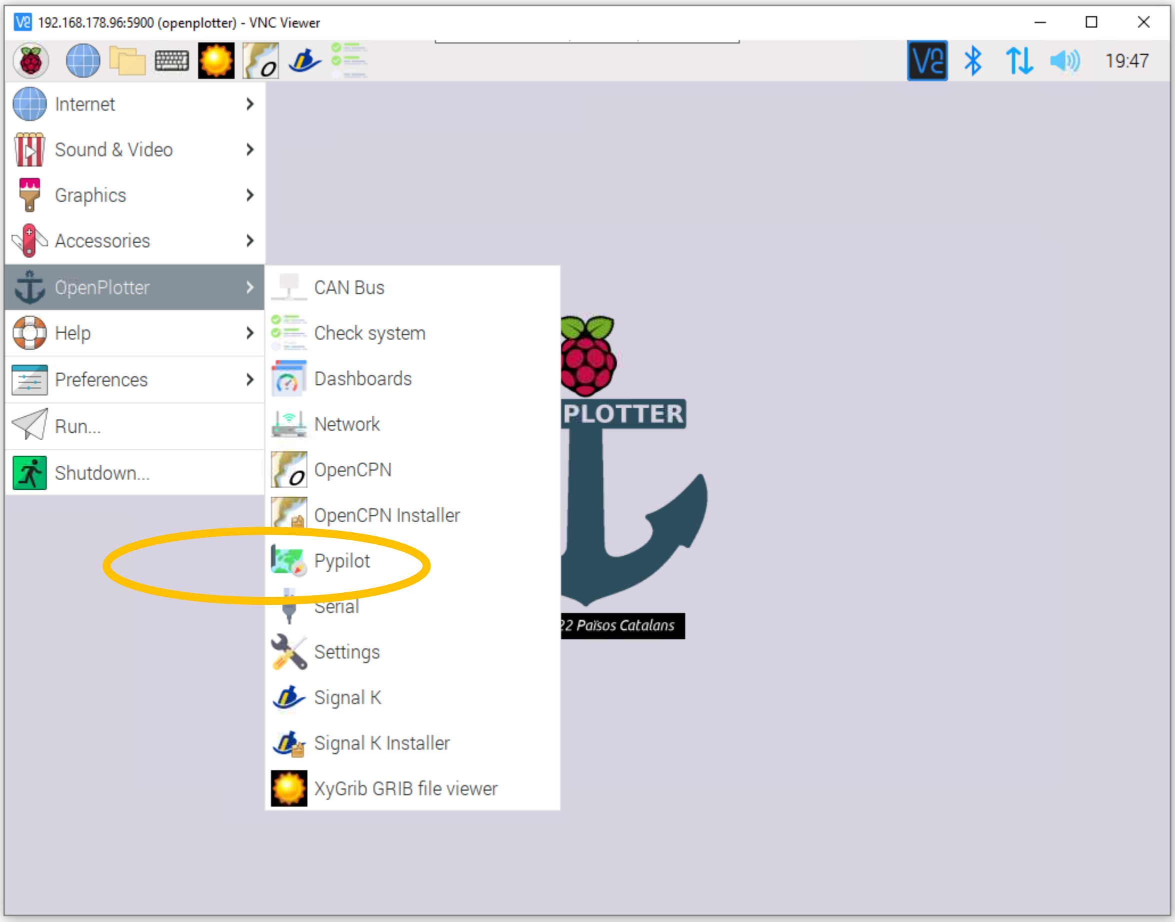
Name	Installed	Candidate	Pending tasks
Serial	3.2.0-stable	3.2.0-stable	Open to apply and refresh
CAN Bus	3.2.5-stable	3.2.5-stable	
Network	3.1.7-stable	3.1.7-stable	
…nstaller		3.0.6-beta	
Pypilot		3.1.0-beta	
I2C Sensors			
GPIO			
Notifications		3.0.6-stable	

Done

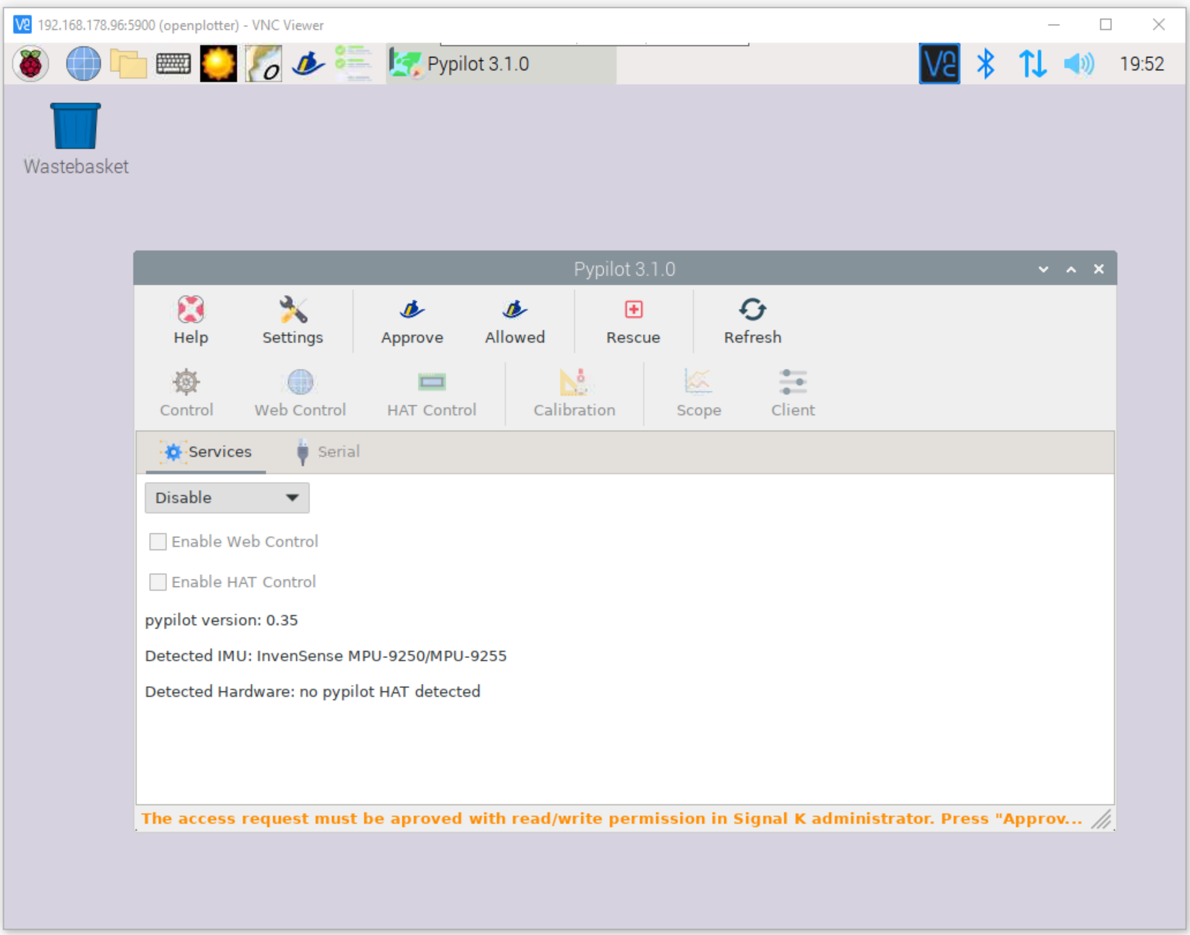
This takes an awful long time again, so you might check your email or other social media, have another cup of tea, or walk the dog.

When it's done, it says Done – press refresh. For the Refresh button, you'd need to click the OpenPlotter Apps tab again, but you can also simply close the screen at this point.

31. At this point, PyPilot will be in the OpenPlotter menu. Click it:



32. It should look like this.



□ Enable Web Control

□ Enable HAT Control

pypilot version: 0.35

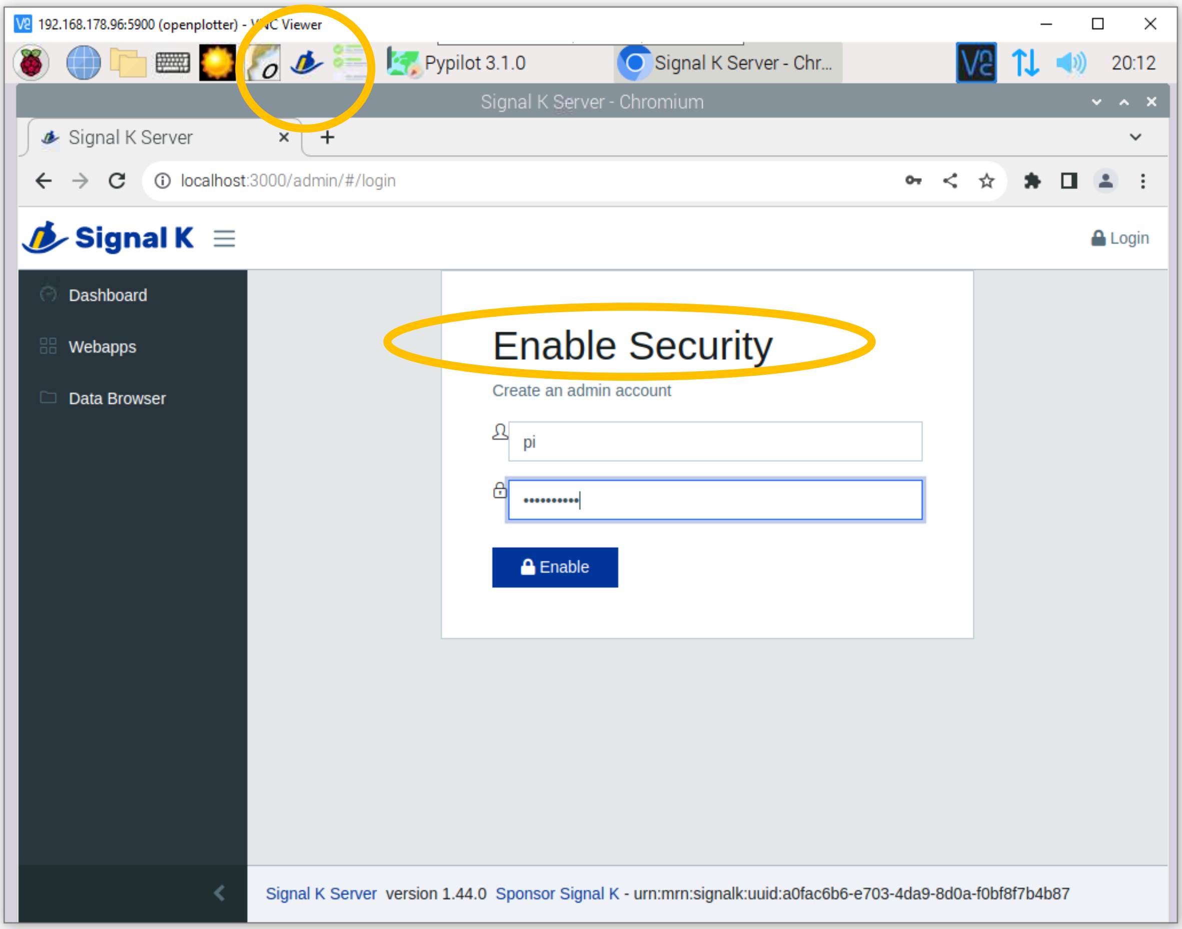
Detected IMU: InvenSense MPU-9250/MPU-9255

Detected Hardware: no pypilot HAT detected

The access request must be aproved with read/write permission in Signal K administrator. Press "Approv...

- There is a message in the footer about approving an access request in SignalK. Let’s first deal with that.

33. Hit the SignalK logo in the upper left part of the screen. When the browser pops up, click Login:


192.168.178.96:5900 (openplotter) - VNC Viewer
Pypilot 3.1.0
Signal K Server - Chr...
20:12
Signal K Server - Chromium
Signal K Server
localhost:3000/admin/#/login
Signal K
Login
Dashboard
Webapps
Data Browser

Enable Security

Create an admin account

pi

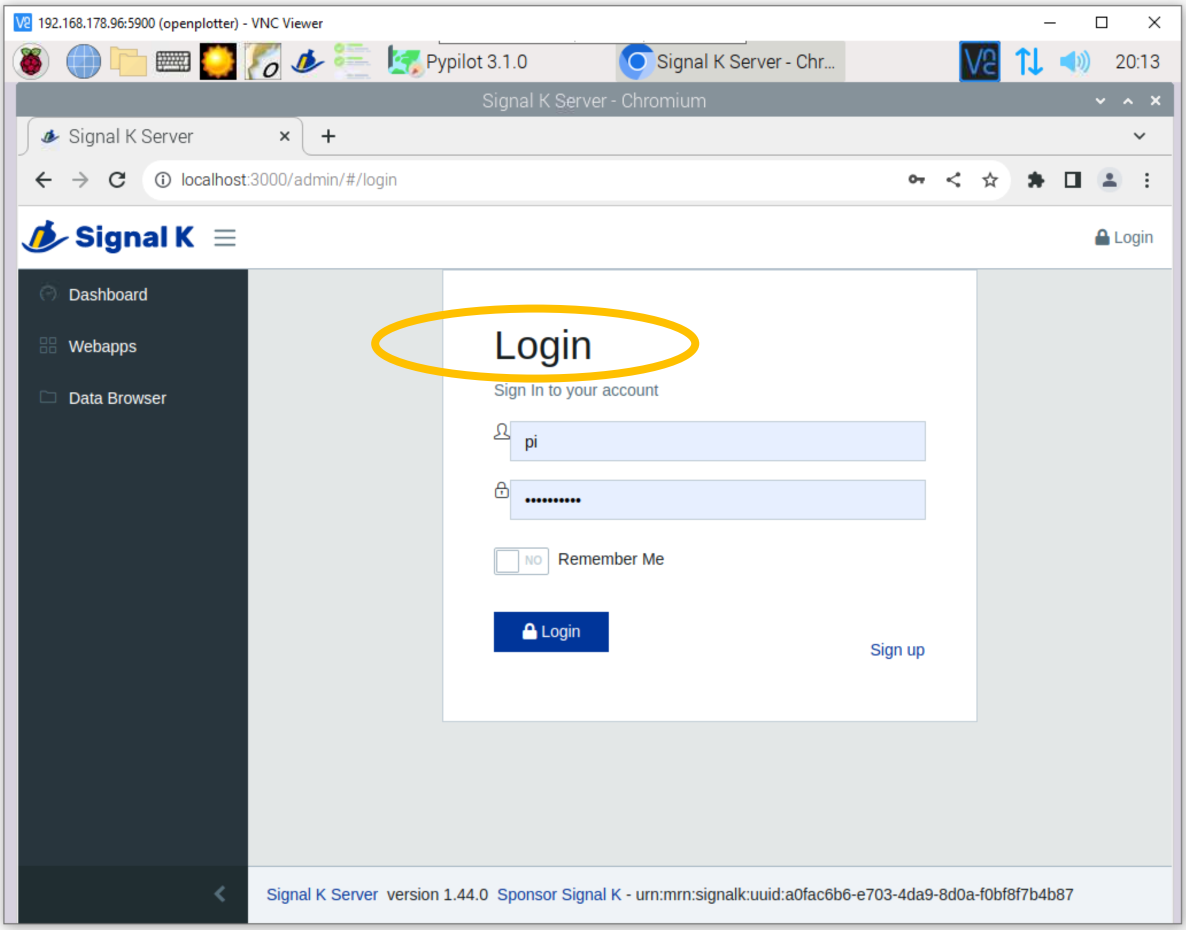
••••••••••

Enable

Signal K Server version 1.44.0 Sponsor Signal K - urn:mrn:signalk:uuid:a0fac6b6-e703-4da9-8d0a-f0bf8f7b4b87

In the Enable Security screen, it asks to *create an admin account* for SignalK. In theory, you can invent a whole new set of credentials here, but I suggest you use ‘pi’ and your favorite password again.

