

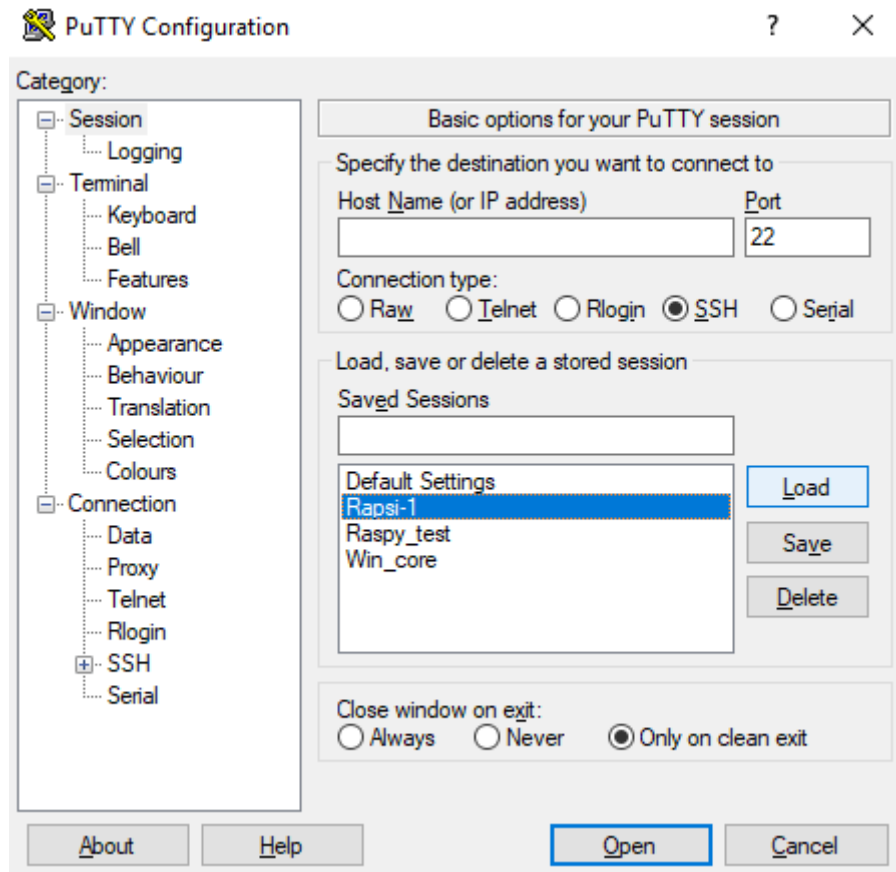
Schritte zum Aktivieren des Hexapod:

- Starten von PuTTY in Win10

Zuerst einmaliges ermitteln der IP Adresse im Terminalfenster des Raspi mit

Ifconfig

Dann nach dem Abspeichern in PuTTY, ist in Zukunft nur mehr **Load** und **Open** am Laptop nötig.



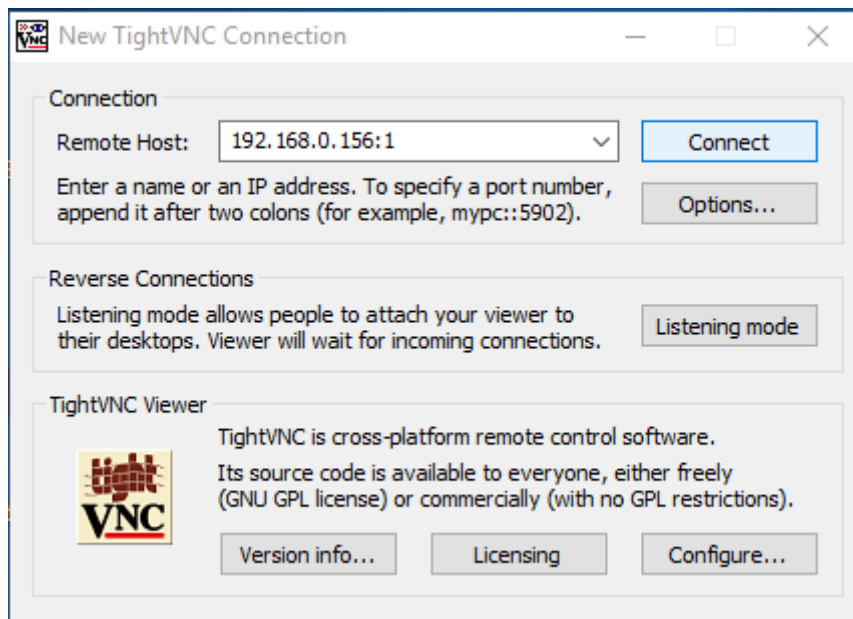
Eingabe vom Benutzernamen und dem Passwort. Beim Erstenmal **pi** und **raspberry** :

```
pi@raspberrypi: ~  
login as: pi  
pi@192.168.0.156's password:  
Linux raspberrypi 4.14.27+ #1100 Fri Mar 16 13:32:09 GMT 2018 armv6l  
  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
Last login: Wed Mar 28 05:28:53 2018 from 192.168.0.153  
  
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 type 'passwd' to set  
a new password.  
  
pi@raspberrypi:~ $ █
```

