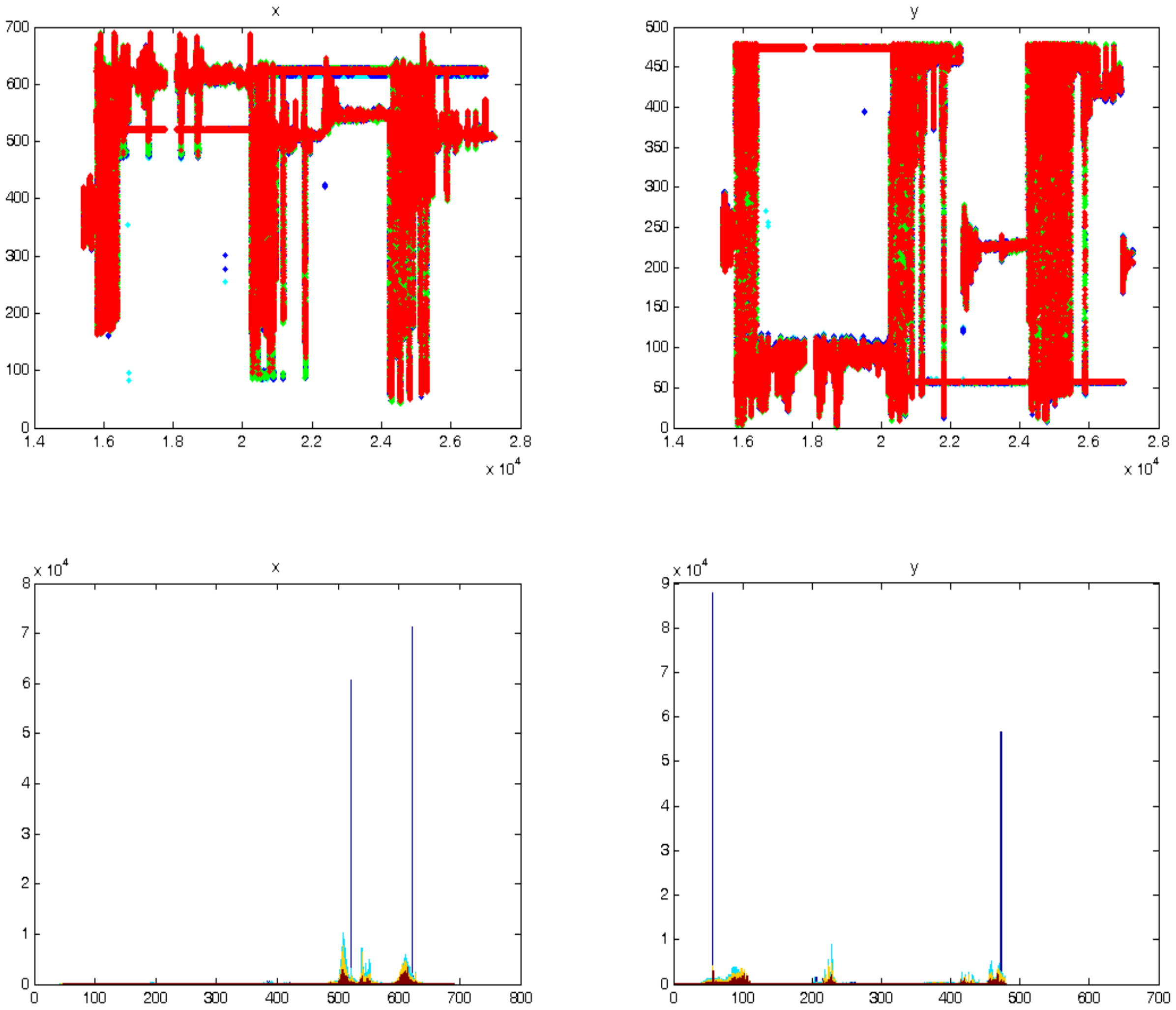
2015-04-29

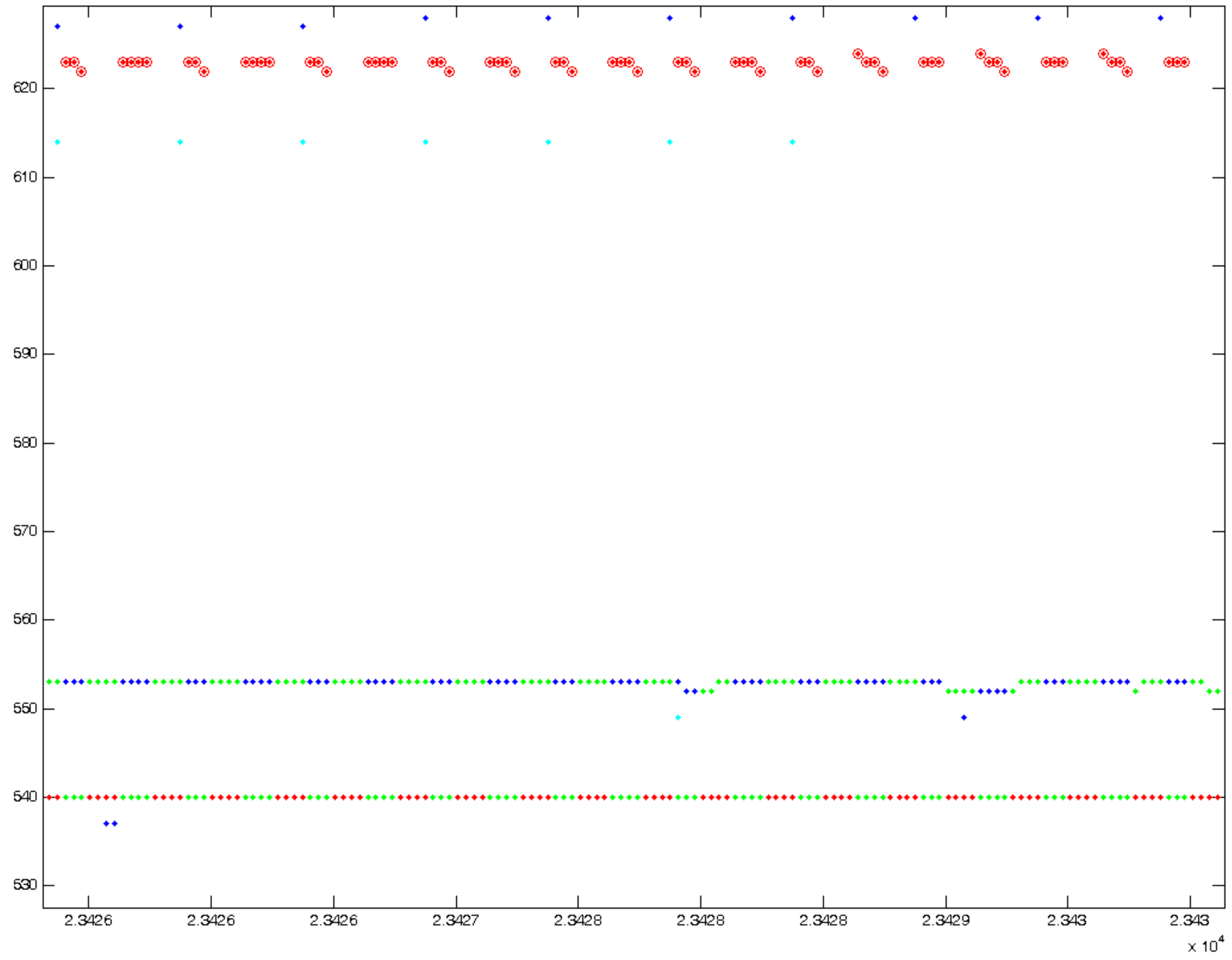
Representative session (R066-2014-11-27) position data and histograms (first 4 targets). Top plots show x, y as a function of time; bottom plots show position histograms:



Peaks, especially in target 1 (blue in histograms) are clearly visible, corresponding to the two LED locations, showing up as horizontal lines in the position.