34. Then you need to login with those new credentials:



192.168.178.96:5900 (openplotter) - VNC Viewer
Pypilot 3.1.0
Signal K Server - Chr...
20:13
Signal K Server - Chromium
Signal K Server
localhost:3000/admin/#/login
Signal K
Login
Dashboard
Webapps
Data Browser

Login

Sign In to your account

pi

••••••••••

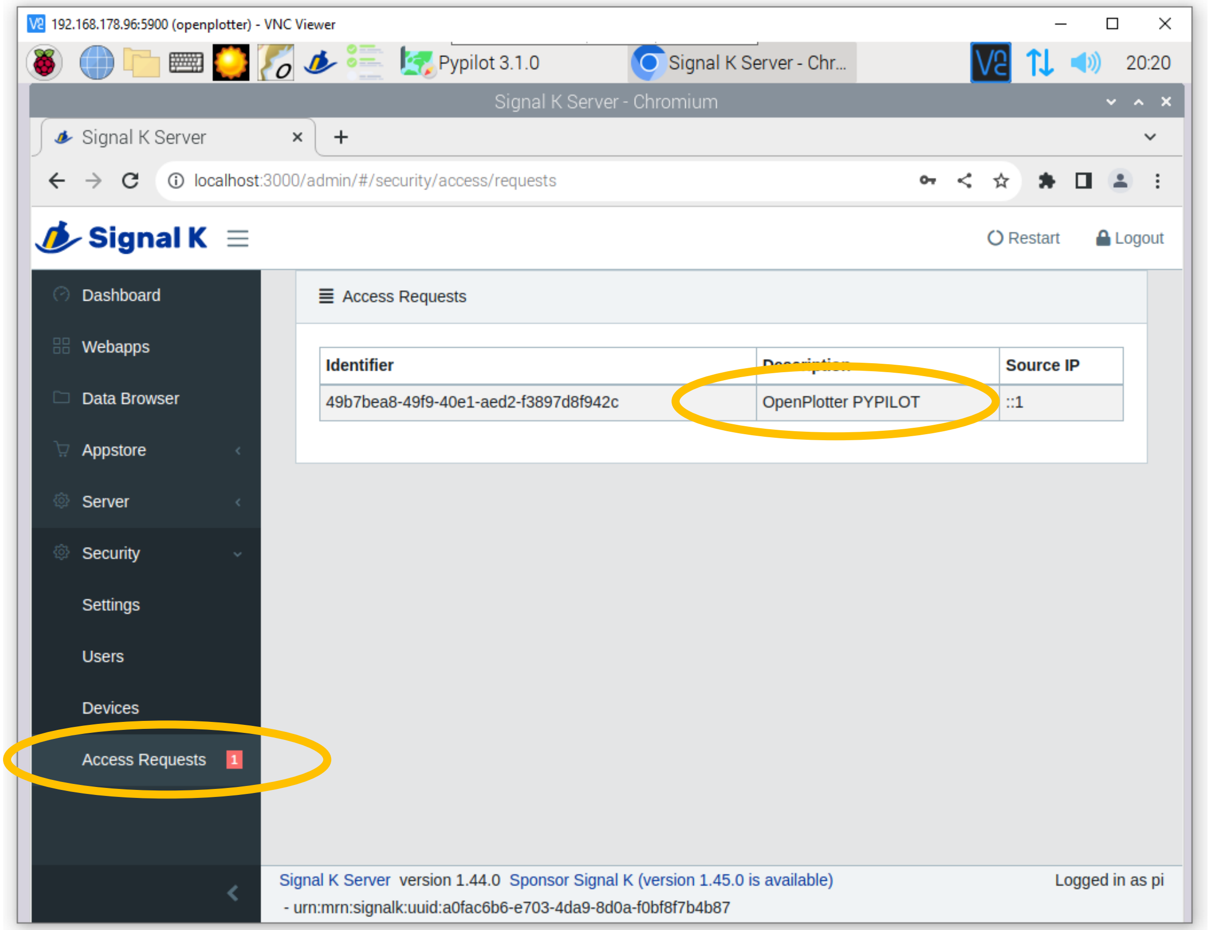
NO Remember Me

Login

Sign up

Signal K Server version 1.44.0 Sponsor Signal K - urn:mrn:signalk:uuid:a0fac6b6-e703-4da9-8d0a-f0bf8f7b4b87

35. Then, under Access Requests, you will find an entry Openplotter PYPILOT:

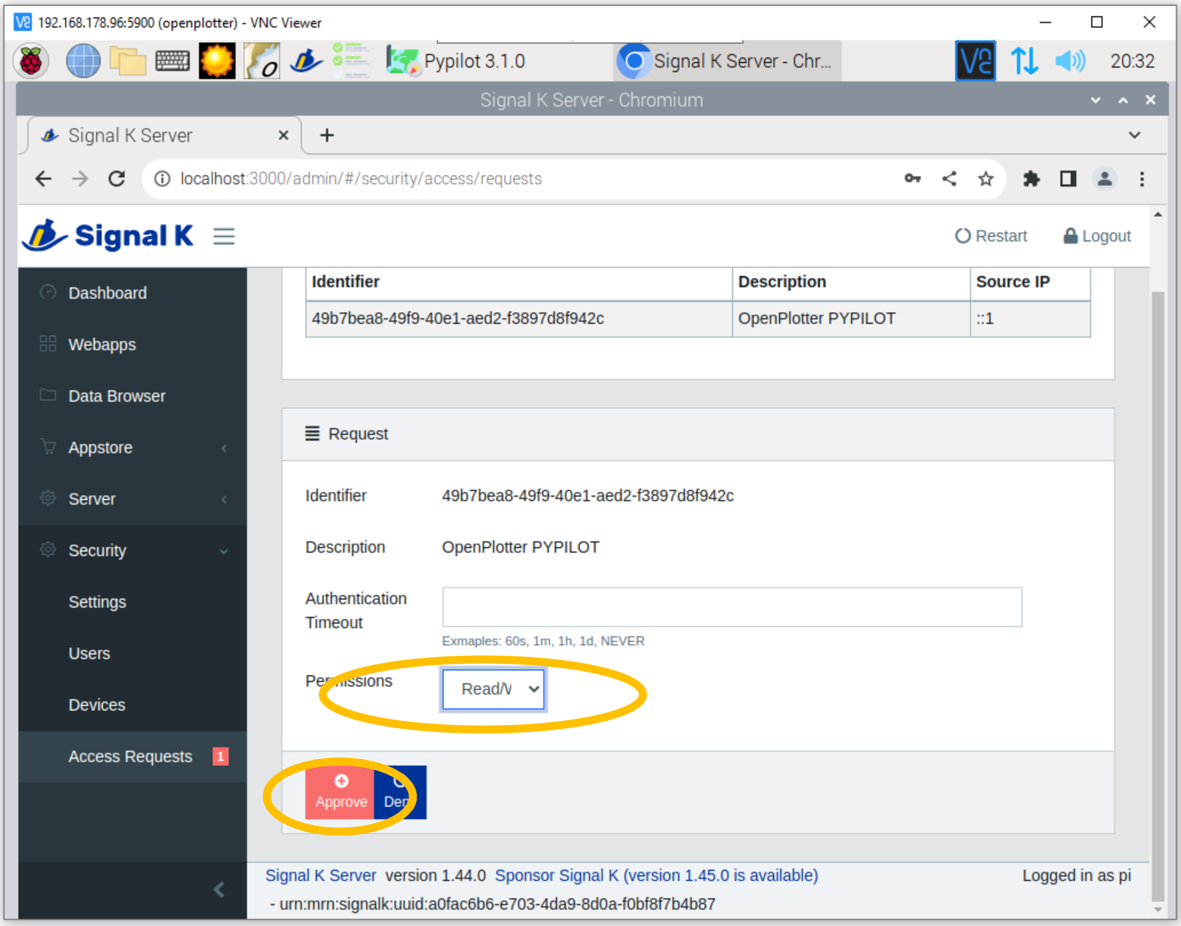


Access Requests

Identifier	Description	Source IP
49b7bea8-49f9-40e1-aed2-f3897d8f942c	OpenPlotter PYPILOT	::1

Signal K Server version 1.44.0 Sponsor Signal K (version 1.45.0 is available) Logged in as pi
- urn:mrn:signalk:uuid:a0fac6b6-e703-4da9-8d0a-f0bf8f7b4b87

36. Click it, and approve with Read/Write permissions. Click OK.



Identifier	Description	Source IP
49b7bea8-49f9-40e1-aed2-f3897d8f942c	OpenPlotter PYPILOT	::1

Request

Identifier 49b7bea8-49f9-40e1-aed2-f3897d8f942c

Description OpenPlotter PYPILOT

Authentication Timeout

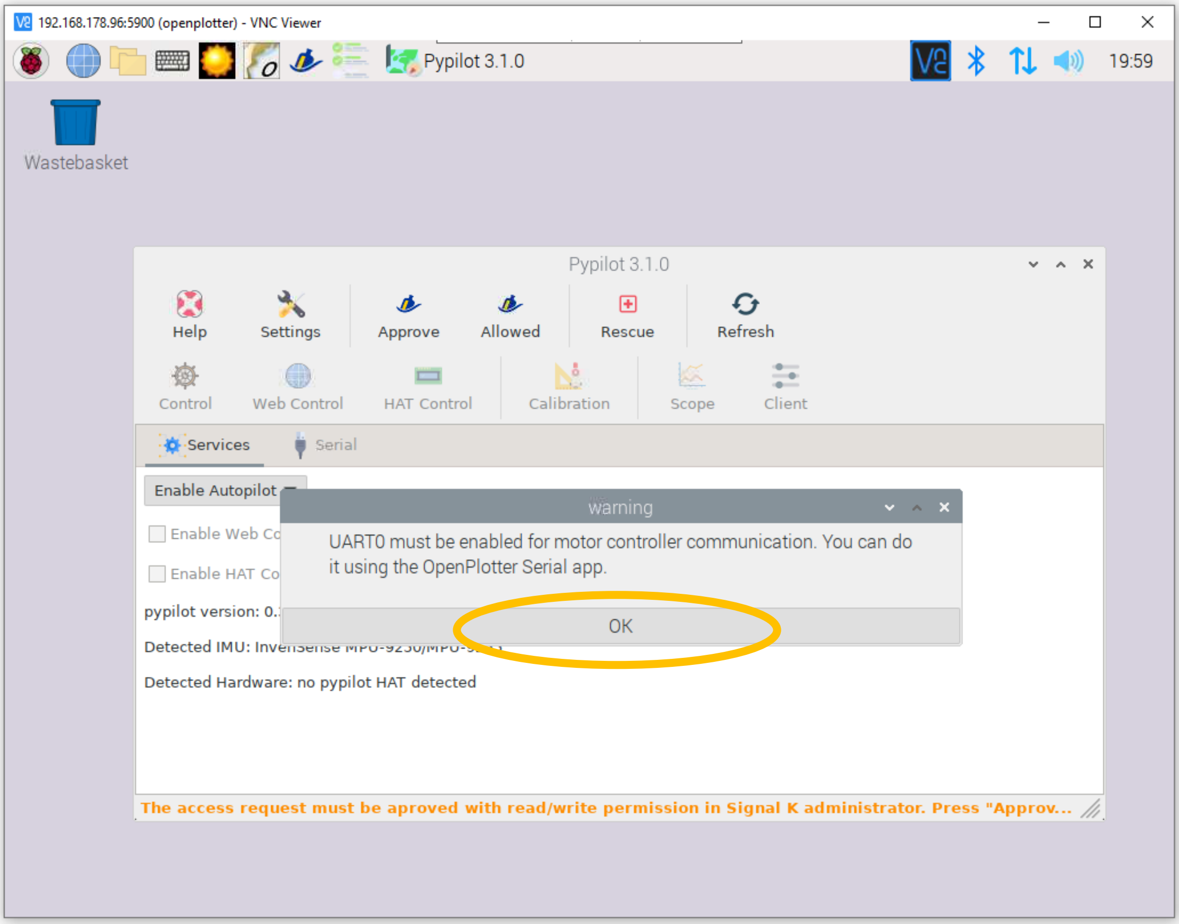
Exmaples: 60s, 1m, 1h, 1d, NEVER

Permissions Read/V

Signal K Server version 1.44.0 Sponsor Signal K (version 1.45.0 is available) Logged in as pi

- urn:mrn:signalk:uuid:a0fac6b6-e703-4da9-8d0a-f0bf8f7b4b87

37. When you Enable Autopilot, it will pop up this message:



pypilot version: 0.

