**Pycam manual**

**Introduction**

Much, but not all, of pycam implements the pyplis (<https://www.mdpi.com/2076-3263/7/4/134>) package as a backend, since a lot of time has already been put into developing this package and it is quite a powerful tool for SO2 camera data analysis. [iFit](https://www.sciencedirect.com/science/article/pii/S037702731930647X) is also used for processing of spectra for SO2 column density retrievals.

**Pi networking**

Pi 1 IP: 169.254.10.180 Controls on-band camera, GPS, external SSD storage, external communications.

Pi 2 IP: 169.254.10.178 Controls off-band camera and spectrometer

**Background modelling**

The background intensity is used to find the optical depth of each band, and subsequently, the SO2 differential optical depth. It is therefore critical that a good estimate of the background intensity is

There are a range of options available for background intensity modelling in pycam. Options 0-6 and 99 are all pyplis methods as described in Table 2 therein. Option 7 is a very basic method which uses vignette correction and then finds the average intensity in the ambient region (defined by the rectangle on the SO2 image of the Analysis tab), for each band separately. This intensity is taken as *I0* and tau is calculated from this.

**Hardware setup**

Jumper cable on GPIOs for Pi start up should be placed from GPIO23 (physical pin 16) on the Witty Pi to GPIO 3 (physical pin 5) on the second pi.

GPS connections:

Red - VIN

Black - GND

Green - RX

White - TX