These position samples show up because the LEDs at reward sites are tracked. The goal is to remove these, leaving only samples tracking the rat's actual location.

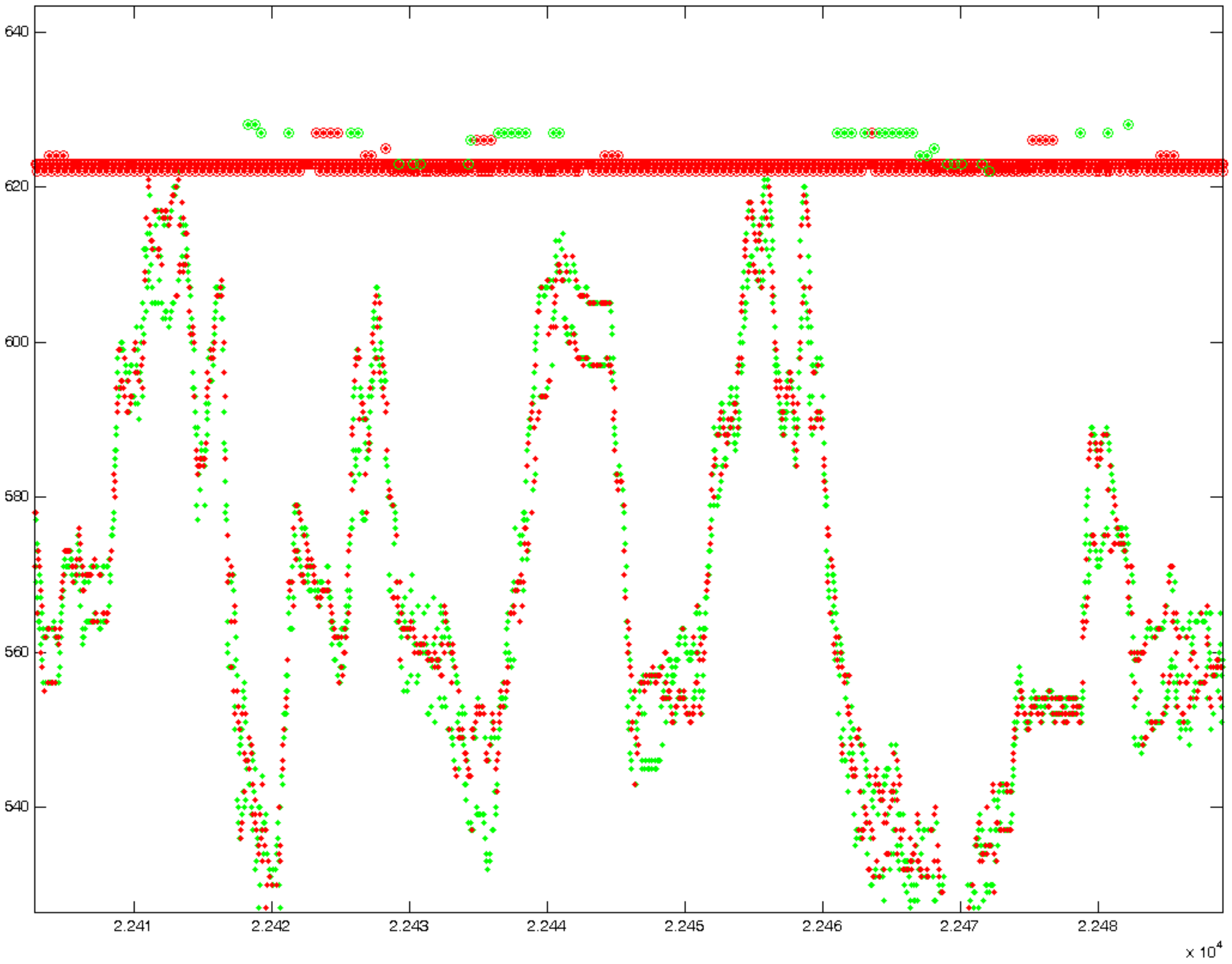
Looking at how individual targets behave when the LEDs are on and off -- target colors are rgbc for 1:4, and circles (for target 1) indicate when the LED is on:



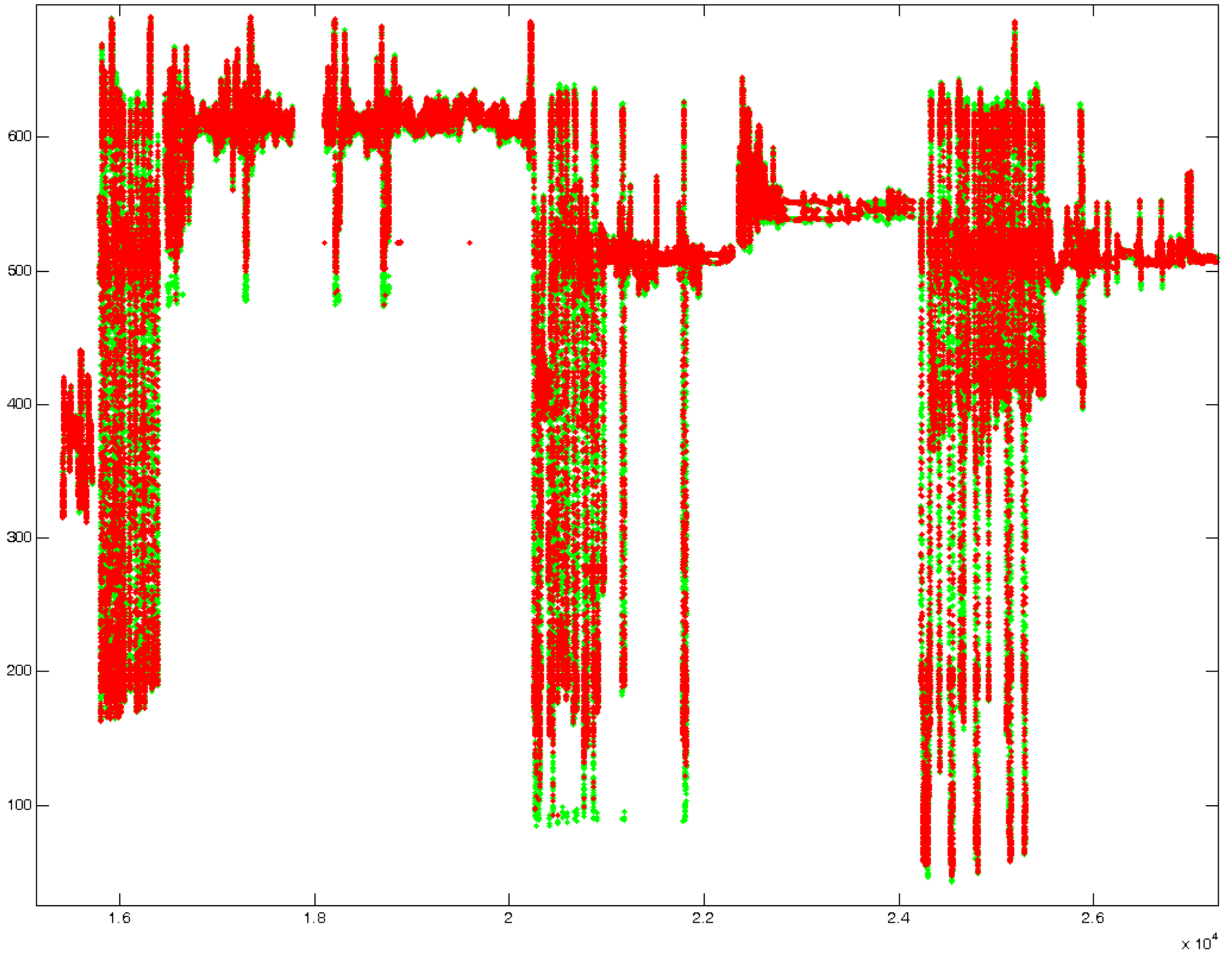
With LED on (circles) target 1 jumps to what is presumably the LED location. Weirdly, this also causes a shift, by ~12 pixels, in target 2 (green), and targets 3 and 4 have some odd pixels around the LED coordinate, yet are outside the LED-on interval (no circles).