Detected IMU: InvenSense MPU-9250/MPU-9

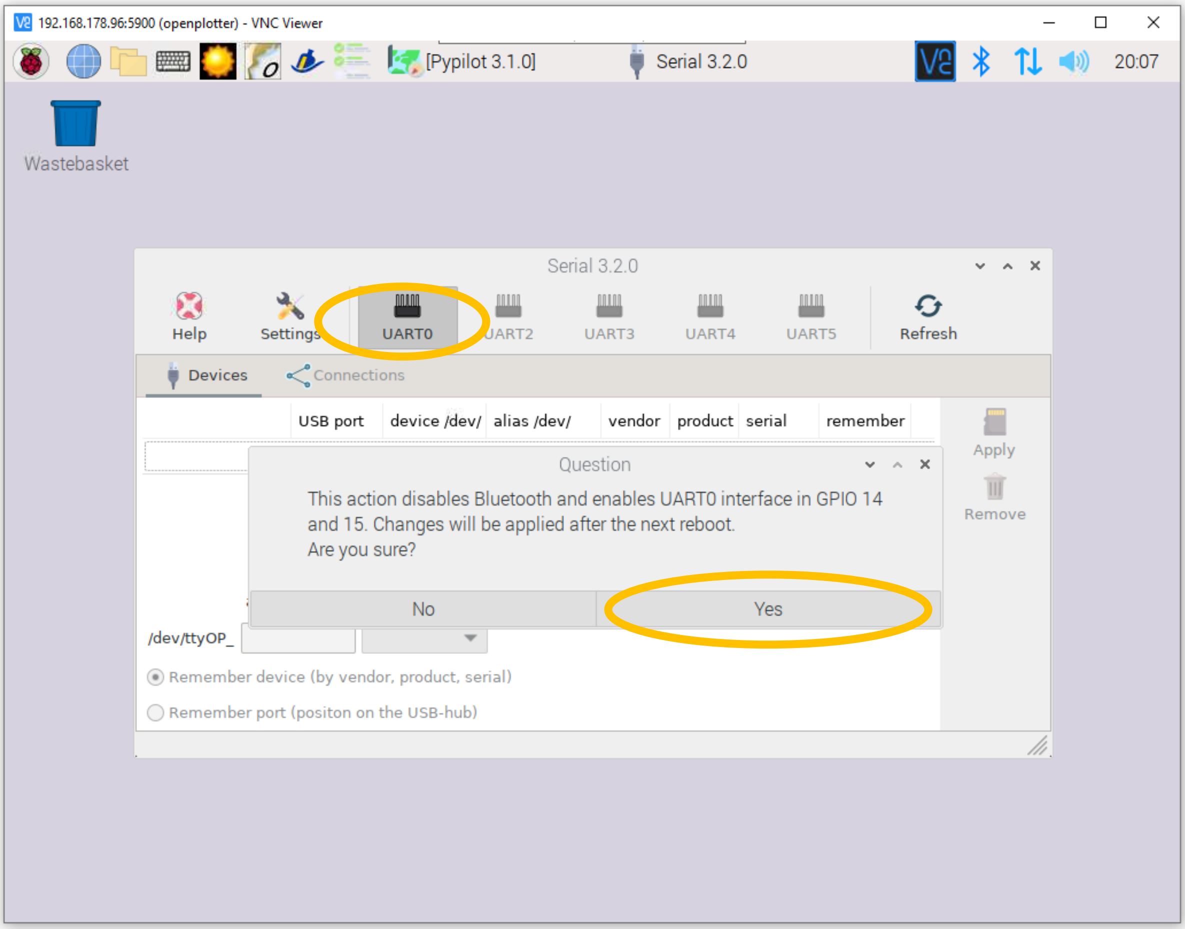
Detected Hardware: no pypilot HAT detected

UART0 must be enabled for motor controller communication. You can do it using the OpenPlotter Serial app.

The access request must be aproved with read/write permission in Signal K administrator. Press "Approv...

This is a bit of a bummer but there is a good reason for it so better get it over and done with.

38. Choose Raspberry → OpenPlotter → Serial, and UART0. The following disheartening message appears. Click Yes and reboot your Pi (Raspberry → Shutdown → Reboot):

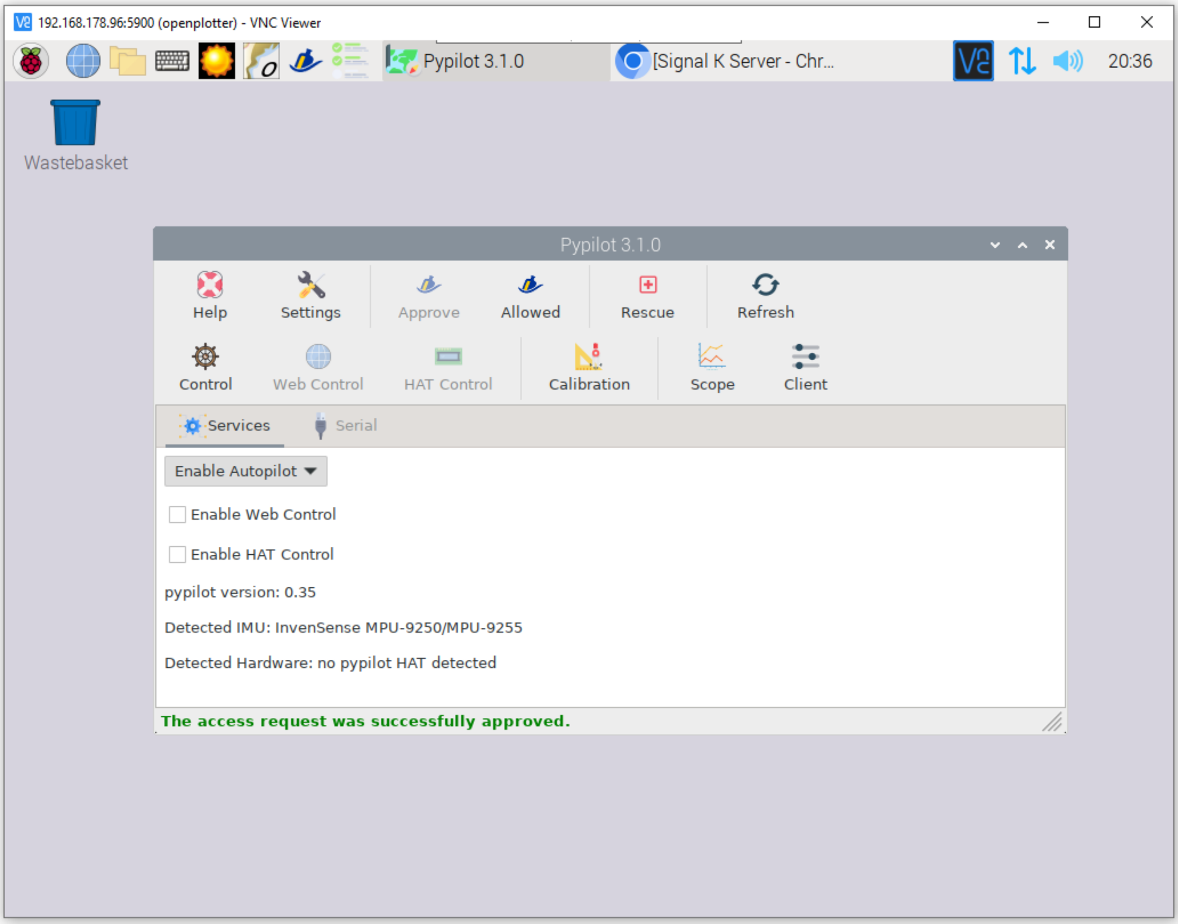


This action disables Bluetooth and enables UART0 interface in GPIO 14 and 15. Changes will be applied after the next reboot.
Are you sure?

● Remember device (by vendor, product, serial)

○ Remember port (positon on the USB-hub)

39. Then, finally, when you start the PyPilot app again, you are able to Enable Autopilot:



□ Enable Web Control

□ Enable HAT Control

pypilot version: 0.35

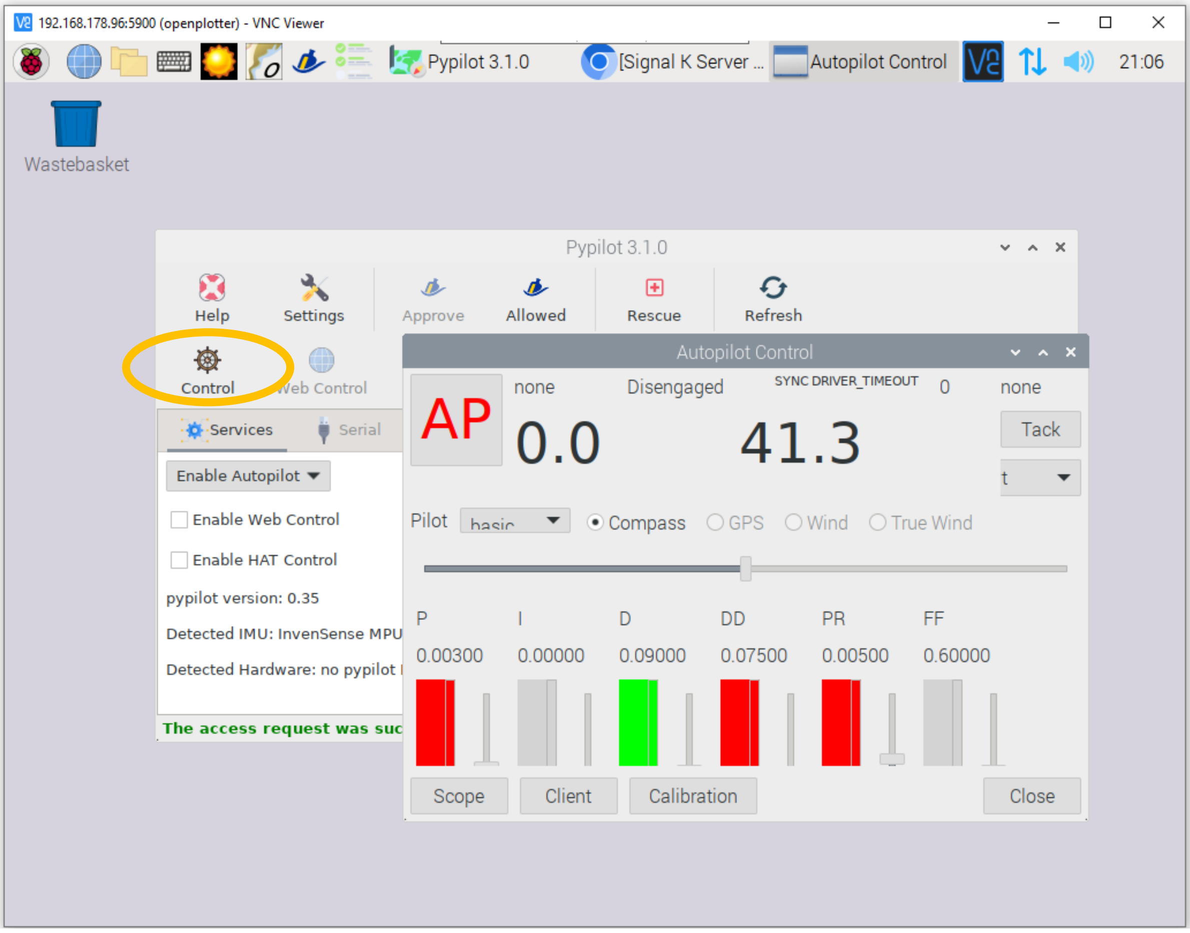
Detected IMU: InvenSense MPU-9250/MPU-9255

Detected Hardware: no pypilot HAT detected

The access request was successfully approved.

This is the moment you have been waiting for: PyPilot is running. Let's see it working!