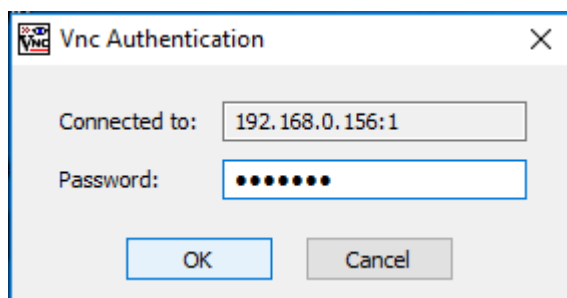
Starten des TightVNC Servers auf dem Raspi im Terminalfenster von PuTTY.

```
pi@raspberrypi: ~  
login as: pi  
pi@192.168.0.156's password:  
Linux raspberrypi 4.14.27+ #1100 Fri Mar 16 13:32:09 GMT 2018 armv6l  
  
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Last login: Wed Mar 28 05:28:53 2018 from 192.168.0.153  
  
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 type 'passwd' to set  
a new password.  
  
pi@raspberrypi:~ $ tightvncserver  
  
New 'X' desktop is raspberrypi:1  
  
Starting applications specified in /home/pi/.vnc/xstartup  
Log file is /home/pi/.vnc/raspberrypi:1.log  
  
pi@raspberrypi:~ $ █
```

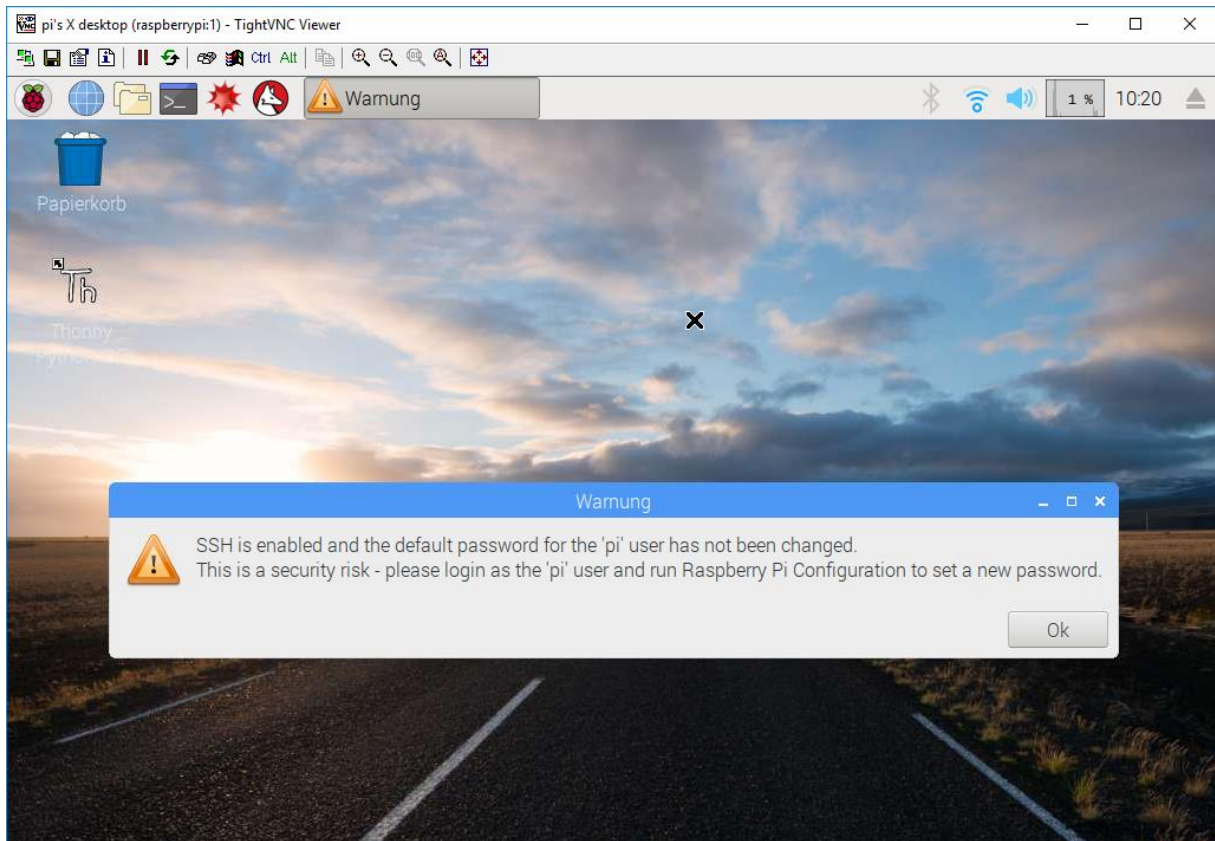
- Starten des TightVNC Viewer am Laptop unter Win10