It's possible that the shift in target 2 happens because it goes from tracking the second LED *on the rat* (when those rat LEDs are the biggest targets) to tracking the first LED *on the rat*.

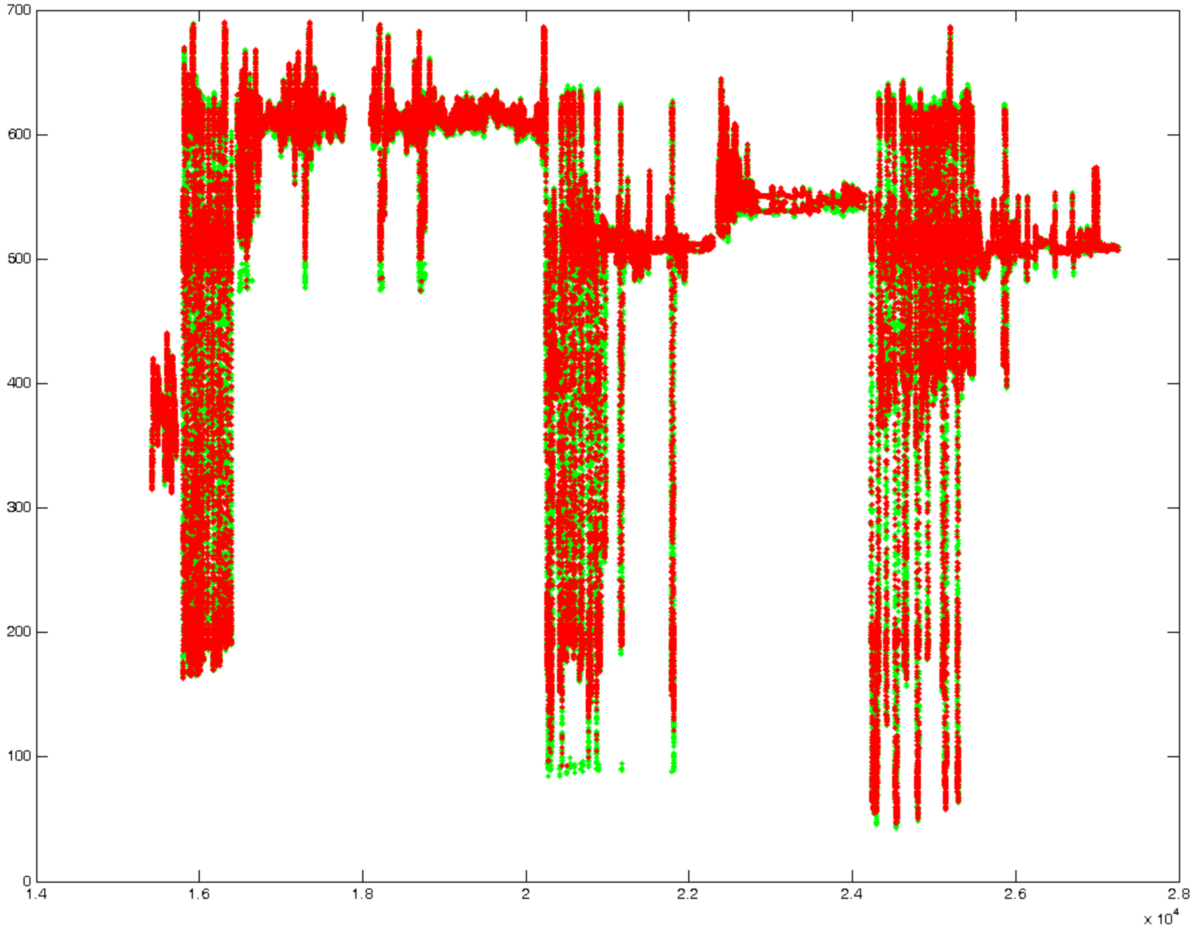
Anyway, looking at the first 2 targets, with circles indicating samples to be removed because <LED on> AND <within radius of LED>:



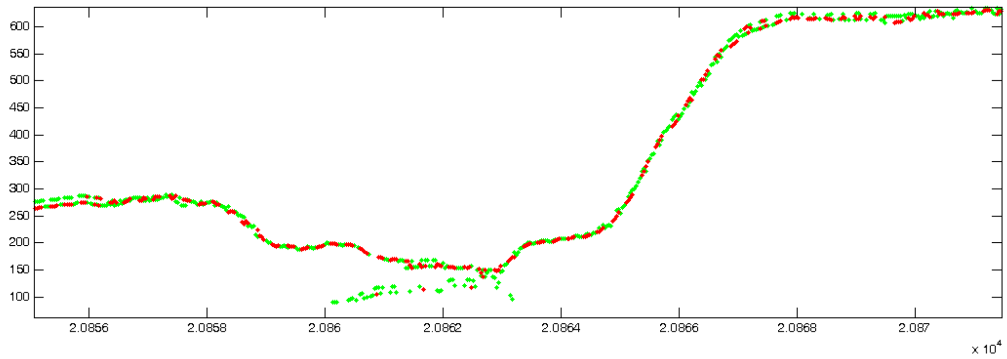
This looks generally reasonable; now with those samples removed:

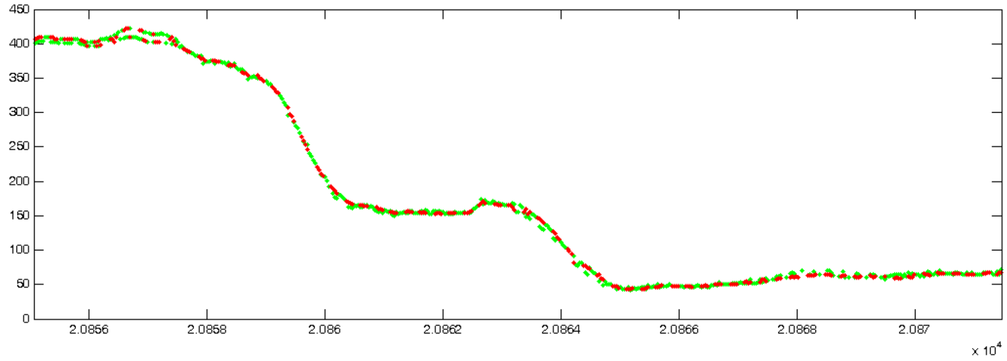


Some stray points still show up -- remove those with jump detection:



Now there are still some poorly tracked points/jumps/reflections that are not due to the LEDs… so need filtering (top is x, bottom is y):