40. Hit the Control button:



□ Enable Web Control

□ Enable HAT Control

pypilot version: 0.35

Detected IMU: InvenSense MPU

Detected Hardware: no pypilot

The access request was suc

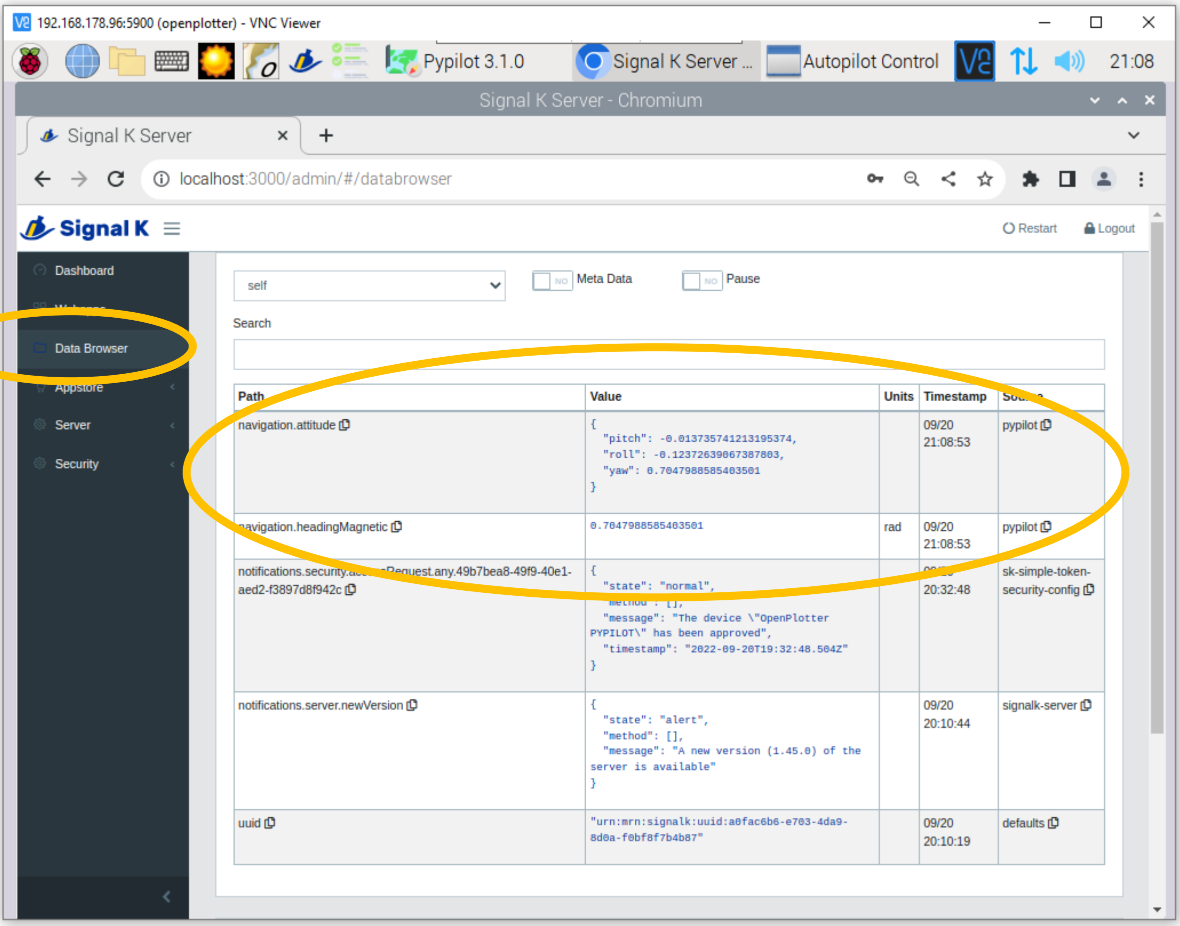
none	Disengaged	SYNC DRIVER_TIMEOUT	0	none
0.0		41.3		

● Compass ○ GPS ○ Wind ○ True Wind

P	I	D	DD	PR	FF
0.00300	0.00000	0.09000	0.07500	0.00500	0.60000

You will see a compass reading (41.3 degrees in this case).

41. In SignalK Data Browser you will see pypilot data flowing in:



Path	Value	Units	Timestamp	Source

navigation.attitude	{
	"pitch": -0.013735741213195374,
	"roll": -0.12372639067387803,
	"yaw": 0.7047988585403501
	}
			09/20
			21:08:53
				pypilot

navigation.headingMagnetic	0.7047988585403501	rad	09/20 21:08:53	pypilot

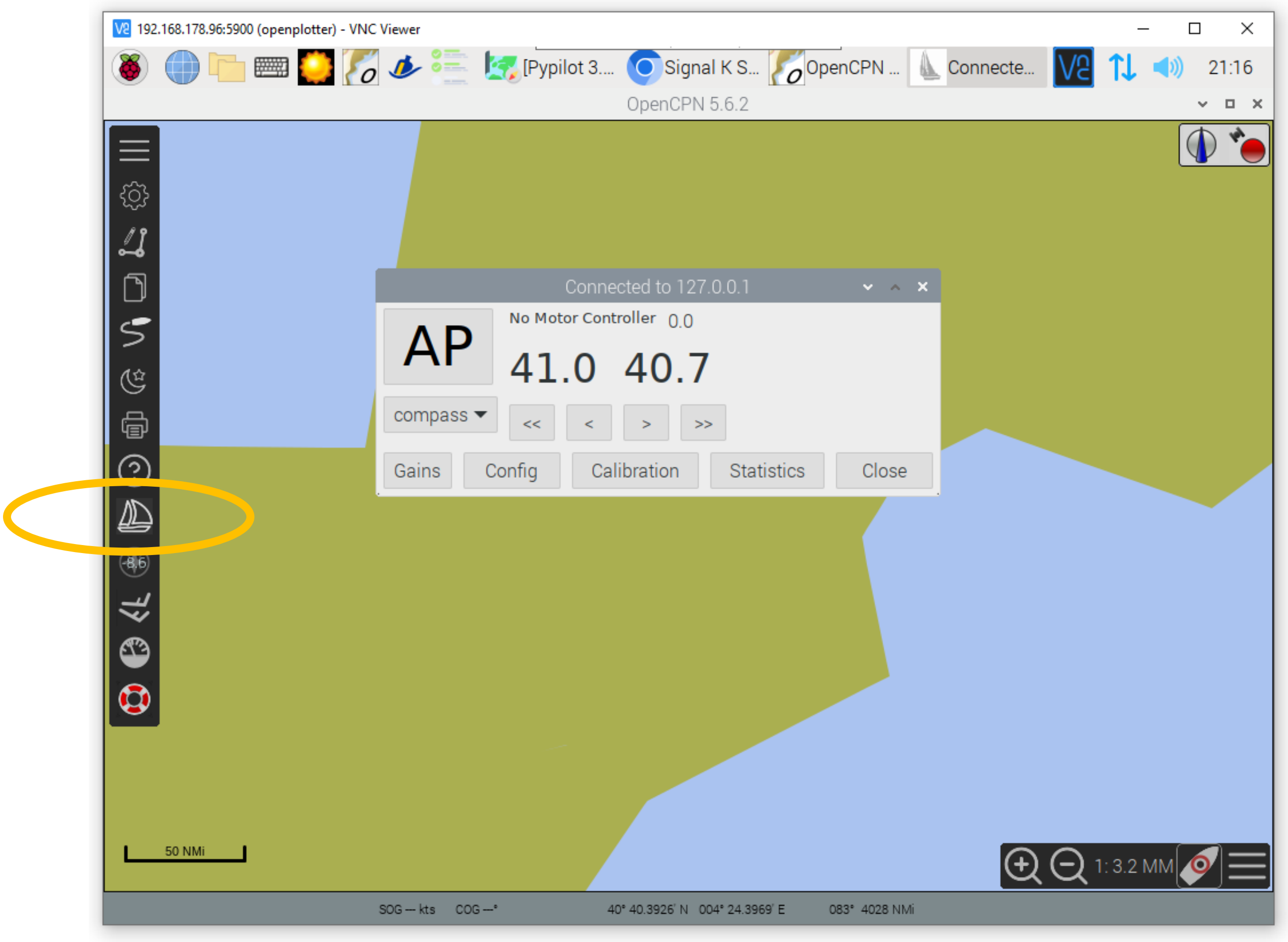
notifications.security.accessRequest.any.49b7bea8-49f9-40e1-aed2-f3897d8f942c	{
	"state": "normal",
	"method": [],
	"message": "The device \"OpenPlotter PYPILOT\" has been approved",
	"timestamp": "2022-09-20T19:32:48.504Z"
	}
			09/20
			20:32:48
				sk-simple-token-security-config

notifications.server.newVersion	{
	"state": "alert",
	"method": [],
	"message": "A new version (1.45.0) of the server is available"
	}
			09/20
			20:10:44
				signalk-server

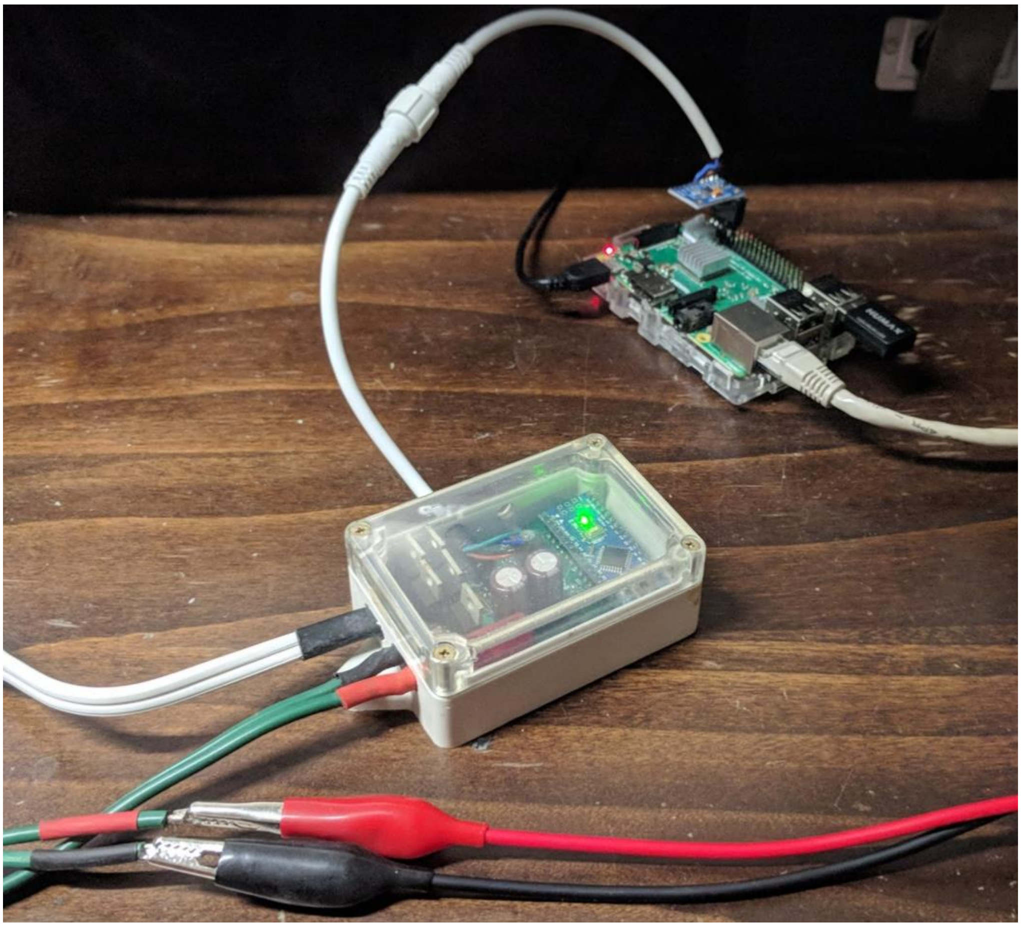
uuid	"urn:mrn:signalk:uuid:a0fac6b6-e703-4da9-8d0a-f0bf8f7b4b87"		09/20 20:10:19	defaults

If you don’t see pypilot data, check whether you have approved the Access Request with Read/**Write** permission in step 36. The already approved device is now in SignalK → Security → Devices.

42. Now go to OpenCPN and install the OpenCPN PyPilot plugin:
    a. OpenCPN → Options → Plugins
    b. Update Plugin Catalog: Master
    c. Scroll to PyPilot, click it, click Install
    d. Click the PyPilot plugin:

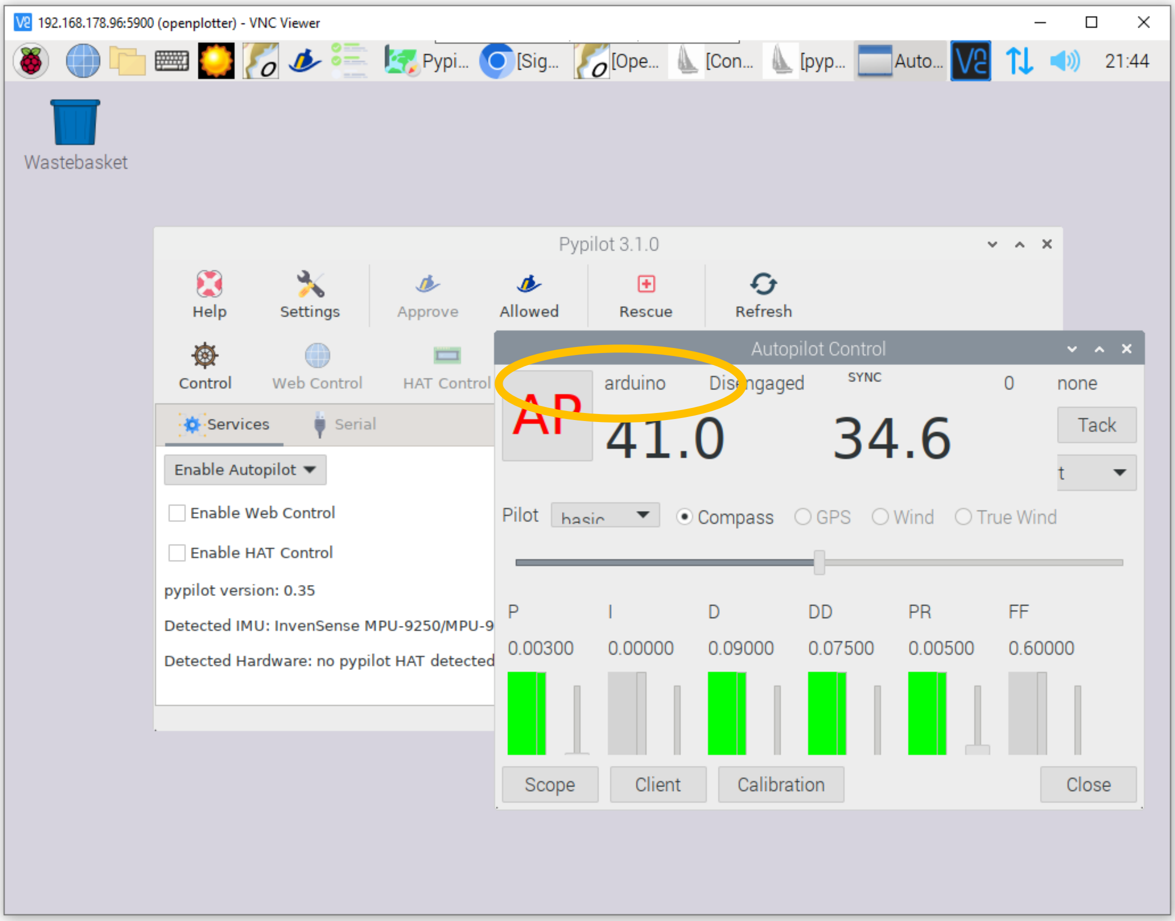


43. If you have a motor controller, connect it to the raspberry, and power it up with 12V:



The Tx/Rx LED’s on the Arduino should start flickering. Depicted is hardware purchased from the pypilot.org store. In case you produced the hardware yourself, remember that for a serial connection, Tx should be connected to Rx and vice versa.