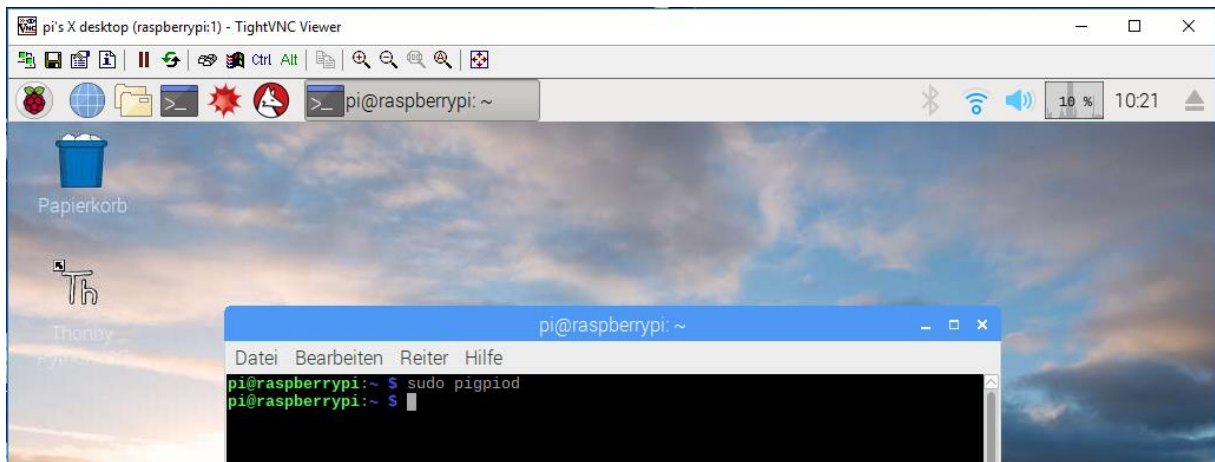
Das Passwort wurde beim erstmaligen Starten der TightVNC Servers am Raspi angelegt.