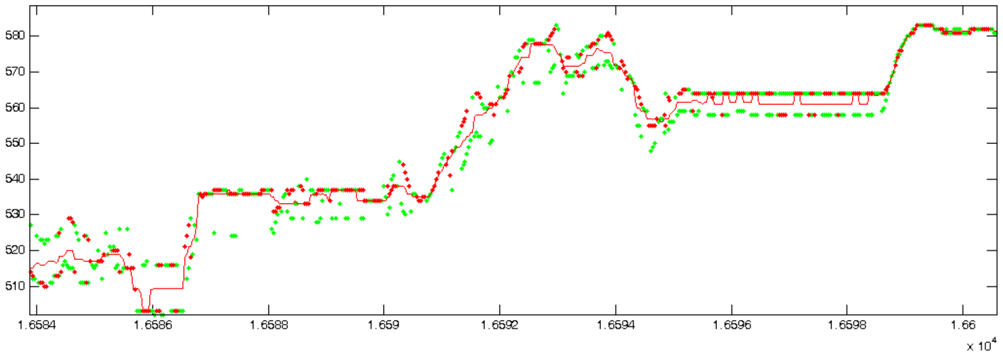


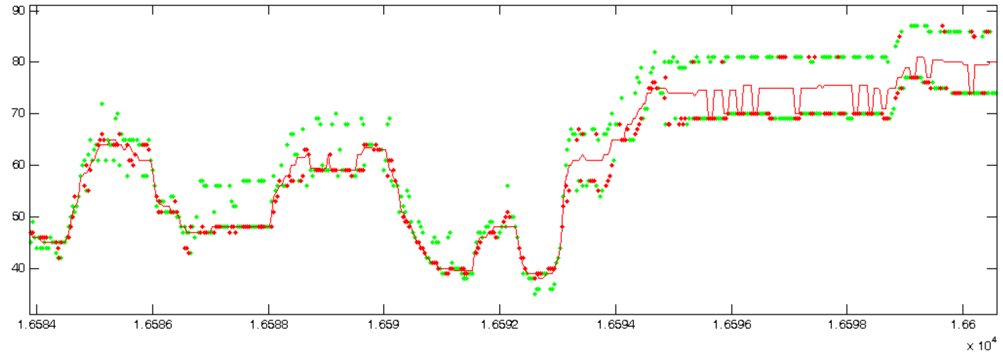


- In addition there is the flipping of the red and green targets which is causing issues.

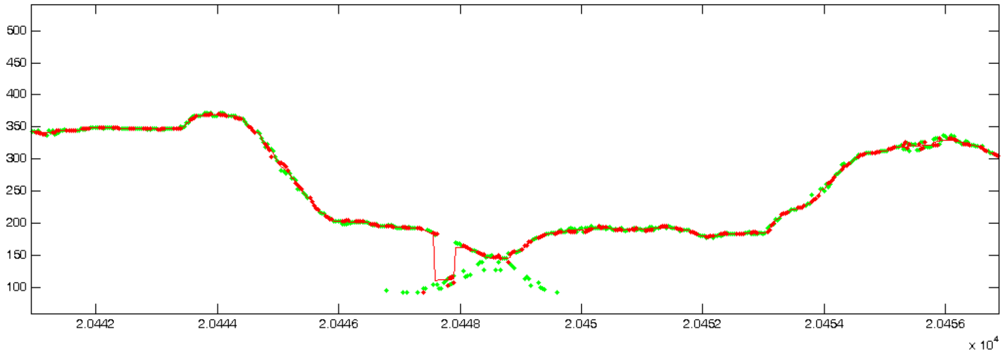
Median filter is good at removing jumpy points, but doesn’t handle swapping well. Would be nice to get a good Kalman implementation that models the idea of two LEDs.

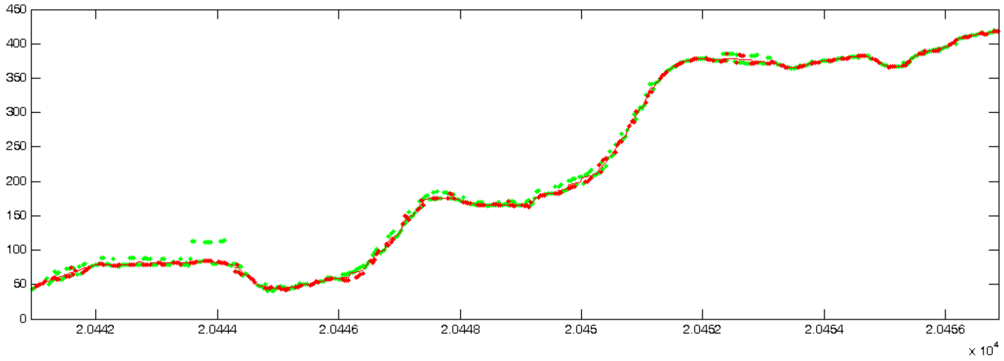
Current output is something like this:





Note the jerks that are generated when the red and green targets are swapped. In addition incorrect samples are not handled perfectly:


500
450
400
350
300
250
200
150
100
2.0442
2.0444
2.0446
2.0448
2.045
2.0452
2.0454
2.0456
x 10^4


450
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2.0442
2.0444
2.0446
2.0448
2.045
2.0452
2.0454
2.0456
x 10^4