44. You will then see the motor controller appear:



192.168.178.96:5900 (openplotter) - VNC Viewer

Pypilot 3.1.0

Services

Enable Autopilot

□ Enable Web Control

□ Enable HAT Control

pypilot version: 0.35

Detected IMU: InvenSense MPU-9250/MPU-9

Detected Hardware: no pypilot HAT detected

Autopilot Control

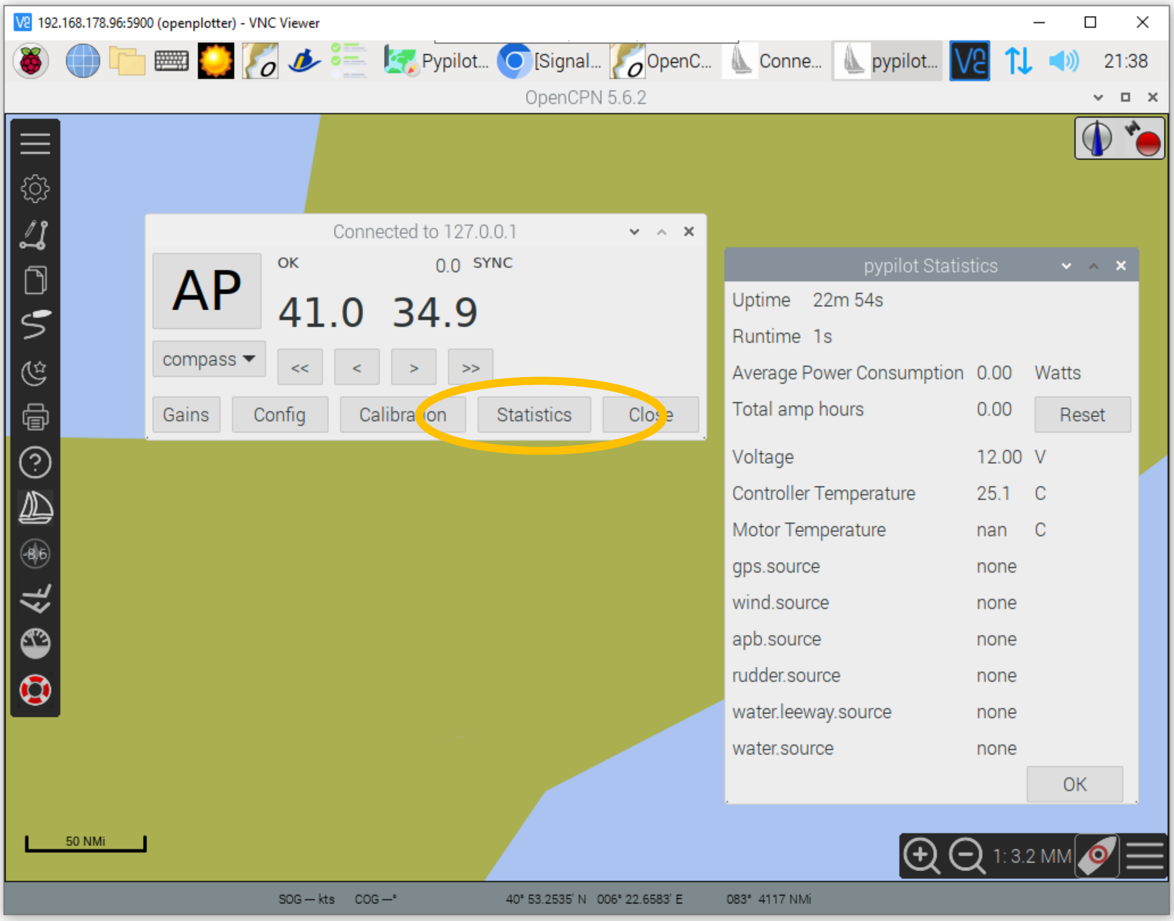
arduino Disengaged SYNC 0 none

AP 41.0 34.6

Pilot basic ● Compass ○ GPS ○ Wind ○ True Wind

P	I	D	DD	PR	FF
0.00300	0.00000	0.09000	0.07500	0.00500	0.60000

45. And in the OpenCPN plugin you can find some controller statistics:



Uptime 22m 54s

Runtime 1s

Average Power Consumption	0.00	Watts
Total amp hours	0.00	
Voltage	12.00	V
Controller Temperature	25.1	C
Motor Temperature	nan	C
gps.source	none	
wind.source	none	
apb.source	none	
rudder.source	none	
water.leeway.source	none	
water.source	none	

46. You can now start playing around; for instance attach a motor to the controller and see how it reacts to movements of the IMU.

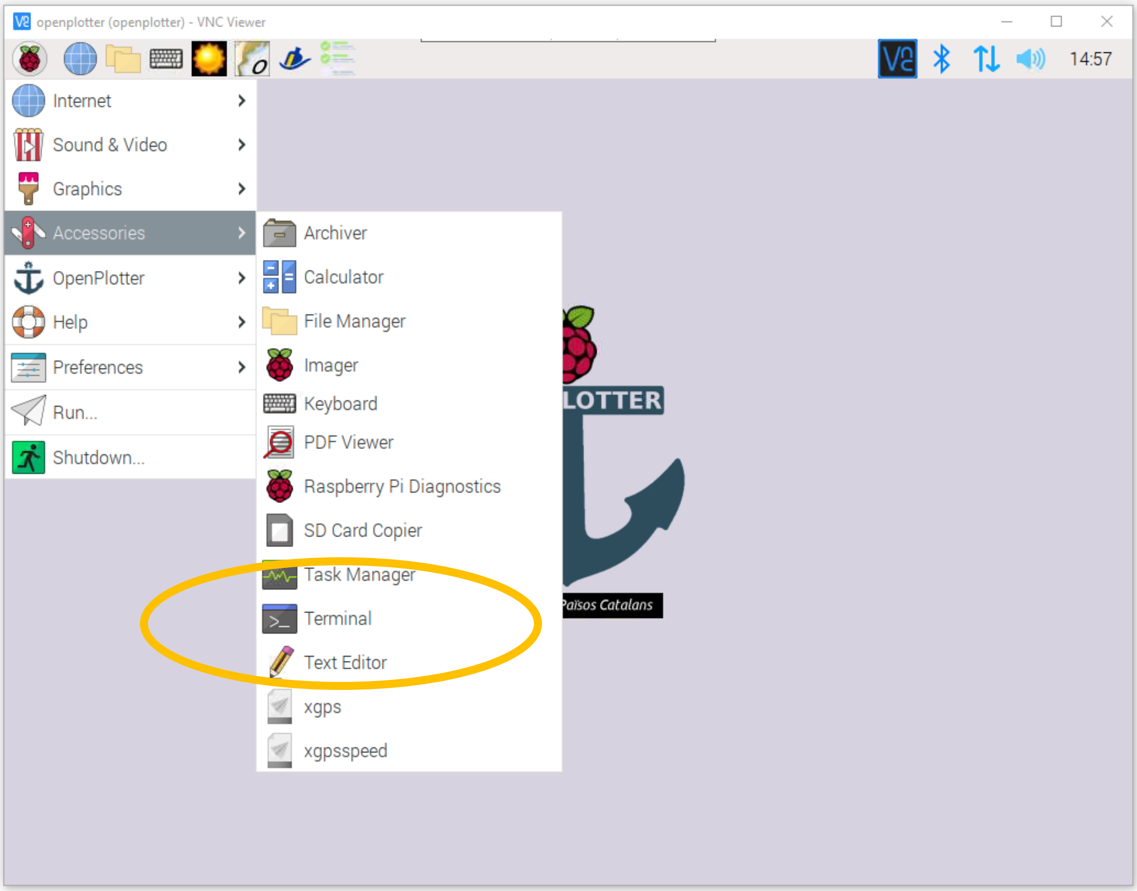
Some notes:

- When the Web control is enabled, the interface is available on port 8080, e.g. browse to http://10.10.10.1:8080
- The HAT control be not enabled when no Pypilot HAT is attached. This seems incorrect; even without PyPilot HAT it should be possible to enable the service to assign raspberry GPIO pins or IR codes to keys. It is possible to start the service manually using `pypilot_hat 127.0.0.1`; the interface then becomes available on port 33333, e.g. http://10.10.10.1:33333

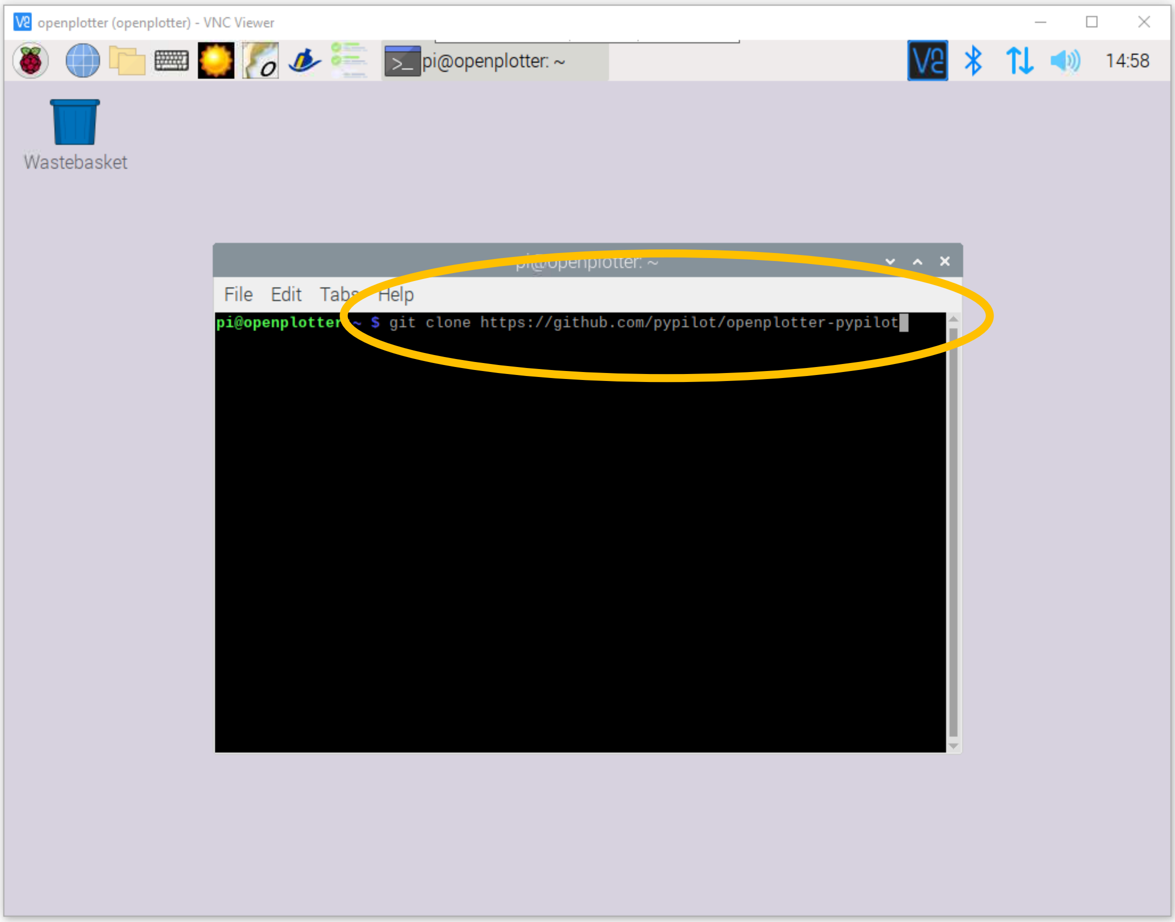
Alternative installation of openplotter-pypilot

Another alternative version of openplotter-pypilot can be installed from Github. This version is expected to be merged with the OpenPlotter version in due time. The following examples are taken from the 04-SEP-2022 commit from github.