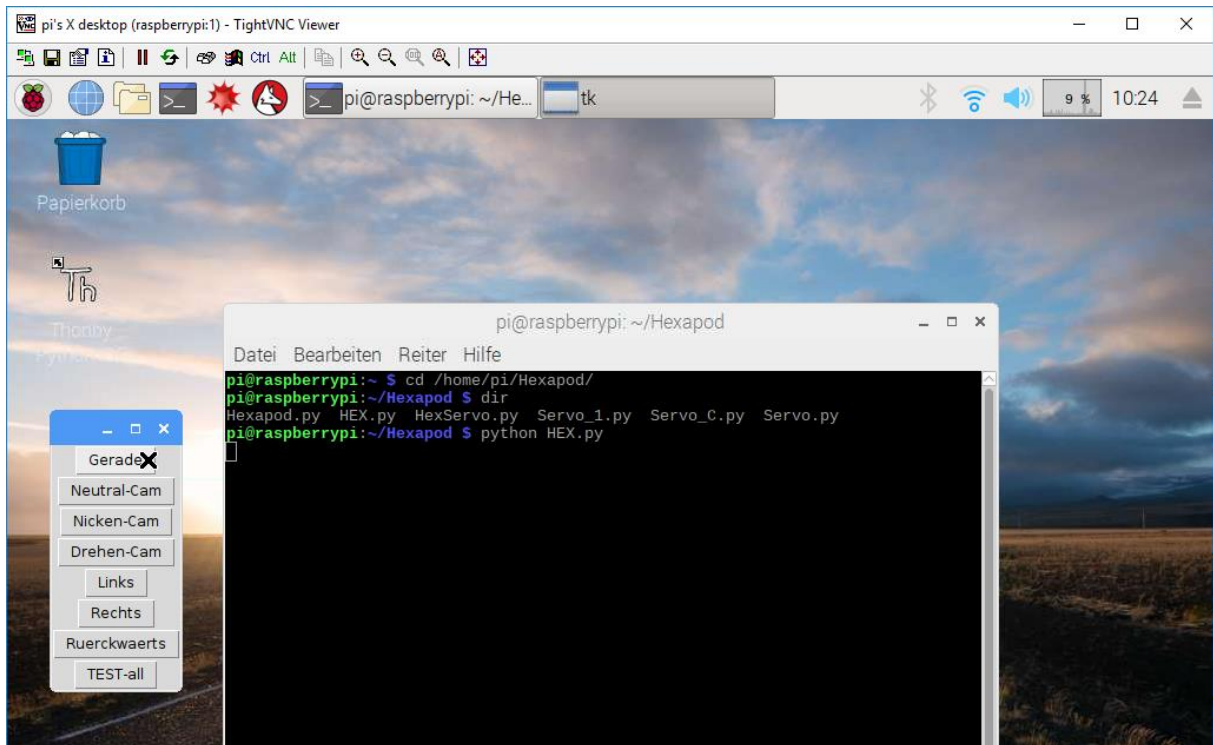
Damit erscheint am Laptop das Raspberry Pi – Fenster.



Starten des Servo Dämons pigpio, der von nun an im Hintergrund läuft.



Starten des Python Programmes HEX.py, das vorher in den neu angelegten Ordner Hexapod kopiert wurde.



- Starten des Videostreams über PuTTY

```

pi@raspberrypi: ~
Linux raspberrypi 4.14.27+ #1100 Fri Mar 16 13:32:09 GMT 2018 armv6l

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed Mar 28 05:28:53 2018 from 192.168.0.153

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 type 'passwd' to set
a new password.

pi@raspberrypi:~ $ tightvncserver

New 'X' desktop is raspberrypi:1

Starting applications specified in /home/pi/.vnc/xstartup
Log file is /home/pi/.vnc/raspberrypi:1.log

pi@raspberrypi:~ $ /usr/local/bin/mjpg_streamer -i "input_uvc.so -r 1280x720 -d
/dev/video0 -f 30 -q 80" -o "output_http.so -p 8080 -w /usr/local/share/mjpg-str
eamer/www"

```

```
pi@raspberrypi: ~
Last login: Wed Mar 28 05:28:53 2018 from 192.168.0.153

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 type 'passwd' to set
a new password.

pi@raspberrypi:~ $ tightvncserver

New 'X' desktop is raspberrypi:1

Starting applications specified in /home/pi/.vnc/xstartup
Log file is /home/pi/.vnc/raspberrypi:1.log

pi@raspberrypi:~ $ /usr/local/bin/mjpg_streamer -i "input_uvc.so -r 1280x720 -d
/dev/video0 -f 30 -q 80" -o "output_http.so -p 8080 -w /usr/local/share/mjpg-str
eamer/www"
MJPEG Streamer Version: git rev: 8cc9d22c1e79905d529a248ccf05bbf0625e0bf3
i: Using V4L2 device.: (null)
i: Desired Resolution: 1280 x 720
i: Frames Per Second.: 30
i: Format.....: JPEG
i: TV-Norm.....: DEFAULT
i: init_VideoIn failed
pi@raspberrypi:~ $
```