47. Choose Accessories → Terminal:



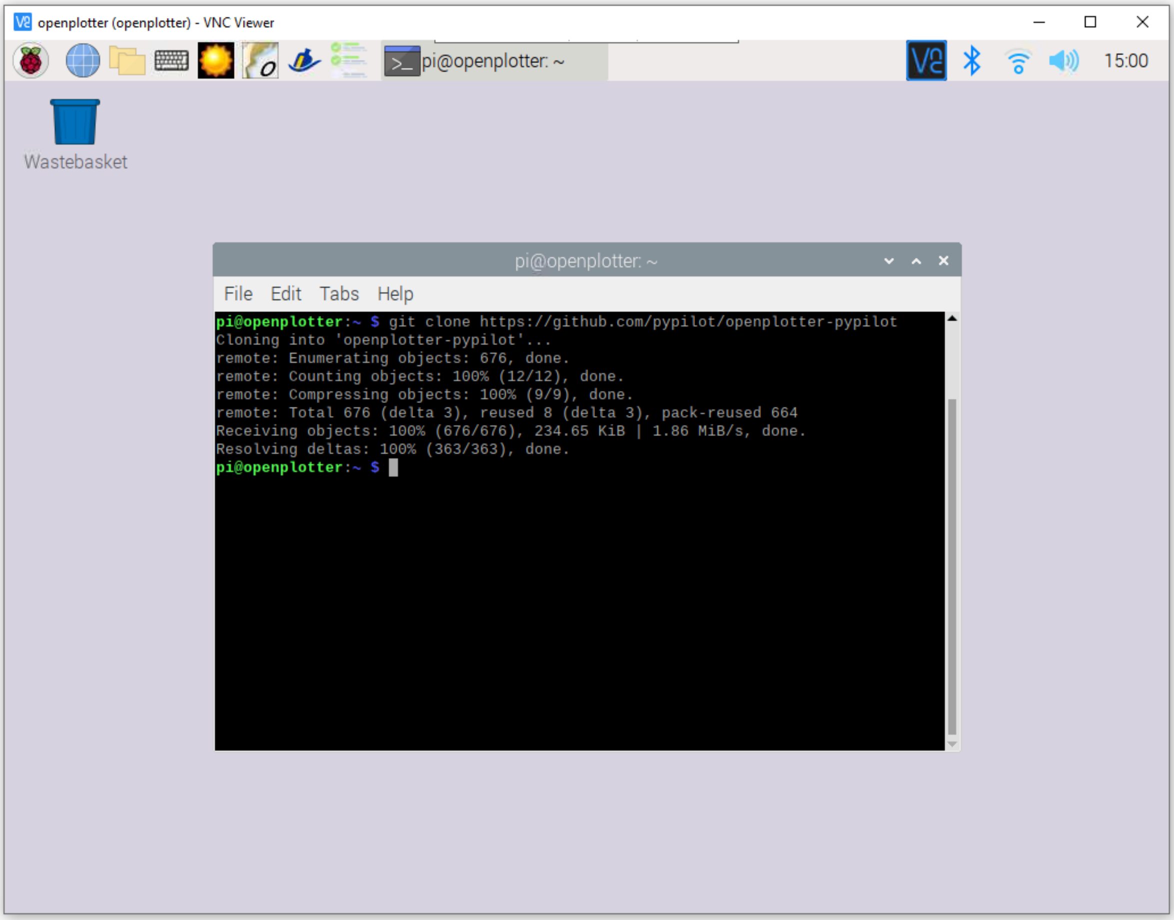
48. Type the 4 (!) commands from the release notes https://forum.openmarine.net/showthread.php?tid=4210&pid=23542#pid23542. If you are on VNC Viewer, you can copy them and use Edit → Paste:



```
pi@openplotter:~ $ git clone https://github.com/pypilot/openplotter-pypilot
```

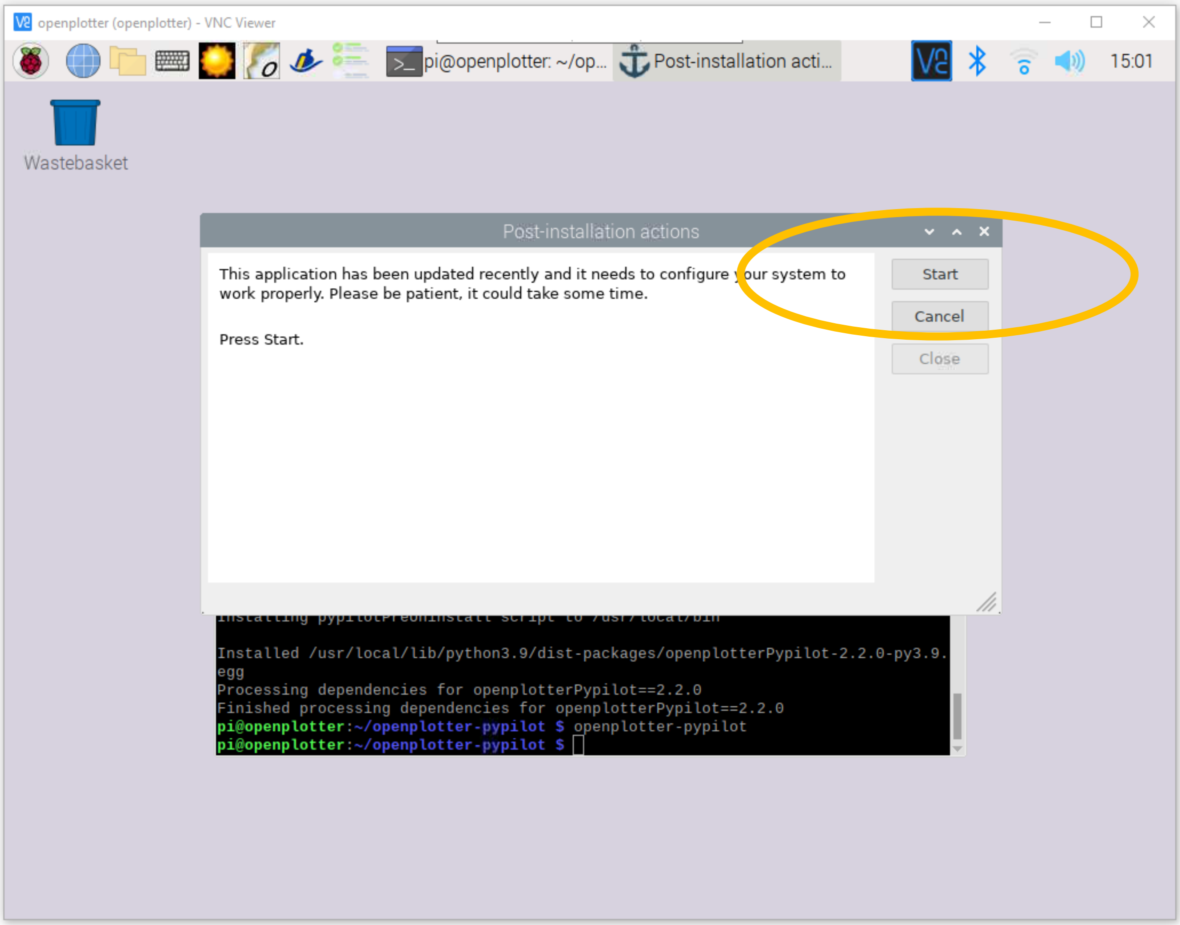
The 4 commands are:

```
git clone https://github.com/pypilot/openplotter-pypilot
cd openplotter-pypilot
sudo python3 setup.py install
openplotter-pypilot
```



```
pi@openplotter:~ $ git clone https://github.com/pypilot/openplotter-pypilot
Cloning into 'openplotter-pypilot'...
remote: Enumerating objects: 676, done.
remote: Counting objects: 100% (12/12), done.
remote: Compressing objects: 100% (9/9), done.
remote: Total 676 (delta 3), reused 8 (delta 3), pack-reused 664
Receiving objects: 100% (676/676), 234.65 KiB | 1.86 MiB/s, done.
Resolving deltas: 100% (363/363), done.
pi@openplotter:~ $
```

49. These 4 commands go very quick. When you start openplotter-pypilot for the first time, you need to click start to install pypilot itself. This takes quite a while.

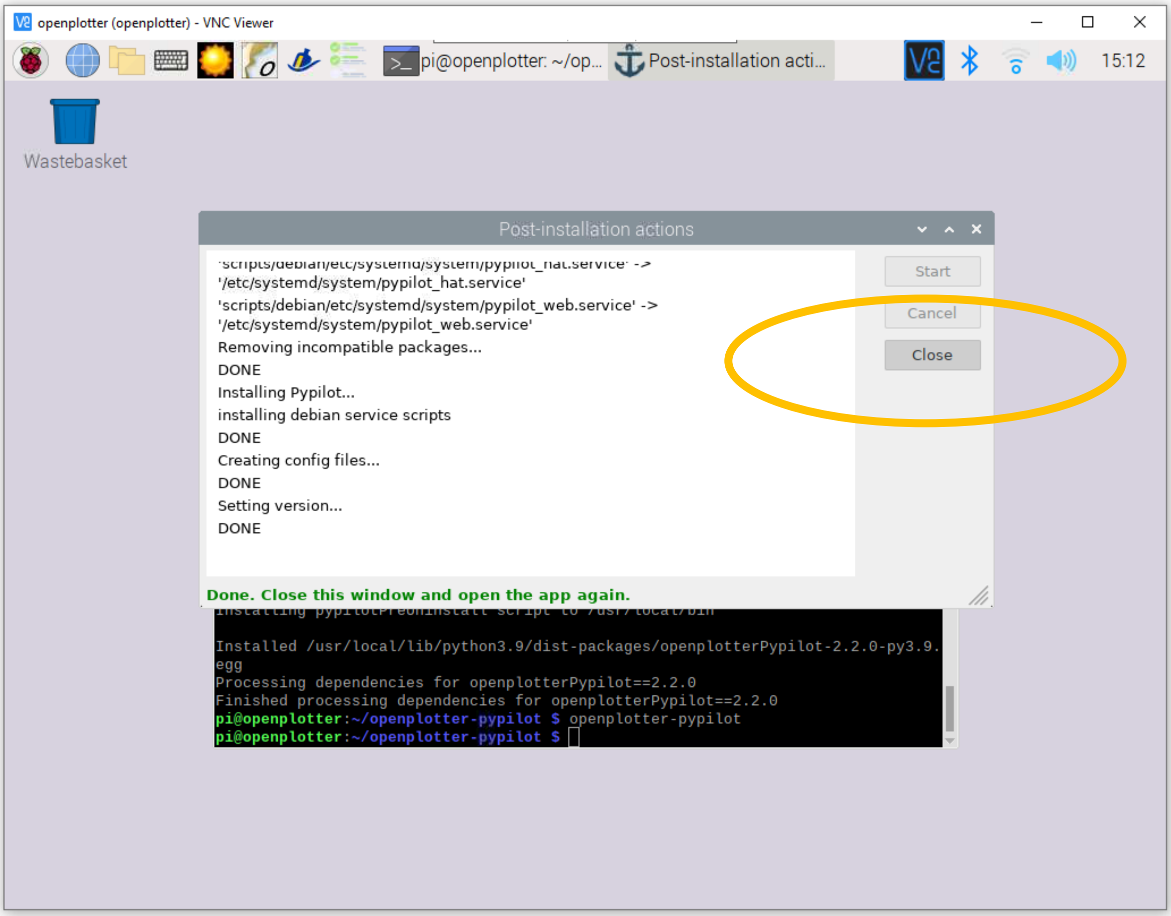

openplotter (openplotter) - VNC Viewer
pi@openplotter: ~/op...
Post-installation acti...
15:01
Wastebasket
Post-installation actions
Start
Cancel
Close

This application has been updated recently and it needs to configure your system to work properly. Please be patient, it could take some time.

Press Start.

```
Installing pypilotPreUninstall script to /usr/local/bin

Installed /usr/local/lib/python3.9/dist-packages/openplotterPypilot-2.2.0-py3.9.
egg
Processing dependencies for openplotterPypilot==2.2.0
Finished processing dependencies for openplotterPypilot==2.2.0
pi@openplotter:~/openplotter-pypilot $ openplotter-pypilot
pi@openplotter:~/openplotter-pypilot $ 
```

50. After it succeeds, you must close and start again:



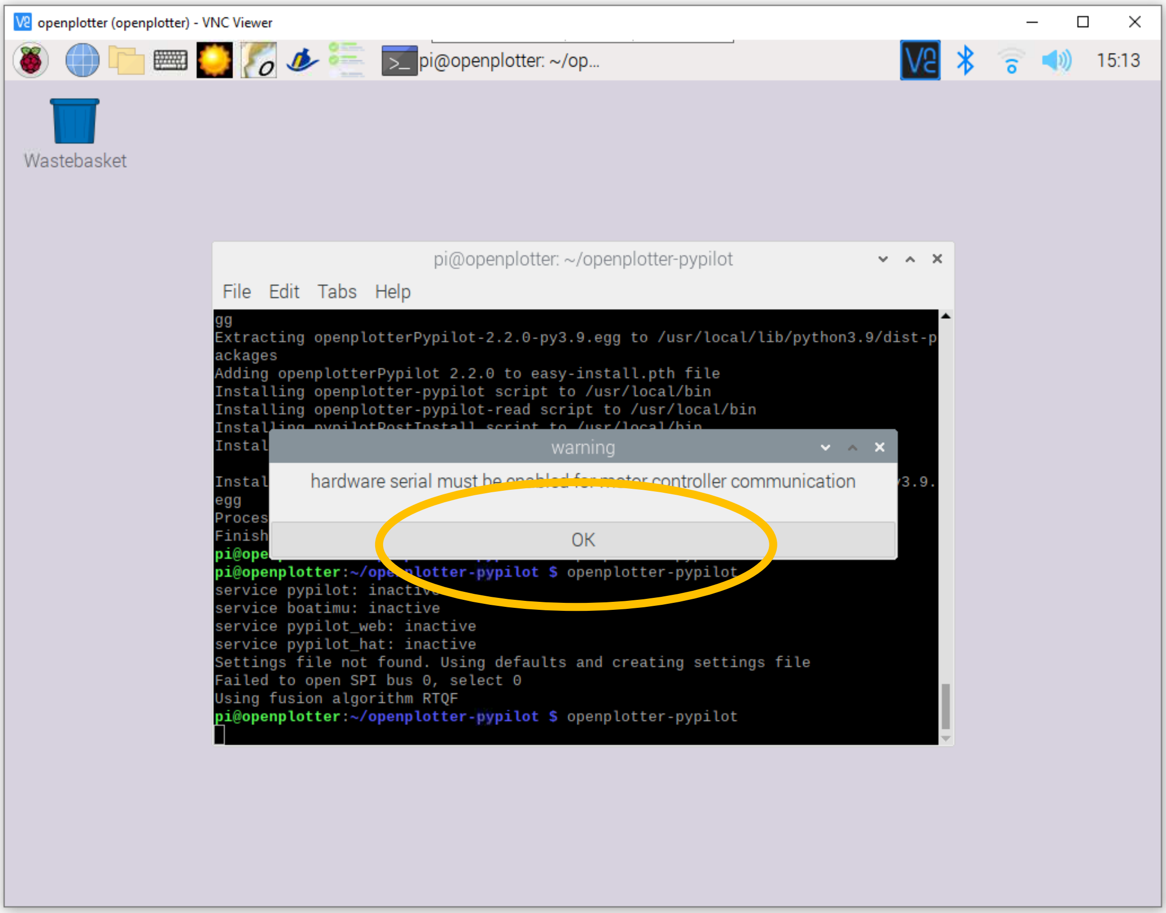
openplotter (openplotter) - VNC Viewer
pi@openplotter: ~/op...
Post-installation acti...
15:12
Wastebasket
Post-installation actions
Start
Cancel
Close

```
'scripts/debian/etc/systemd/system/pypilot_hat.service' ->
'/etc/systemd/system/pypilot_hat.service'
'scripts/debian/etc/systemd/system/pypilot_web.service' ->
'/etc/systemd/system/pypilot_web.service'
Removing incompatible packages...
DONE
Installing Pypilot...
installing debian service scripts
DONE
Creating config files...
DONE
Setting version...
DONE
```