Da der Video4Linux-Treiber in der Version zwei noch nicht aktiviert wurde, erhalten wir eine Fehlermeldung `init_VideoIn failed`. Mit dem Laden des Kernelmoduls `bcm2835-v4l2` funktioniert aber alles.

```
pi@raspberrypi: ~
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 type 'passwd' to set
a new password.

pi@raspberrypi:~ $ tightvncserver

New 'X' desktop is raspberrypi:1

Starting applications specified in /home/pi/.vnc/xstartup
Log file is /home/pi/.vnc/raspberrypi:1.log

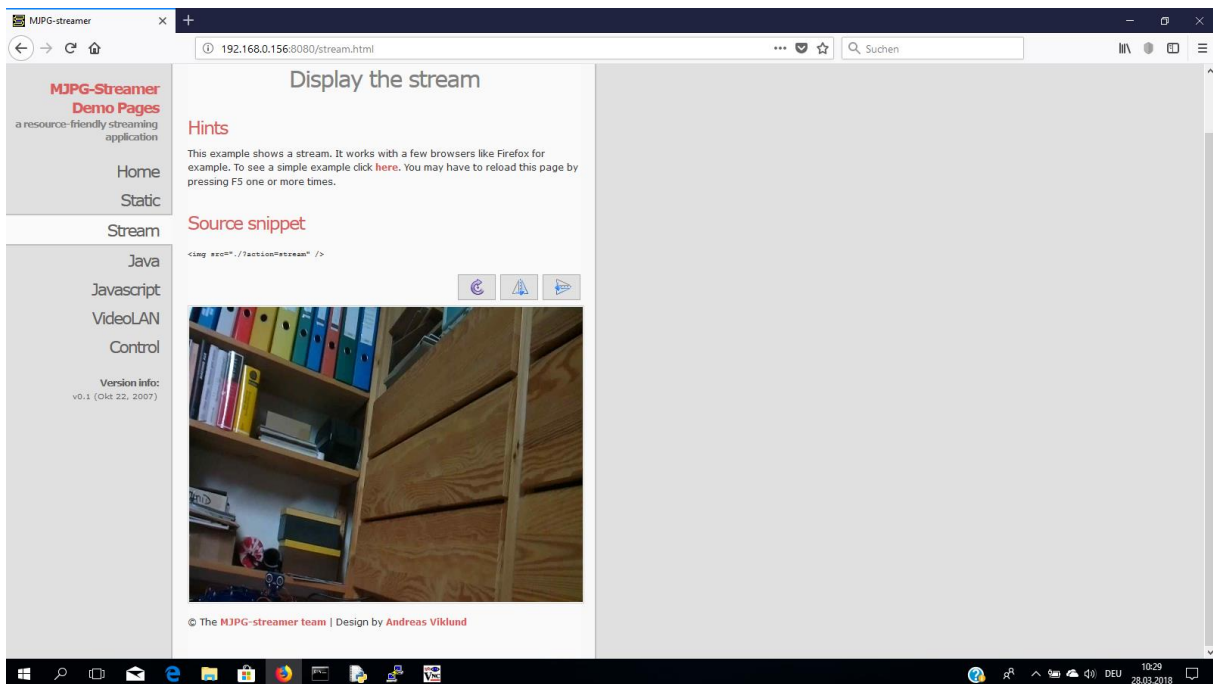
pi@raspberrypi:~ $ /usr/local/bin/mjpg_streamer -i "input_uvc.so -r 1280x720 -d
/dev/video0 -f 30 -q 80" -o "output_http.so -p 8080 -w /usr/local/share/mjpg-str
eamer/www"
MJPEG Streamer Version: git rev: 8cc9d22c1e79905d529a248ccf05bbf0625e0bf3
i: Using V4L2 device.: (null)
i: Desired Resolution: 1280 x 720
i: Frames Per Second.: 30
i: Format.....: JPEG
i: TV-Norm.....: DEFAULT
i: init_VideoIn failed
pi@raspberrypi:~ $ sudo modprobe bcm2835-v4l2
pi@raspberrypi:~ $
```



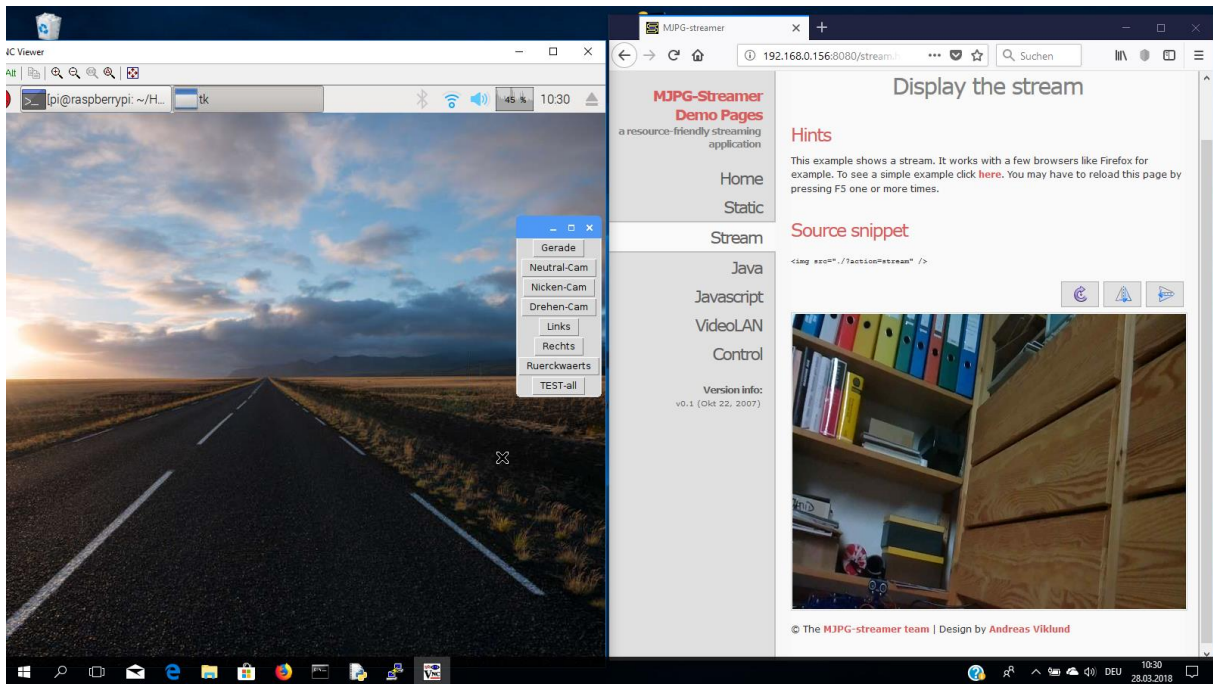
```
pi@raspberrypi: ~
UVCIOC_CTRL_ADD - Error at Pan (relative): Inappropriate ioctl for device (25)
UVCIOC_CTRL_ADD - Error at Tilt (relative): Inappropriate ioctl for device (25)
UVCIOC_CTRL_ADD - Error at Pan Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_ADD - Error at Tilt Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_ADD - Error at Pan/tilt Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_ADD - Error at Focus (absolute): Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Pan (relative): Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Tilt (relative): Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Pan Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Tilt Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Pan/tilt Reset: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Focus (absolute): Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at LED1 Mode: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at LED1 Frequency: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Disable video processing: Inappropriate ioctl for device (25)
UVCIOC_CTRL_MAP - Error at Raw bits per pixel: Inappropriate ioctl for device (25)
o: www-folder-path.....: /usr/local/share/mjpg-streamer/www/
o: HTTP TCP port.....: 8080
o: HTTP Listen Address..: (null)
o: username:password...: disabled
o: commands.....: enabled
```

Wir können am Laptop z.B. Firefox starten, die IP-Adresse mit dem Zusatz :8080 eingeben und wir erhalten unseren Live-Video Stream.

Im Open Source Programm VLC media player könnte der Stream sogar aufgezeichnet werden.



Damit sieht die vollständige Win10 Oberfläche zur Steuerung unserer Schreitmaschine wie folgt aus:



Noch nicht wirklich sehr elegant aber durchaus brauchbar. Jetzt kann man dazu übergehen, das Python Programm zu verfeinern und die GUI eleganter zu gestalten.