Done. Close this window and open the app again.

```
Installing pypilotPreUninstall script to /usr/local/bin

Installed /usr/local/lib/python3.9/dist-packages/openplotterPypilot-2.2.0-py3.9.
egg
Processing dependencies for openplotterPypilot==2.2.0
Finished processing dependencies for openplotterPypilot==2.2.0
pi@openplotter:~/openplotter-pypilot $ openplotter-pypilot
pi@openplotter:~/openplotter-pypilot $ 
```

51. When I restarted, I got this message. Which was weird, because I thought I did that in step 14:


openplotter (openplotter) - VNC Viewer
pi@openplotter: ~/op...
15:13
Wastebasket
pi@openplotter: ~/openplotter-pypilot
File
Edit
Tabs
Help

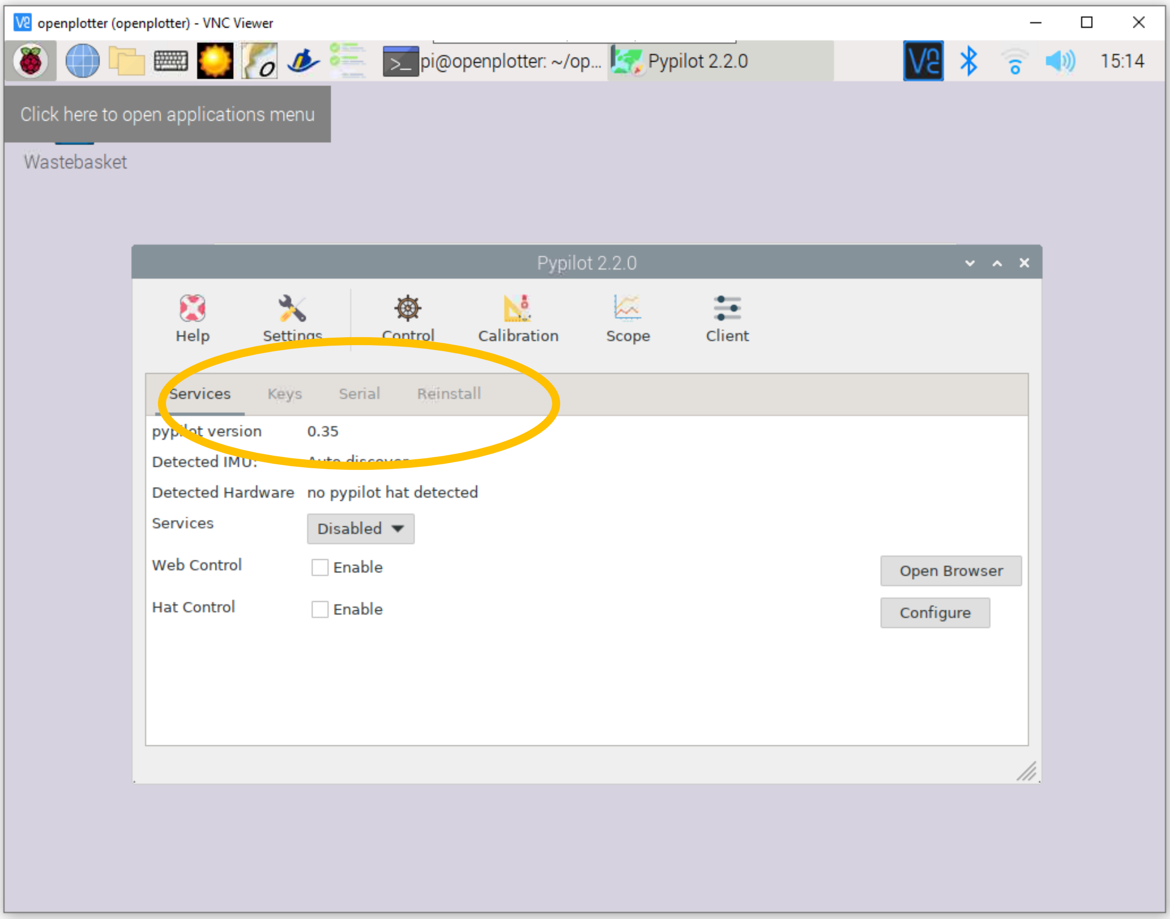
```
gg
Extracting openplotterPypilot-2.2.0-py3.9.egg to /usr/local/lib/python3.9/dist-p
ackages
Adding openplotterPypilot 2.2.0 to easy-install.pth file
Installing openplotter-pypilot script to /usr/local/bin
Installing openplotter-pypilot-read script to /usr/local/bin
Installing pypilotPostInstall script to /usr/local/bin
Instal

Instal                                                                      3.9.
egg
Proces
Finish
pi@ope
pi@openplotter:~/openplotter-pypilot $ openplotter-pypilot
service pypilot: inactive
service boatimu: inactive
service pypilot_web: inactive
service pypilot_hat: inactive
Settings file not found. Using defaults and creating settings file
Failed to open SPI bus 0, select 0
Using fusion algorithm RTQF
pi@openplotter:~/openplotter-pypilot $ openplotter-pypilot
```

warning

hardware serial must be enabled for motor controller communication

OK

52. Anyway, there appears to be a tab called serial:



pypilot version 0.35

Detected IMU: Auto discover

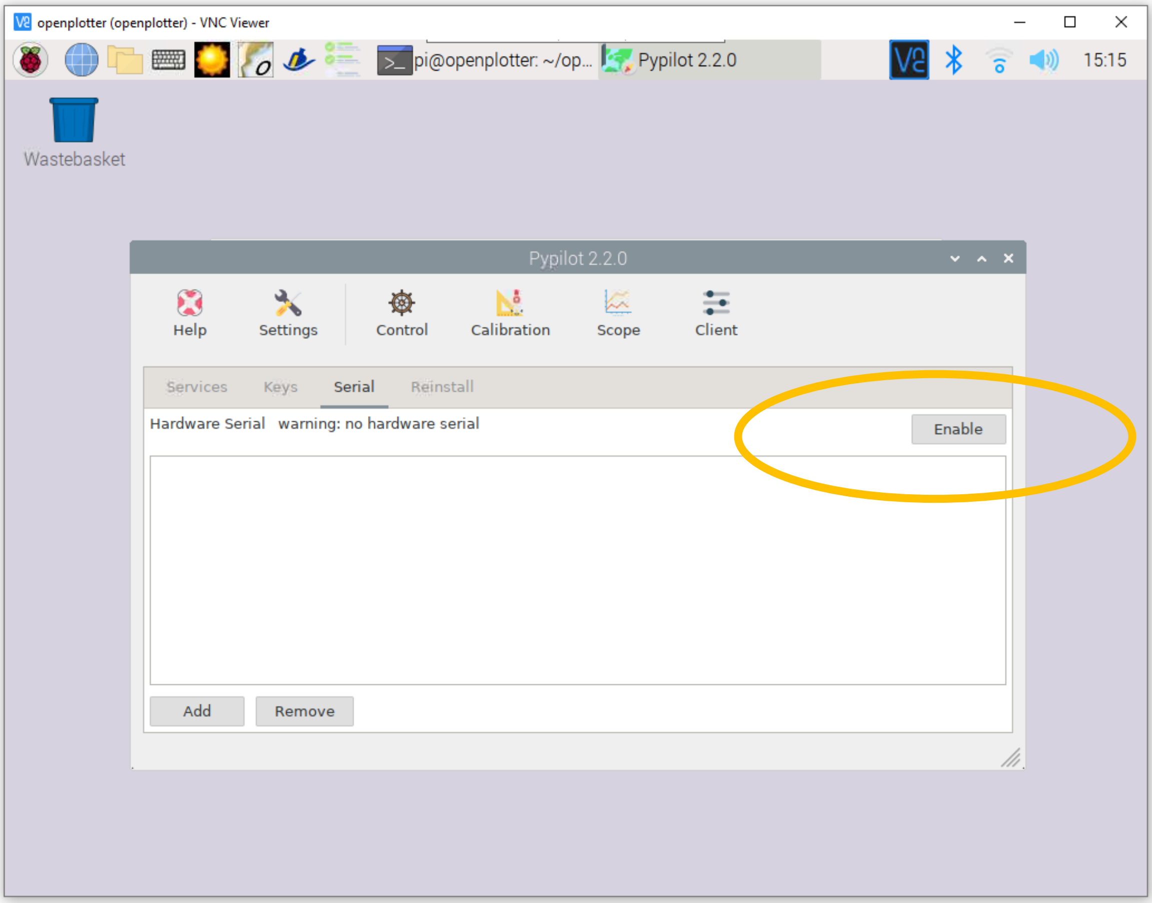
Detected Hardware no pypilot hat detected

Services Disabled

Web Control □ Enable

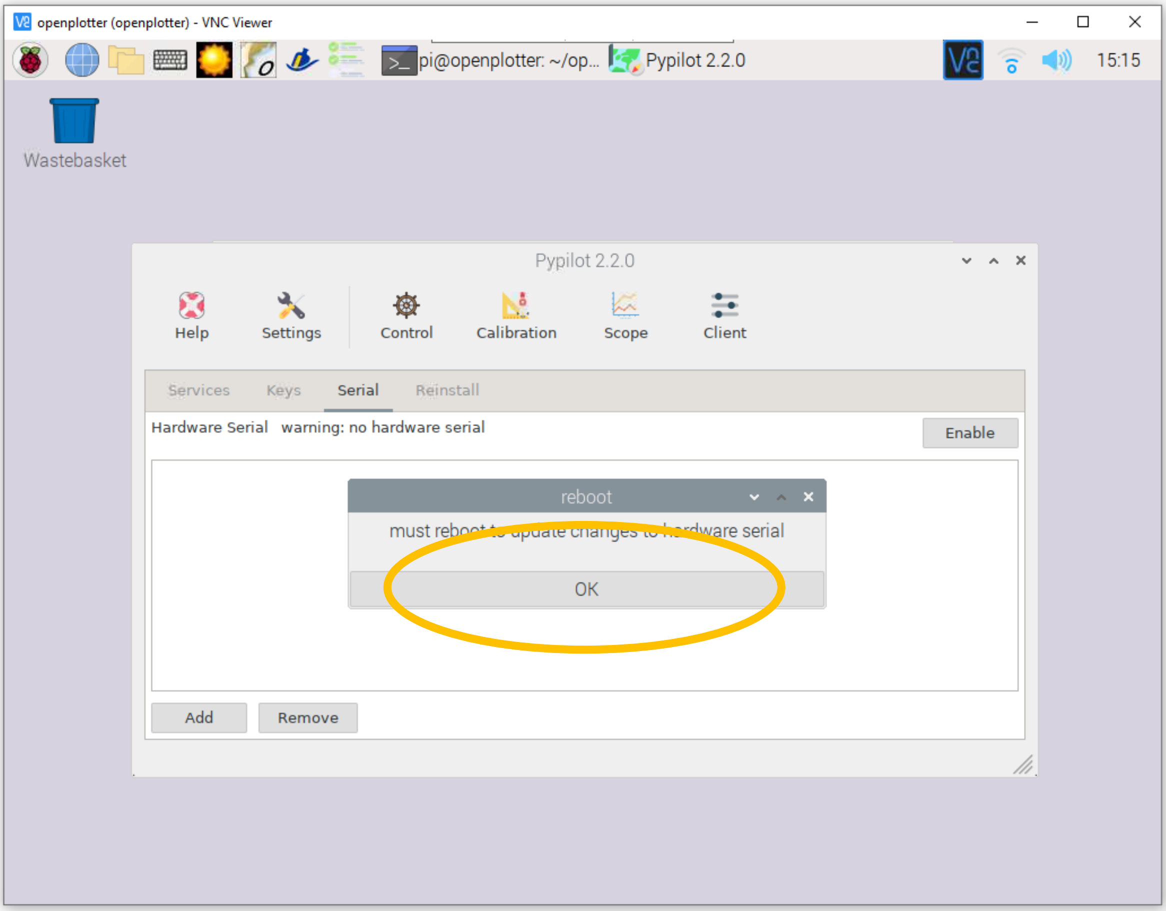
Hat Control □ Enable

53. And there I can click Enable:



Hardware Serial warning: no hardware serial

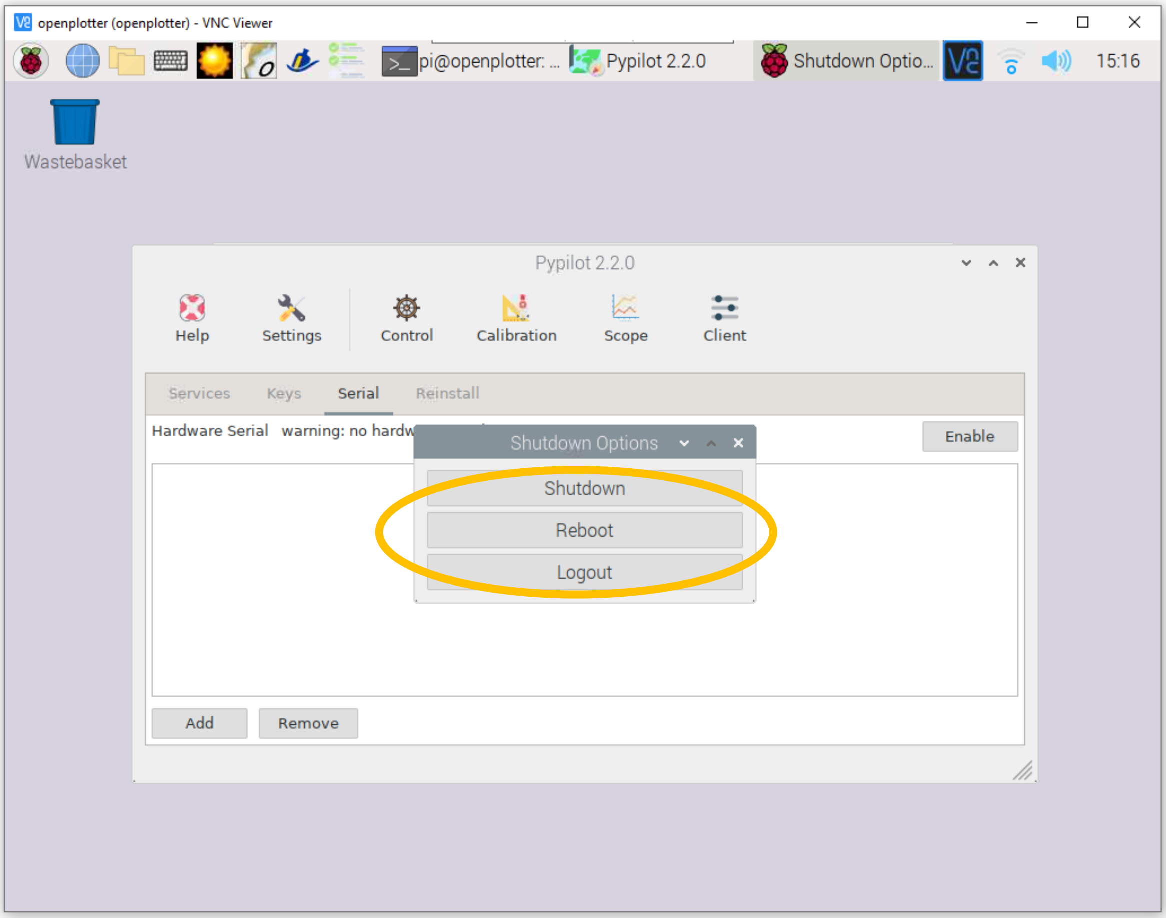
54. Which worked and begged me to do a reboot:



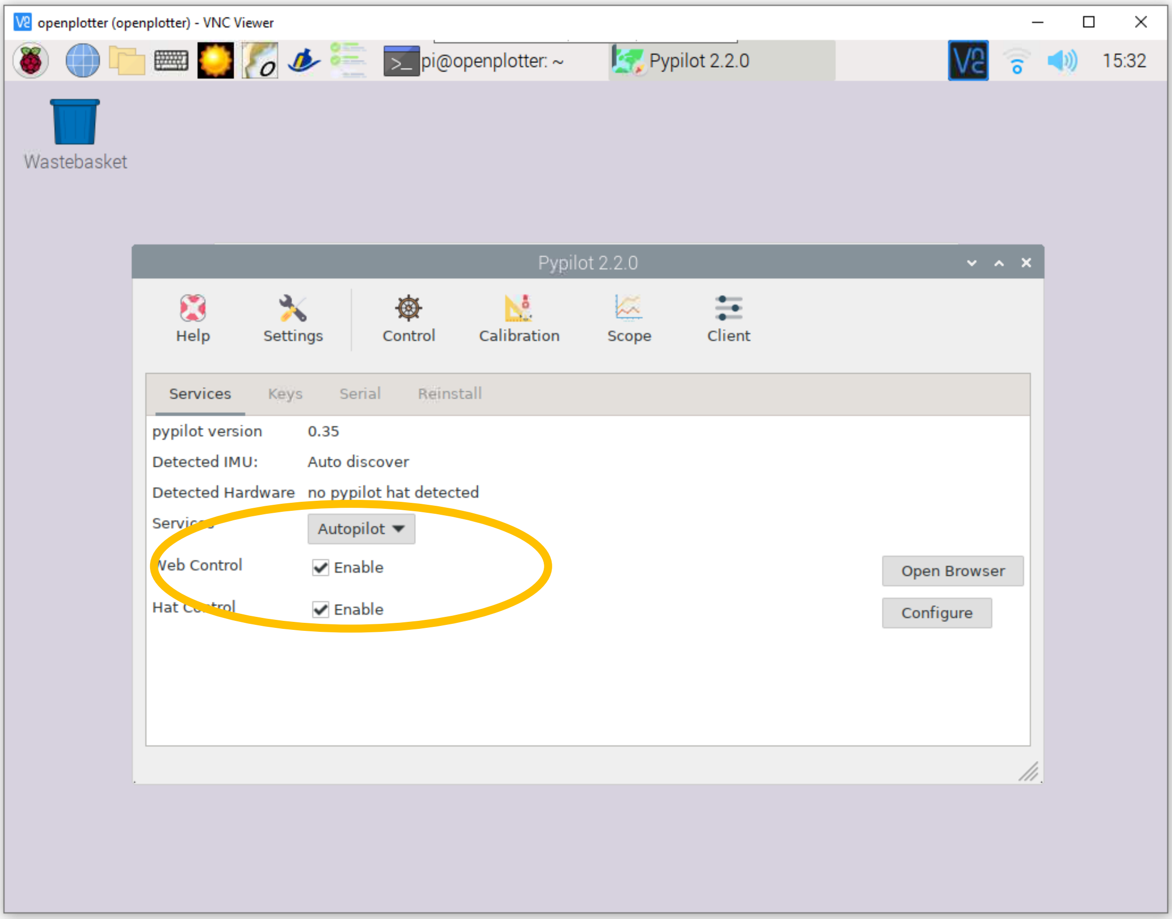
Hardware Serial warning: no hardware serial

must reboot to update changes to hardware serial

55. Which I had to initiate myself:

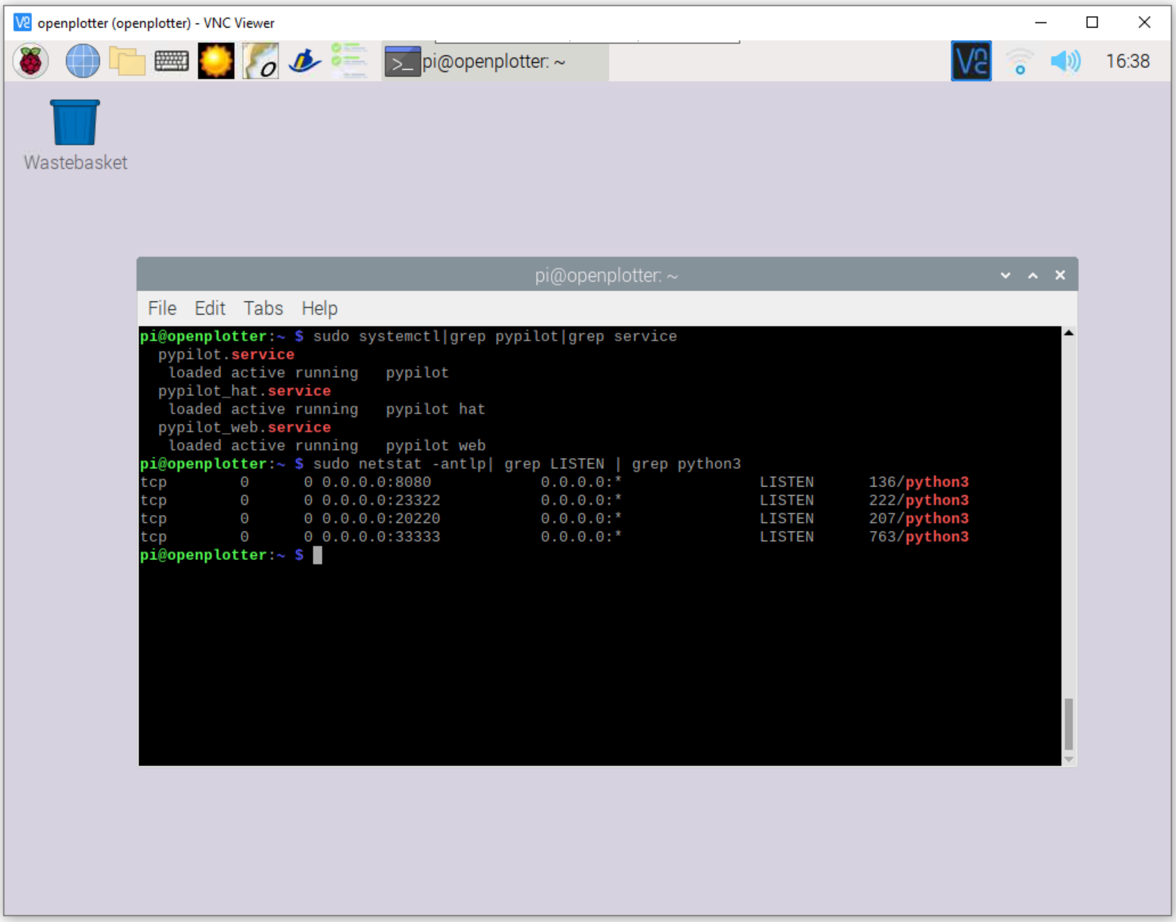


56. But after that I could start openplotter-pypilot without any pop-up messages



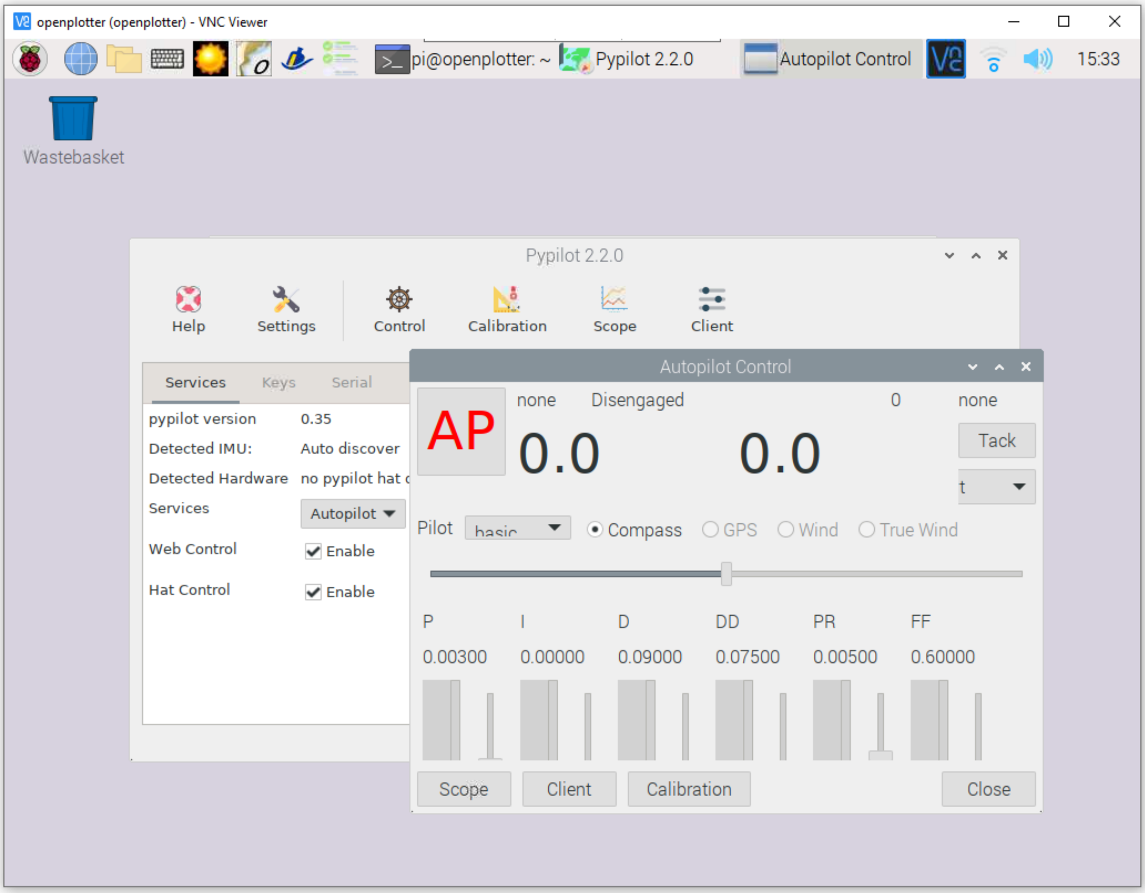
pypilot version 0.35
Detected IMU: Auto discover
Detected Hardware no pypilot hat detected
Services Autopilot
Web Control ☑ Enable
Hat Control ☑ Enable

57. Then I switched Services to Autopilot, enabled Web Control and Hat Control. This brought up all services, persistent to a reboot, listening to the right ports and all, so I would call this a success.



```
pi@openplotter:~ $ sudo systemctl|grep pypilot|grep service
  pypilot.service
   loaded active running   pypilot
  pypilot_hat.service
   loaded active running   pypilot hat
  pypilot_web.service
   loaded active running   pypilot web
pi@openplotter:~ $ sudo netstat -antlp| grep LISTEN | grep python3
tcp        0      0 0.0.0.0:8080            0.0.0.0:*               LISTEN      136/python3
tcp        0      0 0.0.0.0:23322           0.0.0.0:*               LISTEN      222/python3
tcp        0      0 0.0.0.0:20220           0.0.0.0:*               LISTEN      207/python3
tcp        0      0 0.0.0.0:33333           0.0.0.0:*               LISTEN      763/python3
pi@openplotter:~ $ 
```

58. For instance, I could select Control to get the control screen.



openplotter (openplotter) - VNC Viewer

pi@openplotter: ~ | Pypilot 2.2.0 | Autopilot Control | 15:33

Wastebasket

Pypilot 2.2.0

Help | Settings | Control | Calibration | Scope | Client

Services | Keys | Serial

pypilot version	0.35
Detected IMU:	Auto discover
Detected Hardware	no pypilot hat c
Services	Autopilot ▾
Web Control	☑ Enable
Hat Control	☑ Enable

Autopilot Control

AP | none | Disengaged | 0 | none

0.0 | 0.0

Tack

t ▾

Pilot basic ▾ ● Compass ○ GPS ○ Wind ○ True Wind

P	I	D	DD	PR	FF
0.00300	0.00000	0.09000	0.07500	0.00500	0.60000

Scope | Client | Calibration | Close